Unlocking economic growth in Russia

McKinsey
Global
Institute

with assistance from our Advisory Committee
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Moscow
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Preface

This report is an end product of a year long project by the McKinsey Global Institute, working closely with members of McKinsey’s Moscow office, on the economic performance of Russia.

McKinsey undertook this project as an important step in developing our understanding of how the global economy is working. The failure of the reforms undertaken in Russia in the early 1990’s to generate good economic performance is one of the highest priority problems in the global economy. We wanted to find out whether the reforms were causing change at the micro level that would eventually yield good economic performance. If not, we wanted to find out why reforms had failed and how to improve the situation. We have undertaken this work as an investment by McKinsey in knowledge building.

This project builds upon the previous work of the McKinsey Global Institute in assessing economic performance among the leading economies of the world. Our earlier reports addressed separately labour and capital productivity and employment\(^1\), the fundamental components of economic performance. Later, we combined these components to address the overall performance of Sweden, Australia, France, Germany, the Netherlands, Brazil, Korea, and the U.K.\(^2\). In all countries, economic performance is compared with the US, and in some countries with Japan. This study continues our efforts to assess economic performance at the country level.

As before, the core of our work is conducting sector case studies to measure differences in productivity, output and employment performance across countries and to determine the reasons for the differences. This work provides the basis for our conclusions about how to improve economic performance in Russia.

This report consists of four chapters and an executive summary. Chapter 1 describes our project objectives and approach. Chapter 2 describes our analysis and conclusions at the aggregate level. This chapter provides our conclusions about what can be learned from aggregate level analysis and what questions need to be addressed at the micro level. Chapter 3 comprises the ten sector case studies: steel, cement, oil, dairy, confectionery, housing construction, food retailing, general merchandise retailing, hotels and software. Each case starts with a short executive summary, and then gives the results of our productivity calculations and discusses the reasons for the differences we found between Russia and benchmark countries. Chapter 4 presents the synthesis of our findings including our overall conclusions about the economic performance of Russia and how to improve it.

A core team of five consultants from McKinsey’s Moscow office and six consultants from the McKinsey Global Institute participated on the working team for this project at various times. The Moscow based consultants were Alexei Beltyukov, Denis Bugrov, Andrey Dutov, Andrei Kachoubski and Vadim Larine. The Global Institute consultants were Amadeo Di Lodovico, Luba Kobrinsky,

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Katarina Kolar, James Kondo, Vincent Palmade and Aviva Shneider. Communication specialists Mikhail Baushev and Natasha Izosimova provided editorial support. Administrative assistance was provided by Galina Funina, Natalia Tikhonova, Brion Harris and Leslie Hill Jenkins.

Vincent Palmade was responsible for day-to-day management of the project, assisted by James Kondo. The project was conducted under the direction of Alex Reznikovitch and myself with assistance on the oversight of the project from Martin Baily and Michael Obermayer.

In carrying out the work we were fortunate to have an external Advisory Committee. This was chaired by Professor Robert Solow of MIT, and also included Professor Olivier Blanchard of MIT, Professor Richard Cooper of Harvard and Ted Hall, Chairman of the McKinsey Global Institute Advisory Board. The working team had three all-day meetings with the Advisory Committee to review progress during the course of the project and benefited from many written comments and individual discussions.

Throughout the project we also benefited from McKinsey consultants’ unique worldwide perspective on and knowledge of the industries investigated in our case studies. This knowledge has been developed through work with clients and investment in understanding industry structure and behaviour to support our client work. McKinsey sector leaders provided input to our case studies and reviewed our results. McKinsey’s research and information departments provided invaluable information and insight under very tight time constraints.

Finally, we could not have undertaken the work without the information received in our numerous interviews with corporations, industry associations, government officials and others. We thank all the individuals concerned for their time and help but stress that we are solely responsible for the results. We would also emphasise that the work is independent and has not been commissioned or sponsored in any way by any business, governmental or other institution.

Bill Lewis
Director of the McKinsey Global Institute
October 1999
Executive Summary

Russia is in a dire economic situation. Unlike some other reformed ex-communist economies—Poland or Hungary—where economic performance sagged in the early years of the reform, but surged as reforms took hold, Russia has experienced only decline. Gross domestic product (GDP) per capita has fallen by as much as 40% since 1992 and is now at only 15% of the US level. Unemployment topped 12%, and many more people are now engaged in subsistence forms of employment.

In an attempt to understand why economic reform has failed in Russia, we looked at the performance of ten representative sectors—software, steel, general merchandise and food retailing, hotels, oil, housing construction, cement, confectionery, and dairy – and related their performance to that of the overall Russian economy. We also gauged the productivity of those industries against best practices around the world, determined why Russian companies lagged best practice, and identified what the government should do in priority to provide them with the means and incentives to improve their operational performance and expand. We believe that this microeconomic analysis is the only way to build a firm foundation for future economic policies and economic growth.

Our primary findings are:

**Overall labor productivity** is indeed very low. Our ten industries averaged only 19% of US productivity levels, with software leading the group at 38% and cement at only 7%.

**Soviet legacy assets**—which were roughly 30% as productive as US assets in 1992—have had their productivity halved. This precipitous drop results from the fact that industries have not restructured despite sharp drops in demand from Russian consumers who now have access to products from around the world. Roughly 25% of Russia industrial capacity is currently in sub-scale or obsolete assets, which are still operating and fully staffed, but should be shut down.

**Assets added since 1992 are surprisingly unproductive.** Almost no new capacity is being added in the oil and consumer goods industries, the sectors of the economy with the greatest potential for fast performance improvement. New assets are either well below efficient scale – as in housing construction and software, or undercapitalized—as in open-air markets.

**Despite high competitive intensity, the competition is unequal and it causes low productivity.** Price decontrol and privatization did successfully stimulate competition. Paradoxically, however, in Russia the more productive companies are often the least profitable. Thus, more productive companies are not gaining market share and not pushing less productive firms out.
In nine out of the ten sectors, the direct cause of low economic performance is market distortions that prevent equal competition. The distortions come from attempts to address social concerns, corrupt practices, and lack of information.

In the manufacturing sectors, regional governments channel implicit federal subsidies to unproductive companies. Such subsidies take the form of lower tax and energy payments, and are allegedly intended to prevent companies from shutting down and laying off employees. This puts potentially productive companies at a cost disadvantage, blocking investments and growth on their part.

In the service sectors, where employment should grow, investments by efficient companies are discouraged by the presence of well connected unproductive incumbents who benefit from favorable regulations, weak law enforcement, and privileged access to land or government procurements.

Furthermore, these sector level market distortions are key contributors to macroeconomic instability, because they reduce government revenues and increase its expenditures. Macroeconomic instability itself is another important deterrent to investments.

We found the other often mentioned reasons for Russia’s economic problems to play a much smaller role (e.g. poor corporate governance and lack of a transport infrastructure).

There are no natural or economic obstacles to high economic growth in Russia, and the current situation need not be tolerated. Russia can rely on a skilled and inexpensive labor force, large and economically attractive energy reserves, and surprisingly, much spare capacity in potentially productive industrial assets. Explicit and targeted social policies combined with balanced and enforceable regulations (mostly at the sector level, involving taxes, energy, land and red tape) would remove the most important market distortions. The payoff would be strong economic growth in Russia.

These findings are discussed in greater detail in the following sections.
THE PRODUCTIVITY PROBLEM

Market reforms so far have failed to improve Russia’s economic performance. Although the efficiency (productivity) with which companies produced goods and services in the Soviet times was already low compared to the best practice in the world, it has gotten worse since the reforms started. By understanding the underlying operational sources of the productivity gaps between Russian companies and global best practice, we are able to better understand which factors in the external (regulatory) environment are causing managers and investors not to make progress towards closing the gaps.

The size and nature of the productivity gaps are discussed below in this section, the main external factors stopping productivity growth, and consequently economic growth, are discussed in the next section.

How does low productivity lead to low standards of living

The material standard of living in a country is determined by the amount of goods and services produced by the economy, referred to as the Gross Domestic Product (GDP). Russia's GDP per capita is only at 15% of the US level. It is also falling behind many of the ex communist countries, notably Poland, which, unlike Russia, has been rebounding economically since 1992 (Exhibit 1).

The GDP (output) level is determined by the combination of two factors: the amount of hours worked by the people (labor inputs) multiplied by the amount of goods and services produced by an average hour of work (labor productivity). Because people in all countries work to make ends meet, labor inputs tend to be at similar levels. In Russia, for example, despite high unemployment, labor inputs per capita are still at more than 80% of the US level. Thus, labor productivity ultimately becomes the determinant of economic performance. Russia’s labor productivity is very low at only 19% of the US level in 1997, down from around 30% in 1991 (Exhibit 2).

Low productivity performance in all parts of the Russian economy

In this study, we have examined in detail ten economic sectors which cut across manufacturing and services and together represent over 15% of total employment in Russia: steel, cement, oil, dairy, confectionery, residential construction, food retailing, general merchandising, hotels, and software. Agriculture and government sectors, like defense, were not included in the scope of the project. Our cases cover both heavy and light manufacturing, the large core domestic sectors of construction and retailing, and software, the largest of the new, high technology service sectors.

In each of these selected sectors we have compared the performance of companies operating in Russia (both Russian and foreign) with those in the US, selected as the benchmark country.
Our study reveals huge productivity gaps in all sectors of the Russian economy, whose productivity ranges from 7% of the US level in cement to 38% in the new software sector (Exhibit 3). Moreover, in the sectors we studied, a long tail of unproductive enterprises co-existed with a few relatively productive ones, dragging down the overall productivity (Exhibit 4).

Over the last eight years, labor productivity in the old assets (put in place before 1992) fell from 30% to 17% of the US level. This decline was not compensated for by a rapid growth of a new and productive economy. New assets (put in place since 1992) employ less than 10% of the Russian workforce and, surprisingly, achieve only 30% of the US productivity level on average (Exhibit 5).

Main operational reasons for persistent low productivity

We found three main operational reasons for persistent low productivity in Russia:

¶ Excess workers maintained in the old assets. Customers turned away from low quality products and services offered by the old companies once they had to pay the full cash price for them. The resulting 50% fall in the output of these companies was not matched by a similar reduction in employment, which fell by “only” 20%. We estimate that 10% of workers on average are redundant, while another 20% are currently stranded in non-viable operations.

¶ Inefficient organization still prevailing in the old assets. Although most of the former Soviet companies have been privatized, they remain plagued by antiquated modes of organization: absence of marketing and sales skills, poor quality control, lack of basic profit incentives and teamwork. Below are three examples from the studied sectors:

• In steel, breakdowns or defects often go unreported because workers fear being blamed for them.
• Sales and marketing departments at many confectionery plants have extended their product portfolios well beyond an efficient scope.
• In hotels, a team of receptionists could absorb the functions currently performed by the dezhurnayas on each floor (e.g. key handling and surveillance).

¶ Potentially profitable investments not made. We discovered that managers and investors forego investment opportunities in upgrading existing assets and in developing new ones. In markets with equal conditions of competition, such investments would bring financial return in excess of 30%.

• Our sector studies show that almost three-quarters of the old assets are still economically viable and could achieve up to 65% of the US productivity with limited upgrade investments combined with modern forms of organization (Exhibit 6). The investments are
primarily required to improve the quality of output and/or energy efficiency. Examples include upgrading the wet/gas technology in cement, more hydrofracturing in oil, more flexible production lines in panel housing and conversion of gastronoms into minimarkets.

- Potentially high return and substantial investments in developing new productive assets are also not made. For example, new oil fields should be developed in the economically attractive proven reserves of Western Siberia. And, unlike in Poland, very little new capacity has been developed in the consumer goods industries. In these sectors, the demand for quality goods is still being met largely through imports. In food retail, there is strong evidence of unmet demand for high service (relative to open-air wholesale markets) formats like supermarkets. These modern high productivity formats are still almost entirely absent from Russia with less than 1% market share, against already 18% in Poland (growing fast) and 36% in Brazil.

We will now explain why managers and investors are not scrambling to seize these operational improvement opportunities, which should, in a market economy with equal competition, lead to higher profits.
THE DIRECT CAUSE: UNEQUAL COMPETITIVE CONDITIONS

Unequal conditions of competition at the sector level, caused by the existing economic policies, are the most important reason for the lack of restructuring and productive investment in Russia. These inequalities tend to favor low productivity incumbents, protecting them from takeovers and productive new entrants. These policies are often put in place to achieve social objectives, namely protecting existing jobs, but in many cases, the suspicion is that they also serve the personal financial interests of government officials in collusion with businessmen.

We show below how these distortions have both direct and indirect negative impacts on the economy.

Immediate impact of unequal competitive conditions

In open markets with equal conditions of competition, the most efficient (productive) company should be the most profitable. Being more productive means that the company either uses less inputs for the same output (i.e. it has lower costs) or produces better output with the same inputs (i.e. it makes superior products that command higher prices). Higher profitability should enable productive companies to invest and grow at the expense of less productive ones, which should be eventually forced to either improve their operations or shut down.

Studying the sectors of the Russian economy, we found that while competitive intensity is usually high, the rules of the game are different for different competitors. The rules are seriously distorted in favor of less productive companies. Often the regulatory environment in which companies operate makes it difficult for the productive companies to crowd out or take over their unproductive competitors. As a result of unfavorable differential treatment, more productive companies often struggle financially, while their less efficient competitors thrive.

These distortions tend to be sector-specific; they can take many different forms such as:

- Different effective tax rates paid by the companies within one sector
- Preferential access to land and government procurements
- Different effective energy prices paid by different players in the same industry
- Variable degrees of red tape imposed on companies at the discretion of authorities
- Differential law enforcement, e.g. in the area of intellectual property rights or import tariffs
Differential access to government-controlled export infrastructure.

Below are examples of the impact these market distortions have on the development of the sectors covered by our study:

**Steel and cement**

Obsolete (sub-scale and/or inefficient in their use of energy) steel and cement plants are avoiding shutdowns by paying for only a fraction of their energy bills—their largest cost component. Because these companies are often the major employers in a town, municipal and regional officials go to great lengths to keep them operating (Exhibit 7). Regional governments channel implicit federal energy subsidies to these companies by letting arrears to federal suppliers (Gazprom and UES) accumulate at the local gas and electricity distribution companies. These energy distribution companies are often under effective control of the regional governments; laws make their bankruptcy practically impossible. These subsidies slow down recovery in many manufacturing sectors by preventing upgrading investments and industry consolidation in and around the viable industrial assets.

Serving as a means of reallocation of resources to unproductive enterprises, these subsidies may also be viewed as fines imposed on healthy firms. As a result of the subsidies, financially sound companies end up paying taxes and energy bills "for themselves and the other guy".

**Oil**

Russia has large and economically attractive proven reserves which can become a source of additional export and tax revenues. Unpredictable economic policies impede investments into the development of new oil fields. Oil companies are reluctant to commit to large long-term investments without stable and workable tax policies (the recently passed law on the production sharing agreement is far from being operational) and without fully liberalized domestic oil prices. But here again, the social objectives are pursued inefficiently. Policy makers deliberately limit oil exports to secure supply of cheap oil to “strategic” customers like the agriculture and defense sectors. Combined with the current rate of depletion in the existing oil fields, the export-limiting regulations may make Russia a net importer of oil by 2009. Providing the necessary assurances to investors, notably well financed foreigners, could enable oil production to double in ten years (Exhibit 8). Such an increase would be sufficient to meet the demand of a fast growing economy and to increase oil exports by at least 50%. In addition, it would provide additional tax revenues, which would be more than enough to compensate “strategic” customers for higher oil prices.

**Confectionery**

Investments into existing confectionery plants are also discouraged. Regional and municipal governments may effectively ban the best practice companies from laying off excess workers and reaping the productivity benefits of their investments. Local authorities have the means to discipline disobedient managers by, for example, subjecting them to troublesome fire, safety, health and other inspections, the number of which can reach 400 in a year for a single company.
Regional governments, as in the steel and cement industries, can support unproductive confectionery plants by effectively waiving their local tax obligations and helping them to pay less federal taxes. As a result, the few law abiding best practice foreign companies are less profitable (after taxes) than their inefficient domestic competitors (Exhibit 9).

**Residential Construction**

More than half of residential construction in Russia is still financed by the government. Although government contracts are officially submitted to open tenders, they almost invariably end up going to the same ex-Soviet companies closely affiliated with the local authorities. As a result, these companies have no incentives to increase their very low productivity (which they could quadruple with almost no investments). On the contrary, one of their implicit deals with the local government is to get the contracts in exchange for no layoffs.

**Food and general merchandise retailing**

Productivity in the retail sector in Russia is low mainly due to a very low penetration of modern formats: supermarkets, hypermarkets, malls and convenience store chains. Supermarkets—the most productive format in food retailing—have less than a 1% market share in Russia.

The share of supermarkets is low because productive modern formats are treated unfavorably and, as a result, have a significant cost disadvantage vis a vis the much less productive sub-scale formats like open-air wholesale market stands and kiosks. The latter benefit from much lower tax liabilities, less control on the origin of their goods (which are often illegal imports or counterfeits), and cheaper access to prime locations (Exhibit 10). Here again the official rationale for such distortions is social: many jobs are at stake in small format operations, and open-air wholesale markets are the way to get cheap food to the poor.

**Software**

Because the products of Russian packaged software companies are systematically pirated, they lack the resources to invest into the development of innovative products. This consequently limits their productivity and growth potential (Exhibit 11).

The other sub-sector in the software industry, project services, proves by reaching 72% of the US productivity level that, with equal conditions of competition, a whole economic sector can reach high productivity. There are no market distortions in this sector for two reasons; first, it is completely new, with no incumbents to be protected, and second, its customized nature makes it immune to piracy.

**Indirect impact of unequal competitive conditions**

Negative effects of market distortions are not limited to the sectors where they appear. Barriers to higher economic performance in key sectors of the economy block the growth of productivity, and consequently output, in related industries.
via negative spillover effects, and fundamentally lead to macroeconomic instability.

**Negative spillover effects** from problems in related sectors are important in explaining the lack of productivity and investment growth in four out of the ten studied sectors. Below are two examples:

**Dairy**

Negative spillover effects plague the all-important food chain. The absence of large modern retail formats leads to the dominance of monopolistic wholesalers who squeeze retailers and dairy plants. The cash-poor milk processors can neither invest in new equipment, nor pay the ailing dairy farmers. In response, farmers set up their own dramatically sub-scale dairy plants and then distribute the milk (including a large proportion of raw milk) directly to retailers and consumers.

Recent development in Poland shows that the modern best practice supermarkets are interested in helping the local food industry to improve efficiency and grow. They establish direct purchasing agreements to leverage their scale and bypass monopolistic wholesalers. In turn, increasingly sophisticated Polish food processors have, due to supermarkets, the financial resources to help develop efficient farmers through contract growing agreements.

**Software**

The growth of software companies in Russia depends on the growth of their local business customers. In markets with equal and intense competition, the largest software consumers (like banks, supermarkets and telecommunication companies) constantly require productivity-enhancing software tools to help them beat their competitors. Naturally, when productivity improvement is not the primary way to financial success, as is the case in Russia, software services are in low demand. Russian companies spend only 0.1% of their output on purchasing software, against more than 1% in the US (Exhibit 12). The much smaller size of output of Russian companies confounds the situation.

**Barter transactions**, which are prevalent in half of Russia’s economy, are fundamentally a result of these market distortions. Tax evasion, energy subsidies and directed government procurements are most often carried out through complex barter deals. The government and government related companies conceal these subsidies under unfavorable (if real market prices are applied) barter deals, which also provide ample personal enrichment opportunities because they are put in place through short-lived and hugely profitable trading companies.

**Macroeconomic instability** in Russia has been directly caused by the fiscal deficit, which results from the fact that the government spends more than the taxes it manages to collect. This deficit has to be financed by either printing money or by paying high real interest rates to attract private investors. Both ways of financing the deficit introduce macroeconomic instability: inflation becomes a hidden tax on all holders of Russian currency, and high real interest rates paid on government debt lures private investment away from the rest of the
economy. The negative effects of macroeconomic instability could be seen in all the studied sectors, and most notably in oil and hotels, where a long time is needed to recuperate large initial investments.

Unequal rules of competition are a fundamental cause of the chronic budget deficit. Government expenditures are increased by large implicit federal subsidies to inefficient enterprises in the traditional declining sectors (e.g. heavy manufacturing and construction), while tax collection from the unproductive but well-connected firms in the new growing sectors (e.g. retail) is very poor.

The recent progress made towards balancing the budget should be little cause for comfort. Around 40% of budget revenues still depend on extremely volatile oil and gas prices, which have fortunately soared in 1999. Key government expenditures, like the wages of law enforcement officials, are still grossly inadequate. Capital flight, rational when economic policies discourage investment within Russia, continues. Finally, the rise in industrial production, which followed the August 1998 devaluation, should be seen as a one-time adjustment due to a sudden increase in prices of imports, rather than the start of a prolonged economic recovery.

* * *

Overall, the facts show that inequalities in the rules of competition at the sector level are the main roadblocks on the path of economic growth in Russia. Notwithstanding corrupt practices or plain disbelief in the market economy, many of these distortions have been put in place by the government to meet social objectives. Unfortunately, they keep Russia at a very low level of economic performance and thus damage the social provisions they were intended to improve.

We discuss in the last section which policies and dynamics could unlock the current system of intertwined social, political and financial interests.

Secondary causes

We found the other most often cited reasons for lack of growth in Russia to be much less important than the sector level market distortions described above.

Problems in the area of corporate governance, resulting from a combination of privatization to insiders and the lack of shareholders’ rights, are often mentioned as key to Russia’s economic under-performance. The existing governance environment gives the current managers more incentives to divert the company cash flows to their own trading firms, than to restructure or invest. Such cash diversions have been commonly mentioned in the steel, cement and oil sectors. However, in these industries, battles for corporate control are now coming to an end in most of the viable assets, allowing management to focus on increasing long-term value of the company.

Restrictions on labor mobility may lead to social tensions in company towns, but do not limit the abilities of growing companies to recruit workers. For example in Moscow, where the labor market is allegedly tight, a large share of
workers engaged in government financed housing construction could be easily made available for re-employment. Facilitating labor mobility, notably in the non-viable company towns, would nevertheless help release the current pressure on regional and municipal governments to oppose restructuring of enterprises.

Lack of legal infrastructure to enforce commercial agreements. While the lack of a strong and independent judiciary does make it difficult for productive companies to appeal against the inequalities of competition, private parties are now finding ways to work out secured transaction arrangements (e.g. cash on delivery and employment of private third party negotiators).

Lack of an effective banking system. Lack of trust in both the Ruble and the banks (especially following the August 1998 debacle) leads people not to make their savings available for subsequent lending by the banks (savings are mostly kept at home in dollar notes, or outside of the country). Although this is certainly bad news for Russia, it should be noted that the virtual absence of bank lending in Poland did not prevent it from achieving a strong economic growth due to foreign direct investment and retained earnings, the main source of business investments in the West.

Poor transport and communications infrastructure, even with the great Russian distances, did not emerge as an important barrier. Most of the population and production facilities are located west of the Urals, where distances are not as huge as in the Eastern part of the country, and most of the European part of Russia can be reached fairly quickly and inexpensively by truck or train.
RUSSIA'S GROWTH POTENTIAL WITH KEY ECONOMIC REFORMS

As described in the previous section, our investigation of sectors of the Russian economy helped us identify the relative importance of the reforms now being discussed. We concluded that the main barriers to economic growth, unequal conditions of competition, tend to be industry-specific. Thus, they have to be removed on a sector-by-sector basis. Given the political difficulty of reform, this process probably should start with the high growth potential sectors identified below.

Removing the market distortions, especially in the sectors with high growth potential, could enable Russia to achieve and sustain rapid economic growth. Eight percent per annum would be within reach, allowing standards of living to double in less than ten years. This performance could be achieved due to a significant share of potentially viable spare capacity, a sizeable pool of skilled and inexpensive labor, and crucially, a large inflow of foreign direct investment (FDI) into Russia, which can be expected once the inequalities are eliminated from the conditions of competition.

Sectors with the highest growth potential

We have estimated the relative potential of output growth in Russia’s economic sectors based on the experience of other countries, Russia’s starting point and sources of comparative advantage (Exhibit 13). This analysis shows that in addition to oil, where exports could sharply increase, output in light manufacturing (food processing, consumer goods and automotive industries) should grow to replace the current high share of imports. Demand for new services, like supermarkets, should also continue to increase. These are the sectors where the market distortions should be removed first.

Large amounts of potentially viable spare industrial capacity

Our sector analyses have shown that about 75% of Russia’s inherited assets (put in place before 1992) would still be viable if upgraded and managed according to modern principles. Generalizing from the sectors we studied and assuming equal market conditions, this upgrade would allow production in these assets to increase by 40% on average for a relatively small investment, only around 5% of GDP per annum, for five years (Exhibit 14).

Benefits from foreign direct investments

Foreign direct investment (FDI) could be attracted en masse into the high growth sectors and potentially viable assets, provided that the market distortions are removed. Foreign companies would bring not only the dollars necessary to finance imports of machinery, but also the best practice managerial skills indispensable to achieving high productivity.
In oil alone, foreign investment could amount to $80 billion over the next ten years, the equivalent of 3% of Russia’s GDP every year. Foreign oil companies would also bring the expertise and technologies, that would double drilling efficiency in new fields.

In Poland, which has no oil, direct foreign investment already amounts to 7% of GDP, against less than 1% today in Russia. FDI in Poland is concentrated in light manufacturing and services, and in light manufacturing accounts for 60% of total investment (Exhibit 15). Large inflows of foreign direct investment have been the secret of Poland’s “economic miracle”. The Polish experience also shows that if exposed to intense competition on an equal basis, foreign companies do not “milk” the country, but rather keep reinvesting profits and develop a pool of local management talent.

* * *

The Novgorod region of Russia is a rare positive example of what can be done in today’s Russia by regional governments. It managed to attract more foreign direct investment than almost any other Russian region, including nearby St. Petersburg, by removing red tape, facilitating access to land and offering tax holidays to investors. As a result, the region has enjoyed economic growth since 1995, and over half of industrial output is now coming from productive foreign companies (Exhibit 16).
FUNDAMENTAL BARRIERS TO ECONOMIC REFORMS

The drive towards establishing a market economy based on equal opportunities for all competitors has essentially stopped in Russia since 1995. Why has this happened? There are three fundamental explanations for this: social concerns, corruption and lack of information. We discuss below how these factors interplay to lock Russia at the current low level of economic performance and what could be the ways to unlock it.

Social concerns

Many of the market distortions are kept in place in the name of preserving existing employment. When justified, these social concerns would be better addressed with a system of explicit direct subsidies to the workers, rather than through the current mechanism of implicit subsidies to companies, which also serves to enrich government officials and company managers.

¶ Ill founded social concerns. Based on the experience of other countries further ahead in their economic development, notably Poland, and our understanding of labor productivity gaps in Russia, we have estimated how employment would evolve by sector if the barriers to economic growth were removed. We found that employment should continue to grow in services and remain roughly stable in light manufacturing and construction. Thus, workers who would lose their jobs as a result of strong productivity growth or shutdowns in these sectors should be able to find new jobs of similar profile, especially if they are around large urban areas. As a result there are no social reasons to keep in place the following barriers which have been identified in the cases:

- Red tape limiting the restructuring of potentially viable dairy and confectionery plants
- Directed housing contracts to preserve employment levels in the traditional (panel type) housing construction companies
- Tax and other advantages given to open-air wholesale markets, kiosks and pavilions
- Government ownership of hotels.

¶ Alternative for addressing well founded social concerns. In the heavy manufacturing sectors, productivity would grow faster than output, leading to substantial employment losses. This prospect does raise serious social issues, especially in doomed company towns, because workers’ mobility is restricted by the registration (propiska) system. In such cases, direct subsidies, given to the workers to help them relocate would be much more efficient than the current barter-based corrupt system of implicit federal subsidies to unproductive companies. Doing this would allow the removal of the following distortions:
• Unequal energy and tax payments slowing down modernization of viable industrial assets

• Limits on oil exports to force cheap oil to be supplied to agriculture and defense, discouraging investment into new oil production.

Corruption

Our interviews with companies confirmed the common view that pursuit of personal financial gains within the government and government-related agencies or companies is pervasive in Russia. Like in many other developing countries, the combination of arcane laws, government control over key assets, low salaries of state employees and weak enforcement and control mechanisms provides the means and incentives for corrupt practices. In Russia, virtually every business is in violation of laws (primarily tax laws) and hence the potential target of public or private shakedowns (primarily at the local level). We believe that in many cases corruption, together with social concerns, is the main reason for the rules of competition to be kept unequal.

¶ The conventional wisdom on how to fix corruption suggests that the highest level of government, remaining untarnished, should initiate the crackdown: “the fish rots from the head”. The salary level of key officials needs to be increased, laws against conflict of interest passed and strong independent controls need to be put in place together with credible punishment.

¶ Based on our case studies, we believe that a potentially more effective way to reduce corruption in Russia would be to remove the numerous means by which the federal and local governments can interfere with the markets to extract economic rent. This would entail lower and simpler taxes, streamlined red tape, reduced scope for government procurements (e.g. social housing) and privatization of remaining government assets (e.g. land and hotels).

This suggests that corruption is not only a cause for Russia’s current economic problems but also a consequence of incomplete market reforms.

Lack of information

Such vicious dynamics have been broken in other countries through the democratic process on the basis of fact-based policy debates. Facts about the Russian economy are difficult to obtain. We hope to contribute a useful fact base to policy debates, as we show with microeconomic analysis:

• The extent of the performance gaps for both the old and new economy

• The absence of fundamental natural or economic obstacles to high economic growth in Russia
• The economic sectors with the highest growth potential
• The often underestimated importance of services in stimulating overall economic growth (e.g. supermarkets triggering positive spillover effects down the whole food chain)
• The key role that could be played by foreign direct investments, especially in a “strategic” sector like oil
• The most important economic reforms, to be pursued with priority in the high growth potential sectors
• How these economic reforms can be made compatible with the pursuit of social objectives
• How these economic reforms would help reduce the scope for corrupt practices
• The key role and responsibility of regional governments in fostering economic growth.

* * *

The changes described above require painstaking efforts in the political process to overcome conflicts of interest and reach compromises. Today’s advanced democracies have taken decades to achieve good economic policy, both at the macroeconomic and sector levels. However, the result has been that they have achieved the highest levels of economic performance in the world. Russia can benefit from the hard lessons learned by others, but for historical reasons, the obstacles in Russia are more difficult. How to lead a democratic political process to overcome these obstacles is beyond the scope of this project and beyond McKinsey’s experience and expertise. However, we have found no structural constraints on the economic side that would prevent Russia from quickly joining the ranks of the advanced economies.
**GDP PER CAPITA AT PURCHASING POWER PARITY**

US = 100 in 1995

![Graph showing GDP per capita at purchasing power parity for Poland and Russia from 1989 to 1997.](image)

Source: Goskomstat; Polish Central Statistical Office; OECD, EIU

---

**RUSSIA'S GDP PER CAPITA**

US = 100 in 1995

- **Employment per capita**
  - 1991: 90
  - 1997: 83

- **Output per capita**
  - 1991: 27
  - 1997: 16

- **Labor productivity**
  - 1991: 30
  - 1997: 19

*Based on hours worked per capita
**In 1998 - 15 %.

Source: Goskomstat; EIU; BEA; McKinsey analysis
**Exhibit 3**

Russia's actual labor productivity is 25, but only 15 if measured on a geology-comparable basis.

*Weighted by employment share*

Source: McKinsey analysis

**Exhibit 4**

**EMPLOYMENT AND LABOR PRODUCTIVITY IN FOOD RETAILING IN MOSCOW**

Source: Case studies
THE OLD AND NEW ECONOMY*

US = 100 in 1995

<table>
<thead>
<tr>
<th>Productivity</th>
<th>Employment</th>
<th>Output per capita</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Old economy (Pre-1992 assets)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td>1997</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td><strong>New economy (Post 1992 assets)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td>1997</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

*Estimates based on sector case studies
Source: Goskomstat; EIU; McKinsey analysis
LABOR PRODUCTIVITY POTENTIAL OF VIABLE OLD OPERATING ASSETS

US = 100 in 1995

<table>
<thead>
<tr>
<th>Viable share of old assets</th>
<th>Current productivity</th>
<th>Potential productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>80% Steel</td>
<td>35</td>
<td>90</td>
</tr>
<tr>
<td>85% Cement</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>90% Oil*</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>45% Dairy</td>
<td>10</td>
<td>70</td>
</tr>
<tr>
<td>50% Confectionery</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>90% Residential construction</td>
<td>10</td>
<td>60</td>
</tr>
<tr>
<td>70% Retail</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>75% Hotels</td>
<td>15</td>
<td>50</td>
</tr>
<tr>
<td>75% Case average</td>
<td>20</td>
<td>65</td>
</tr>
</tbody>
</table>

*Impact from favorable geology included
Source: McKinsey analysis

COMPANY STEEL TOWNS
Steel plant workforce as a percentage of town employment

Source: Goskomstat

Exhibit 6

Exhibit 7
POSSIBLE SCENARIOS FOR FUTURE OIL PRODUCTION

Millions of barrels per day

Low productivity and no new field development
Low productivity and new field development
High productivity (with FDI) and new field development

Current domestic consumption

Production over 10 years - cumulative
Bn bbl

Source: McKinsey analysis

CONFECTIONERY INDUSTRY DYNAMICS

Productivity
US Average = 100

Profitability
Return on sales; percent

Market share
Percent

Green field FDI

Russian plants* (Ex-Soviet)

*Excludes brown-field plants operated by multinationals (13% market share)

Source: Goskomstat; Institute for confectionery industry
EFFECTS OF UNEQUAL TAX AND LAW ENFORCEMENT ACROSS RETAIL
FORMATS
Indexed to price in gastronoms = 100

Price | 83 | 101 | 96

<table>
<thead>
<tr>
<th>Cost of goods</th>
<th>1998</th>
<th>With equal laws and enforcement</th>
<th>Supermarkets 1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net margin</td>
<td>8</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>Operating expenses</td>
<td>12</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>Taxes</td>
<td>0.2</td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>

Retail/wholesale markets

Source: McKinsey price survey; McKinsey productivity survey; Gubernia, Expert interviews

Exhibit 10
EFFECTS OF SOFTWARE PIRACY ON PRODUCTIVITY

Piracy rates
Pirated software applications as percent of total, 1997

- Russia: 89
- Poland: 61
- Germany: 53
- US: 27

Relative price levels for software USD for comparable software

- Legal software: >1,000.0*
- Pirate disks: 2.5

Relative scale of packaged software companies**
Average annual revenues of companies in sample, USD Million

- Russia: 6
- US: 619
- Germany: 1,323

Productivity levels in packaged software**
Percent of US level

- Russia: 13
- US: 84

*Indicative total worth of software
** Russia, 1996; other countries, 1996

Source: BSA; IDC; "Russian Shield" Association; Financial reporting; McKinsey analysis
CONSUMPTION OF SOFTWARE BY SOME SECTORS OF THE ECONOMY*
Software spending as percent of output of the sector

Financial and business services

<table>
<thead>
<tr>
<th>Sector</th>
<th>Russia</th>
<th>Germany</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N/A</td>
<td>1.0</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Trade

<table>
<thead>
<tr>
<th>Sector</th>
<th>Russia</th>
<th>Germany</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.03</td>
<td>0.70</td>
<td>0.90</td>
</tr>
</tbody>
</table>

Manufacturing

<table>
<thead>
<tr>
<th>Sector</th>
<th>Russia</th>
<th>Germany</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.1</td>
<td>1.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Total economy

<table>
<thead>
<tr>
<th>Sector</th>
<th>Russia</th>
<th>Germany</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.1</td>
<td>0.7</td>
<td>1.1</td>
</tr>
</tbody>
</table>

* Russia, 1997; other countries, 1996
Source: IDC; OECD; EIU; Interviews

RELATIVE OUTPUT GROWTH POTENTIAL OF RUSSIA’S SECTORS
Percentage points of US GDP in 1995 per capita

<table>
<thead>
<tr>
<th>Sector</th>
<th>Poland 1997</th>
<th>Brazil 1995</th>
<th>Russia's expected future output distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>1.5</td>
<td>1.2</td>
<td>1.5</td>
</tr>
<tr>
<td>Heavy manufacturing</td>
<td>2.2</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Light manufacturing</td>
<td>3.0</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>Oil/gas/mining</td>
<td>1.7</td>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td>2.1</td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td>Transportation/communication</td>
<td>4.0</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>Trade</td>
<td>1.8</td>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td>Business/personal services</td>
<td>2.5</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>Public services</td>
<td>2.5</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td>215</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>Heavy manufacturing</td>
<td>150</td>
<td>140**</td>
<td></td>
</tr>
<tr>
<td>Light manufacturing</td>
<td>300</td>
<td>140**</td>
<td></td>
</tr>
<tr>
<td>Oil/gas/mining</td>
<td>190*</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td>230</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>Transportation/communication</td>
<td>230</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>Trade</td>
<td>230</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>Business/personal services</td>
<td>230</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>Public services</td>
<td>230</td>
<td>150</td>
<td></td>
</tr>
</tbody>
</table>

* Oil expected to grow faster than gas and mining
** Commercial and infrastructure construction to grow faster than housing construction
Source: OECD; McKinsey analysis
# SIZE OF UPGRADING INVESTMENTS

<table>
<thead>
<tr>
<th>Nature of upgrading investments</th>
<th>Share of sector's value added (over 5 years) Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>• Process control and management systems</td>
<td>6</td>
</tr>
<tr>
<td>Cement</td>
<td></td>
</tr>
<tr>
<td>• Upgrading of wet/gas technology</td>
<td>12</td>
</tr>
<tr>
<td>Oil</td>
<td></td>
</tr>
<tr>
<td>• More hydro fracturing and tertiary recovery</td>
<td>5</td>
</tr>
<tr>
<td>Dairy</td>
<td></td>
</tr>
<tr>
<td>• Super-pasteurized technology</td>
<td>10</td>
</tr>
<tr>
<td>Confectionery</td>
<td></td>
</tr>
<tr>
<td>• Improved packaging to increase shelf life</td>
<td>10</td>
</tr>
<tr>
<td>Residential construction</td>
<td></td>
</tr>
<tr>
<td>• Flexible production lines for panel housing</td>
<td>3</td>
</tr>
<tr>
<td>Retail</td>
<td></td>
</tr>
<tr>
<td>• Conversion of gastronoms into convenience stores/minimarkets</td>
<td>2</td>
</tr>
<tr>
<td><strong>Weighted average</strong></td>
<td><strong>5</strong></td>
</tr>
</tbody>
</table>

Source: Interviews
POTENTIAL INCREASE IN BUSINESS INVESTMENT
Percent of GDP

<table>
<thead>
<tr>
<th>Sector</th>
<th>Russia in 1997</th>
<th>Russia's potential with level playing fields</th>
<th>Poland in 1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Heavy manufacturing</td>
<td>2.0</td>
<td>2.0</td>
<td>0.5</td>
</tr>
<tr>
<td>Construction</td>
<td>0.1</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Light manufacturing*</td>
<td>2.5</td>
<td>5.0</td>
<td>0.7</td>
</tr>
<tr>
<td>Trade</td>
<td>1.5</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Other services**</td>
<td>5.5</td>
<td>5.0</td>
<td>5.5</td>
</tr>
<tr>
<td>Total</td>
<td>13.0</td>
<td>19.0</td>
<td>6.8</td>
</tr>
</tbody>
</table>

*Includes automotive
** Transport, communication, business and personal services

Source: Goskomstat; PAIZ; McKinsey analysis

SUCCESS OF MARKET REFORMS IN NOVGOROD REGION

<table>
<thead>
<tr>
<th></th>
<th>Novgorod region</th>
<th>Russia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evolution of GDP per capita, 1995-98</td>
<td>3.8</td>
<td>-2.7</td>
</tr>
<tr>
<td>CAGR, Percent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cumulative FDI per capita, 1995-97</td>
<td></td>
<td>49</td>
</tr>
<tr>
<td>USD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share of FDI in industrial output, 1998</td>
<td></td>
<td>62.4</td>
</tr>
<tr>
<td>Percent</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Median of cumulative 1995-97 FDI per capita of all regions
** First quarter 1998

Source: Goskomstat; Interviews; Bureau of Economic Analysis; IEWS; Press reports
Objectives and Approach

Since the start of the economic reforms in January 1992, Russia’s economic performance has deteriorated over time and has not shown the signs of recovery registered in other transition economies (e.g. Poland). GDP per capita has fallen by around 40% and is now at 15% of US level (Exhibit 1). During the same period, investment levels have decreased by 60% and were at 13% of GDP in 1997, with very little foreign direct investment. As a consequence, unemployment in 1998 is at more than 12%, with an increasing number of workers engaged in subsistence forms of employment.

OBJECTIVE OF THE STUDY

The purpose of this report is to shed light on the reasons for Russia’s dismal economic performance and help policy makers prioritize reforms. To do this, we analyze Russia’s output and productivity gap relative to the US and other transition economies, especially Poland. We believe that the comparison with Poland is particularly useful given the relatively large size of the Polish economy and the positive results observed since the start of economic reforms (especially in foreign direct investment).

The main focus of our work is to build a microeconomic understanding of performance differences through ten detailed sector case studies. We first benchmark the productivity performance of Russian industries relative to the best performing economies in the world. Then we seek to understand the main barriers to productivity improvements and productive investments as a key to output and employment growth in each sector. By synthesizing the case studies, we draw conclusions on the actions needed to improve the Russia’s economic performance in the future. In doing this, we will focus on the policy actions needed to kick-start Russia’s growth without incurring unsustainable levels of unemployment.

Productivity growth is a key determinant of GDP growth. More efficient use of resources to create value allows the economy to provide lower cost goods and services relative to the income of domestic consumers and to compete for customers in international markets. This in turn raises the nation’s material living standards. Productivity growth is the key determinant of higher profitability if there is a level-playing field and the industry is competitive (see Box 1: Productivity and Profitability). To start the virtuous circle leading to higher standards of living and improved profitability, we seek to identify concrete actions that the Government and businesses can undertake to raise productivity in different industries.
Russia’s recent economic performance has been the focus of many studies in both academic literature and the press. Frequently cited causes for low levels of output are the macroeconomic instability, incomplete market reforms, corruption, and a skill gap on Russian managers due to Soviet legacy. However, the bulk to the literature has not been conclusive and has focussed on Russia’s aggregate performance without studying specific industries that comprise the national economy. In contrast, we believe that a systematic analysis of the relative importance of determinants of productivity in a representative set of sectors is key in understanding the nature of Russia’s economic problems. This report aims to fill this void.

The emphasis of our work is on economic barriers that determine Russia’s economic prospects in the medium and long term. We do not address the short-term macroeconomic factors that may affect economic performance at any given moment. In drawing policy implications from our findings, we bear in mind that higher material living standards are only one of many policy goals that a government can have, but still reflect our belief that higher productivity and output levels provide the opportunity to use resources to address social challenges more effectively.

**APPROACH OF THE STUDY**

The approach used in this study is based on the methodology used in previous McKinsey Global Institute (MGI) reports. First, we review the data on the country’s aggregate performance as well as the existing literature. Second, we use industry case studies to highlight economic barriers that explain the performance of different sectors. Finally, by looking at common patterns across our industry case studies, we could identify the main barriers preventing Russian managers/owners from increasing productivity in their sectors.

**Aggregate analysis**

The first chapter is a diagnostic of the Russia’s past economic performance based on aggregate data and relevant literature. Through a comparison with the US as well as other transition economies and developing countries, we took, as a point of departure for our case studies, the current understanding of the main factors that have contributed to Russia’s past productivity, output and employment performances in its market economy.

**Sector case studies**

The core of the research project is ten detailed industry case studies. In each we start by measuring the productivity gap between Russia and the benchmark country. We then analyze the sector to understand how
Russian operations differ from world benchmarks and the reasons for the different choices Russian managers have made. By developing a deep microeconomic understanding of industry operations we are then able to draw conclusions on the relative importance of the external factors affecting managers’ decisions. In doing this, we focus on the barriers that are preventing productivity growth within existing assets as well as the factors that are limiting investment in new productive capacity.

Our sectors are selected to represent a significant share of the market economy (Exhibit 2). The oil, steel, and cement cases represent heavy manufacturing sectors while dairy and confectionery are examples of light manufacturing industries with large growth potentials. Housing construction represents a domestic sector with a large employment component. Among the remaining service sector cases, we studied food retailing, general merchandise retailing, hotels, and software as examples of rapidly changing sectors.

Each of the sector cases follows the same sequential analytical process that starts with a measurement of the Russian industry’s current productivity level relative to world benchmarks (see Box 2: Interpreting Global Productivity Benchmarks). Then we generate and test hypotheses on the causal factors that explain the observed gap.

¶ Measuring productivity. Productivity reflects the efficiency with which resources are used to create value in the marketplace. It is measured by computing the ratio of output to input. We first define each industry in a consistent manner in Russia and the comparison countries, making sure that our industries include the same parts of an industry value chain. We then measure the sector’s output using measures of Purchasing Power Parity adjusted value added or physical output. The labor inputs are measured as number of hours worked, and capital inputs (used in the steel and oil cases) as capital services derived from the existing stock of physical capital (see Appendix 1: Measurement of Output and Productivity).

Given the lack of reliable statistical data in some sectors, we complemented official information with customized surveys and extensive interviews with customers, producers, and regulators (see Exhibit 3). This methodology was particularly helpful in deriving bottom-up productivity estimates in service sectors such as food retailing, general merchandise retailing, and hotels, where traditional sources of information are particularly unreliable and incomplete. Finally, given the size of the Russian territory, we also conducted interviews in different cities in order to account for regional performance differences. These interviews were particularly helpful in sectors such as housing construction and hotels, where local policies (especially as they relate to land
use) are a crucial determinant of the industry’s competitive intensity.

Generating and testing causality hypotheses. To explain why levels of productivity in Russia differ from the benchmarks, we start by generating a set of hypotheses on the possible causes. In this phase, we benefit from McKinsey’s expertise in many industries around the world, as well as from the expertise of industry associations and company executives in both Russia and the comparison countries.

We use a systematic framework to explain productivity differences across countries that captures the major possible causal factors. This causal framework has three hierarchical layers of causality (see Appendix 2: Framework Definition):

- Differences observed at the production process level
- Factors, arising from industry dynamics
- External factors that explain why the choices of Russian companies differ from those in the comparison countries.

The hypotheses are tested with further fact based analyses and plant visits that allow us to conclude with an assessment of the relative importance of the causal factors in explaining the productivity difference in each sector.

Synthesis

Having identified the causal factors for each industry, we compare the results across industries. The patterns that emerge allow us to draw conclusions about the causes of the aggregate productivity gap between Russia and the comparison countries, as well as about the level to which productivity can rise when the external factors are changed. We then use this information to estimate the potential rate of productivity growth that would occur in different sectors if these external factors were removed as well as the foreign direct investment that would result from it. Simultaneously, we also assess, based on the actual experience of countries slightly ahead of Russia in their economic development (Poland and Brazil), the future relative rate of output growth of Russia’s main economic sectors. Finally, we combine these labor productivity and relative output growth estimates to derive employment implication of sector economic reforms, suggesting which ones should be tackled first to start economic growth without incurring unsustainable levels of unemployment.
Appendix 1: Measurement of Output and Productivity

Productivity reflects the efficiency with which resources are used to create value in the marketplace. We measure productivity by computing the ratio of output produced in a year to inputs used in that production over the same time period.

Output (Value Added)

For a given industry, the output produced differs from the traditional notion of sales. Sales figures include the value of goods and services purchased by the industry to produce the final goods or services (e.g. milk from farms purchased by dairies to produce pasteurized milk). In contrast, the notion of value added is defined as factory-gate gross output less purchased materials, services, and energy. The advantage of using value added is that it accounts for differences in vertical integration across countries. Furthermore, it accommodates quality differences between products, as higher quality goods normally receive a price premium that translates into higher value added. It also takes into account differences in the efficiency with which inputs are used (e.g. energy).

GDP can be seen as a value added concept of output. In many cases, output is not homogeneous; the GDP of a country is made up of many thousands of different goods and services. The GDP of a country is the market value of the final goods and services produced. It reflects the market value of output produced by means of the labor and capital services available within the country.

In case studies for the dairy, confectionery, housing construction, food retail, general merchandise retail, hotels, and software industries we used the value added measure of output. One complication arises from the fact that value added is not denominated in the same currency across countries. As a result, this approach requires a mechanism to convert value added to a common currency using Purchasing Power Parity (PPP) exchange rates, a topic which is discussed separately below.

In sectors where prices for inputs and/or outputs is not reliable, we have used the adjusted physical production as a measure of output. This was the case for our analysis of sectors were barter payments are widely used such as steel, oil, cement, and housing construction. To make our measures comparable to our benchmark countries, we needed to account for the product variety and quality differences across countries. This
approach also requires data from the same part of the value chain in every country; in some countries an industry may simply assemble products while in others it may produce them from raw materials. Physical measures would tend to overestimate the productivity of the former, as fewer inputs would be required to produce the same amount of output. To overcome these problems, our adjusted physical output measure accounts for differences in quality and relative differences in energy consumption. Besides accounting for physical differences in the output produced and the inputs used, this method allowed us to isolate our estimates from distortions in output valuation due to the wide use of barter payments in these industries.

**Purchasing Power Parity (PPP) exchange rate**

To convert value added of different countries to a common currency, we use PPP exchange rates rather than market exchange rates. PPP exchange rates can be thought of as reflecting the ratio of the actual costs of purchasing the same basket of goods and services in local currencies in two countries. The PPP exchange rates are constructed ‘bottom up’ by comparing the actual market prices of comparable goods and services across countries, and then aggregating the individual prices up to a ‘price’ for sector-specific baskets and finally the total GDP.

The reason for not using the market exchange rate is that because it reflects international transactions alone; it cannot reflect the prices of non-tradable goods and services in the economy. Furthermore, comparisons made on the basis of market exchange rates would be affected by fluctuations in the exchange rate resulting from, say, international capital movements.

For our aggregate survey and most of our cases, we use PPP exchange rates reported by the United Nations and by the Russian Statistical Office, Goskomstat. In principle, as long as the products are in the same market, we would only need the PPP for one product and use the market relative prices to compute the PPPs for the rest of the product range. However, in service sectors such as Hotels, were the sample taken for the official PPPs does not include all the relevant market segments in which different players and consumers interact (low, medium, and high-end hotels), we constructed our own PPP measure for each segment. To do this, we used price comparisons of hotels with similar quality, service range, and location in Russia and the comparison country.

Finally, we adjusted our PPPs to exclude VAT and other taxes and we accounted for different input prices in order to obtain a Double Deflated PPP which is the PPP exchange rate ultimately used in our value added comparisons.
Inputs

Our inputs consist of labor and capital. Labor inputs are the more straightforward to measure: we seek to use the total annual number of hours worked in the industry by workers at the plant site. When actual hours are not available, we estimate labor inputs by multiplying the total number of employees by the best available measure of average hours of work per employee in the sector. In the case of Russia, we also needed to account for additional services provided by the companies which are not usually being provided by their companies in the benchmark countries. Provision of social and recreational services to workers can still be found among Russian factories (especially in heavy manufacturing) and are a legacy of Soviet times. In these cases, detailed data on workers’ occupation was needed in order to subtract them from the labor inputs figures used in our productivity calculations.

In the steel and oil industry cases we also measured capital inputs. The heterogeneity of capital makes measuring capital inputs more difficult. Capital stock consists of various kinds of structures (such as factories, offices, and stores) and equipment (such as machines, trucks, and tools). The stock is built up incrementally by the addition of investment (business gross fixed capital formation) to the existing capital stock. Each piece of capital provides a flow of services during its service life. The value of this service is what one would pay if one were leasing this piece of capital and this is what we use as our measure of capital inputs. Given the lack of relevant pricing information for capital during Soviet times, we were forced to estimate the value of the capital stock in the oil and steel industries using a “bottom-up” approach. In the case of steel, we constructed an inventory of existing capital equipment from either a complete list of existing machinery. In oil, our experts estimated the investment requirements to drill the existing oil wells (oil case).

Once we have measured capital stock, we construct our capital service measures using the Perpetual Inventory Method (PIM). Given the unavailability of information about soviet service lives, we based our estimates on US service lives for structures and equipment. Although ideally we would have liked to measure the capital inputs in each of our case studies, we concentrated on the oil and steel industries since they are the most capital-intensive sectors in our sample. For the remaining case studies, capital was treated as a causal factor in explaining labor productivity.
Appendix 2: Framework Definition

The framework for synthesising the explanatory factors for the productivity performance in each industry is summarised in Exhibit 4. The various elements of the framework are further described below. Illustrations of possible barriers are also presented under some of the subheadings, both in order to facilitate the understanding of the relevance of each point and in order to introduce some of the barriers that are presented in the later discussions.

Production process

The first set of factors affecting productivity arises at the production process level. These can be grouped into low capacity utilization, inefficient organization, and lower capital intensity/technology. Production process factors in the framework are jointly determined by elements of a firm’s external environment beyond its control and decisions made by its managers.

- **Low capacity utilization.** Represents the labor productivity penalty associated with low capacity utilization given the fixed portion of workers (i.e. management, machine operators, maintenance, floor ladies, etc.). It also includes the variable portion of workers still around despite a drop in output. These are workers who could be laid off "Monday morning" without any significant changes to the organization of functions and tasks.

- **Inefficient organization**
  
  - **Organization of functions and tasks.** This is a broad category encompassing the way in which production processes and other key functions (product development, sales, marketing) are organized and run. It reflects managerial practices in most areas of the business system as well as the structure of incentive systems that employees and companies face.

  - **Marketing.** Countries may differ in the categories of products they demand or supply (e.g. milk or cheese in dairy), and a productivity penalty can arise if a country’s output consists of a higher share of inherently less productive product or service categories. Within product categories, countries may differ in the quality of products they produce. Producing higher value added products or services with similar levels of inputs is reflected in higher productivity. Another source of
productivity differences within product categories is
differences in product proliferation. A wide range of product
or service lines can reflect a sub-optimal product mix that
reduces productivity. Finally, both within the manufacturing
sectors and in services, design can influence which technology
might be applied. Design changes might simplify the
production process and improve productivity.

- **Supplier relations.** Suppliers can contribute to industry
  productivity by efficient delivery processes, by collaborating in
  product development or by providing products or services that
  facilitate production (e.g. special trade in housing
  construction). It also includes productivity penalties due to
  lower quality and fluctuations in the delivery of inputs.

- **Blue collar trainability.** This factor captures any possible labor
  productivity penalties due to lower frontline trainability
  potentially caused by lower educational levels, different
  educational focus (discipline/skills), less frontline worker
  motivation, lack of incentives/possibility for top management
to impose changes. Is also a factor when (older)
  workers/middle management find it particularly difficult to
  break old habits.

### Lower capital intensity/technology

- **Obsolete assets (scale/outdated technology).** Higher production
  scale generally leads to increased productivity if fixed assets are
  a large enough proportion of total costs. We use capital in the
  sense of physical assets and their embodied technologies (e.g.,
  machines, plants, buildings, and hardware). We classify assets
  as being obsolete when they don’t reach the minimum
  efficient scale or when the production technology is outdated.

- **Lack of viable investment in non-obsolete assets
  (upgrades/green fields).** Refers to investment in upgrading
  non-obsolete assets (i.e. up-to-scale and up-to-date technology)
  as well as investment in green field operations that would be
  economical to make under the same conditions as above (i.e.
  30% discount rate and level playing fields). In addition to
  macroeconomic instability, low labor and energy costs could
  also explain why these investments are not viable today in
  Russia.

- **Non-viable investment due to factor costs.** Refers to
  investment in upgrading non-obsolete assets (i.e. up-to-scale
  and up-to-date technology) as well as investment in green field
  operations that would not be economical to make even at a
  discount rate around 30% if the industry’s playing field is
leveled across players. As a result, this category includes investments that are not being made because of lower relative cost of productive factors such as capital, labor, and energy (e.g. full packaging automation).

**Industry dynamics**

The competitive pressure in the industry influences the pressure on management to adopt best practices in the production process. We include three types of factors: domestic competitive intensity, exposure to best-practice, and non-level playing field.

- **Domestic competitive intensity.** Differences in the industry structure and the resulting competitive behavior of domestic players. Other factors being equal, more competitive industries will put more pressures on managers to adopt more productive processes.

- **Exposure to best practice.** Includes competitive pressures from foreign best practice companies either via imports or through foreign direct investment.

- **Non level playing field.** In a fair market economy, the same laws and rules (e.g. prices, taxes, etc.) apply to different industry players. In contrast, non-level playing field reflects distortions that result from differential treatment of industry producers by parties outside the industry (e.g. government). Within the same market, non-level playing field may result in more productive firms not being the most profitable ones.

**External factors**

The external barriers on managers can be divided into macroeconomic, labor, capital, sector specific, related industries, and others. These factors are mainly outside the control of firms but influence how they operate.

- **Macroeconomic barriers.**

  - **Drop in demand/low labor cost/low income.** For a given level of capital costs, low labor costs relative to capital will lead to managers using less automated production processes, which, in turn, reduce labor productivity. In addition, sharp drops in demand may lead to lower productivity in the short term due to lower capacity utilization as managers keep their resources in place in the hope of a future upturn.

  - **Country risk/high capital costs (political instability/budget deficit).** Large budget deficit crowd-out of resources for private investments. Furthermore, the general economic
environment in which managers operate affects their planning horizon, investment decisions, and their everyday operational decisions. Investments are more difficult to commit to in an unstable macroeconomic and political environment where high inflation rates, uncertainty about exchange rates, or frequently changing fiscal policies generate additional uncertainty. This instability will result in higher investment discount rates due to higher capital costs (for domestic investors) or higher country risk (for foreign investors). These higher discount rates will lead profit-maximizing managers to choose different production technologies, resulting in labor and capital productivity differences across economies. In the case of Russia, removing these sources of instability would decrease the discount rate from around 30% to 8-15%.

¶ **Labor market**

- **Downward wage flexibility (mobility restrictions).** Downward wage flexibility may affect the relative labor costs faced by different industries and players beyond the level determined by the country’s capital and labor availability. This downward flexibility results from restrictions to labor mobility across regions and industries which decreases labor opportunity costs.

- **Inadequate education.** Managers and frontline workers in one country may have lower levels of education or a different educational focus (discipline/skills) than those in other countries. This may lead to lower frontline skills/trainability resulting in lower productivity.

¶ **Capital market**

- **Government ownership.** The extent to which management is exposed to pressure from owners or shareholders can influence the rate at which productivity is improved. Companies under government ownership may pursue objectives different from profit maximization that leads to lower productivity in favor of other goals.

- **Problems with minority shareholders’ rights.** Another source of misalignment of incentives between managers and owners, is the lack of protection of minority shareholders’ rights. Given that Russian managers are usually also the majority shareholders, weak shareholders rights protection also leads to managers’ pursuing personal benefits as opposed to the firm’s profit maximization.

¶ **Sector specific barriers (non-level playing field)**
• **Non-level taxes.** Includes direct tax breaks and/or subsidies to specific players as well as indirect tax benefits through arrears and non-payments. In defining tax advantages, we include differences in law as well as enforcement of tax payments.

• **Non equal allocation of government procurement and land.** Includes discretionary procedures for government procurement contracts and land allocation.

• **Threat of red tape/harassment.** Excessive red tape and regulatory harassment increases complexity costs and limits the incentives of firms to optimize operations. These actions become particularly important when they are used by government officials to deter layoffs.

• **Non-level energy payments.** Unequal enforcement of energy payments will also create difference in costs and value added faced by players. This is particularly relevant in energy intensive manufacturing sectors such as steel and cement.

• **Others (property rights, trade/FDI barriers).** Unequal property rights enforcement can decrease incentives for productive investment (brand development, R&D). Tariff and non-tariff barriers to trade or foreign direct investment (FDI) can reduce the competitive pressure on an industry and allow low productive players to persist.

|| **Barriers in related sectors**

• **Other industries/up and downstream.** Supplier or downstream industries can hamper productivity by reducing the competitive pressures on the industry players (e.g. lack of sophisticated customers limit the incentives to innovate for Russian software companies). An underdeveloped upstream industry can also impose significant productivity costs on its clients by not providing products or services that facilitate production (e.g. special trade in housing construction) or by delivering outputs with lower quality and/or at high fluctuations (e.g. high bacteria content in milk to dairy processors).

• **Poor infrastructure.** Includes differences in the country’s infrastructure such as roads, rail links and other communications. As a related sector, infrastructure can affect productivity either through the demand side (e.g. inefficient distribution) or through the cost side (e.g. input procurement).

|| **Other barriers.** Russia and its comparison countries may differ in the structure of consumer demand they face as a result of varying climate, income distribution, or traditional consumption
patterns. This influences the product mix demanded in the marketplace, which in turn can affect the value of the total output and thus productivity. Productivity penalties may also arise in different sectors through the structure of costs as a result of climate, geographical, and geological differences across countries.
Box 1

PRODUCTIVITY AND PROFITABILITY

Within any given market, a firm that is more productive will enjoy higher profitability, unless it suffers from some other source of cost disadvantage. A more productive firm will either produce the same output with less inputs and thus enjoy a cost-advantage, or produce better output with the same inputs and thus enjoy a price-premium.

Over time, the higher profitability of productive firms will attract competition. As competitors catch up in productivity, profitability will tend to converge. In such an environment, the only way a firm can enjoy higher profitability is by pushing the productivity frontier beyond its competitors. If, as a result, the firm achieves higher productivity, it will enjoy higher profitability only until its competitors catch up again. In another words, profitability, in a dynamic world, is a transient reward for productivity improvements. This linkage holds within a given market, unless there is a non-level playing field among different players. As it will be explained below, non-level playing field is particularly important in explaining Russia’s productivity performance which results in productive players not being the most profitable ones.

While a more productive firm will enjoy higher profitability within a given market, this may not be true for firms operating in different markets, for two reasons. First, higher cost of inputs may deem a productive firm in one market unprofitable, while a less productive firm in another market with lower cost of inputs may be profitable. For example, a US firm may be more productive but less profitable than a Russian firm because US wages are higher. Second, competitive intensity may differ across markets so that a productive firm in a highly competitive market may be less profitable than an unproductive monopolist or oligopolist in another market. For example, in the 1980s European airlines enjoyed higher profitability than their more productive US counterparts because they faced much less price competition.

However, deregulation and globalisation are eliminating distinctions between national markets. As barriers are removed, productive firms will enter markets with unproductive incumbents. This could take the form of exports if the goods are traded. While cheap input prices may temporarily shield unproductive incumbents in the importing country, those input price differences are not sustainable in the long-run. The cost of capital (a key input price) is converging internationally, and wages (the other key input price) will eventually catch up with productivity (so that no country can enjoy both low wages and high productivity in the long-run). The other form of market entry for productive firms is foreign direct investments. In this case, productive transplants will face the same input prices as unproductive incumbents, and will therefore enjoy higher profitability.

In sum, as markets liberalise and globalise, the only sustainable source of higher profitability for a firm will be to continually raise productivity higher than its competitors.
Box 2

INTERPRETING GLOBAL PRODUCTIVITY BENCHMARKS

To assess the performance of Russian industries, we compare their labor productivity with those of the best performing countries in the world. This benchmark allows us to measure how efficient Russian companies are in the production process relative to their potential. The use of comparison countries allows us also to identify the reasons for the productivity gap through a detailed comparison of production process and other business practices between Russia and the benchmark country.

The global benchmarks should not be perceived as a measure of maximum possible productivity level however. At any moment of time, there are individual companies with productivity levels above the average of the best performing country. And over time, the global benchmark rises as individual companies continuously improve their productivity (Exhibit 5). So while the benchmark productivity level can be interpreted as a realistically achievable level of efficiency, it should not be seen as a limitation.

Independent of the global benchmark for any specific sector, we have chosen to express all of our productivity measures in consistent units defined relative to the US average productivity level. The US has the highest real income level among large countries, which makes it the benchmark for the level of total GDP per capita. While this is not the case for several industries, we believe that using a consistent benchmark unit helps the interpretation of productivity gaps in individual industries and facilitates performance comparisons across them.
GDP PER CAPITA AT PURCHASING POWER PARITY
US level = 100 in 1995

South Korea 1995: 49
Brazil 1995: 23
Poland 1997: 23*
Turkey 1997: 21
Russia 1991: 27
Russia 1998: 15**

*Middle of estimate ranges
** 1997 figure: 16

Source: Goskomstat; BEA; WEFA; OECD, EIU

Exhibit 1
SECTOR COVERAGE OF ECONOMY IN 1997

Percent, share of total employment

100% = 66m employees

- Market services
  - 28% coverage
  - Construction
    - 50% coverage
  - Agricultural services
    - 16% coverage
- Manufacturing
- Non-market services*
  - 27
- Agriculture
  - 9

*Government services, education, healthcare and defense

Source: Goskomstat, McKinsey analysis

Exhibit 2

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McKINSEY GLOBAL INSTITUTE’S INDUSTRY STUDIES IN RUSSIA: SOURCES OF INFORMATION

<table>
<thead>
<tr>
<th>Industry</th>
<th>Interviews</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>With companies</td>
<td>With experts</td>
</tr>
<tr>
<td>Steel industry</td>
<td>5 (location is confidential)</td>
<td>10</td>
</tr>
<tr>
<td>Cement industry</td>
<td>3 (location is confidential)</td>
<td>3</td>
</tr>
<tr>
<td>Oil industry</td>
<td>3 (location is confidential)</td>
<td>7</td>
</tr>
<tr>
<td>Residential construction</td>
<td>40 (Moscow, Nizhny Novgorod, Rostov-on-Don, St. Petersburg, Obrininsk, Cherepovets)</td>
<td>5</td>
</tr>
<tr>
<td>Dairy industry</td>
<td>13 (Moscow, Moscow region, St. Petersburg, Cherepovets, Belgorod, Ekaterinburg)</td>
<td>15</td>
</tr>
<tr>
<td>Confectionery industry</td>
<td>12 (Moscow, Moscow region, Samara)</td>
<td>9</td>
</tr>
<tr>
<td>Food retailing</td>
<td>51 (Moscow, Obrininsk, Vladimir, Yurievets)</td>
<td>11</td>
</tr>
<tr>
<td>General merchandise retailing</td>
<td>76 (Moscow, Samara, Moscow region)</td>
<td>3</td>
</tr>
<tr>
<td>Hotel business</td>
<td>34 (Moscow, St. Petersburg, Novgorod, Nizhny Novgorod, Krasnodar)</td>
<td>8</td>
</tr>
<tr>
<td>Software production</td>
<td>11 (Moscow, St. Petersburg)</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>248</strong></td>
<td><strong>76</strong></td>
</tr>
</tbody>
</table>

Source: McKinsey Global Institute

Exhibit 3
## CAUSALITY FOR PRODUCTIVITY DIFFERENCES

<table>
<thead>
<tr>
<th>External factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>• <strong>Macroeconomic barriers</strong></td>
</tr>
<tr>
<td>– Drop in demand/low labor cost/low income</td>
</tr>
<tr>
<td>– Country risk/high capital cost (political instability/budget deficit)</td>
</tr>
<tr>
<td>• <strong>Labor barriers</strong></td>
</tr>
<tr>
<td>– Mobility restrictions</td>
</tr>
<tr>
<td>– Inadequate education</td>
</tr>
<tr>
<td>• <strong>Capital barriers</strong></td>
</tr>
<tr>
<td>– Government ownership</td>
</tr>
<tr>
<td>– Problems with minority shareholders’ rights</td>
</tr>
<tr>
<td>• <strong>Sector specific barriers (non-level playing field)</strong></td>
</tr>
<tr>
<td>– Non-level taxes</td>
</tr>
<tr>
<td>– Non-equal allocation of government procurement and land</td>
</tr>
<tr>
<td>– Threat of red tape/harassment</td>
</tr>
<tr>
<td>– Non-level energy payments</td>
</tr>
<tr>
<td>– Others (property rights, barriers to trade/FDI)</td>
</tr>
<tr>
<td>• <strong>Related industry barriers</strong></td>
</tr>
<tr>
<td>– Upstream/downstream sectors</td>
</tr>
<tr>
<td>– Poor infrastructure</td>
</tr>
<tr>
<td>• <strong>Other barriers (climate, geology, etc.)</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Industry dynamics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• <strong>Pressure from global best practice</strong></td>
</tr>
<tr>
<td>• <strong>Domestic competitive intensity</strong></td>
</tr>
<tr>
<td>• <strong>Non-level playing field</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Production process</th>
</tr>
</thead>
<tbody>
<tr>
<td>• <strong>Low capacity utilization</strong></td>
</tr>
<tr>
<td>• <strong>Inefficient organization</strong></td>
</tr>
<tr>
<td>– Organization of functions and tasks</td>
</tr>
<tr>
<td>– Marketing/product mix</td>
</tr>
<tr>
<td>– Supplier relations</td>
</tr>
<tr>
<td>– Blue collar trainability</td>
</tr>
<tr>
<td>• <strong>Lower capital intensity/technology</strong></td>
</tr>
<tr>
<td>– Obsolete assets (subscale/obsolescent technology)</td>
</tr>
<tr>
<td>– Lack of viable investment in non-obsolete assets (upgrades/green fields)</td>
</tr>
<tr>
<td>– Non-viable investment due to factor costs (labor, capital, and energy)</td>
</tr>
</tbody>
</table>
INTERPRETING GLOBAL PRODUCTIVITY BENCHMARKS:
TOTAL FACTOR PRODUCTIVITY IN STEEL SECTOR
Indexed to US = 100 in 1995

Source: Industry associations; VDH; James King; McKinsey analysis
Aggregate Analysis

To set the stage for our industry case studies, this chapter describes the economic performance of Russia in the past decade through a comparison with the US and Poland. Based on aggregate data and a review of the available literature, we explored the main factors that can explain the Russia’s economic problems. Taken together, the aggregate analysis and the industry case studies allow us to draw conclusions on the relative importance of the different barriers to output and productivity growth in Russia.

Understanding past performance is necessary for assessing Russia’s future growth prospects. Based on our understanding of the barriers to past growth, our industry case studies allow us to estimate the achievable productivity growth under alternative policy scenarios. This, together with the estimates of evolution of demand derived in from experiences of other countries, allows us to derive potential future development paths for Russia. The discussion on future prospects is contained in the Synthesis chapter.

RUSSIA’S ECONOMIC PERFORMANCE AT THE AGGREGATE LEVEL

We assess Russia’s economic performance at the aggregate level by comparing its past experience with that of the US and Poland. While the US is the leading economy in current aggregate productivity and output, Poland is one of the strongest performers among transition economies. After ten years from the first liberalization reforms, Poland is currently considered a moderately successful market economy.

Taking the level of GDP per capita as the measure of economic well-being, we explain Russia’s declining level of output by differences in the level of labor inputs (employment) and labor productivity (the efficiency in which labor inputs are used to produce a certain level of output).

¶ GDP per capita level. The best available aggregate measure to compare material living standards across countries is their gross domestic product (GDP) per capita measured in Purchasing Power Parity (PPP) terms. From the start of the economic reforms in January 1992 until the end of 1998, Russia’s GDP per capita fell by around 40% and is now at 15% of the US level and about 70% of the Polish level (Exhibit 1). In effect, Soviet-era products and services found it difficult to pass the market test following price liberalization and a drop in government spending.
Similarly to other transition economies, the biggest drop in output in Russia (more than 30%) occurred in the first few years following price and trade liberalization reforms. However, unlike in the most successful transition economies, notably Poland, output has failed to rebound following the initial drop. After 1995 Russia’s output fell further. In contrast, Polish GDP increased by around 65% after 1991 and is now enjoys output level 10% higher than under Soviet times (Exhibits 2 and 3).

Drop in output was not the same across sectors. Manufacturing and construction output dropped by more than 50%. Overall output in services remained stable, the drop in previously subsidized services like air travel and hotels being compensated by an increase in retail, personal and business services, which had been grossly underdeveloped during Soviet times (Exhibit 4).

Our output figures represent middle of range estimates from available estimates. Due to measurement problems, different estimates of Russia’s GDP are available. First, the shadow economy and use of barter payments make difficult the valuation of the non-monetary component of output. Second, new services and quality improvements are often not properly accounted for in official deflators. To increase confidence, the estimates have been cross-checked using physical output and consumption figures. According to several indexes, physical production in most industries decreased by around 30% between 1993-97 (Exhibit 5). Taking into account quality improvements and new market services, this figure seems consistent with our estimated GDP drop of around 20% for the same period.

¶ **Employment.** Less employment is one of the factors contributing to the current GDP per capita gap with respect to the US. Since 1991, labor inputs per capita have decreased by around 8% and are now at 83% of the US level (Exhibit 6). As a result, unemployment has increased and is now at more than 12%, with many more workers engaged in subsistence forms of employment.

As in the case of output, employment continued to decrease also after the adjustment period. From 1993 to 1997 employment fell further by 3% (Exhibit 7). This trend is in sharp contrast with the Polish experience where, after the initial drop, total employment increased by 8% since 1992.

The largest employment drop occurred in manufacturing (mostly textile and machine building) and construction which decreased by 30% since 1991. The impact of this fall was partially compensated by the growth in trade services where employment increased by 50%. Employment remained roughly stable in the other sectors of the economy.
is the sharp decrease in labor productivity over time (Exhibit 6). The level of labor productivity (output per unit of labor) reflects the extent to which an economy is making efficient use of its labor inputs.

Although capital inputs affect labor productivity, from our case studies we know that substantial improvements in labor productivity can be achieved with a more efficient organization of existing assets (see Synthesis Chapter).

**Investment.** Substantial levels of growth are associated with high investment levels. In 1997, business investment in Russia was at 13% of GDP compared to 16.5% in Poland in 1998. Of this total, Foreign direct investment accounts for less than 1 point in Russia compared to more than 6 points in Poland (Exhibit 8). This level is the reflection of the limited presence of foreign best practice players in many industries.

In our assessment of Russia’s economic performance, we treated capital inputs as an explanatory variable for labor productivity differences. Due to difficulties in the valuation of soviet capital, a consistent and comparable figures of capital stock are not available for Russia.

**The 1998 financial crisis.** On August 17, 1998, the Russian government announced a 90 day moratorium on external debt repayments and the devaluation of the ruble. These events had a series of political and economic ramifications for the country. The government was replaced and a deep financial crisis began that would claim the life of most commercial banks.

Although financial losses have been substantial for investors, the crisis had limited impact on the real economy. The crisis mainly highlighted the unrealistic expectations held by investors for the Russian economy and demonstrated the limited role of the banking system in financing the real economy. Only a small portion of the funding for private business is provided through the banking system (Exhibit 9). Productivity figures had been declining since the liberalization reforms and production was affected indirectly only through the decrease in consumption resulting from lower disposable income following the crisis.

**CONVENTIONAL WISDOM FACTORS AFFECTING RUSSIA’S ECONOMIC PERFORMANCE**

Output growth is an important indicator of increasing standards of living in Russia. Economic outcomes are fundamentally the result of actions taken by individual managers at the enterprise level. In this study, we seek to identify the most important barriers to operational improvements
level on the barriers found in this study, we will first examine the conventional wisdom found in the existing literature.

The perception that Russia has a host of problems was confirmed by the 1999 World Competitiveness Report, which compiled the views from 4000 global business leaders. According to them, Russia is ranked last of the 59 countries surveyed (Exhibit 10). In what follows, we will summarize the main barriers to economic growth mentioned in the academic and policy literature.

<table>
<thead>
<tr>
<th>Macroeconomic instability and the tax system.</th>
<th>For most of the post-Soviet era, Russia’s macroeconomic environment has been highly volatile. As a result of unsustainable budget deficit levels, real interest rates increased over time and may have discouraged private domestic investment (Exhibit 11). Moreover, high inflation and fluctuations in domestic demand may have increased country risk deterring foreign investment in productive fixed assets.¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low tax collection rates are reportedly the main cause for the Russian budget deficit. Although expenditure levels are not different from those of comparable countries, the Russian government collects in cash less than a third of its nominal taxes (Exhibit 12).</td>
<td></td>
</tr>
<tr>
<td>Besides the effect on the budget deficit, structural problems of the Russian tax system may further discourage investment. The current tax code is often arbitrary and complex and includes additional potentially distorting taxes. As a result, companies are often subject to higher tax rates in Russia than abroad.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Barter, non-payments, and the financial system.</th>
<th>The extensive use of barter payments and arrears are also mentioned as distorting economic incentives faced by Russian managers (Exhibit 13).² At the aggregate level, barter can distort prices and increase transaction costs. Moreover, barter payments of taxes can also contribute to the budget deficit as the government may end up with resale value significantly below their nominal price.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Several reasons for barter payments have been mentioned in the literature. Among others, the lack of an efficient financial system, high capital costs, tax evasion, and subsidies by local government are thought to contribute to the persistence of barter and arrears.</td>
<td></td>
</tr>
</tbody>
</table>

| Corporate governance (especially minority shareholders’ rights and bankruptcy law). | After privatization, most Russian companies remained under the control of their previous managers and workers. Moreover, the number of publicly traded |
companies remained significantly lower than in other developing countries such as Korea and Brazil.

These factors, together with the absence of legal mechanisms to discipline managers, may hamper enterprises’ economic performance. First, minority shareholder rights are still insufficiently protected. Under current provisions, it is easy for majority shareholders to dilute minority shareholders’ ownership and limit their access to company information. Moreover, directors are also protected by the Labor Code that makes it very difficult to fire them. As a result, directors may pursue the interests of a group of shareholders resulting in the “milking” of company assets.

Second, bankruptcy enforcement may be influenced by local governments. Salaries and appointment clauses often give local governments direct control over judges. This could introduce political distortions in the application and enforcement of bankruptcy laws as governments are usually motivated to prevent layoffs from company shut-downs.

¶ **Red tape, organized crime, and corruption.** The large amount of red tape, organized crime, and corruption in Russia is often mentioned as discouraging productive investment. According to surveys of large companies’ executives, corruption levels in Russia are perceived to be substantially higher than in other transition and developing countries like Poland, Brazil, and Korea (Exhibit 14). As a result, foreign best-practice players may be deterred from entering the market further limiting competitive intensity.

¶ **Lack of law and contract enforcement.** Some sources also point to the lack of law and contract enforcement as hampering economic performance. Lack of an independent judiciary increases the influence of federal and local governments in court decisions and their enforcement. Judges’ salaries and appointment are often subject to the direct influence of local governments who use them as instruments to achieve different policy objectives. As a result, courts may be influenced by short-term political and economic incentives which may deter long-term investment by productive players.

¶ **Transportation, distribution, and infrastructure.** Some sources have stressed the quality of infrastructure as hampering Russian...
economic performance. In a large country like Russia, the capacity of the whole economy to function as one market hinges on efficient infrastructure that reduces transportation costs and exposes producers to inter-regional/national competition. First, the nature and coverage of the physical infrastructure (e.g. rail links and roads) determines how and where inputs and output can be transported. Second, the competitive nature of the distribution services affects the cost in which these goods will be distributed.

**Land ownership.** The absence of a comprehensive land code that gives clear principles to land ownership and lease can also increase investment risks. Although the option to privatize the land has been given to the local governments, the privatization has been slow and uneven across regions. Furthermore, allocation of government owned land is often non-transparent and may be subject to political rather than economic incentives.

**CONCLUSIONS AND IMPLICATIONS FOR CASE STUDIES**

Our review of the literature highlights the wide array of issues that may hamper Russian economic performance. Although the list of issues is extensive, the literature offers no indication as to their relative importance. Prioritization of these factors is essential for the provision of specific policy prescriptions.

Although this prioritization may be also accomplished by analyzing the aggregate economic performance, industry-level analysis has proven particularly useful in our past studies in different countries. By looking at the different factors at the industry-level, we are able to understand how managers operate under current conditions. Taken together, these individual actions are responsible for the country’s aggregate economic performance.

Using the results from case studies of ten representative industries in the Russian economy, this report seeks to identify the recurring barriers that are preventing industry players in Russia to improve their performance and invest in productive assets. In doing this we are able to: 1) evaluate the economic cost of previously recognized factors; 2) identify new important issues that restrict economic growth; and 3) prioritize the different barriers in order to provide a viable set of policy actions needed to kick-start Russia’s growth without incurring unsustainable levels of unemployment.
GDP PER CAPITA AT PURCHASING POWER PARITY
US level = 100 in 1995

*Middle of estimate ranges
** 1997 figure:16

Source: Goskomstat; BEA; WEFA; OECD, EIU
GDP PER CAPITA AT PURCHASING POWER PARITY
US level = 100 in 1995

Source: Goskomstat; Polish Central Statistical Office; OECD, EIU

GDP PER CAPITA IN TRANSITION ECONOMIES - 1998*
Indexed to 1989 = 100

1989 = 100

Poland
Czech Republic
Hungary
Russia
Ukraine

*1998 estimate
Source: EBRD
EVOLUTION OF RUSSIA’S OUTPUT BY SECTOR
Percent of 1991 level

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>14</td>
<td>68</td>
<td>63</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>38</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Construction</td>
<td>10</td>
<td>21</td>
<td>16</td>
</tr>
<tr>
<td>Transport/communications</td>
<td>7</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Trade*</td>
<td>11</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Other services</td>
<td>20</td>
<td>19</td>
<td>20</td>
</tr>
</tbody>
</table>

*Includes restaurants and catering

Source: Goskomstat

INDIRECT WAYS OF MEASURING THE OUTPUT DECLINE

<table>
<thead>
<tr>
<th>Industrial production indexes*</th>
<th>1990 = 100</th>
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<tbody>
<tr>
<td></td>
<td>1993</td>
</tr>
<tr>
<td>Energy (electric)</td>
<td>91</td>
</tr>
<tr>
<td>Fuels</td>
<td>77</td>
</tr>
<tr>
<td>Steel</td>
<td>59</td>
</tr>
<tr>
<td>Chemicals</td>
<td>65</td>
</tr>
<tr>
<td>Machine building</td>
<td>63</td>
</tr>
<tr>
<td>Construction materials</td>
<td>65</td>
</tr>
<tr>
<td>Textile</td>
<td>48</td>
</tr>
<tr>
<td>Food processing</td>
<td>69</td>
</tr>
<tr>
<td>Total industry</td>
<td>65</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Consumption indexes</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Freight (rail)</td>
<td>63</td>
<td>48</td>
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<tr>
<td>(1990 = 100)</td>
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<td></td>
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<tr>
<td>Electricity consumption by industry</td>
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<td>70</td>
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<tr>
<td>(1990 = 100)</td>
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<tr>
<td>Food calorie intake</td>
<td>104</td>
<td>94</td>
</tr>
<tr>
<td>(1992 = 100)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TVs per family</td>
<td>102</td>
<td>103</td>
</tr>
<tr>
<td>(1990 = 100)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cars per family</td>
<td>116</td>
<td>155</td>
</tr>
<tr>
<td>(1990 = 100)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Uses previous year prices as weights and value added share as aggregation mechanism, Goskomstat adjusts total industry number for estimate of shadow activity

Source: Goskomstat
RUSSIA’S GDP PER CAPITA TREE
Indexed to US = 100 in 1995

Output per capita

Employment per capita*

Labor productivity

*Based on hours worked per capita
** In 1998 - 15%
Source: Goskomstat; BEA; EIU; McKinsey analysis

EVOLUTION OF RUSSIA’S EMPLOYMENT BY SECTOR
Percent of 1991 level

*Includes restaurants and catering
Source: Goskomstat

Exhibit 6

Exhibit 7
POTENTIAL INCREASE IN BUSINESS INVESTMENT
Percent of GDP

Source: Goskomstat; PAIZ; McKinsey

BANK LOANS TO THE PRIVATE SECTOR - 1997
Percent of GDP

Source: IMF, EBRD
**PERCEPTION OF TOP 4,000 GLOBAL BUSINESS LEADERS ON RUSSIA, 1999**

Overall competitiveness Rankings, 1999

Top 5
1. Singapore
2. US
3. Hong Kong
4. Taiwan
5. Canada

Bottom 5
55. Bolivia
56. Bulgaria
57. Zimbabwe
58. Ukraine
59. Russia

Source: Global Competitiveness Report; World Economic Forum

**MACROECONOMIC INSTABILITY: INFLATION AND INTEREST RATES**

Inflation
CPI percent - log scale

Consolidated budget deficit*
Percent of GDP

Real interest rates
Percent

* High uncertainty
* Diversion of management attention to gaming inflation
* Liquidity crunch
* Crowding out of investment

* Estimates from the Economic Expert Group of the Ministry of Finance
Source: BEA, IMF, Goskomstat; IMF, Ministry of Finance; McKinsey analysis
BARTER/ARREARS ISSUES IN RUSSIAN INDUSTRY

Share of barter in industrial transactions
Percent of all transactions

Cumulative non-payments
Percent of GDP

Source: Russian Economic Barometer; Russian Economic Trends; McKinsey analysis  
Exhibit 13
LEVEL OF CORRUPTION IN RUSSIA - 1997

Corruption perception index
(the lower the index, the higher the corruption)

<table>
<thead>
<tr>
<th>Country</th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>7.5</td>
</tr>
<tr>
<td>Poland</td>
<td>4.6</td>
</tr>
<tr>
<td>Korea</td>
<td>4.2</td>
</tr>
<tr>
<td>Brazil</td>
<td>4.0</td>
</tr>
<tr>
<td>Russia</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Source: Transparency International
EXECUTIVE SUMMARY

Industry overview. In 1990 the Soviet Union was the largest steel producer in the world. Following a 60% drop in domestic steel consumption, not compensated for by an increase in exports, steel production fell by 40% in Russia since the 1990 production peak. The more than one hundred Russian steel plants can be divided between the “Big Three” integrated steel plants (mainly flat products), the “Medium Six” (long products) and “Small Others”. Each group employs around one third of the almost 400,000 steelworkers.

Productivity performance. With no shutdowns or layoffs, productivity fell by 40% to 28% of the US level between 1990 and 1997. The “Big Three” achieve around 45% of the US productivity level, the “Medium Six” 25% and the “Small Others” only 10% of the US level.

The main reasons for the productivity gap at the operational level for the “Big Three” and “Medium Six” are low capacity utilization, excess workers in logistics and overhead functions, and low yields on energy and raw materials. These plants could achieve more than 80% of the US productivity level with very little upgrading investments. Most of the “Small Others”, however, are not viable because they use the outdated open hearth furnace and ingot casting process, wasting energy and representing major environmental hazards.

The most important external barrier to productivity and output growth is the implicit federal energy subsidy given, in the form of arrears or advantageous barter deals, to many non-viable “Small Others”, allowing them to remain in operation. There have been virtually no layoffs in the viable steel plants because wages are free to adjust downward, as the prevailing registration (propiska) system curbs the ability of workers to travel in search of better jobs. Poor corporate governance was a key barrier to growth soon after the privatization (1993-1996) as managers concentrated their efforts on gaining control. Today, with the end of most shareholder battles at the large productive plants, it is of secondary importance.

Policy implications and future outlook. With adequate technology in most of its production capacity, and relatively low labor and energy costs, Russia has a clear competitive advantage in steel. To allow the industry to realize its full potential, local governments should stop channeling implicit subsidies to doomed plants in exchange for appropriate mobility provisions and social safety nets to be provided by the federal government. At the same time, a good way for the West to help Russia would be to remove the current restrictions on Russian steel imports.
Steel

This case benchmarks the performance of the Russian steel industry against those of the US (primarily), Japan, Korea and Brazil.

We will start with an overview of the industry, then present productivity performance across countries, explain causes of differences in performance, and end with a future outlook.

INDUSTRY OVERVIEW

The USSR considered steel production to be a class “A” priority industry and devoted considerable resources to its development. As a result of this policy by 1990 the Soviet Union (as opposed to Russia) made over 160 million tons of crude steel per annum and was the largest steel producer in the world. After the breakdown of the USSR, each steel plant was designated as a company and privatized in 1993 – 1994 with management and employees capturing most of the shares.

Today steel remains an important industry. It forms 1 % of GDP, employs 0.7% of the workforce and contributes 8 % of exports (by value in 1997) thus being a significant source of hard currency for Russia. As an industry where there are no new entrants (either Russian or foreign), it provides an interesting illustration of competitiveness of the industrial base inherited by Russia from the USSR. Additionally, through the enterprises located in ‘steel towns’ where the steel plant is the main employer, it illustrates some of the key social challenges that must be addressed going forward.

Industry description

For data availability/comparability reasons our analysis covers the steel industry of Russia through 1997 and compares it against the United States, Brazil, South Korea and Japan in 1995. Unlike the traditional Russian definition of black metallurgy, we focus on fabrication of steel products and exclude primary activities like mining and first transformation activities such as foundries, forging and metalware production (Exhibit 1).

In the 1980s Russia was one of the leading producers of steel in the world. However, after the breakdown of the Soviet Union in 1990 the industry output fell by almost a half before production stabilized again in 1994 (Exhibit 2). To compensate for the fall in domestic demand, the industry moved from being a net importer to exporting aggressively and in 1997 exported 60 % of production, compared to only 28 % for Brazil, which has the next highest export share in our sample (Exhibit 3).

Today the two major technologies used to produce steel in the world are: integrated steel mills which produce steel from ore and (increasingly) minimills which reprocess scrap into new steel products (Exhibit 4). Russia has very few minimills (Exhibit 5),
but, unusually, a number of major integrated Russian steel plants possess Electric Arc Furnaces (EAFs). For the purposes of this report we will consider such facilities to be a part of the integrated production, rather than as stand alone minimills. We do this because these facilities differ significantly from Western minimills in at least two key respects. First of all, Russian EAFs are often used to make special steels rather than to produce commodity long carbon products as is the case in the West. And secondly, because they are a part of major integrated plants, the management, sales and support structures associated with the Russian facilities are very different from those in the West. As a result, we would expect the productivity of such facilities to be closer to that of integrated plants, rather than to that of traditional minimills.

Steel products can be divided into four product segments: semi-finished steel, long carbon steel, flat carbon steel, and specialty products (Exhibit 6). Semi-finished products can not be sold directly to end-users because they require further processing. Flat products generally require more inputs to produce and are more expensive than long products. Specialty items are partly made of, or coated with, metals other than steel. As Exhibit 7 shows, product mix varies significantly by country, with Russia making by far the least amount of high value-added items.

We have segmented the Russian steel producers based on their product orientation and facilities employed. We separate the steel companies, for whom steel making is a primary business, from various heavy machinery plants which, although they produce small amounts of crude steel, are not really steel competitors (Exhibit 8). We exclude the non-primary steel producers from our work. The primary steel producers are split into three groups: the ‘Big Three’ (large scale integrated producers of flat products and shapes), the ‘Medium Six’ (large producers of long and specialty products) and the ‘Small Others’ (the remaining plants). Each group of producers employs roughly a third of the workers in the industry, but the Big Three produce more than 50% of output (Exhibit 9). Because we have excluded mining and transformation from the industry definition and we count only production workforce (excluding social workers employed at steel plants), we show only 367,000 workers in the ‘steel industry’ as opposed to the 1 million typically quoted for Russian black metallurgy.

**Global steel industry trends**

The general pattern of steel consumption development is closely tied to the level of economic development of the country and the state of its construction and manufacturing sectors (Exhibit 10). In a less developed stage, steel demand is quite low because these sectors are small. As countries industrialize, steel demand grows together with these sectors. In the final stage of development, however, the growth in demand for steel from construction and manufacturing industries slows down and steel consumption growth slows too. At the same time, less developed countries with significantly lower labor, material and energy costs have built steel capacity, which they use to export to developed countries like the U.S. and Japan. The latter tend to produce increasingly high value added per ton steel. These combined factors have led to the mature, low growth steel industries that we observe in developed countries and to the growth in the steel industries in rapidly growing countries.

In the 1970s and early 1980s, Japan and Europe undertook aggressive capacity expansion even though their domestic consumption did not grow. Along with this, the breakup of the Soviet Union led to a rapid decrease in demand in the early 1990s.
These factors have led to continuing world overcapacity in steel production (Exhibit 11).

**PRODUCTIVITY PERFORMANCE**

In this case study we have measured both labor and capital productivity using a physical output measure. That is, we define labor and capital productivity as the amount of labor and capital needed to produce a certain amount of ‘equivalent tons’ of output. These ‘equivalent tons’ are derived by adjusting physical output for the different value-added content of different products, production processes and energy consumption levels. The details of methodology and sources of information used for this calculation are presented in the Appendix to this case study.

Russian labor and capital productivity are the lowest of the five countries studied (Exhibit 12). Its 1997 labor productivity is 28 % of the level achieved by the United States in 1995 and it is less than half that of Brazil. Russian capital productivity is higher, 67 % of the United States or 77 % of Brazil. Total factor productivity, at 43% of the United States, is at 39 % of best practice Korea and Japan.

This low number, however, is not representative of what Russian industry has achieved and can achieve in the future. In 1990 Russia had higher labor productivity than Brazil. However, between 1990 and 1995 Russian labor productivity declined by 43 % while labor productivity of all benchmark countries grew significantly (Exhibit 13). The drop was driven by a decline in production and a shift to a lower value added product mix (as Russia produced slabs for export), that was not accompanied by reductions in industry employment.

The 1997 industry total factor productivity of 43% of the US masks important differences among three types of companies. The big flat product producers (Big Three) are performing at 61 % of US, the big long product producers (Medium Six) are at 41% of US and the Other Small producers are, on average, at 21% (Exhibit 14). All firms have suffered because of the drop in demand. The small plants whose labor productivity was lowest to begin with were hit hardest (Exhibit 15). The total drop in labor productivity for the Big Three, for example, was from 96% of 1990 US level in 1990 to 47% of 1995 US level in 1997. This was driven almost equally by improvements in US labor productivity and by the decline in absolute Russian labor productivity (Exhibit 16).

Although there is some uncertainty around these numbers (as described in the appendix and shown in Exhibit 17) we believe that it does not materially impact the following discussion or our conclusions.

**REASONS FOR DIFFERENCES IN PRODUCTIVITY PERFORMANCE**

Exhibit 18 shows the framework within which we have analyzed the productivity gap between Russian and American producers. It divides the causes of the productivity gap into two groups. At the lowest level we explain productivity gaps by differences in production process and staffing levels within firms. We then try to understand what key external factors are preventing the Russian steel industry from recovering/restructuring. These external factors can influence management decisions
either directly (e.g. through different labor and capital costs) or indirectly, by affecting the level of competition in the industry.

**Production process– labor productivity**

Japanese firms currently define best practice in labor productivity, and we believe that they could increase it even further, to 140 % of 1995 US levels, by increasing output while keeping employment constant. However, we have chosen to compare Russia to the US as this is the first natural benchmark that Russia will strive to reach. Exhibit 19 summarizes the causes of the labor productivity gap between the United States and each of the three groups of Russian producers. We believe that the Big Three and most of the Medium Six producers can reach a level of 80-90 % of the US level by increasing capacity utilization and addressing the organization of functions and tasks issues. Most of the Small Others, however, will never be able to close the productivity gap as many are sub-scale, rely on outdated technology and are an environmental hazard.

**Low capacity utilization**

In Russian steel plants there are a group of people who could be called “excess workers”. These workers can be removed immediately, thereby improving productivity, without any impact on the work flow of the plant. In general, this is the first and, perhaps, the most obvious target for gaining productivity improvements. In the Soviet times plants were under no pressure to operate with minimum possible employment. As a result many hired additional workers who today perform no useful function. In steel, however, because staffing for many key production processes was determined in conjunction with equipment design (so that there are very few obviously superfluous employees), the number of workers in this category is not large.

More important are variable portions of labor who are idle because of a fall in capacity utilization. The fall in production between 1990 and 1994 was not matched by an adequate reduction in employment or by any significant shut down of capacity (Exhibit 20). This led to decreased capacity utilization for all Russian plants, with the Small Others group suffering the most (a production drop of 70 % over 1990). Although the total impact of low capacity utilization is similar for the Small Others and Medium Six groups (see exhibit 19), the relative impact is much larger for Small Other plants who have much lower initial labor productivity.

The drop in labor productivity due to low capacity utilization is a very tough problem to address. First of all, domestic demand for steel is low and unlikely to recover for some time, since a large share of the adjustment downwards reflects positive/permanent adjustment of downstream sectors (e.g. much less waste, less steel being used in cars). Also, most capable plants are already exporting aggressively, so it is unlikely that total export volumes can be increased significantly in the future. So, while all plants would like to increase production, for most this is not an attainable goal. Secondly, staffing is determined primarily by the number of pieces of equipment being operated. Few cutbacks can be made if all equipment is still running, albeit at 50% capacity. Only by closing down batteries, furnaces or mills can labor be freed. Unfortunately, the nature of equipment is such that many shutdowns, if undertaken, can not be reversed quickly and managers are understandably reluctant to mothball capacity that may again be useful one day. It may also be hard to rehire and retrain workers if equipment must be restarted.
This latter approach of closing some of the capacity is being pursued by the larger plants (primarily Magnitogorsk and Severstal – members of the Big Three group) who are shutting down outdated open hearth furnaces. The labor productivity improvements achieved by these partial closings are not very big because certain links of the production chain, such as the mix preparation shop and blooming, must operate as long as there is even one open hearth furnace running. This option, moreover, is not open to many small plants who have only one or two furnaces and two to three rolling mills that produce different products.

Hence, while the larger plants still maintain a reasonable level of capacity utilization and can shrink their capacity somewhat, the smaller plants are truly stuck. They can neither increase production nor lay off many workers (in response to low capacity utilization only). They do, however, have other workforce reduction options as described further in this section (under Organization of Functions and Tasks).

**Inefficient organization**

- **Organization of functions and tasks.** Organization of labor is the most important driver of labor productivity differences between Russia and the US and it applies to all three groups of Russian plants.
  
  - **Production workforce.** By benchmarking direct staffing of select production processes in Russia against industry best practice we have found that the Big Three plants employ roughly as many people as the average US integrated plant, which is 30-40% more than the best practice benchmarks. The situation may be worse at Small Other plants.
  
  - **Overhead workforce.** We estimate that Russian plants employ three times as many people in non-production functions as Western plants of similar size. Significant productivity improvement can be achieved by optimizing management, logistics (e.g., warehousing and railroad operations) and research & development areas. This additional staffing is a legacy of the Soviet management approach which never had minimizing or controlling total headcount as an objective. The current lean level of staffing achieved in these areas in the United States was driven primarily by competitive pressure.

  We believe that the overall potential for improvement for the industry is even higher than identified in Exhibit 19. We have excluded from our analysis workers employed at the metallurgical plants but performing social duties (e.g., construction workers, teachers, etc) and workers in production support functions not present in the West (e.g., manufacturing of spare parts). Although we have not reviewed productivity in these areas, findings from other cases lead us to believe that the improvement potential there is just as high.

  In this area, in principle, a large improvement in productivity can be achieved with small investment. Two questions immediately arise. One, whether the Russian workforce can perform at the same level of productivity as the Western one. And, if the answer to the first question is ‘Yes’, then why does this problem still persist.

  To answer the first question we evaluated the skills and motivation of the Russian workforce.
Blue collar trainability. On average, the Russian workforce is very skilled. All workers have at least a high school education and 20% have additional schooling beyond high school.

Labor Motivation. The legacy from Soviet times (no emphasis on quality/responsibility) and very low cash salaries may cause many Russian workers not to give their best to their employer. Examples such as materials not matching customers’ specifications being sent out (e.g., plates of the wrong width) and additional exploitation costs (incurred because machines are not maintained on schedule and known damage to equipment is not reported to management) have been cited. Although we have not quantified the impact of this factor, it has come up repeatedly in our interviews with plant managers and industry experts. The best companies are aggressively tackling this issue, introducing improved quality control procedures and adjusting incentives, but even they have a long way to go before they can match the Japanese teamwork ethic.

To summarize, the Russian workforce possesses sufficient technical skills to perform at the required level, but whether its motivation is adequate is in doubt. The current low level of motivation is likely driven, at least in part, by large arrears incurred on initially low wages that exist at many plants. We believe that this issue can be addressed with more realistic cash salaries and better incentive systems.

In answer to the second question above, there are two possible causes for persistence of this problem. The first could be a lack of knowledge on the part of plant management on where workforce reductions are possible or how they can be achieved. The second is fear of social consequences associated with layoffs. While the level of management expertise varies widely among Russian plants, we believe that at present the fear of social consequences is the bottleneck for tackling this problem (this will be addressed further in the External Factors section).

Product mix. As shown in Exhibit 7, Russia produces a lower value-added mix of product than other countries, which has a negative impact on Russian labour productivity. This is driven both by the large proportion of low value-added products supplied for export and lower domestic demand for high value-added steel.

Additionally, in measuring productivity we have decreased the output measure by 5% to reflect the quality differential between Russian and Western products (see appendix for a detailed description of this adjustment). We believe that at least some companies are striving to improve quality in response to customer pressure.

Lower capital intensity: lack of scale and outdated technology

Scale is not an important cause of productivity differences for the Big Three and Medium Six groups, but it impacts the Small Other plants. Many of these plants were established before World War II with some dating back to the 19th century. The capacity of most is below 0.5 million tons per annum (Exhibit 21), whereas current efficient scale is 3-4 million tons for an integrated plant and 1 million tons for a minimill. As staffing in steel plants depends primarily on number of pieces of equipment and not on the capacity of each item (mill or furnace), the lower scale translates directly into a productivity penalty. This area is almost impossible to fix at an individual plant level and must be addressed on an industry basis.
In addition to the scale penalty, Small Other plants also have a disproportionately high share of outdated technologies (open hearth furnaces and ingot casting) (Exhibit 22). This has at least three negative effects.

First, these technologies require significantly more people than modern processes (Exhibit 23). This is driven by the higher number of manual processing steps in the chain (especially in ingot casting) and by the lower yields at each step which require more work to be applied for the same amount of finished product. For technological reasons liquid steel produced by most open hearth furnaces can not be cast continuously and the much less efficient ingot casting process must be used. For the Small Other producers, many of whom perform only steel making, casting and hot rolling steps and thus have a large proportion of their workforce in open hearth furnace and associated ingot casting shops, this penalty accounts for 30 % of their workforce (Exhibit 24).

Secondly, together with requiring additional labor to process the ‘internal scrap’, this process leads to additional spending on ‘transformation materials’ – energy and spare parts for machinery. Open hearth furnaces and ingot casting require three times more energy than newer set ups (Exhibit 25), which means that the plants must carry an additional productivity penalty because their value-added per ton of final product is lower (energy inputs being larger).

Finally, open hearth furnaces pollute the environment. For example, the quality of air in Magnitogorsk has improved considerably following the partial shut down of the open hearth furnaces.

The size of productivity penalty associated with Scale/Outdated technology, which is 6 % for the Big Three, 12 % for the Medium Six and 30 % for the Small Other, is representative of the future prospects of the plants.

We believe that the Big Three and some of the Medium Six can reach a level of productivity of 80 – 90 % of the US. Their equipment provides an adequate base for future development and only a small fraction of the penalty is associated with technical deficiencies in the installed production equipment. Their technology gap is caused primarily by absence or inadequacy of process control and management systems and, somewhat, by manual material handling operations. Absence of proper control systems reduces labor productivity in two ways – directly, by requiring more personnel, and indirectly, through increased use of energy (which penalizes the labor productivity measure – see the Appendix for details). There are two reasons for the increased consumption of energy. First of all, each piece of equipment is not operated as efficiently as it could be. For example, basic oxygen converters frequently need to be reblooned because they are not initially loaded with the optimal mixture of raw materials. Second, the efficiency of operation of the whole system is lower. Russian plants hot charge, on average, only 20 % of their output compared to 80 % average for the Western producers. A part of this gap is caused by plant layout limitations, but at least at some plants the percentage could be increased considerably by better planning and co-ordination of production steps. While some of the investments necessary to close this technological gap are viable given current relative factor costs, many are not and the extent of investments that will be made depends on the evolution of the relative prices of labor (which is very cheap in Russia), energy (which is even cheaper (Exhibit 26)) and expensive capital.
Most of the Small Other producers and the rest of the Medium Six, on the other hand, will not be able to overcome the productivity gap without replacing open hearth furnaces with electric arc furnaces and changing the layout of the plant to accommodate a high degree of hot charging. This involves replacing half of the equipment at the plant and basically amounts to building a minimill on a brownfield site. The magnitude of the investment required leads us to believe that most of the plants in this group are not long term viable, especially if environmental concerns are taken into consideration, as shown by experience of other countries.

**Production process– capital productivity**

Steel is not a typical industry in that there is a core set of capital equipment which accounts for a very high share of the total capital used by the industry. Except for capacity utilization, capital productivity can vary much less than in other industries, where more capital-labor substitution is possible.

*Exhibit 27* summarizes the causes of capital productivity gap between Russia and the estimated maximum achievable productivity for Korea (best practice country). As with labor productivity, higher energy consumption, lower capacity utilization and product mix/marketing explain some of the gap. However, the most important explanatory factor and one unique to capital productivity, is minimill share.

The minimill share is important because minimills have, on average, almost double the capital productivity of integrated facilities (*Exhibit 28*). Development of minimills has not been a priority for the USSR because the country had abundant resources of ore, coal and natural gas required to power the existing integrated mills and existing capacity satisfied the internal demand. Today absence of minimills explains most of the capital productivity gap between Russia and Korea.

**Industry dynamics**

Steel is one of the few sectors of the Russian industry where the competitive intensity is quite high.

*Pressure from global best practice*

As shown in *Exhibit 3*, in 1997 Russia exported more than 60 % of its production and in 1998 exports will likely exceed 75% of output. On this market the Big Three and Medium Six plants compete against both other exporters and the domestic companies in the destination countries, a combination which encompasses some of the best producers in the world – including Japanese, Korean and US steel plants. However, because the Russian factor prices are much lower than the Western ones, this competition does not put any pressure on the Russian plants to restructure. So, while the Russian steel industry is well exposed to global best practice, it does not feel the pressure to improve operations – that would occur only if either the Russian factor prices rose to Western levels or if a foreign player commenced operations in Russia, both using best practice processes and taking full advantage of the low input costs.

*Domestic competitive intensity*

The nature of competition differs by customer and product type. In the flat products segment, the major manufacturers (the Big Three) compete aggressively for the most important customers from automotive, ship building and machine building sectors. In
the long products market, there is a fair amount of competition for construction customers, which (at the end of the distribution chain) purchase the products for cash. This is the market that the Medium Six participate in. The Small Other players supply the small regional customers (construction companies and machine building plants subsidized by the local governments) who acquire steel primarily on barter terms. Overall, we believe that while the Big Three and Medium Six face a fairly high level of competition on the domestic market, the degree of competition facing the Small Others is lower.

**Non-level playing field**

In general, Small Other plants are often not competing directly against the bigger more productive steel plants. This happens because 1) many small players are indirectly subsidized by the local governments (through tax arrears and cheap energy) and/or because 2) many of the smaller customers are receiving a subsidy from the local government (transferred indirectly through the barter deals) that requires them to deal with a local supplier. The existence of this sheltered market open to the Small Other plants is the key problem hampering the development of the industry.

**External factors**

Two production process factors – capacity utilization and organization of functions and tasks – explain 39 percentage points or almost two thirds of the labor productivity gap between Russia and United States ([Exhibit 19](#)). Hence in the external factor framework (presented in [Exhibit 18](#) and highlighted in the following text) we will concentrate particularly on the external causes of these two factors.

Capacity utilization is a ratio of demand (export and domestic consumption) to producing capacity. Low capacity utilization in Russia is caused both by the fall in domestic demand and by the persistence of producing capacity, because local government subsidies are preventing closure of plants, no matter how unproductive and unprofitable they are.

To address the other production process factor – organization of functions and tasks – a significant proportion of the industry workforce must be laid off. Low labor costs and mobility reduce management’s incentive to restructure, especially if the plants are profitable in their current state (as are the Big Three). Local government pressure further reduces the likelihood that this step will actually be taken. Although problems with minority shareholder rights also retards this process, we believe that it is a secondary factor. High transportation tariffs reduce the level of competition and are another secondary influence on industry behavior. Although there are quite a few problems in related sectors and cost of capital is high, surprisingly, we did not find that they play an important role in inhibiting productivity growth. All steel plants are privately owned, so government ownership is not an issue. Red tape/harassment and barriers to trade / FDI which are important in other sectors, are not a problem for the Russian steel.

We will now review each of these external factors in detail.

**Macroeconomic barriers**

The productivity of Russian steel producers has suffered in the last five years as output fell (driven by a drop in demand), but labor remained in place.
¶ **Drop in demand.** Domestic demand for steel has fallen by more than 70 % since 1990 (Exhibit 29). Exacerbating the situation further, for a period of time Russia exempted Ukrainian steel from the VAT, effectively giving Ukrainian producers a 20 % cost advantage over domestic producers. Russian plants have tried to compensate for this drop in domestic demand by aggressively increasing exports, but, without prior experience in this area, this was a difficult market to develop. When Russian plants did succeed in increasing their export volumes, anti-dumping proceedings leading to institution of quotas (e.g. Europe) or tariffs (e.g. potentially with the United States right now) have again limited the extent of exports. This has significantly decreased the total demand facing Russian plants with output falling by 40 % between 1990 and 1997. A belief that domestic demand or exports could increase significantly in the future (at least at an individual plant level) is certainly motivating management to keep capacity and labor in place.

¶ **Low Labor Cost.** Russian labor costs are low, even when compared to Brazil which has a similar overall income level (Exhibit 30). This is both a competitive advantage for the steel industry and a barrier to improving productivity. Russian managers looking to improve performance find that many operational opportunities, such as improving yield, for example, have a much higher impact on the bottom line than labor reductions (Exhibit 31). And when decisions are made on investments that could bridge the automation gap (thus permitting workforce reductions) more options are found to be non-economic than would otherwise be the case. The overall result is the same – management is not tackling the excess labor problem.

¶ **Country Risk / high capital cost.** At short term rates of 40 % in ruble or 25 – 30 % in real terms (1997) Russia does have a high cost of capital. However, it is not a major barrier to the development of the steel industry. The majority of big producers (Big Three and Medium Six) can get access to international financing (loans may be provided by EBRD or obtained with the help of foreign shareholders or equipment manufacturers) and most have significant projects underway. For example, Magnitogorsk is building a new hot rolling mill, Severstal is putting in an electric arc furnace, Nosta is restructuring to produce special strips to permit production of pipes for northern regions, etc. The Small Other plants can not access this market and are restricted by the high cost of Russian capital. We feel, however, that most of them are not viable in their current configuration and should not be investing in their current equipment. So the high internal cost of capital is, in the case of steel, actually beneficial in that it stops the weakest producers in the industry from pouring money down the drain.

*Labor barriers: mobility restrictions*

Management’s unwillingness to restructure is also exacerbated by the very low labor mobility caused by the registration system, which ties key social benefits to the worker’s current residence. This system has two effects. First of all, it implies that any moves taken to significantly reduce workforce are associated with a very real risk of social unrest in the plant’s town/region, especially for plants in ‘steel towns’. Secondly, it effectively gives managers the flexibility to reduce the real cost of labor by delaying payment of wages and running up arrears, which are not covered until after the inflation has eroded the value of the arrears.
Combined, low labor mobility and low cash labor cost have meant that management has not been interested in tackling the excess labor issue.

**Capital barriers**

- **Government ownership.** Given Russia’s history it is natural to ask how government ownership is affecting industry behavior. We found that it is not an issue for the steel industry, as all plants have been privatized and the number of shares held by government is low. The problems, such as they are, are concentrated around the rights of minority shareholders and their enforcement.

- **Problems with minority shareholder rights.** After the privatization of 1993–94 most Russian steel plants became the subject of a battle for control between various groups of shareholders. While this fight was going on, no group was interested in tackling thorny issues like plant restructuring and labor reduction. Perhaps the most famous example of this situation is the battle between Reforma and Trans World Group for control of Novolipetsk Metallurgical Complex. This phase has largely come to an end in 1996–97, and today most plants are under control of a clearly defined group of owners.

Today, the main problems in this area are driven by inadequate protection of shareholder rights and underdeveloped conflict resolution process/enforcement. The situation is exacerbated by opaque Russian accounting information, which is further distorted by barter (which will be discussed further in the following section on ‘Upstream/downstream industries’). When taken together these conditions often permit the controlling shareholders to maximize their personal return by ‘milking’ the plant at the expense of minority/outside shareholders, workers, suppliers and government (i.e. siphoning off cash through purposely designed transfer pricing mechanisms and trading companies), rather than by restructuring it. A good example of this attitude comes from a newspaper article about a Small Other plant where “(controlling shareholder/manager) is not interested in preserving the plant’s position on the internal market, caters to its own interests, hides profits and does not worry about developing production”. This problem is discouraging foreign investment in the industry.

For the industry as a whole we, nevertheless, rank corporate governance as a secondary and not as a significant problem for two reasons. First, the emergence of clear private ownership at most of the Big Three and Medium Six plants did not lead to any significant labor reductions. Second, because if Small Other plants were faced with hard budget constraints (see ‘Government subsidies’ section) they would, eventually, be forced to end milking and/or restructure.

**Sector-specific barriers**

- **Government subsidies.** Local government behavior pushes plants in the same direction as the low labor cash cost and mobility factors – towards not reducing the workforce. Because of low labor mobility and the ‘steel town’ phenomena, Russian local governments have an even higher stake than their Western counterparts in maintaining high employment in their
regions/towns. Their influence varies for the three groups of producers. Local governments implicitly subsidize the continued operation of most Small Other players and a few of the Medium Six (thus preventing plant closure). They pressure the remaining players of the Medium Six group not to lay off workers and do not really have much influence on behavior of the Big Three plants.

Many of the Small Other and a few of the Medium Six plants are not viable and cannot operate without outside help. This support is provided in the form of an implicit government subsidy delivered via barter deals with suppliers and customers who are forced by local government to deal with the plant. For example, local government can provide cheap gas because it controls local gas distributors. It can also initiate local projects (e.g. a medium size Russian city is now building a metro) where participants receive steel from the local plant in exchange for tax waivers.

Local governments use a different approach with the other Medium Six plants, the management of some of which is interested in restructuring. Here local governments apply pressure to management to prevent layoffs. The methods used to achieve this result vary. Local government can acquire ownership of a blocking package of a plant's shares, or bankrupt the enterprise outright or apply pressure to it through its creditors (again threatening bankruptcy). These processes are facilitated by mounting tax arrears of many plants and/or of their creditors/suppliers. The bankruptcy route leads to installation at the plant of a new general director chosen by the local court and not answerable to shareholders. In the Kemerovo region, for example, all major industrial enterprises have been declared bankrupt but none have shut down. The end result is the same – the plant maintains its current staffing levels.

The Big Three are not subsidized by their local governments and, because of their size and better financial position, can not be pressured to the same extent as the Medium Six group.

The overall effect of government actions is to prevent closure of non-viable producers and minimize layoffs at other companies.

- **Red Tape / harassment.** We believe that the issues described in the “Government subsidies” point above reflect the main bad influence of the government on the Russian steel industry. Although red tape and regulatory harassment were mentioned as key barriers to industry development in sectors such as food and general merchandise retailing, we did not find them to be an issue in steel.

- **Barriers to trade/FDI.** We also do not think that there are any significant regulatory/enforcement problems relating to trade barriers or rules on foreign direct investment that impact development of the Russian steel industry.

**Related industry barriers**

- **Poor infrastructure / high transportation costs.** We believe that the high transportation tariffs, which are frequently mentioned in the press as a major problem for the Russian industry, are only a secondary barrier to improving
productivity. Without a doubt they reduce the level of competition on the domestic market and influence the ability of some of the plants to export. However, the vast majority of plants are not fully shielded by transportation from competition. For example, the reduced labor cost of medium sized plants permits them to compete almost on par with the less productive smaller plants located 500 kilometers away (Exhibit 32). The few remaining plants located in remote areas will be immune from competition at almost any transport tariff.

We do believe, however, that Russian railroads are suffering from productivity and/or surcharging issues, as before the August 1998 crisis their prices roughly equaled the US ones, even though in Russia labor is many times cheaper than in the US.

Upstream/downstream sectors. There are a number of problems in the upstream and downstream industries and we have already mentioned some of them in various sections above. The first of these is the decreased domestic demand for steel (described in the ‘Drop in demand’ section). The second is barter.

In 1997 barter accounted for almost 80% of all domestic steel sales. Barter reduces financial transparency, hides true profitability of transactions and obscures operating results of plants. There are many reasons for why companies engage in barter, some of which were already mentioned above (Exhibit 33). It may facilitate milking (described under ‘Problems with minority shareholder rights’) and it acts as a mechanism for transferring subsidies from the government to the non-viable players (described under ‘Government subsidies’).

In addition, companies may engage in barter to optimize taxes, to overcome a lack of working capital and to facilitate contract enforcement. In Russia a company with tax arrears (a definition which fits most enterprises) is required to use only one bank account and all funds appearing in this account are subject to 100% marginal tax rate. By dealing in barter companies can avoid this immediate seizure of profits. The hyperinflation of 1992–1994 has wiped out the working capital of many players, and barter offers a way to continue operations without it. Finally, in Russia accounts receivable may be very tough to collect if the debtor is de-facto bankrupt. So, when dealing with a company whose financial stability is suspect, many firms prefer to do straight goods exchanges.

Barter is a major influence on the behavior of the industry, but it is primarily a symptom of problems described above and to eliminate it we must tackle its causes. We feel that local government subsidies are the key issue to be addressed, because barter is almost non-existent in the industries where government subsidies are not present and the end consumer pays cash, such as food processing. The tax code must also be addressed and not only because of barter (see the Aggregate Section). Barter is not a requirement for milking plants, although it does facilitate it. Lack of working capital is frequently cited as the driver of barter, but we believe that this argument is suspect as barter did not arise in Brazil which had even worse hyperinflation than Russia and where companies had similar problems with working capital. As far as use of barter to enforce payment is concerned, contract
enforcement can also be addressed in other ways. Of the causes described in this section, we rank local government subsidy as a primary problem for the industry, corporate governance as a secondary issue and we address the tax code in the Aggregate/Synthesis sections. We are not going to denote ‘problems in related industries’ as an issue for the steel industry because of barter.

The only remaining issue for the steel industry caused by problems in upstream / downstream industries is supply management. Because many suppliers are unable to guarantee timely delivery, steel plants maintain a large inventory of raw materials. Suppliers may be unable to fulfil their commitments for a number of reasons ranging from non-delivery of materials necessary for their operation (problems in their upstream industries) to strikes and uncertain transportation delays. Although this problem can potentially have very severe repercussions, todate the large steel plants have managed to smooth out these fluctuations and we conclude that currently problems in upstream and downstream industries do not have a significant effect on productivity of the Russian steel industry.

**POLICY IMPLICATIONS AND FUTURE OUTLOOK**

While the future of individual plants will depend on the demand level (scenarios of GDP growth are discussed in the Synthesis and Implications chapter), we can talk here about the likely development pattern for the entire industry.

Optimal development of the industry depends on the elimination of implicit government subsidies. If the relevant reforms are introduced, the Small Other plants will be exposed to the full effect of their ever increasing losses and the majority of them will close. The same fate may befall the least technologically advanced of the Medium Six players. While the speed of closure and number of plants exiting the industry will depend on the extent and speed with which subsidies are eliminated, we can do some parametric estimates of what may happen.

If, implicit government subsidies were eliminated and, for example, 2/3 of the smaller plants and one of the medium six plants were to close, roughly 100 thousand workers would exit the industry. The demand previously fulfilled by the closing plants will now be met by the long-term viable Big Three and remaining Medium Six plants. The industry labor productivity will immediately increase by 40 % – to 40 % of the US level. At the same time, as the non-level playing field disappears, domestic competition will heat up and the remaining plants will start to address energy consumption and “easier” issues in the organization of functions and tasks area. Industry productivity would continue to grow, reaching 45% of the US level.

Further growth in productivity will depend both on the plants’ motivation to tackle the harder OFT issues and, largely, on growth in domestic demand for steel associated with GDP growth (see above the section on “Global industry trends” and Exhibit 10, which illustrates the relationship between GDP and steel consumption). If the annual GDP growth is in the 0 – 6 % range, over the next five years the existing plants will be able to accommodate the additional domestic demand and their productivity would increase to 50 % of the US level. If GDP growth rate reaches the 9 – 12% range, industry productivity will increase to 70 – 75% of the US level and by the end of the
five year period the existing plants will have reached full capacity utilization (maintaining current export volumes). To sustain high growth beyond the three to five year period, Russia’s steel plants would either need to reduce exports, supplying more and more steel to the domestic market or new capacity (in the form of minimills) will start to be built.

Three initiatives can facilitate optimal development of the steel industry:

- Replacement of implicit local production subsidies with explicit federal unemployment benefits, permitting small plants to shut and big plants to shed excess employees
- Availability of an explicit choice open to all workers between moving and accepting low wages (labor mobility must be increased through relaxed registration process and a proper housing market needs to be created – see the Housing Construction case)
- Employment growth in other sectors which can absorb labor freed from the steel industry

In this sector the West can best help Russia by allowing Russian steel plants to export freely. Rather than introducing quotas or punishing tariffs for Russian steel (as the European community has done), the West should allow Russia to capitalize on its competitive advantages, such as the low cost of natural gas.
Appendix. Measuring productivity

OUTPUT

We use “equivalent tons” as the proxy to value added. “Equivalent tons” are derived by adjusting the total tonnage of finished steel produced by the product and production process mixes of each country. Additionally, for Russia only, we have decreased the ‘equivalent tons’ due to the (lower) quality of Russian product relative to other countries and due to the much higher level of energy consumption per ton of finished product.

For the product mix, raw output is divided into product segments with each segment adjusted for its different value-added content. This weighting approach was tested in countries for which reliable price data is available and was found to provide a strong correlation to value added (Exhibit 34). In the production process mix, raw output is split into minimill and integrated mill production and adjusted for the different amount of value-added of these two facilities. Instead of starting with ore and coal and proceeding through the sintering, coking and blast furnace process steps (as integrated mills do), minimills begin their production process at the electric arc furnace step, which they feed with the more costly scrap, rather than coal and ore. Consequently, their value-added per ton of finished product is much lower than that of the integrated plants (Exhibit 35).

Two other adjustments are unique to Russia. The first is the quality adjustment factor. To select the quality factor we reviewed the difference between Russian export prices and world market prices for different types of products (Exhibit 36). Although the average difference in 1996 was 10 %, we believe that factors other than quality differential, such as prepayment requirements, FOB Black/Baltic sea sales conditions which require customers to arrange transport and inclusion in the figures of some Ukrainian exports, which many believe to be of worse quality than Russian steel, may account for some of the price differential. Consequently, we selected 5 % as a quality adjustment for the Russian industry.

The efficiency adjustment factor (ratio of value-added per ton of finished product in Russia and in the United States) is required because, due to their lower yield and production process configuration that requires more reheating, Russian plants consume three times more natural gas to produce a ton of finished product than their western counterparts. For the big plants (Big Three and Medium Six) we have developed the efficiency adjustment under the US and Russian relative prices and selected the average – reducing the value-added by 10 % (Exhibit 37). For the small plants (Small Others), whose productivity was estimated at 13 % before the adjustment, we reduced the estimate by 30 % – to 10% of the US level – to account for higher energy utilization and other factors (Exhibit 38).

Exhibit 39 details the determination of ‘equivalent ton’ output for Russia and Exhibit 40 compares Russian and US “equivalent tons” per ton of physical output.
We have rejected two other options for calculating output. The first option would have involved using financial value added figures adjusted by the industry PPP. We rejected this option for two reasons. First, it is not possible to get accurate price data for steel products in the sample countries. Second, as the Russian accounting system differs significantly from the GAAP standard, it is not possible to obtain reliable value-added data for the Russian industry on a basis comparable to Western countries. The second method would be to measure output as total tonnage without taking into account differences in product or production process mix. We rejected this method because the product and production process mixes in the included countries are sufficiently different to make calculations made using raw output figures inaccurate. This approach would have understated the true output of countries producing a higher value-added mix of products.

LABOR INPUTS

The labor input is the total number of hours worked, calculated by multiplying the number of hours worked per employee by the total number of production workers adjusted for the level of outsourcing. We have derived the outsourcing equalization factor based on detailed review of production workforce at one of the major Russian plants and comparing it to the US integrated producers. We found that Russian plants were much more vertically integrated than their US counter-parts, and only 68% of the Russian plant workforce (85 % of the production labor) performs functions comparable to those of the US plants (Exhibit 41).

CAPITAL INPUTS

The capital input is the value of the capital stock used in steel production. Based on 1990 and 1995 surveys of facilities performed by GIPROMEZ (the State Institute for Design of Metallurgical Plants) we constructed a database of equipment in use in Russia. To arrive at a capital stock measure we valued the equipment using 1995 US market replacement prices. For open hearth furnaces we used the replacement price for the technology that best fits the plants’ production cycle. In large integrated plants this was basic oxygen furnaces and for smaller plants, which did not have blast furnaces, we used the replacement value of similar sized electric arc furnaces.

An alternative methodology, constructing a capital stock using the perpetual inventory method (PIM) and data on capital investments over time was impossible to apply in Russia because of lack of reliable and meaningful investment data. First of all, the historical recorded prices paid for Russian equipment by Russian plants could not be compared to the world market prices and, secondly, because the value of capital was adjusted multiple times during the hyperinflation of 1992 – 1995.

In our previous work we have compared the survey approach to the PIM method. For the US and Korea the findings using PIM were very similar to the survey method. For Japan, the PIM method yielded a higher result, but the difference roughly corresponded to the capacity which has been retired in Japan after 1973.
DATA SOURCES, MARGIN OF ERROR AND DRIVERS OF UNCERTAINTY

Labor Productivity

In calculating productivity measures we have relied primarily on physical output and employment data collected by GOSKOMSTAT. This agency collects historical data on all Russian plants and provides a detailed breakdown of output. We have checked some of GOSKOMSTAT’s company specific output and employment figures with the relevant plants and found that they agreed almost perfectly. With the exception of plant specific employment for 1996 (which we extrapolated from 1995 and 1997 figures), GOSKOMSTAT provided us with all the required information for the bigger Russian plants (the Big Three and the Medium Six) and for the Industry as a whole for 1993 - 1997. The Small Other plant figure is available directly for 1997 and is a plug between the industry and the two big groups for the earlier years.

For 1990 – 1992 only the total industry output (with a limited split into product groups) and black metallurgy (not steel by our definition) employment were available from GOSKOMSTAT. In addition, we were able to obtain plant specific total output figures for the Big Three and Medium Six plants for 1990 from the NIISiS1. We estimated labor productivity for 1990 – 92 based on these figures with the following assumptions. The industry product split was constructed based on available limited information and the detailed 1993 industry product split. This same product split was used for all three groups of producers. We assumed that employment in the industry as a whole and in each group of plants changed by the same percentage as the black metallurgy employment. We believe that the additional margin of error for the 1990 – 1992 labor productivity estimates driven by these extrapolations is at most +/- 2 % of the US productivity. Thus Russian industry productivity in 1990 was between 44 and 48 % of the United States figure for the same year.

In addition, there is some uncertainty associated with all labor productivity estimates. To convert physical output into ‘equivalent tons’ and number of workers in Russian plants into labor hours, we applied a number of adjustments to the data. For many of these adjustments, a range of values is possible. The above sections on output and labor detail the calculation made for each and mention the value of the adjustment factors chosen. Here we will mention the drivers and possible margin of error associated with each adjustment.

As in our prior work, we had a sufficiently detailed breakdown of output to apply process and product mix factors. No additional uncertainty is introduced by this step. As the actual difference between Russian export and third country import prices was around 10 % and we chose 5 % for our quality adjustment, there is a margin of error of +/- 5 % associated with this factor. On the labor input side we believe that there is a margin of error associated with the function equalization factor. We derived the factor of 85 % of production workforce (ratio of 68 to 80 on Exhibit 41) based on a very detailed breakdown of labor of one of the Big Three plants. We believe that its staffing is representative of the industry, but the error for each group of plants could be +/-5%.

The other sources of uncertainty differ by plant size:

1 NIISiS is the Research Institute of Steel and Alloys
The Big Three and Medium Six  The value of the efficiency adjustment factor depends on relative prices chosen and varies between 7% on Russian prices and 15% on US prices. Thus there is a range of roughly +/- 4% associated with this choice.

The possible total impact of these concerns on labor productivity of the Big Three and Medium Six plants is summarized in Exhibit 42.

Exhibit 43 summarizes the impact of uncertainty from special adjustments described in the output measurement section on Small Other plants.

The overall possible effects of these concerns on labor productivity are:

<table>
<thead>
<tr>
<th></th>
<th>Selected Labor Productivity Estimate</th>
<th>Minimum Labor Productivity Estimate</th>
<th>Maximum Labor Productivity Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>28 %</td>
<td>23 %</td>
<td>35 %</td>
</tr>
<tr>
<td>Big Three</td>
<td>47 %</td>
<td>41 %</td>
<td>55 %</td>
</tr>
<tr>
<td>Medium Six</td>
<td>27 %</td>
<td>23 %</td>
<td>32 %</td>
</tr>
<tr>
<td>Small Others</td>
<td>10 %</td>
<td>3 %</td>
<td>18 %</td>
</tr>
</tbody>
</table>

We believe that the conclusions presented in the case study above hold for all values in this range.

Capital Productivity

In addition to adjustments to output that are described in the labor productivity section above, there is additional uncertainty associated with the survey of capital. Although we know what equipment was installed at the plants in 1990, we have limited information on any items that may have been taken off-line since then. This leaves a roughly +/- 4% range of uncertainty around the value of capital employed in the industry. The overall impact of these uncertainties is to create a range of +/- 13% around the industry capital productivity estimate of 43% of the US.


LIST OF SOURCES USED IN THIS STUDY

RUSSIAN


NIISiS       The State Institute of Steel and Alloys supplied a survey of salaries, arrears and employment levels for many plants and arranged interviews with experts on open hearth technology.


ROSSIYSKAYA METALURGIYA by Expert*RA The survey of most of the Russian black metallurgy players (from mines to metalware producers) contains a summary of key indicators for many steel plants – a description of equipment, production, exports, financial ratios, lists of investments made and planned.

Metalli Evrasii, Metallo-
snabzhenie I Sbit We have found these magazines to contain a number of very useful articles on external factors affecting the industry. Metallosnabzhenie I Sbit publishes a bimonthly list of Russian market steel prices which were used for many calculations on the Russian domestic market.

WESTERN

Industry Associations  In Brazil we made extensive use of the information collected by the association of steel producers in Brazil.

James King  James King Consulting supplied all Western transportation costs used in our work.

Paine Webber  We used Paine Webber benchmarks on material yield and energy consumption to compare Russian plants with the Western best practice.

Metal Bulletin  Metal Bulletin prices were used to assess the Russian quality differential.

McKinsey best practice benchmarks  We have relied on the accumulated McKinsey knowledge of the steel industry in understanding the problems facing Russian plants.
SCOPE OF THE VALUE CHAIN ANALYZED

<table>
<thead>
<tr>
<th>Process</th>
<th>Mining</th>
<th>Raw material processing</th>
<th>Iron making</th>
<th>Steel making</th>
<th>Casting</th>
<th>Hot rolling</th>
<th>Cold rolling/coating</th>
<th>First transformation</th>
</tr>
</thead>
</table>

End products
- Ore
- Sinter
- Pig iron
- Liquid steel
- Slabs
- Billets
- Blooms
- Ingots
- HR coils
- Plates
- Rails
- Sections
- Channels
- CR coils
- Galvanized sheets
- Coated sheets
- Nuts and bolts
- Wires
- Nets

Source: McKinsey analysis

CRUDE STEEL PRODUCTION EVOLUTION

Million tons

CAGR, 1980-90
- 0.6%

CAGR 1990-94
-14.1%

CAGR 1994-97
-0.3%

World average
1.5%

Source: MGI Korea study; Industry association; IBS; Goskomstat

Exhibit 2
STEEL TRADE INTENSITY
Percent of steel products

Export share of production

<table>
<thead>
<tr>
<th>Country</th>
<th>1997</th>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>60</td>
<td>28</td>
</tr>
<tr>
<td>Brazil</td>
<td>22</td>
<td>20</td>
</tr>
<tr>
<td>Korea</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Japan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>US</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Import share of consumption

<table>
<thead>
<tr>
<th>Country</th>
<th>1997</th>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Brazil</td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>Korea</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Japan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>US</td>
<td></td>
<td>20</td>
</tr>
</tbody>
</table>

Source: Industry association; Global Vantage; Russia customs; McKinsey analysis

Exhibit 3
TWO MAJOR TECHNOLOGIES IN STEEL

<table>
<thead>
<tr>
<th></th>
<th>Integrated mills</th>
<th>Mini-mills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw materials</td>
<td>Iron ore, coke</td>
<td>Scrap</td>
</tr>
<tr>
<td>Production/capacity</td>
<td>2 to 10m tons</td>
<td>100,000 to 1m tons</td>
</tr>
<tr>
<td>Technology/equipment</td>
<td>Complex production flow (Blast furnace --&gt; Basic Oxygen Furnace --&gt; Ingot/Continuous casting --&gt; Hot rolling --&gt; Cold rolling/finishing)</td>
<td>Single production line (Electric Arc Furnace --&gt; Continuous casting --&gt; Hot rolling)</td>
</tr>
<tr>
<td>Product range</td>
<td>Wide variety of flat and long products including higher value added products</td>
<td>Limited product mix of commodity long products (wire rod, bars, sections, normally in common and lower quality steel grades); now penetrating flat products</td>
</tr>
<tr>
<td>Markets</td>
<td>Domestic and global markets</td>
<td>Mainly domestic and local markets</td>
</tr>
<tr>
<td>Investment level</td>
<td>Requires high investments (2 times per unit of capacity more than mini-mills)</td>
<td>Small to medium investments to install and maintain</td>
</tr>
</tbody>
</table>

PRODUCTION PROCESS MIX - MINI-MILL SHARE BY COUNTRY

Percent of total output

![Bar graph showing the share of mini-mills in different countries with specific percentages and years (Russia 1997: 4%, Brazil 1995: 15%, Korea 1995: 28%, Japan 1995: 34%, US 1995: 40%, including Oskol with DRI technology. *)

*Includes Oskol (DRI technology)

Source: Industry association; Global Vantage; McKinsey analysis

Exhibit 4

Exhibit 5
**STEEL PRODUCT EXAMPLES**

<table>
<thead>
<tr>
<th>Semi-finished</th>
<th>Long carbon steel</th>
<th>Flat carbon steel</th>
<th>Specialty</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Slabs</td>
<td>• Reinforcement bars</td>
<td>• Hot rolled coils</td>
<td>• Stainless steel</td>
</tr>
<tr>
<td>• Billets</td>
<td>• Bars</td>
<td>• Cold rolled coils</td>
<td>• Galvanized sheets</td>
</tr>
<tr>
<td>• Blooms</td>
<td>• Rails</td>
<td>• Plates</td>
<td>• Tin plate</td>
</tr>
<tr>
<td></td>
<td>• Wire rod</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PRODUCT MIX**

Percent

<table>
<thead>
<tr>
<th></th>
<th>38.8m</th>
<th>21.8m</th>
<th>38.9m</th>
<th>88.4m</th>
<th>98.4m tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coated sheets and specialty products*</td>
<td>14</td>
<td>14</td>
<td>21</td>
<td>28</td>
<td>41</td>
</tr>
<tr>
<td>Cold rolled flat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plates</td>
<td>14</td>
<td>13</td>
<td>11</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>Hot rolled flat</td>
<td>15</td>
<td>12</td>
<td>9</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Long carbon steel**</td>
<td>27</td>
<td>22</td>
<td>27</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Semi-finished</td>
<td>26</td>
<td>27</td>
<td>37</td>
<td>22</td>
<td>32</td>
</tr>
<tr>
<td>products</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Includes stainless, galvanized tin plate, other specialty products

** Includes wire rod, sections, seamless tubes, rails, reinforcement bars, bars

Source: Industry association; Goskomstat

Exhibit 6

Exhibit 7
ROLE OF NON-METALLURGICAL PLANTS IN STEEL INDUSTRY - 1996

- Crude steel: 49.3%
  - Produced by non-metallurgical plants and excluded from our analysis: 6%
- Flat steel: 16.2%
  - 3%
- Long steel: 22.3%
  - 1%

Source: Goskomstat
THE RUSSIAN STEEL INDUSTRY - BY OUR DEFINITION - 1997

Production workforce

### Big three
- Flat products and long products
- Big integrated plants

### Medium six
- Long products
- Big integrated plants

### Small others
- All other players

Percent

100% = 38.8m tons

<table>
<thead>
<tr>
<th>Category</th>
<th>Production of finished rolled steel products</th>
<th>Production workforce</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big three</td>
<td>55</td>
<td>32</td>
</tr>
<tr>
<td>Medium six</td>
<td>38</td>
<td>37</td>
</tr>
<tr>
<td>Small others</td>
<td>7</td>
<td>31</td>
</tr>
</tbody>
</table>

Source: Goskomstat

---

STEEL CONSUMPTION DEVELOPMENT

Kg per capita vs. USD 1990 GDP at PPP per capita

Note: Sample includes Brazil, France, Germany, Japan, Korea, Taiwan, US, average values

Source: HSIC; Madison (1994); McKinsey analysis
WORLD STEEL CAPACITY AND CONSUMPTION
Thousand tons raw steel

Source: EWG; OECD; ECE; Industry associates

Exhibit 11
**PRODUCTIVITY**
Indexed to US =100 in 1995

*Capital and labor factor shares are equal at 50% each
Source: Industry associations; VDH; James King

**LABOR PRODUCTIVITY EVOLUTION, 1990-95**
Indexed to US =100 in 1995

Source: McKinsey analysis

Exhibit 12

Exhibit 13
PRODUCTIVITY - 1997
Indexed to US =100 in 1995

Total factor productivity

Capital productivity

Labor productivity

Source: Industry associations; VDH; James King

Exhibit 14
EVOLUTION OF RUSSIAN LABOR PRODUCTIVITY BY SUBGROUP

Percent of 1990 US labor productivity

*Drop between 1990 and 1997
Source: Industry associations; VDH; Goskomstat; Steel & Alloy Institute

EXPLAINING THE DROP IN LABOR PRODUCTIVITY OF THE BIG THREE RELATIVE TO US

Labor productivity
Equivalent tons per hour

*Calculated as percent of 1995 US labor productivity
Source: McKinsey analysis

*Calculated as percent of 1995 US labor productivity
Source: McKinsey analysis
Exhibit 17

SUMMARY OF MARGIN OF UNCERTAINTY FOR PRODUCTIVITY ESTIMATES
Indexed to US =100 in 1995

![Graph showing total factor productivity for different industry sizes]

Source: Industry associations; VDH; James King

CAUSALITY FOR PRODUCTIVITY DIFFERENCES: STEEL
Russia vs. US

<table>
<thead>
<tr>
<th>External factors</th>
<th>Industry overall</th>
<th>Big Three</th>
<th>Medium Six</th>
<th>Small others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macroeconomic barriers</td>
<td>Very important</td>
<td>Secondary</td>
<td>Secondary</td>
<td>Secondary</td>
</tr>
<tr>
<td>Labor barriers</td>
<td>Important</td>
<td>Secondary</td>
<td>Secondary</td>
<td>Secondary</td>
</tr>
<tr>
<td>Capital barriers</td>
<td>Secondary</td>
<td>Important</td>
<td>Secondary</td>
<td>Secondary</td>
</tr>
<tr>
<td>Related industry barriers</td>
<td>Important</td>
<td>Secondary</td>
<td>Secondary</td>
<td>Secondary</td>
</tr>
<tr>
<td>Other barriers (climate, geology, etc.)</td>
<td>Secondary</td>
<td>Secondary</td>
<td>Secondary</td>
<td>Secondary</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Industry dynamics</th>
<th>Industry overall</th>
<th>Big Three</th>
<th>Medium Six</th>
<th>Small others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low capacity utilization</td>
<td>Very important</td>
<td>Secondary</td>
<td>Secondary</td>
<td>Secondary</td>
</tr>
<tr>
<td>Inefficient organization</td>
<td>Important</td>
<td>Secondary</td>
<td>Secondary</td>
<td>Secondary</td>
</tr>
<tr>
<td>Lower capital intensity/technology</td>
<td>Secondary</td>
<td>Important</td>
<td>Secondary</td>
<td>Secondary</td>
</tr>
</tbody>
</table>

Productivity
(Indexed to US = 100)

Exhibit 18
LABOR PRODUCTIVITY - PRODUCTION PROCESS LEVEL CAUSALITY
Indexed to US = 100 in 1995

Big three

Medium six

Small others

Industry

Source: McKinsey analysis

Exhibit 19
### EVOLUTION OF PRODUCTION AND EMPLOYMENT IN STEEL IN RUSSIA

Percent change 1997 over 1990

<table>
<thead>
<tr>
<th></th>
<th>Production of finished steel products</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry overall</td>
<td>-32</td>
<td>-11</td>
</tr>
<tr>
<td>Big Three</td>
<td>-25</td>
<td>-3</td>
</tr>
<tr>
<td>Medium Six</td>
<td>-35</td>
<td>-1</td>
</tr>
<tr>
<td>Small Others</td>
<td>-70</td>
<td>-28</td>
</tr>
</tbody>
</table>

Source: Goskomstat

### SCALE OF RUSSIAN PLANTS - 1990

Million tons of finished product

<table>
<thead>
<tr>
<th></th>
<th>Magnitogorsk</th>
<th>Severstal</th>
<th>Novolipetsk</th>
<th>Nizhny Tagil</th>
<th>Metal</th>
<th>Zapfino</th>
<th>Kuznetsk</th>
<th>Nosta</th>
<th>Oskol (DRI technology)</th>
<th>Krasniy Oktiabr</th>
<th>Amurstal</th>
<th>Oskol</th>
<th>Chusovsk</th>
<th>Ashinsk</th>
<th>Alapaevsk</th>
<th>All others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big Three</td>
<td>13.0</td>
<td>11.7</td>
<td>7.1</td>
<td>6.0</td>
<td>5.4</td>
<td>5.2</td>
<td>3.5</td>
<td>3.4</td>
<td>1.3</td>
<td>1.4</td>
<td>1.5</td>
<td>1.4</td>
<td>&lt;0.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium Six</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Typical mini-mill scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small Others</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Minimum efficient scale for an integrated plant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Goskomstat; NIISS; McKinsey analysis
### CRUDE STEEL PRODUCTION BY TECHNOLOGY AND CONTINUOUS CASTING - 1997

**Percentage of output**

<table>
<thead>
<tr>
<th></th>
<th>BOF+EAF</th>
<th>Open hearth technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude steel production</td>
<td></td>
<td></td>
</tr>
<tr>
<td>US</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Russian industry</td>
<td>68</td>
<td>32</td>
</tr>
<tr>
<td>Big Three</td>
<td>82</td>
<td>18</td>
</tr>
<tr>
<td>Medium Six</td>
<td>63</td>
<td>37</td>
</tr>
<tr>
<td>Small Others</td>
<td>27</td>
<td>73</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Continuous casting</th>
<th>Ingot casting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel casting</td>
<td>95</td>
<td>5</td>
</tr>
<tr>
<td>Russian industry</td>
<td>47</td>
<td>53</td>
</tr>
<tr>
<td>Big Three</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>Medium Six</td>
<td>17</td>
<td>83</td>
</tr>
<tr>
<td>Small Others</td>
<td>7</td>
<td>93</td>
</tr>
</tbody>
</table>

Source: Goskomstat; Industry associations

Exhibit 22
IMPACT OF OPEN HEARTH TECHNOLOGY ON LABOR REQUIRED FOR THE STEEL MAKING PROCESS STEP

Manning requirements by process
Indexed to EAF and CC = 100

- Electric Arc Furnace and Continuous Casting: 100
- Basic Oxygen Furnace and Continuous Casting: 133
- Open Hearth Furnace and Ingot Casting: 167

Source: Institute of Steel & Alloys

IMPACT OF OPEN HEARTH TECHNOLOGY ON LABOR PRODUCTIVITY

Additional labor required*
Percent

- Big Three: 0
- Medium Six: 2
- Small Others: 30

*Compared to total optimum labor inputs for the whole plant

Source: Institute of Steel & Alloys; Goskomstat
IMPACT OF TECHNOLOGY IN SMALL PLANTS ON ENERGY CONSUMPTION
Percentage of energy consumed by Western Electric Arc Furnace (kJ per ton of liquid steel)

- Open Hearth Furnace energy consumption: 250
- Impact of low yield from ingot casting - additional energy needed per ton of blooms/slabs: 100
- Overall impact of Open Hearth Furnace and Ingot Casting versus Electric Arc Furnace and Continuous Casting: 350

Source: Steel and Alloy Institute; Expert interviews; McKinsey analysis

Exhibit 25
NATURAL GAS PRICE, JAN-AUG 1998
USD per 1000 m³

US list price

Official Russian price

Possible actual Russian price after "cash discount"

Real price paid by Russian steel plant is 15-25% of the US price

Source: Gazprom; McKinsey analysis

CAPITAL PRODUCTIVITY - CAUSALITY
Indexed to US = 100 in 1995

Russia vs. Korea

Source: McKinsey analysis
MINI-MILL VS. INTEGRATED MILL CAPITAL PRODUCTIVITY IN THE US *

**Capital productivity**
VA$/USD thousands invested

- Integrated: 0.12
- Mini-mills: 0.21

**Value added/ton**
VA$/ton

- Integrated: 190
- Mini-mills: 140

**Unadjusted capital productivity**
Tons/USD thousands invested

- Integrated: 0.64
- Mini-mills: 1.52

* Based on a sample of companies
Source: VDEH; James King; McKinsey analysis
RUSSIAN STEEL CONSUMPTION

Percent

Source: Goskomstat; Metal Bulletin; EIU; Planecon; McKinsey analysis

Exhibit 29

LABOR COST

USD per hour

<table>
<thead>
<tr>
<th>Country</th>
<th>1994-95</th>
<th>1995-96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>Western Europe</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>US</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Korea</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Brazil</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Russia* (pre Aug 98 crisis)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Russia* (post Aug 98 crisis)</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

*Assuming social benefits equal to salary

Source: Industry associations

Exhibit 30
IMPACT OF VARIOUS COST CUTTING INITIATIVES

Improvement in pre-tax profit* resulting from 10% reduction in use of labor or energy

<table>
<thead>
<tr>
<th>Percent</th>
<th>Labor</th>
<th>Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12</td>
<td>30</td>
</tr>
</tbody>
</table>

- Socially sensitive (steel plant as the main employer)
- Wage is flexible as a result of registration policy and lack of portability of social benefits
- Industry uses twice as much energy as benchmarks
- Price of energy increasing towards world market levels

*Based on 7% profit margin
Source: RMG report; McKinsey analysis

Exhibit 31
IMPACT OF TRANSPORTATION ON COMPETITION
USD per ton of finished product

Source: Russian Metallurgy by Expert RA; Ministry of railroads; McKinsey analysis

Labour cost of a medium player: $44
Transportation cost for 500 km: $25
Labour cost of a small player: $63

Does not prevent price competition
## IMPACT OF BARTER ON STEEL INDUSTRY

<table>
<thead>
<tr>
<th>Causes of Barter</th>
<th>Importance</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acts as a mechanism for transferring implicit government subsidies to steel plants</td>
<td>•</td>
<td>Covered in ‘Government subsidies’ section</td>
</tr>
<tr>
<td>Facilitates milking</td>
<td>○</td>
<td>Covered in ‘Problems with minority shareholder rights’</td>
</tr>
<tr>
<td>Optimizes taxes paid</td>
<td>○</td>
<td>Covered in ‘Aggregate Analysis’</td>
</tr>
<tr>
<td>Permits continued operation without working capital</td>
<td>—</td>
<td>Barter is not necessary to address this issue, as shown by Brazil</td>
</tr>
<tr>
<td>Substitutes for contract enforcement mechanisms</td>
<td>—</td>
<td>Mechanisms other than barter are also possible</td>
</tr>
</tbody>
</table>

Although barter plays an important role in determining behavior of Russian steel industry, its main causes where identified as problems in other sections of the report.
PRODUCT MIX ADJUSTMENT

Correlation between value added and product factor used
Indexed VA/ton

0 50 100 150 200 250 300
0 50 100 150 200 250 300
Slabs
Hot rolled
Galvanized
Cold rolled
Tin mill

Source: McKinsey steel practice
Exhibit 34

PROCESS MIX ADJUSTMENT

Value-added per ton
Indexed 100 = integrated plant

Integrated plant
Iron ore
Coking and sintering
Iron making
Steel making
Casting
Hot rolling
Cold rolling/coating
100

Mini-mill
Scrap
Steel making
Casting
Hot rolling
65

Exhibit 35
MAXIMUM POSSIBLE QUALITY DIFFERENTIAL FOR RUSSIAN STEEL PRODUCTS

<table>
<thead>
<tr>
<th>Product type</th>
<th>Discount from 1996 average CIS export price* to ECSC mills’ price** Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Billets</td>
<td>0</td>
</tr>
<tr>
<td>• Rebars</td>
<td>9</td>
</tr>
<tr>
<td>• Merchant bars</td>
<td>14</td>
</tr>
<tr>
<td>• Sections***</td>
<td>16</td>
</tr>
<tr>
<td>• Wire rod</td>
<td>9</td>
</tr>
<tr>
<td>• Hot rolled coil (dry)</td>
<td>9</td>
</tr>
<tr>
<td>• Cold rolled coil</td>
<td>9</td>
</tr>
</tbody>
</table>

* Calculated as CIS third country export price, FOB stowed, Black/Baltic sea plus USD 20 in freight to Antwerp
** FOB Antwerp
*** 1997 price

For productivity calculations we are going to use quality discount of 5%

YIELD ADJUSTMENT - BIG AND MEDIUM PLANTS

<table>
<thead>
<tr>
<th>Russian relative prices</th>
<th>Russia</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel - USD 280/ton</td>
<td>Value-added 81</td>
<td>88</td>
</tr>
<tr>
<td>Gas - USD 40/1000 m³</td>
<td>Gas 14</td>
<td>7</td>
</tr>
</tbody>
</table>

US relative prices

<table>
<thead>
<tr>
<th>Russia</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel - USD 350/ton</td>
<td>Value-added 123</td>
</tr>
<tr>
<td>Gas - 120/1000 m³</td>
<td>Gas 42</td>
</tr>
</tbody>
</table>

Source: Paine Webber report; RMG report; McKinsey analysis
ENERGY AND OTHER ADJUSTMENTS FOR SMALL OTHER PLANTS
PRODUCTIVITY
Indexed to US = 100 in 1995

<table>
<thead>
<tr>
<th>Adjustment</th>
<th>Selected adjustment value (multiplier)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production process which starts with pig iron (excludes coking, sintering and blast furnace steps)</td>
<td>0.72</td>
</tr>
<tr>
<td>Efficiency factor</td>
<td>0.67</td>
</tr>
<tr>
<td>Some workers performing functions outside value chain (in addition to labor equalization factor)</td>
<td>1.60</td>
</tr>
<tr>
<td>Environmental damage caused by open hearth furnaces</td>
<td>Not quantified but less than 1.00</td>
</tr>
</tbody>
</table>

Adjusted labor productivity estimate of 10%
**EQUIVALENT TON DETERMINATION**

**Percent**

- **US**
  - 100% = 88.4 m tons
  - 100 = 187
  - Equivalent ton/ton Index: 1.87

- **Russia**
  - 100% = 38.8 m tons
  - 100 = 158
  - Equivalent ton/ton Index: 1.58

**EQUIVALENT TON COMPARISON**

**Percent**

- US 'equivalent tons' per physical ton: 187
- Product mix factor: 21
- Production process factor (mini-mills in industry structure): 19
- Quality factor: 9
- Efficiency factor: 17
- Russian 'equivalent tons' per physical ton: 158

Source: McKinsey analysis

Exhibit 39

Exhibit 40
### TYPICAL RUSSIAN PLANT STAFFING

#### Percent of plant staffing

<table>
<thead>
<tr>
<th></th>
<th>Total workforce</th>
<th>Social workers, e.g.,</th>
<th>Production personnel</th>
<th>Production workforce</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100</td>
<td>20</td>
<td>80</td>
<td>68</td>
</tr>
</tbody>
</table>

- **Total workforce**
- **Social workers, e.g.,**
  - Kindergartens
  - Construction workers
  - Concert halls and sports arenas
- **Production personnel**
- **Production workforce**
  - Used in productivity calculation

**Source:** Description of workforce of one of the big three Russian plants; McKinsey analysis

---

### RANGE OF ERROR FOR LABOR PRODUCTIVITY ESTIMATES FOR BIG THREE AND MEDIUM SIX PLANTS

<table>
<thead>
<tr>
<th></th>
<th>Range of impact on productivity (multiplier)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality factor</td>
<td>0.95 - 1.05</td>
</tr>
<tr>
<td>Efficiency factor</td>
<td>0.96 - 1.06</td>
</tr>
<tr>
<td>Labor equilization factor</td>
<td>0.95 - 1.05</td>
</tr>
</tbody>
</table>

**Labor productivity estimate**

- **Big Three:** 47%
- **Medium Six:** 27%

**Range of possible labor productivity estimates**

- **Big Three:** 41-55%
- **Medium Six:** 23-32%
### Range of Error for Small Other Plant Labor Productivity

Indexed to US = 100 in 1995

<table>
<thead>
<tr>
<th>Factor</th>
<th>Range of Impact on Productivity (Multiplier)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality Factor</td>
<td>0.95 - 1.05</td>
</tr>
<tr>
<td>Impact of shorter production process</td>
<td>0.50 - 1.10</td>
</tr>
<tr>
<td>Efficiency factor</td>
<td>0.70 - 1.10</td>
</tr>
<tr>
<td>Workers performing functions outside value chain (labor equalization factor)</td>
<td>0.65 - 1.10</td>
</tr>
<tr>
<td>Impact of open hearth on environment</td>
<td>Not qualified but less than 1</td>
</tr>
</tbody>
</table>

* The range is not symmetric as the average of products of end values of individual ranges is not equal to a product of midpoints and selection in each range was made to match the overall midpoint estimate

Range of possible labor productivity estimates 3-18%
EXECUTIVE SUMMARY

Industry overview. There are 50 cement plants in Russia employing around 40,000 workers. Cement production collapsed by more than 60% since the 1990 peak; it is now at half the Polish level on a per capita basis. The industry has remained extremely fragmented since privatization, and the three foreign global players present in Russia have yet to commit to significant investment.

Productivity performance. Despite the production collapse, there have been virtually no plant shut downs or layoffs. Productivity has thus dropped from 20% of the US level in 1990 to 7% in 1997. The best Russian plant achieves 30% of the US productivity level, while many plants stand at 1%.

The main reasons for the productivity gap at the operational level are very low capacity utilization, lack of multitasking, less automation in packaging and delivery and inferior wet/gas technology leading to much higher energy consumption and lower cement quality. More than half of the cement plants could achieve 50% of the US productivity level at full utilization, with best practice modes of organization and a few targeted investments like converting to semi-wet/gas technology.

The most important external barrier to productivity and output growth is the flow of implicit federal subsidies in the form of cheap energy, tax arrears and/or directed government procurements channeled to the weakest players by local governments anxious to prevent shut-downs. These subsidies and political constraints are also preventing best practice companies from buying up excess capacity to shut it down in order to increase capacity utilization and make the necessary upgrading investments that are worthwhile in the viable capacity. These subsidies do not only serve a social cause, since allegedly, part of the subsidy flow is being diverted, via complex barter deals, to short lived and well-connected trading companies.

Policy implications and future outlook. A strong federal government could force the rapid restructuring of the sector by cutting the flow of energy and tax subsidies and replacing them with direct help to the workers wherever deemed necessary. This would make more higher quality and cheaper cement available to major downstream industries, such as construction and oil.
Cement

We have selected cement for a case study as it is representative of the important construction material sector. This case is therefore closely related to both the housing construction and steel cases. Cement has the particularity of being essentially domestic and most often local since it is bulky. Although cement is rarely traded between countries, the industry is, worldwide, increasingly dominated by a few global players (e.g. Holderbank and Lafarge).

INDUSTRY OVERVIEW

Cement production in Russia was less than 27 million tons in 1997, a 68% decrease since the peak of 1990. This is the result of the collapse of infrastructure (including defense related) investments and a 25% drop in housing construction output (once adjusted for increases in quality and shadow construction—see the housing construction case). Most of the cement being produced is now destined for housing construction (Exhibit 1). Demand for cement is also decreasing as a result of a marked switch towards brick housing construction away from panels. Panels are themselves becoming less “cement intensive” as privatized construction companies are under more pressure to optimize the utilization of inputs.

Russia, which was among the largest producers of cement in 1990 (on a per capita basis), is now at the bottom of the list, at half the current Polish level (Exhibit 2). Cement production also dropped in Poland between 1990 and 1992 (although “only” by 30%). It is now recovering due to heavy investments in infrastructure. Housing construction output is currently very low in Poland and much lower than in Russia. Unless infrastructure investment recovers, the demand for cement could continue to decrease in Russia as government and large companies continue to phase out the remaining subsidies to panel type multi family housing construction. The demand from retail customers is low but it is increasing, 15% of cement was sold in packaged form in 1996.

Most regions have experienced a similar decline; only the Far East, Central and Volga regions have had markedly different performance than the average. The Far East is much worse with the end of almost all investment and housing projects, combined with, as explained later, abnormally high cost/prices for cement. The Central region has performed relatively better due to increased (subsidized) panel type housing construction in Moscow. This also positively affects cement producers in the Volga region, which can ship cement at low cost on the Volga river towards Moscow (Exhibit 3).

The quality of Russian cement is poor and has only marginally improved. Only a few plants (mostly in the Central region) were capable of producing
standard 500 grade (Western standard) cement in 1998. Poor quality cement is affecting the productivity of many downstream industries such as housing construction and oil, where it can kill a well (see the housing construction and oil cases).

Following privatization in 1993-95 which, as always in Russia, was carried out on a plant by plant basis, Russian and foreign industry consolidators have slowly emerged, especially in the Central/Moscow region. The rest of the country remains completely fragmented (Exhibit 4). There are around 50 cement plants in Russia, of which 40 are above the minimum efficient scale (around 1 million tons of annual production capacity). Most of the plants rely on the wet/gas technology as opposed to the dry/electric technology used in the West.

Although the production of cement has decreased by two thirds between 1990 and 1997, employment in the industry has only marginally declined (by less than 15%).

PRODUCTIVITY PERFORMANCE

In this case we focus on labor productivity. Our benchmark is the US with some references to Poland wherever relevant.

In 1997, average labor productivity in Russia was at around 7% of the US 1997 level. Russian output has been adjusted to reflect both the much lower cement quality and the fact that Russian cement plants are using on average three times more energy than their Western counterparts, a 20% and 40% downward adjustments in output respectively. We have also adjusted for the fact that, unlike in the West, around 20% of the workforce in Russia are still performing social functions.

Russian labor productivity has fallen in absolute terms by around 60% since 1990 reflecting the fact that production collapsed while employment remained almost stable with no plant shut downs; this is an extreme case of a general trend observed in most manufacturing sectors.

A couple of Russian plants manage to be at around 30% the US productivity level. They are in the Central and Volga regions where market demand did not fall as much, thus allowing them to keep capacity utilization up and to upgrade their technology to become more energy efficient. The Russian plants east of the Urals have the lowest productivity, as low as 1% of the US level. The best practice Polish plants are now reaching 55% of the US level, almost double the productivity level of the Russian best practice plants (Exhibit 5).

REASONS FOR DIFFERENCES IN PRODUCTIVITY PERFORMANCE

Exhibit 6 shows the overall results from the causality analysis for the productivity gap between Russian and US cement plants. There are two levels of analysis. At the lowest level we explain the productivity gaps by
differences in production process and staffing levels within firms. We then try to understand what key external factors are preventing the Russian cement industry from recovering/restructuring. These external factors can influence management decisions either directly (e.g. lower automation because of lower labor costs in Russia) or indirectly, by affecting the level of competition in the industry.

Production processes

We found that most of the labor productivity gap is related to excess workers in relation to the low capacity utilization, ineffective organization of functions and tasks and lack of automation/energy efficient technology. Around two thirds of the Russian cement plants could achieve productivity levels close to 50% of the US level with only limited investments in packaging and in upgrading their wet/gas technology (Exhibit 7). This is the productivity level which the best practice Polish plants have achieved. Going beyond this would require significant investments (switch to dry/electric production technology and further automation), which are hard to justify today in Russia. Around a third of the Russian cement plants are sub scale and/or rely on the obsolete wet/oil or coal technology, we estimate their productivity potential (assuming that only “reasonable” investments are made) to be at less than 10% of the US level. We present these findings in more detail below.

Low capacity utilization

Capacity utilization is down to 33% on average from close to 100% in 1990. The best players achieve close to 75% while the poorest performers can have as low as 7% capacity utilization (Exhibit 8). Since cement production is a twenty four hour continuous process, plants can only cope with lower demand by, at best, shutting down production lines (each production line is around 0.5 million tons annual capacity). Thus, in principle, plants with a few production lines and operating at low capacity could have laid off workers at least in proportion to the reduction in operating production lines, that was not the case since in most plants employment did not change regardless of their size or utilization levels. Only the ten sub-scale plants, with only one production line, are directly and fully hit by low capacity utilization. Plants in the Central/Volga regions achieve higher capacity utilization levels because of the high demand for cement coming from Moscow. They also enjoy higher demand because they are the only ones producing higher quality cement (grade 500) and/or they are benefiting from the consolidation which is starting to take place between cement plants belonging to the same firms.

We estimate that overall employment could be reduced by 50% simply by shutting down the non viable plants (around 25% of employment) and laying off workers in the remaining large plants in proportion to the mothballed production lines (another 25% of workers at the current demand level). This potential reduction in excess workers corresponds to doubling labor productivity moving the industry from 7% to 14% as can be seen in Exhibit 7.

Inefficient organization

¶ Organization of functions and tasks. Even assuming full capacity utilization, marked differences between the staffing levels of the
plants which are above the minimum efficient scale with similar technology suggest that organization of functions and tasks can be easily improved at many Russian plants. Assuming that all these plants reach the current Russian best practice then labor productivity would increase by 25% (**Exhibit 9**). This increase corresponds to moving the industry productivity from 14 to 17% of the US level as can be seen in **Exhibit 7**. Even the best practice plant in Russia told us that they could improve labor productivity by an additional 30% by increasing multitasking through on the job training (much easier to do with younger workers) as well as by improving the link between marketing and production planning. This would allow them to move from 30 to 40% of US productivity (**see Exhibit 7**).

¶ **Supplier relations.** Given the current low levels of output, securing supplies of raw materials has not been a major issue. As in the West, best practice Russian cement producers are now vertically integrating to avoid monopoly pricing by the local quarries and to help them to restructure.

¶ **Blue collar trainability.** As mentioned earlier, training older workers to multitask and to responsibly use (new) equipment has proven difficult. Nonetheless, best practice Russian plants are helping them to retire early, or are moving them to the “social sphere areas” which are being subsequently outsourced.

Management, including the foremen level, has also been a problem. Best practice firms are replacing them, often at the end of long and hard fought battles for corporate control.

*Lower capital intensity / inefficient technology*

The two main areas of possible investments for Russian plants are in upgrading current production technology (to improve cement quality and energy yield) and automating delivery/packaging, this is what the best practice Russian plant has done recently. These investments have less than two year payback periods and would allow the viable Russian plants to almost double productivity, moving from 17 to 30% of US productivity (**see Exhibit 7**). The additional investments that would be required to reach the US productivity level are difficult to justify today in Russia (**Exhibit 10**).

¶ **Lack of investment.** Most Russian plants rely on wet/gas or wet/fuel technology as opposed to the more energy efficient dry/electricity technology used in the west. The best practice Russian plant uses recent wet/gas technology, which allows it to produce grade 500 cement while using half the energy (50% increase in productivity at current cement and energy prices in Russia-worth 10 productivity points in **Exhibit 7**). Most Russian plants could upgrade to this level of technology at a cost of only around $10/ton of capacity, and some plants are already in the process of upgrading their equipment. This upgrade would be out of reach for the six plants relying on the obsolete wet/coal technology.
Best practice Polish plants are now converting to dry/electricity technology allowing them to save an additional 30% in calories used per ton compared to the best Russian wet/gas technology. But this conversion would be very costly ($70 per ton of capacity) and hard to justify in Russia where gas is cheap relative to electricity and the raw materials wet compared to the West. US plants achieve even higher energy efficiency by pre heating the raw material, which is only relevant for the dry/electric technology (Exhibit 11).

We did not capture in our productivity analysis the degree to which cement production negatively impacts the environment. Reaching the relatively low levels of pollution achieved in the West would require most Russian cement plants to replace their filters which are long past their due service life. This operation is a costly one, and does not seem to be high on the agenda of local authorities.

The best practice plant in Russia has also invested in special elevators allowing them to efficiently deliver the cement to the trucks and trains (15% increase in productivity worth 3 productivity points in Exhibit 7). This plant reckons that more targeted investments in the area of packaging (as it is being done by the Polish best practice) would allow them to improve productivity by another 25%, worth ten productivity points in Exhibit 7. Reaching Western levels of automation would require $50 per ton of capacity investments, which is hard to justify in Russia today given the very low labor costs.

Industry dynamics

Because cement is very bulky, competition tends to be local with plants rarely serving customers beyond 500 km. There is very little foreign trade in cement.

Two Western best practice companies have made a careful entry into the market. Lafarge controls two plants, 4% of the market, and Holderbank has a number of minority positions, including stakes in Stern Cement and Alfa Cement. None of them have committed to any significant investment in operations yet. All these firms are mostly focused on the Central region and are starting to act as industry consolidators.

Given the massive over capacity in the industry, with no signs of capacity shut downs or demand recovery, competition is fierce for the cash paying customers (30% of the market). The rest of the industry is plagued by barter, which creates opacity and uncertainty as transactions are settled for reasons other than a competitive price (tax evasion, favoritism towards special companies/projects). Barter also results in “wild” competition from secondary traders, who have a strong interest in dumping their cement as soon as possible (these companies are being set up by players along the industry chain to milk plants and/or avoid taxes).

In the remote regions, the price of cement can be twice as high as in the Central region ($80 versus $40, see Exhibit 12) as a result of very inefficient local producers being shielded by high transportation costs.
External factors

In this section, we seek to identify the most important external factors (e.g. macro economic conditions, regulations, government interventions) which are slowing down the restructuring of the Russian cement industry. More specifically, what is preventing best practice firms from investing, laying off and consolidating the industry? What is allowing sub-scale/obsolete plants to keep operating?

We found that the main barrier to productivity growth is the access enjoyed by the weakest players to implicit government subsidies in the form of cheap energy, tax arrears and/or allocated contracts. Local governments, with the implicit complicity of a weak federal government, are subsidizing local plants to avoid the social/political consequences of plant shut downs or even layoffs. These subsidies/political constraints are also discouraging best practice companies from buying up excess capacity as a prerequisite to upgrading viable capacity.

Four other factors, although much less important, are also slowing down industry restructuring. These are, an uncertain macroeconomic environment, poor protection of minority shareholders, low labor cash costs and mobility and high transportation costs. We detail our findings below.

Sector-specific barriers: access to implicit government subsidies

The cement industry lies in between two industries, which are still very much under the control of federal/local governments. These are, upstream, the energy sector (energy costs account for more than 50% of total cement costs) and downstream, the construction sector (more than 60% of cement is used for publicly financed infrastructure and housing projects).

Upstream, local governments, which in most regions have ownership control of the gas distribution company, can ensure a continuous supply of energy (both gas and electricity-which is mostly produced with gas powered turbines) to the local cement producers, even if they can’t pay the full energy price. This cumulates into arrears to Gazprom and UES, which in turn cannot meet their tax obligations to the federal budget. As an alternative to not paying, cement producers would pay for their energy through barter, exchanging flats or cement at grossly inflated prices for energy. Here again, Gazprom and UES would be paying their taxes and/or meeting their social obligations to employees with overpriced flats.

Downstream, local governments together with affiliated large industrial companies still finance most of the infrastructure projects and about 40% of housing projects, mostly in the form of cement intensive panel construction (see housing construction case). Many of the previously state owned construction companies are still dependent on state programs for their survival. As for cement producers, many local governments try to minimize the social/political consequences of shut downs and layoffs by effectively allocating to these vulnerable construction companies the publicly financed programs (see the housing construction case). As a quid pro quo, they will also tell these construction companies who to buy their cement from (in the form of barter of course-more than 70% of cement was sold through barter in 1997).
All in all, everything happens as if the federal government was directly subsidizing the (local) cement production destined to “locally financed” infrastructure/housing programs.

In addition to being motivated by social/political concerns, such barter schemes are also facilitating, by their sheer opacity, tax evasion by companies and personal enrichment of decision makers all along the industry chain.

Because of their prevalence and magnitude these schemes are essentially discouraging any serious attempts at industry restructuring. Industry restructuring will have to take place through the consolidation of excess capacity into the most viable plants by a few best practice firms given some expectations for the future demand of cement. In effect, it makes little sense to invest in plants for which there is no guarantee that they will one day exceed 30% capacity utilization (low utilization increases the pay back period of capital investment proportionally). As long as they have access to cheap energy and non price sensitive customers the weakest cement plants will be under no financial pressure to close down or sell off “cheap” to industry consolidators. This would be especially true if plant directors find it personally more rewarding to milk the plant, leveraging the possibilities offered by barter schemes, weak minority shareholder rights and strong relationships with the local government, while keeping a clear social consciousness. Even if industry consolidators could buy up “excess capacity”, local governments could still exercise pressure against any planned shut down. In effect, they could for example, threaten to buy cement from the main competitor in the future for their publicly financed programs or they could raise the specter of unsettled liabilities to the local government or gas distribution companies, a gloomy prospect given their influence over local arbitration courts.

In addition, the prevalence of these barter/subsidy schemes create a very big uncertainty as to what the future demand for cement would be if they were to come to an end. Indeed, demand for cement could fall another 50% in the short to medium term if panel type housing construction is no longer financed and overall conditions in the economy do not improve markedly. A large global cement producer mentioned that barter and its implications was the number one deterrent for them not to invest any significant money in Russia.

**Other less important factors**

- **Macroeconomic instability** is less important since even with low capital costs, most of the investments required to go beyond 50% of the US productivity level would be non viable in today’s environment (very low labor and gas costs). Macroeconomic instability does adversely affect the demand for cement (extremely sensitive to GDP growth) and contributes, together with barter as discussed above, to making it very difficult to reliably forecast the future demand for cement. High capital costs are reflected by the significant discount at which Russian cement companies have been traded, they are on average six times cheaper than Polish companies (Exhibit 13). It should be noted that this is not only the result of macroeconomic instability, but also of the pervasiveness of
government subsidies, which prevent industry consolidation and thus higher capacity utilization at the viable plants. This effect mechanically explains half of the price discount since Russian plants operate on average at 33% capacity.

Problems with corporate governance are related to the fact that according to interviews, many managers (especially in the independent and doomed plants) find it more rewarding to milk the plant as opposed to shutting it down or investing in/restructuring it. This is attractive as long as they can violate minority shareholder rights by capturing 100% of the profits from a wholly owned trading company to whom the cement is sold at an artificially low price. This milking is allowed to go on as long as the subsidy valves are open and workers (often the minority shareholders) prefer this outcome to an outright plant shut down.

Low labor cash costs/mobility are, as described above, limiting the bargaining power of workers and reducing the incentives for managers to reduce the number of excess workers more rapidly. Even best practice companies are not pushing too hard to improve their organization through training, which would allow them to lay off more than 20% of their workers. They are simply relying on the natural attrition rate, the outsourcing of non-core activities and/or on offering packages for voluntary departures. Finally, at the current labor costs, only limited investments in automation are economical, even assuming a low capital cost.

Transportation (railway) costs have been in dollar terms as high as in the West up until the August 1998 crisis. This has to be either the result of very low productivity and/or monopoly pricing by the railways. As a result, isolated plants east of the Urals are essentially shielded from competition. The extreme effect from this can be seen in two cement plants in the Far East which are charging three time as much as the national average for their cement. All in all, this problem affects less than 20% of current output.

FUTURE OUTLOOK AND POLICY IMPLICATIONS

The Russian cement industry is stranded in a low equilibrium trap. Even if the demand for cement increases twofold (unlikely for the short term), reaching the current output per capita level of Poland, the sector would still suffer from 50% over capacity and at least 50% excess employment. The government has to put in place the mechanisms by which, on the one hand, private investors force the consolidation of the industry and, on the other hand, laid off workers are being socially treated.

The key priority is to cut the flow of subsidies (tax arrears and barter deals) going to cement producers. This will force the consolidation of the industry, as doomed plants will have no other alternatives than to shut down or sell off (cheap) to industry consolidators. This would require, upstream, to allow Gazprom and UES to cut off non-cash paying customers by reviewing the
ownership structure of the local gas distribution companies. Downstream, a transparent cash based housing market should be established, with targeted housing policies being conducted explicitly through the demand side (see the housing construction case). Furthermore, government officials should have no personal interest or close relatives in the cement/housing business as to avoid potential conflicts of interests.

For this process to proceed, local governments will also have to allow the layoffs associated with the shutting down of excess capacity. There is no reason for cement workers to receive better treatment than the textile or machine building workers laid off since the start of reforms. In any case, there is little to lose for these workers given the low wage levels and high wage arrears. The short term social and political impact could be alleviated by the provision of an efficient short-term unemployment benefit/severance pay federal program.

This would allow for significant foreign investments and for the (quality adjusted) price of cement to come down markedly, stimulating the demand from cash paying customers. Removing the system of implicit federal subsidy will also help the Russian government balance its budget.
EVOLUTION OF CEMENT OUTPUT IN RUSSIA
Million of tons; percentage

Source: Goskomstat; Interviews

Exhibit 1

COMPARISON OF CEMENT OUTPUT PER CAPITA
Tons per capita

Source: Global Cement Report

Exhibit 2
EVOLUTION OF OUTPUT BY RUSSIAN REGIONS: 1995-97

Percent

<table>
<thead>
<tr>
<th>Region</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern</td>
<td>-33</td>
</tr>
<tr>
<td>North-Western</td>
<td>-32</td>
</tr>
<tr>
<td>Central</td>
<td>-15</td>
</tr>
<tr>
<td>Volgo-Vyatksy</td>
<td>-7</td>
</tr>
<tr>
<td>Central Black Earth</td>
<td>-34</td>
</tr>
<tr>
<td>Povolzhie</td>
<td>-28</td>
</tr>
<tr>
<td>North Caucuses</td>
<td>-32</td>
</tr>
<tr>
<td>Urals</td>
<td>-37</td>
</tr>
<tr>
<td>West Siberia</td>
<td>-26</td>
</tr>
<tr>
<td>East Siberia</td>
<td>-28</td>
</tr>
<tr>
<td>Far East</td>
<td>-73</td>
</tr>
<tr>
<td>Total Russia</td>
<td>-27</td>
</tr>
</tbody>
</table>

- Positive impact from Moscow
- Benefited from relatively low transportation costs (Volga river)
- Prohibitive cost of cement

Source: Goskomstat
Exhibit 3

INDUSTRY STRUCTURE IN RUSSIA - 1997

Total market
Percent of sales

- Stern Cement (3 plants): 14%
- Eastern Cement Holding (3 plants): 12%
- Alfa Cement (5 plants): 10%
- Lafarge (2 plants): 10%
- Other (35 plants): 59%

Moscow market
Percent of sales

- Stern Cement (3 plants): 19%
- Alfa Cement (1 plant): 6%
- Lafarge (2 plants): 15%
- Other (7 plants): 60%

100% = 26.6m tons
100% = 4.0m tons

Source: Fleming; Interviews
Exhibit 4
LABOR PRODUCTIVITY PERFORMANCE
Indexed to US = 100 in 1997

Source: Global Cement Report; Fleming; Interviews
CAUSALITY FOR PRODUCTIVITY DIFFERENCES: CEMENT
Russia vs. US

Exhibit 6

External factors
- Macroeconomic barriers
  - Drop in demand/low labor cost/low income
  - Country risk/high capital cost (political instability/budget deficit)
- Labor barriers
  - Mobility restrictions
  - Inadequate education
- Capital barriers
  - Government ownership
  - Problems with minority shareholders' rights
- Sector specific barriers (non-level playing field)
  - Non-level taxes
  - Non-equal allocation of government procurement and land
  - Threat of red tape/harassment
  - Non-level energy payments
  - Others (property rights, barriers to trade/FDI)
- Related industry barriers
  - Upstream/downstream sectors
  - Poor infrastructure
- Other barriers (climate, geology, etc.)
  - Pressure from global best practice
  - Domestic competitive intensity
  - Non-level playing field

Industry dynamics
- Low capacity utilization
- Inefficient organization
  - Organization of functions and tasks
  - Marketing/product mix
  - Supplier relations
  - Blue collar trainability
- Lower capital intensity/technology
  - Obsolete assets (subscale/outdated technology)
  - Lack of viable investment in non-obsolete assets (upgrades/green fields)
  - Non-viable investment due to factor costs (labor, capital, and energy)

Production process
- Productivity
  (Indexed to US = 100)

SUMMARY OF OPERATIONAL CAUSALITY
Labor productivity indexed to US = 100 in 1997

Exhibit 6

Source: McKinsey; Interviews

Exhibit 7
Exhibit 8

CAPACITY UTILIZATION - 1997
Percent

Source: Fleming

Exhibit 9

COMPARISON OF STAFFING LEVEL FOR COMPARABLE CEMENT PLANTS* - 1997
Number of employees per million tons of capacity

*Plants of more than 2 million tons annual capacity relying on wet gas technology (staffing levels did not change much since the full capacity utilization days)

Source: Fleming; McKinsey analysis
# INVESTMENT OPPORTUNITIES

USD per ton, 1.5m capacity plant operating at 60% capacity

<table>
<thead>
<tr>
<th></th>
<th>Size of investment</th>
<th>Annual labour savings</th>
<th>Annual energy savings</th>
<th>Total annual savings</th>
<th>Payback period at 25% cost of capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Convert from wet oil/coal to wet/gas</td>
<td>10</td>
<td>0.2</td>
<td>5.0</td>
<td>5.2</td>
</tr>
<tr>
<td>2</td>
<td>Upgrade obsolete wet/gas plant (e.g., conversion to semi-wet)</td>
<td>5</td>
<td>0.2</td>
<td>2.5</td>
<td>2.7</td>
</tr>
</tbody>
</table>
| 3 | Convert into best practice dry  
   – Good wet/gas | 50 (green field) | 0.5 | 5.0 | 5.5 | Not economic |
|   | – Obsolete wet/gas | 50 (green field) | 0.7 | 7.5 | 8.2 | 20 years |
| 4 | Automated packaging lines | 3 | 0.6 | 0.0 | 0.6 | 10 years |

Source: Interviews

Exhibit 10
**ENERGY EFFICIENCY - 1997**

Kilocalories per kg

| Source: Interviews; Fleming |

- **Russian wet/oil or coal**: 3,000
- **Obsolete Russian wet/gas**: 2,000
- **Good Russian wet/gas**: 1,300
- **Dry Russian (old technology)**: 1,500
- **Average dry (e.g., Poland)**: 1,000
- **Best practice dry (with pre heating of raw material)**: 750

| Number of plants | 15 | 10 | 15 | 8 |

Source: Interviews; Fleming  
Exhibit 11

---

**COMPETITIVE INTENSITY - 1997**

USD per ton

- **Regions**: Central, Central black earth, Urals, Povolzye, Nothern, West Siberia, East Siberia, Far East
- **Number of players**: 4, 4, 8, 4, 3, 4, 4, 2
- **Relative cost position (labor plus energy)**: 14, 18, 19, 23, 23, 18, 22, 22
- **Relative price position**: 36, 33, 40, 34, 37, 38, 43, 55

- **Best player**: 
- **Worst player**: 

Source: Fleming  
Exhibit 12

*Only one datapoint available*
ACQUISITION PRICE OF CEMENT COMPANIES - 1997
USD per ton of capacity

Source: Interviews; Fleming
EXECUTIVE SUMMARY

Industry overview. While its employees accounted for only 1% of the Russian workforce, the oil sector\(^1\) sales represented 6% of GDP, 16% of exports and 22% of budget revenues in 1998 (despite relatively low oil prices). Oil production has halved since the peak of 1988, with the fall in domestic demand and exports to countries of the ex-communist block. The industry has been privatized to insiders with very little foreign involvement.

Productivity performance. The actual total factor productivity (the combined measure of labor and capital productivity) of the Russian oil industry is 55% of that of Texas on-shore. Once adjusted for favorable geology and younger oil fields in Russia, the productivity level falls to about 30%.

The main reasons for the productivity gap at the operational level are lower oil recovery due mostly to less hydrofracturing and poor reservoir management techniques, and inefficient drilling because of low quality drill bits, cleaning muds and cement being used. There are also more than 35% excess workers and a large amount of idle drilling equipment resulting from the stoppage of new field developments since 1991, despite attractive proven reserves in Western Siberia. The total production cost in these new fields would be as low as $6 a barrel (against $20 a barrel for current world oil prices) with best practice operations.

The most important external barriers to productivity and output growth are the lack of workable tax laws (the recently passed production sharing agreement is not yet operational) and distorted domestic oil markets with limits on oil exports. These limitations, which discourage any significant investments, force the supply of cheap oil to “strategic sectors” such as defense and agriculture. Other, less important, factors include unresolved shareholder battles with weak minority shareholder rights protection, and widespread barriers to layoffs put in place by local governments in oil company towns.

Policy implications and future outlook. If the main barriers to investment are not removed, Russia could, with the current rate of depletion in the existing fields, end up being a net importer of oil in ten years. The social objectives and national interest would be better served if further assurances were given to investors, notably deep pocket foreigners who could pour in $80 bn worth of investment over the next ten years. Such assurances should include workable taxes as well as a fully liberalized domestic oil market with open access to an enlarged export infrastructure. As a result production could double in ten years, thus meeting demand of a (hopefully) fast growing economy and increasing

\(^1\) Including refining and transportation of crude and petroleum products
exports by more than 50% (keeping Russia’s market share of world oil exports constant given current expectations of increasing future demand). Also, the additional tax revenues would suffice to keep subsidizing (if deemed necessary) the oil purchases for agriculture and defense customers and help relocate stranded oil workers.
Oil

This case study benchmarks the performance of the Russian oil industry against that of the US.

We will start with an overview of the industry, then develop the causes for lower productivity and lack of new field development in Russia, and end with possible future scenarios for the industry given different policy choices.

INDUSTRY OVERVIEW

Importance of the sector

We have selected the oil industry for a case study because it is both a key natural resource sector and one that is particularly important to the Russian economy due to its large contribution to government budget revenues and Russian exports. The oil industry is special because it has traditionally generated extra profits (due to cartels), which can be taxed away, and is a large net exporter since the share of foreign equipment and services is less than 15% of the total oil production cost. Realizing the oil industry’s growth potential would therefore help the government to balance its budget and allow Russia to import more of the capital goods necessary for productive investments in the rest of the economy.

The oil sector plays a critical part in the Russian economy: while its employees account for only 1% of the Russian labor force, sales represent 6% of GDP and 16% of exports, and taxes contribute 22% to budget revenues (figures include refining) (Exhibit 1).

Industry definition

The scope of our analysis is the upstream part of the industry – production wells drilling, field infrastructure construction, and field operations (Exhibit 2). Exploration has not been included because it has virtually stopped in Russia, given the high reserves to production ratio of the Russian oil industry. Crude oil transportation, refining, wholesale distribution and gasoline retailing have also been excluded as they are “less strategic” than oil field development and production.
Industry evolution

Oil production in Russia has fallen almost by half over the last 10 years, from a peak of 12 million barrels per day (Mbpd) in 1988 (19% of world production) to a low of 6.1 Mbpd in 1998 (9% of world production) (Exhibit 3). The decrease in production reflects the lack of new field development, the 30% fall in domestic demand since 1990, as well as the export drop to former USSR republics (who saw a similar fall in local demand), and East European countries (who have been trying to reduce their dependence on Russian supplies and have also experienced some fall in demand). Exports to the West have been stable with West-bound export infrastructure filled to capacity and no capacity increase.

The Russian oil industry consists of eight leading majors (Lukoil, Yukos, Surgutneftegas, Sidanco, Tatneft, Sibneft, Tyumen Oil Co., and Rosneft) who accounted for about 72% of Russia’s oil production in 1997, and approximately 90 smaller production companies. Further consolidation of the industry around the better managed companies is currently under way. The industry was privatized in 1993-94, but government retains stakes in several large oil companies (Exhibit 4). Privatization was completed very fast, with insiders controlling many of the leading oil companies.

In the course of privatization, foreign oil companies expressed interest in making investments in the Russian oil industry. Even though no legal barriers prevent foreign ownership, few actual deals have been made, and real successes have yet to happen. The first Western oil major to team up with a Russian counterpart, Arco, spent USD 340 million in 1995-96 to acquire eight percent of Lukoil shares. In September 1996, the new partners set up a joint venture and earmarked USD 10 billion for investment in oil production outside of Russia, which has yet to materialize. Amoco failed to engage in Priobskoy oil field development with Yukos, and recently, BP has been trying to recoup some of its USD 571 million investment in Sidanco, which is now bankrupt. Sakhalin is the only project with significant foreign involvement, which is still proceeding.

PRODUCTIVITY PERFORMANCE

Measurement methodology

Because the oil industry is very capital intensive, we have estimated and analyzed capital productivity, which combined with labor productivity, gives a measure of total factor productivity (TFP). We decided to compare Russia with onshore production in Texas, which is close to global best practice in drilling and oil field operations (once stripper wells have been excluded). However, we have had to make structural adjustments due to the differences in natural conditions between the two countries. The overall frameworks used for the measurement of total factor productivity and the structural adjustments are described in Exhibits 5 and 6.
Total factor productivity is an aggregate measure of how productively labor and capital are used together. It measures the volume of output per unit of total factor inputs (the sum of capital and labor inputs). Capital and labor inputs are added together by using the shares of capital and labor cost in the industry value added. We compare Russia’s TFP with Texas, which was chosen because most fields in Texas are located onshore, and we were able to collect a sufficient amount of data on those fields to make reliable comparisons. Texas is part of a highly competitive and efficient US oil industry, which allows us to compare the Russian oil industry to the leading edge benchmark with regards to both current technology level and industry practices.

Capital inputs have been estimated using statistics from several industry sources, including the Institute of Oil and Gas Field Development and Production Operations (VNII OENG), the Drilling Technologies Institute (VNII BT), company interviews and industry publications. The basic capital unit and factor of production of the oil industry is a production well. As the capital input measure for the industry we use the amount of labor and capital which is required to produce and maintain a well.

Physical volume of crude oil per well, adjusted for quality differences, was used as the measure of output.

**Total factor productivity (with structural adjustments)**

The Russian oil industry TFP is 30% of the US level after adjusting for structural factors (putting both countries on a comparable basis) (Exhibit 7). Because of favorable geology and younger oil fields, the actual Russian oil industry TFP is 55% of the actual US (Texas onshore) productivity. In order to put the US on a comparable basis with Russia, structural adjustments have to be made (Exhibit 8).

The average field size in Russia is 117 million barrels, against only 3 million barrels in Texas. A larger field size commands higher well output, as larger fields tend to have thicker reservoir formations. According to Texas Geological Survey estimates, everything else being equal, larger fields in Russia should lead to around 1.8 times higher well output (Exhibit 9).

Another important advantage for Russia lies in the fact that Russian fields are younger on average than Texan ones (16 versus 30 years old). Russian fields should, as a result, enjoy higher output flows being less depleted. The standard economically optimal decline curve predicts that a 16 year old well should be 2 times more productive than a 30 year old one (Exhibit 10).

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2 Labor inputs in oil well construction are capitalized as part of fixed assets
The other, much less important, structural differences tend to penalize Russia. These are Russia’s lower crude oil quality (Exhibit 11), deeper wells, which increase drilling time and therefore increase consumption of drilling capital inputs and supplies (Exhibit 12), and a colder climate (Exhibit 13). Swampy areas and permafrost, which are typical in the West Siberia and Timan-Pechora regions, require the use of more expensive temperature-resistant equipment and construction materials, and extra investment in roads and foundations for equipment.

REASONS FOR DIFFERENCES IN PRODUCTIVITY PERFORMANCE

We first explain the productivity differences at the production process level. We then discuss the main external factors that prevent the productivity gaps in existing fields from being closed more quickly as well as the reasons for why new fields are not being developed despite large attractive proven reserves.

Production process

The differences in the production processes that lead to much lower total factor productivity in Russia in the existing fields (once adjusted for structural differences) are summarized in Exhibit 14. These operational deficiencies lead to either lower output per equivalent well, more inputs needed to drill and maintain the well or more labor inputs to operate the well.

Lower output per well

Lower output per well has the biggest overall TFP effect, as it explains 45% of the TFP gap (Exhibit 15). Although in 1994-1998 Russia saw oil output stabilization (Exhibit 16), this was mainly due to better recovery (e.g. through some hydro fracturing) and more well workovers by Russian oil companies. Russia still has a long way to go in recovery improvement, since currently Russian oil reserves in existing fields are not recovered to the maximum economic level.

The output of an average well can be increased by 50% - an increase that is unlikely to happen all at once, but no matter when it happens, it can bring an extra 30% in cumulative output. The increase could be achieved by wider adoption of hydro fracturing, more tertiary recovery and better in-fill drilling, all at very low additional cost (the extra capital inputs necessary to generate additional output are included in the corresponding TFP effects in Exhibit 14).

The largest increase is possible if Russian oil companies increase their use of hydro fracturing technology. Under any combination of reasonable assumptions, this would be largely profitable, with a short payback period (Exhibit 17).

Higher capital inputs per well

Extra capital inputs per well are due to inefficient drilling and well completion practices, and lack of development of new fields which creates idle drilling
capacity (Exhibit 18). It takes two times longer to drill a (comparable) well in Russia.

Low quality drill bits extend drilling time and lead to excessive use of drilling supplies (Exhibit 19). Low quality drilling fluids and cement also lead to formation damage and shorter well life between workovers. More operational details are provided in the appendix at the end of this Chapter.

Higher labor inputs

Extra labor inputs explain 29% of the overall TFP gap after structural adjustments. Low labor productivity is due to poor organization of functions and tasks (OFT) and excess labor (Exhibit 20).

¶ Organization of functions and tasks is the most important operational factor explaining low labor productivity in the Russian oil industry. An important cause of poor OFT is a different approach in using specialists directly engaged in field operations, engineering and administrative support functions. For example in oil reservoir management, Russia relies on a large team of geologists as opposed to small multidisciplinary (geologists, reservoir engineers and economists) teams in the West better suited to figure out the optimal (from a net present value basis) depletion profile.

¶ Excess labor amounts to 35-40% of the overall workforce in the industry, according to industry expert interviews. We define excess labor as employees who do not contribute to operational activities and therefore can be removed without any changes to the organization and impact on the operations. It is not unusual to see several hundred administrative support employees serving relatively small NGDU production activities, the typical independent field operating unit in the Russian oil industry. These NGDU may have production from 0.02 to 0.2 Mbd, while employing several thousand people. In the US, operations of this size usually employ 90% fewer people.

To a lesser extent, higher labor inputs can also be the consequence of less automation (not included in our measure due to its low share in capital inputs). For example, there are no telemetric remote well controls in Russia.

Lack of new field development

The other key operational issue facing the industry is the lack of new field development – despite large attractive proven reserves. It is important to note that overall productivity would not be as low if more new fields were in operation. Oil field development activity in Russia peaked in 1990, when over 12,000 production wells were drilled. Since that time drilling has been declining, and new wells are mostly drilled within developed and partially depleted fields – so called in-fill drilling (Exhibit 21). At the same time the proven oil reserves of Russia are very large within the non-OPEC world. Located in regions with already developed infrastructure, fields in Western Siberia, Volga-Urals and Timan-Pechora contain 127 billion barrels of reserves according to the Russian
Register of the State Reserves\(^3\). This gives Russia over 50 years of reserve life, compared to 10-12 for most international oil companies.

**External factors**

There are two key external (regulatory) factors preventing TFP improvement and output growth in the Russian oil industry. These are the distortions in the domestic oil market resulting from government oil subsidy schemes and related restrictions on exports, and the lack of a workable tax system (the recently passed production sharing agreement is still not operational) and. The other relatively less important limiting factors are poor protection of minority shareholders’ rights, red tape facing imported equipment and services, and widespread barriers to layoffs put in place by local governments in oil company towns. The causal links between these external factors and the operational issues are summarized on Exhibits 22 and 23.

**Sector-specific barriers: distorted domestic oil markets**

The Russian government wants to subsidize the oil needs of domestic agriculture, the Defense Ministry and other “strategic” entities. The government is particularly concerned about a potential failure of sowing and harvesting campaigns followed by agricultural product shortages. Instead of direct cash subsidy schemes, the government creates barriers to crude exports in order to force oil companies to supply insolvent domestic sectors in exchange for tax offsets. The government controls crude oil exports through the state owned pipeline monopoly Transneft. The oil export infrastructure has been operating at full capacity and has not been enlarged since 1991. These export restrictions and domestic subsidy schemes discourage investment in either improved oil recovery or new field development, since any marginal production increase is bound to be sold on the domestic market at a low price, even if the world price of oil increases as it did in 1999. Exports of refined products by railroad did pick up, but it has marginal economics and is much less attractive than crude oil exports.

Increased production and exports should in principle bring substantial new tax revenues, which could allow more targeted domestic cash subsidies to be paid to “strategic” sectors in order to compensate them for higher domestic prices.

The likely explanation for why the government is not encouraging export infrastructure development is that the government does not trust the oil industry to make the additional investments necessary to increase production in order to both increase exports and still satisfy domestic consumption needs. A possible solution to this lack of trust would be to condition any additional access to (enlarged) export infrastructure to an increase in production. Such schemes have been discussed before to no avail; to be credible vis a vis the investor, the government should take the first step and pro actively enlarge export infrastructure (a relatively modest investment which could be partially privately financed).

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\(^3\) Estimates of “identified” reserves; not “proven” reserves (estimated, for example, by BP-Amoco).
This could still be insufficient to stimulate domestic investments (especially if the world price of oil comes back down) because of continued corporate governance problems at many of the large Russian oil companies and the lack of domestic sources of capital. This problem can be surmounted if foreigners are allowed in, this would require completion of the recently passed PSA tax laws to make them workable.

Macroeconomic barriers: lack of workable PSA legislation

Production Sharing Agreement is a contract between the government and the investor, which protects the later from any undue future changes in the tax and regulatory system and ensures the government higher tax revenues when oil prices are high. A PSA legislation has been recently passed by the Russian Duma, but it is still not functioning on a large scale since most normative acts (enabling legislation on the level of ministries and state departments) have yet to be created and approved by the corresponding power structures. Its effectiveness will also ultimately depend on a certain level of political stability in Russia.

The other relatively less important external factors are weak protection of minority shareholder rights, red tape and barriers to layoffs.

Capital barriers: problems with minority shareholders’ rights

Weak protection of minority shareholder rights prevents minority investments in both new fields and in improvement of recovery in existing fields. Flawed minority shareholder protection laws and weak law enforcement permit the use of various value extraction mechanisms, such as transfer pricing and subsidiary share dilution, which allow the holding companies to “milk” their subsidiaries, thus hurting the shareholders holding minority stakes in the subsidiaries. The subsequent shareholder battles cause under-investment in viable projects, divert management attention from operations and diminish the market value of companies’ stocks by creating negative publicity (thus increasing the companies’ cost of capital).

Sector-specific barriers: red tape

Red tape restricting higher quality imported equipment (especially needed for the drilling industry) and services limits the choices of Russian oil companies. Only the largest Western equipment and tool suppliers are able to pass the very convoluted and non-transparent licensing process by Gosgortekhnadzor (safety watchdog) and Gosstandart. Without those licenses Russian oil companies have no right to use imported equipment and services. This is in sharp contrast to most other counties where responsibility for the equipment rests with the user, and compliance with safety norms is controlled using straightforward approval processes. This red tape results in high prices for such services in Russia, thus reducing the demand for them.

Labor barriers

Barriers to layoffs prevent labor productivity improvements. Such barriers exist in oil towns, which were created during the large-scale development of Timan-Pechora and West Siberian oil fields, and where the whole population is
dependent on an oil company (Exhibit 24). Towns like Surgut, Langepas, Kogalym, Urai, Usinsk, Nefteyugansk, Megion, Raduzhny, etc. are fully dependent on the well-being of major Russian oil companies based in those towns. Recently some Russian oil majors started limited layoffs, but this immediately caused fierce retaliation of local governments, who have great power over oil companies, e.g. they can revoke oil field licenses.

POLICY IMPLICATIONS AND FUTURE OUTLOOK

Future growth of the oil industry will depend on the removal of external obstacles to increased investments and higher productivity. If the current external factors persist, oil production may decline by 50% in 10 years with the natural depletion rate in existing fields. If the main external barriers are removed, however, many investment projects will become attractive. New fields will be developed, additional export infrastructure would be built, and the utilization of existing wells would increase. As a result, oil production could almost double in 10 years (Exhibit 25), from 6 mbpd in 1999 to 11.5 mbpd by 2009, with large possible contributions from foreign direct investment (FDI).

Methodology and assumptions

In order to estimate the oil production potential in Russia we subcontracted the research unit of Russian Petroleum Investor, an oil industry journal, which analyzed Russia’s reserves and their economic attractiveness under current TFP. Based on this we estimated how much more oil would be economical to produce if Russia was to adopt close to best practice operations over the next ten years.

¶ We have created two distinct development scenarios: a Status quo scenario and a Favorable investment conditions scenario (Exhibit 26). The world oil price and the possible appreciation in real terms of the ruble against the dollar are treated as independent variables. The ruble appreciation increases domestic expenses and makes the industry less cost competitive. The impact of ruble appreciation, however, is limited to Russia-specific costs nominated in rubles, such as labor, domestic transport and non-exportable services, whereas we assume that Russian equipment and exportable services will trade at world prices regardless of ruble appreciation. As a result, a 50% appreciation of the ruble against the US dollar will increase the industry costs by about 35%, since about 30% of industry costs are effectively dollar-denominated. It should be noted that the ruble is more likely to appreciate in real terms under the Favorable investment scenario with large foreign capital inflows and, most likely, higher GDP growth which could result from improvements in the oil sector alone.

¶ We have derived a regionally-based new fields cost curve based on industry data and analyses detailing the size of proven reserves by region, and the required schedule of capital and operating expenses. We have used a 10% discount rate and assumed that operational
productivity factors will in 10 years almost reach US 1997 levels. Finally, we assumed that most new fields would be developed under the Production Sharing Agreement (PSA) framework, which reduces the risk level of an investment by sharing the oil price risk between the investor and the government, and locking the tax level for the entire project life. We have calculated the tax payments and the oil sector net GDP contribution based on the PSA framework, as set out in several existing new field feasibility studies.

The net GDP contribution of the oil industry in Russia is very high; in fact, it is close to the amount of total sales. Not only does oil have extra profits, as long as oil prices are well above Russia’s cost (thanks to Saudi Arabia - the low cost producer - restraining its production), but these profits are also for the most part dollar denominated. First, revenues are dollar denominated at the prevailing world oil price, including domestic sales, since the oil consumed domestically would have to be imported if not produced locally. Second, only 20% of operational costs (against 10% today) would be dollar denominated, even assuming best practice operations (use of foreign subcontractors and specialized equipment). The bulk of the resources used would still be local and carry a very low opportunity cost (high unemployment rate, and large amount of excess workers and idle rigs available). Last, less than 10% of additional (dollar denominated) financial costs would have to be added assuming a 20% return on investment, which represents about half of total cost. Furthermore, this notional financial cost (in the case of equity financing) would be pushed back long into the future with retained earnings likely to be reinvested as long as the investment climate remains favorable.

Status quo scenario

In the Status Quo scenario the external barriers to growth will continue to exist. As a result, oil production will decline from 6 today to 2.9 mbpd in 2009, and oil sector contribution to GDP from USD 16 Billion to USD 8 Billion (assuming USD 11 Urals) (Exhibit 27). No new field developments are assumed. The existing fields will remain on their natural decline curve of 8% year, primarily due to limited investments in oil recovery improvements.

Favorable investment conditions scenario

In the Favorable investment conditions scenario the external barriers to growth would be removed. Provided that the oil sector is open to FDI, TFP in new field development could reach close to best practice levels with the application of modern field development and production technologies (Exhibit 28). The resulting cost curve of Russian proven reserves would allow more oil fields to be economically attractive to develop.

At the current low TFP levels, it is not viable to develop Timan-Pechora reserves under 11 USD/bbl Urals (Exhibit 29). Overall oil production could grow from 6
today to 7.5-11.5 Mbpd in 2009 depending on the TFP level. Oil sector contribution to GDP would rise from USD 16 Billion today to USD 38 Billion in 2009, assuming TFP improvement. Detailed capital and operating cost breakdowns by region depending on the prevailing TFP improvement sub-scenario are presented in Exhibit 30.

Due to better oil recovery in existing fields, existing fields oil production in the Favorable investment conditions scenario with high TFP will decline from 6 mbpd today to only 3.6 mbpd in 2009, rather than to 2.9 mbpd in the Status Quo scenario. The lower discount rate and the resolution of corporate governance/minority shareholder rights issues would prompt increased investments in higher oil recovery.

New fields will be developed. Under the Favorable investment conditions scenario the discount rate would drop to 10%, making oil production much more profitable. A workable PSA and the absence of export barriers and the export parity level of domestic pricing would promote investment by guaranteeing that oil can be sold at world prices. Improved corporate governance and minority shareholder rights would also help by aligning management incentives so as to ensure that NPV-positive long-term investments will indeed be made. The resulting oil industry output and GDP contribution are shown in Exhibit 31, and the corresponding investment requirements are summarized in Exhibit 32.

Additional export infrastructure development would be required. New pipelines and ports would have to be built to allow more crude exports. For the West Siberia new fields development, the additional costs related to infrastructure financing represent about USD 1.7/bbl. Sufficient export capacity to allow West Siberia exports can be created by building e.g. the Polotsk-Ventspils and Kirishi-Gulf of Finland pipelines. Pursuing other projects, such as the Druzhba extensions, Black Sea ports expansion, and Northern Gateway projects can create additional infrastructure for Volga-Urals and Timan-Pechora exports. The two most attractive pipeline expansion options, on a dollar per barrel of new capacity basis, are the Baltic Pipeline System expansion projects (Exhibits 33 and 34). They are included in the new fields cost curve calculations.

Given the potential growth in both domestic and global demand, Russia could increase its oil production by 70% (i.e. 10 million barrels per day) without increasing its current share of oil exports. Realizing the full production potential of 11.5 million barrels could be possible but contains a certain risk given the fact that oil demand is relatively inelastic to price – i.e. the absorption by the market of an increased quantity of oil would require much lower prices. The overall production, domestic consumption and export forecasts are summarized in Exhibit 35.

- **Domestic demand could grow at about 4% per year.** Energy consumption in the developed economies grows on average at _the
GDP growth rate. In the developing economies, energy consumption grows at the rate of GDP growth. Russian energy consumption under the Favorable investment conditions scenario is likely to grow at the GDP growth rate, or about 4% per year, due to several factors. First, consumer goods and services rather than heavy industrial development are likely to become the Russian growth engine under the Favorable investment conditions scenario (see the Synthesis Chapter at the end of this report). Second, ineffective energy use at the existing industrial enterprises allows for significant efficiency improvements. The resulting growth rate would bring Russian domestic consumption from 2.5 mbpd today to 4.0 mbpd in 2009.

- **World oil market could absorb increased Russian crude exports.** World net oil imports are projected to grow by 75% by 2010 due to the decreasing production in OECD Europe and North America and the high demand growth in Asia (Exhibit 36). As a net oil exporter, Russia could increase its exports (crude and products combined) by 75%, from today’s level of 3.5 mbpd to 6.1 mbpd, without increasing its share of the world market. Under the Favorable economic policy with high TFP scenario, Russian crude exports would rise to 7.5 mbpd, or by 115% in 10 years, so Russia would increase its share of the world oil trade market from 12% today to 15% in 10 years. Although possible, this growth, if matched by other countries, could trigger a strong oil price decline since the demand for oil is relatively inelastic, meaning that prices would have to decrease significantly for the demand to remain at its present level (Exhibit 37).
Appendix: Extra capital inputs per well

Following is a detailed explanation of the operational reasons behind extra capital inputs per well in Russia:

![低质量的钻头和钻井液—1960年代末，俄罗斯几乎完全从旋转钻井转向所谓的涡轮钻井。涡轮钻井的优点是其机械钻速更高（当时的优势因子为五倍）。人们希望机械速度能转化为商业速度，即每台钻机一年能钻多少口井。关键条件是能够生产出高耐用性钻头，因为使用常规钻头时，所有机械速度优势都会被频繁更换钻头所带走。当时的俄罗斯钻头行业（甚至现在）也无法达到涡轮钻井的质量要求。钻头更换是最费时的工作，因为它涉及从2.5公里深的井底起出一串钻杆，以更换底部附带的钻头。今天，全球钻头市场被四大制造商主导，他们有强大的研发力量和丰富的经验。自1990年代以来，主要的西方钻头制造商才具备生产足以用于涡轮钻井方法的钻头，现在被西方石油公司采用。现代钻头使用聚晶金刚石切割（PDC）的钻头平均寿命比普通俄罗斯钻头长5倍。钻头耐用性优势部分抵消了其价格溢价。](image1)

Another driver of drilling efficiency is the usage of appropriate drilling fluids, of which the main one is drilling mud. Drilling mud is pumped into the wellbore, and then returned to the surface to be cleaned and used again. Drilling mud has the following functions:

- Transmit hydraulic energy to tools and bit
- Flush away the rock cuttings from the well bottom
- Maintain wellbore stability keeping the wellbore at its optimal size and cylindrical shape
- Cool, lubricate, and support the bit and drilling assembly

Failure of the mud to adequately fulfill any of those functions results in drill pipe sticking, reservoir damage, and possibly blow outs – fatal accidents when gas or water enters the wellbore uncontrollably under great pressure. The negative consequences of using suboptimal drilling mud can be combined into two groups – extra inputs due to longer...
drilling time per well and reservoir (formation) damage which reduces the well flow rate.

- Extra inputs per well are due to, e.g., drill pipe sticking or excessive drilling mud consumption. One of the problems in the Russian drilling industry is its failure to control the optimal drilling mud density and its chemistry that leads to wellbore destabilization, in turn leading to drill pipe sticking, as well as excess cement consumption and poor cementing later on. Poor filtration of drilling mud leads to higher mud turnover, adding to the cost of drilling a well. We estimate that 22% of the difference in capital inputs per well comes from use of low quality drilling fluids and circulation/cleaning systems (shale shakers).

- Formation damage causes drop in permeability and porosity, as drilling mud penetrates and plugs the formation. It has not been possible to reliably estimate losses caused by this factor, but it is not unreasonable to expect a 12-15% lower initial well flow rate due to poor quality drilling mud only (and this requires more enhanced recovery at later stages in the field life). Effective drilling fluids solutions exist in the international market, and incremental cost of using those is minimal compared to damage caused by using poor quality fluids.
OIL SECTOR* SIZE IN THE RUSSIAN ECONOMY - 1998

Percent

100% =

65m USD 325bn USD 74bn USD 73bn

Labor force**

GDP***

Total export

Budget**** revenues

The oil sector is extremely important in the Russian economy and represents a very substantial part of Russian budget revenues and total exports

*Oil sector includes exploration, production, refining and wholesale distribution through pipelines and ports. Excludes retail sales
** 394,000 employees in upstream (exploration and production), and 200,000 in downstream (refining and distribution), excludes gasoline retail
*** Oil industry sales as a percent of GDP
**** Incurred amount, actual budget receipts may be lower due to tax offsets

Source: Goskomstat; BP

SCOPE OF THIS REPORT

Percent

Exploration

Drilling

Surface facilities construction and field operations

Crude oil transportation

Russian oil industry

Labor

Drilling

Surface facilities construction and field operations

Capital

Drilling equipment (wells)

Surface facilities

Output 6.2 mbpd**

Total

100% = 394,000 employees*

100% = USD 180bn

* In 1998
** Million barrels per day
*** McKinsey estimate

Source: McKinsey analysis and estimates; API; VNII OENG
PRODUCTION, CONSUMPTION AND EXPORT OF OIL IN RUSSIA

Million barrels per day

Source: Goskomstat

- Data unavailable on export of products before 1994

PRODUCTION, CONSUMPTION AND EXPORT OF OIL IN RUSSIA

Decline due to lower exports to ex-Soviet bloc countries

Source: OPEC Bulletin

 PRIVATIZATION IN THE RUSSIAN OIL INDUSTRY

Percent

Average government share in major Russian oil companies*

*Sidanco, Sibneft, Surgutneftgas, YUKOS, Vostsibneftgas, KomiTEK, Nafta Moskva, LUKoil, Tatneft, Eastern Oil Co., Tyumen Oil Co., Transneft, ONAKO, Sibur, Norsi Oil, Slavneft, Rosneft; weighted by production volume

** Expected before August 1998 crisis, based on government plans

Source: OPEC Bulletin
TOTAL FACTOR PRODUCTIVITY FRAMEWORK

*Technical definition of TFP: \( TFP = \text{Labor Productivity}^{1-\alpha} \times \text{Capital Productivity}^\alpha \), where \( \alpha \) is share of capital in value added; \( \alpha = 0.75 \) for Russian oil industry

** Texas onshore

Source: McKinsey analysis
TOTAL FACTOR PRODUCTIVITY FRAMEWORK (CONTINUED)

TFP on a comparable basis

Operational factors leading to lower output per well in Russia
- Lack of hydrofracturing
- Idle wells that can be restarted
- Lack of tertiary recovery
- Poor in-fill drilling

Operational factors leading to higher capital inputs per well
- Extra drilling equipment services
- Extra labor in drilling (capitalized)
- Extra drilling supplies
- Idle drilling capacity (labor and capital)
- Extra well workovers due to poor well completion

Operational factors leading to higher labor inputs per well
- Excess labor
- Inefficient organization of functions and tasks (OFT)
**Sources of Difference in Total Factor Productivity**

Indexed to US = 100 in 1997

<table>
<thead>
<tr>
<th>Structural factors</th>
<th>Operational factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>US* actual</td>
<td>Output per well</td>
</tr>
<tr>
<td>Capital and labor inputs per well</td>
<td>US on a comparable basis to Russia</td>
</tr>
<tr>
<td>Lower output per well</td>
<td>Extra capital inputs per well</td>
</tr>
<tr>
<td>Extra labor inputs per well</td>
<td>Russia actual</td>
</tr>
</tbody>
</table>

TFP on comparable basis: $\frac{55}{185} = 30\%$

*Texas onshore

Source: McKinsey analysis

Exhibit 7
TOTAL FACTOR PRODUCTIVITY - SUMMARY OF STRUCTURAL ADJUSTMENTS
Indexed to US = 100 in 1997

Factors affecting output per well

Factors affecting capital and labor inputs per well

Source: USGS; API; McKinsey analysis

STRUCTURAL OUTPUT ADJUSTMENT - GEOLOGY

Well flow rate *
Index

*Given the same area of reservoir per well indexed to average Texan production well flow rate
Source: US Geological Survey
**STRUCTURAL OUTPUT ADJUSTMENT - DEPLETION**

NPV and cumulative recovery maximizing standard decline curve predicts that difference in age is responsible for factor of 2.0 change in flow rate.

[Graph showing well output and field age with factors and ages for Russian and Texas fields.]

Source: McKinsey analysis; Oil field development textbooks

**STRUCTURAL OUTPUT ADJUSTMENT - OIL QUALITY**

Indexed to WTI* value = 100

<table>
<thead>
<tr>
<th>Crude oil quality drivers</th>
<th>WTI*</th>
<th>Urals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulphur content (Percent of volume)</td>
<td>0.24 (Better)</td>
<td>1.19</td>
</tr>
<tr>
<td>API gravity (API gravity = (141.5/specific gravity at 60°F) - 131.5)</td>
<td>39.6 (Better)</td>
<td>33.4</td>
</tr>
</tbody>
</table>

*Value of a barrel of WTI vs. barrel of Urals, where WTI (West Texas Intermediate) and Urals are Texas and Russian dominant crude mixes, net of transport cost

Value of a barrel of Urals

Source: API

Exhibit 10

Exhibit 11
WELL DEPTH - STRUCTURAL CAPITAL INPUTS ADJUSTMENT

Drilling cost grows exponentially with depth.

Based on well depth difference, capital inputs and labor per well in Russia should be 30% higher than in Texas (73 percentage points on Exhibit 8)

Source: API

Exhibit 12
Climate factor causes extra 45% capital inputs per well in Russia overall* (59 percentage points on Exhibit 8)

*Average weighted by share of regions

Source: RPI

Drivers of extra capital inputs:

- Special foundations for equipment and drilling rigs in swampy areas
- Extra protection against corrosion due to temperature differentials
- Higher investments in roads and infrastructure
OPERATIONAL SOURCES OF DIFFERENCE IN TOTAL FACTOR PRODUCTIVITY
Indexed to US = 100 in 1997

*Drilling labor is capitalized, in accordance with industry practice
Source: McKinsey analysis

LOWER OUTPUT PER WELL - SUMMARY
Indexed to US = 100 in 1997

<table>
<thead>
<tr>
<th>Factor</th>
<th>TFP effect</th>
<th>Explanation</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of hydro-fracturing</td>
<td>29</td>
<td>25,000 (20%) of wells in Russia can be successfully fractured, increasing output by 22% overall</td>
<td>&quot;Geology and Development of oil and gas fields&quot; by Gavura</td>
</tr>
<tr>
<td>Idle wells that can be restarted</td>
<td>7</td>
<td>20% of wells are idle; can increase overall output by 5% if those wells are restarted</td>
<td>Interviews</td>
</tr>
<tr>
<td>Lack of tertiary recovery - Chemical treatment - CO₂</td>
<td>14</td>
<td>11% overall output increase based on US result (1995)</td>
<td>Oil and Gas Journal, EOR survey</td>
</tr>
<tr>
<td>Poor in-fill drilling</td>
<td>9</td>
<td>7% overall output increase due to increase of new well flow rate from 132 to 370 bbl/day due to better reservoir monitoring</td>
<td>VNII OENG, McKinsey</td>
</tr>
</tbody>
</table>

Source: McKinsey analysis

Exhibit 14
Exhibit 15
Oil production
Million barrels per day

- Improvement in oil production in 1994-97 came mainly from higher oil recovery from existing wells
- Much larger improvement still possible if all reservoir stimulation techniques utilized

Source: Goskomstat

Exhibit 16
HYDROFRACTURING PROFITABILITY*

*Based on use of Western hydrofracturing (FRAC) subcontractor in West Siberia

** Assumes oil is 100% exported

*** Production volume goes up by 72 BPD in the first year and goes back to its original decline rate by year 4

**** There is no incremental operating cost due to extra output

Source: Neft i Kapital, RPI

Exhibit 17

HIGHER CAPITAL INPUTS PER WELL - SUMMARY
Indexed to US = 100 in 1997

*Based on use of Western hydrofracturing (FRAC) subcontractor in West Siberia

** Assumes oil is 100% exported

*** Production volume goes up by 72 BPD in the first year and goes back to its original decline rate by year 4

**** There is no incremental operating cost due to extra output

Source: Neft i Kapital, RPI

Exhibit 18
**DRILL BIT DURABILITY**

Based on series of tests run by a Western drill bit manufacturer in different regions and on different depth wells

Drill bit distance before replacement
Meters

![Graph showing drill bit distance before replacement in meters for Russia and US.]

*Russian average reported by other sources is higher (approximately 140m), but since the tests have been performed on comparable wells the result is justified*

Source: Company interviews

---

**FACTORS LEADING TO EXTRA LABOR INPUTS* PER WELL**

Indexed to US = 100 in 1997

<table>
<thead>
<tr>
<th>Factor</th>
<th>TFP effect</th>
<th>Explanation</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excess workers</td>
<td>10</td>
<td>Approximately 40% of employees are excess labor, mainly due to fall in output since 1988</td>
<td>Company interviews</td>
</tr>
<tr>
<td>Inefficient OFT</td>
<td>28</td>
<td>Excess administration, Overstaffed geological departments, Scientific-research institutes, Extra field labor</td>
<td>Company interviews, Field visits</td>
</tr>
</tbody>
</table>

* US average labor productivity is million BOE per year per 37 employees, which includes company and contractor full-time equivalents and embedded contractor employees; Russian average labor productivity is million BOE per year per 143 employees

Source: McKinsey analysis; Industry interviews

---

*Exhibit 19*
LACK OF NEW FIELDS DEVELOPMENT DESPITE LARGE RESERVES

Exhibit 21

Production wells drilled

Average output of a new production well

Wells

Bbl/day/well

14,000
12,000
10,000
8,000
6,000
4,000
2,000
0


Wells drilled

Output per well***

4,000
2,000
0


Proven reserves in Russia*

*Based on Russian reserves classification
** Major international oil companies average 10-12 years
*** Large West Siberian field average is 3 to 4 times greater

Source: VNII OENG

EXTERNAL FACTORS PREVENTING OPERATIONAL IMPROVEMENT

Exhibit 22

Exhibit 22

External factors

Major barriers to growth
- Government policy of limiting crude oil exports
- PSA regime still not 100% workable

Weak protection of minority shareholder rights

Red tape facing imported equipment and services (and lower quality domestic equipment and services)

Barriers to layoffs

Operational factors

Significant

Secondary

Lack of new field development

Low recovery in existing fields

Extra capital inputs per well

Extra labor inputs per well

Significant

Secondary
### Causality for Productivity Differences: Oil

<table>
<thead>
<tr>
<th>Russia vs. US</th>
</tr>
</thead>
</table>

#### External Factors
- **Macroeconomic barriers**
  - Drop in demand/low labor cost/low income
  - Country risk/high capital cost (political instability/budget deficit)
- **Labor barriers**
  - Mobility restrictions
  - Inadequate education
- **Capital barriers**
  - Government ownership
  - Problems with minority shareholders’ rights
- **Sector specific barriers (non-level playing field)**
  - Non-level taxes
  - Non-equal allocation of government procurement and land
  - Threat of red tape/harassment
  - Non-level energy payments
  - Other (property rights, barriers to trade/FDI)
- **Related industry barriers**
  - Upstream/downstream sectors
  - Poor infrastructure
- **Other barriers (climate, geology, etc.)**

#### Industry Dynamics
- Pressure from global best practice
- Domestic competitive intensity
- Non-level playing field

#### Production Process
- Low capacity utilization (excess workers)
- Inefficient organization
  - Organization of functions and tasks
  - Marketing/product mix
  - Supplier relations
  - Blue collar trainability
- Lower capital intensity/technology
  - Obsolete assets (subscale/outdated technology)
  - Lack of viable investment in non-obsolete assets (upgrades/new fields)
  - Non-viable investment due to factor costs (labor, capital, and energy)

#### Productivity
(Indexed to US = 100)

- **Very Important**
- **Important**
- **Secondary**

- Non-workable PSA exposing investor to tax uncertainty
- Limits on exports
- Overall, in favor of Russia
- Applies to oil field services
- Lack of outsourcing to best practice subcontractors
- Lack of hydrofracturing
- Lack of new field development

Exhibit 23
SOCIAL BARRIERS TO LAY-OFFS IN OIL-DOMINATED TOWNS

Typical oil town example (Nefteyugansk)

- Dependents who will lose support
  - 60-70%
  - 20-30%
  - 10%

Forecasted lay-offs by end of 1999

Will remain employed or supported

• Since Russian oil towns were dominated by the oil industry, few job alternatives exist
• Mobility out of oil towns is restricted by “Propiska” laws limiting mobility
• Poverty making cost of move and new place to live unaffordable

Source: Oil and Kapital

POSSIBLE SCENARIOS FOR FUTURE OIL PRODUCTION

Millions of barrels per day

Low productivity and no new field development

Low productivity and new field development

High productivity and new field development

Existing fields

New fields

Effect of recovery improvement in existing fields

Source: McKinsey analysis
### REGULATORY SCENARIO ASSUMPTIONS

<table>
<thead>
<tr>
<th></th>
<th>Status quo scenario</th>
<th>Favorable investment conditions scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Other assumptions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Discount rate</td>
<td>30%</td>
<td>10%</td>
</tr>
<tr>
<td>• GDP growth</td>
<td>0%</td>
<td>8%</td>
</tr>
<tr>
<td>• Oil price (Urals)</td>
<td>USD 11/bbl</td>
<td>USD 11/bbl</td>
</tr>
<tr>
<td>• New field development</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>• TFP**</td>
<td>Low 55%</td>
<td>Low 55%, high 185%</td>
</tr>
<tr>
<td>• Ruble appreciation vs. USD*</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>External factors</strong></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Political and macroeconomic stability</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>• Minority shareholder rights issues resolved</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>• Removal of red tape facing imported equipment and services</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>• Labor layoffs allowed</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

* Affects Russia - specific cost categories only (i.e., labor, energy, transportation costs, not equipment)
** TFP as indexed to US = 100 in 1997, we assume that TFP is scenario independent (unlikely) to simplify the model

Exhibit 26
STATUS QUO SCENARIO

**Oil production**
Million barrels per day

![Graph showing a 52% drop in oil production from 6.0 million barrels per day in 1999 to 2.9 million barrels per day in 2009.]

**Assumption:**
- Existing fields production declines 8% per year

Source: McKinsey analysis

---

TFP IMPROVEMENT IN NEW FIELDS UNDER FAVORABLE INVESTMENT CONDITIONS SCENARIO
Indexed to US = 100 in 1997

<table>
<thead>
<tr>
<th>Current gap</th>
<th>Remaining gap*</th>
<th>Assumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Total TFP gap</td>
<td>130</td>
<td>13</td>
</tr>
<tr>
<td>Lack of hydrofracturing</td>
<td>29</td>
<td>0</td>
</tr>
<tr>
<td>Idle wells that could be restarted</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Lack of tertiary recovery</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td>Poor in-fill drilling</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Extra drilling equipment services</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Extra labor in drilling</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Extra drilling supplies</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Idle drilling capacity</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Extra well workovers due to poor well completions</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Excess labor</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Inefficient OFT</td>
<td>28</td>
<td>15</td>
</tr>
</tbody>
</table>

*TFP gap is steadily corrected over 10 years

Source: McKinsey analysis

---

* Urals 15 USD/bbl
* Urals 11 USD/bbl
NEW FIELDS COST CURVE UNDER DIFFERENT SCENARIOS

Oil production and transportation costs* in 2009
USD per barrel Urals

- **Status quo**
  - No FDI
  - Low TFP**, 30% discount rate
- **Favorable investment conditions**
  - No FDI
  - Low TFP** improvement
  - 10% discount rate
- **Favorable investment conditions**
  - FDI
  - High TFP** improvement
  - 10% discount rate

West Siberia Volga-Urals Timan Pechora

New field production in 2009***
Million barrels per day

*Includes opex and capex and transportation infrastructure financing costs (to get oil to the closest world market), assuming constant ruble/USD exchange rate; the cost curve will shift up by 15% if ruble appreciates 50% against the dollar; PSA taxation
** TFP - total factor productivity
*** East Siberian and Arctic Shelf oil fields have total cost over 25 USD/bbl even under high TFP and low discount rate

Source: RPI data; McKinsey analysis

COST ESTIMATES* UNDER FAVORABLE INVESTMENT CONDITIONS SCENARIO
USD/bbl

Operating cost Capital cost Total cost
New fields development New export infrastructure

<table>
<thead>
<tr>
<th></th>
<th>Low TFP** improvement</th>
<th>High TFP** improvement</th>
<th>Low TFP** improvement</th>
<th>High TFP** improvement</th>
<th>Low TFP** improvement</th>
<th>High TFP** improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Siberia</td>
<td>2.9</td>
<td>2.8</td>
<td>2.6</td>
<td>1.4</td>
<td>1.7</td>
<td>7.2</td>
</tr>
<tr>
<td>Volga Urals</td>
<td>4.9</td>
<td>4.1</td>
<td>6.4</td>
<td>2.9</td>
<td>1.9</td>
<td>13.2</td>
</tr>
<tr>
<td>Timan Pechora</td>
<td>6.0</td>
<td>5.1</td>
<td>7.7</td>
<td>3.5</td>
<td>2.1</td>
<td>15.8</td>
</tr>
</tbody>
</table>

*Average cost per barrel over 35 years, assuming 10% discount rate and PSA taxation
** TFP - total factor productivity

Source: RPI; McKinsey analysis
FAVORABLE INVESTMENT CONDITIONS SCENARIO

Note: Urals 11 USD/bbl assumed; under 15 USD/bbl Urals oil production can be significantly higher (technically) but output will be limited by demand constraints.

Source: McKinsey analysis

OIL INDUSTRY POTENTIAL INVESTMENT PROFILE

*Includes maintenance and upgrading investment
** Assuming 8% overall economic growth from year 2000

Source: McKinsey analysis
# SEA-PORT BOTTLENECK REDUCTION PRIORITIES

<table>
<thead>
<tr>
<th>Key priorities</th>
<th>Issues/constraints</th>
<th>Additional capacity Million barrels per day</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Expand Ventspils port in the Baltic sea to double capacity to 0.6 mbpd to take advantage of the capacity of pipeline in place</td>
<td>• Up to the government of Lithuania</td>
<td>0.30</td>
<td>$</td>
</tr>
<tr>
<td>2 Prolong pipeline from Kirishi to St. Petersburg to allow more exports</td>
<td>• St. Petersburg port may need addition of terminals</td>
<td>0.10 - 0.20</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td>• Wetlands issue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Expand Gdansk port and pipelines leading there to increase export</td>
<td>• Up to the government of Poland</td>
<td>0.10 - 0.14</td>
<td>$</td>
</tr>
<tr>
<td>4 Expand Black sea ports</td>
<td>• Black sea exports are constrained by the limited capacity of Bosphorus strait</td>
<td>0.10 - 0.30</td>
<td>$$</td>
</tr>
<tr>
<td></td>
<td>• Caspian oil flows also compete for same limited Bosphorus capacity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Overall increase</td>
<td>0.90 - 1.24</td>
<td></td>
</tr>
</tbody>
</table>

Exhibit 33
BALTIC PIPELINE SYSTEM PROJECTS

New capacity
Cost
Countries involved

Polotsk - Ventspils pipeline expansion
0.4 mbpd
USD 435-510m
Russia, Belorussia, Latvia/Lithuania

Kirishi - Gulf of Finland pipeline
0.6 mbpd
USD 900m
Russia, Finland

Polotsk - Ventspils pipeline expansion
0.4 mbpd
USD 435-510m
Russia, Belorussia, Latvia/Lithuania

Porvoo (Finland)

Source: Neftegazovsaia Vertical; Morgan Stanley Dean Witter; World Bank

POTENTIAL CRUDE OIL EXPORTS UNDER DIFFERENT SCENARIOS*
Mbpd

<table>
<thead>
<tr>
<th>Scenario</th>
<th>1999</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>TFP level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Status quo Low TFP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Favorable investment conditions Low TFP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High TFP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Potential production</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Existing fields</td>
<td>6.0</td>
<td>2.9</td>
</tr>
<tr>
<td>– New fields</td>
<td>6.0</td>
<td>2.9</td>
</tr>
<tr>
<td>• Domestic consumption</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>– Available for exports</td>
<td>3.5</td>
<td>0.3***</td>
</tr>
<tr>
<td>• Export infrastructure requirement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Existing</td>
<td>2.3</td>
<td>2.3</td>
</tr>
<tr>
<td>– Additional capacity required</td>
<td>N/A</td>
<td>0.0</td>
</tr>
</tbody>
</table>

*Assumes Urals price 11 USD/bbl
** Assumes consumption growth at 2% per year (GDP growth of 3%, energy use correlation 2/3)
*** Assumes consumption growth at 4.0% per year (GDP growth of 8%, energy use correlation 1/2)
**** Higher oil price will improve profitability but due to export infrastructure constraint volume will not change

115% increase over 1999 exports

Exhibit 35
EXPECTED GROWTH IN WORLD NET OIL IMPORTS

Million barrels per day

- 75% growth will come from increased exports by:
  - Middle East
  - FSU
  - Latin America
  - Africa

- Net imports of oil are projected to increase by 75%, or 22 Mmbd
- Russia could increase its crude exports by 75% by 2010 without increasing its share of the world oil trade market

<table>
<thead>
<tr>
<th>Region</th>
<th>1996</th>
<th>2010</th>
<th>CAGR</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>28.1</td>
<td>75%</td>
<td>49.7</td>
<td>6</td>
</tr>
<tr>
<td>South Asia</td>
<td>0.3</td>
<td>1.5</td>
<td>3.7</td>
<td>7</td>
</tr>
<tr>
<td>East Asia</td>
<td>3.3</td>
<td>12.5</td>
<td>3.3</td>
<td>6</td>
</tr>
<tr>
<td>Pacific</td>
<td>6.0</td>
<td>7.4</td>
<td>8.0</td>
<td>7</td>
</tr>
<tr>
<td>OECD Europe*</td>
<td>7.7</td>
<td>14.8</td>
<td>4.0</td>
<td>4</td>
</tr>
<tr>
<td>North America*</td>
<td>9.3</td>
<td>3.7</td>
<td>3.7</td>
<td>3</td>
</tr>
</tbody>
</table>

*North American demand is forecasted to increase from 20.3 to 23.4 Mmbd, while its supply - will fall from 11.1 to 8.6 Mmbd; OECD Europe demand will grow from 14.4 to 17.0 Mmbd, while its supply will shrink from 6.7 to 4.5 Mmbd


Exhibit 36
WORLD OIL DEMAND AS A FUNCTION OF OIL PRICE

Price elasticity of oil demand is low**, e.g., 50% increase in oil price causes 7% drop in demand.

*1998 worldwide oil production was 73.4 Mmbd
** Within a price range of 10 - 20 USD/bbl
Source: Energy Information Administration/International Energy Outlook 1999; McKinsey analysis
Dairy

EXECUTIVE SUMMARY

Industry overview. The industry consists of four functions: raw milk receiving, fluid and non-fluid milk processing, and packaging. Dairy farming and distribution are excluded from our study. The major processed dairy products are fluid milk (the largest category), cream, butter, cheese and milk powder. In 1997, 199,000 people were employed in the Russian dairy industry across 1,753 plants.

Productivity performance. Labor productivity in dairy is at 8% of the US level. Russian dairy plants produce a fifth of US output per capita using more than twice as many people. Since 1990, labor productivity has almost halved. Productivity differs by size of plant, since large economies of scale are present in this industry: 72 large plants (capacity of 55,000 tons a year or more) employ ca. 20% of the industry workforce and have 12% of the US level of productivity; 1,681 small plants employ the rest, and operate at 7% of US productivity level.

The main reasons for the productivity gap at the operational level differ between small and large plants. Large plants (43% of industry capacity) could raise their productivity from 12% to more than 60% of the US level without major investments, since the present gap is mainly due to low capacity utilization and inefficient organization of functions and tasks. The remainder of the gap comes from lack of automation and inefficient relations with suppliers. These large plants, if utilized at 80%, could produce all current output of the industry by themselves. Small processors need major investments to reach minimum efficient scale – an investment that will not be economical.

The most important external barriers to productivity and output growth are problems in up- and down-stream industries, macroeconomic instability and local government interventions. Problems in up- and downstream industries hinge on monopolistic wholesalers, who force arrears onto dairy plants and set off a chain of events leading to inefficient dairy farming and the emergence of sub-scale mini-plants which do their own distribution. Macroeconomic instability manifests itself via a high cost of capital (discouraging investments into larger scale plants, and into shelf-life enhancing technologies that could give dairy plants more bargaining power over wholesalers) and a low level of demand (leading to reduced consumption of processed milk and lower capacity utilization of dairy plants). Local governments shield wholesalers from competition from supermarkets by taxing the latter ones out, and directly hamper restructuring of the dairy sector by deterring layoffs and bankruptcies of inefficient plants, thus creating unequal conditions of competition in the industry.
Policy implications and future outlook. For Russia to increase its productivity in the dairy sector, large plants should expand, while small ones should exit. For this to happen, barriers to growth of supermarkets need to be lifted (see the summary of the Food Retailing industry), regulatory interventions against layoffs must be stopped, and bankruptcies of small plants should not be artificially prevented. With these policies, the sector would be able to achieve more than 60% of the US productivity level with limited investments.
Dairy

This case study benchmarks the performance of the Russian dairy industry against the US.

We will start with an overview of the industry, then present productivity performance comparisons across countries, explain causes of differences in performance, and end with recommendations to policy-makers and firms to close the gap.

INDUSTRY OVERVIEW

Importance of the sector

The dairy industry’s importance stems from the significance of the food processing sector – one of the biggest manufacturing sectors with a large impact on food prices. Food processing constitutes 4.2% and 2.3% of Russian GDP and employment respectively. Since food makes up 45% of Russian household consumption and food processing accounts for approximately 20% of that cost, the sector affects 9% of total household consumption in Russia. As a result, improvements in the sector performance will improve standards of living in Russia.

Dairy is the second largest food processing industry (after bread) occupying 10% of its employment. Improvements in its performance would enhance the overall food processing performance and hence the aggregate performance and standards of living.

The sector's contribution to the study

The dairy case contributes to the overall study in two ways. First, as a large food processing industry, it can contribute to a better understanding of issues confronting the Russian food processing industry (or more broadly, the Russian manufacturing industry).

Second, dairy highlights the importance of related industries in the development of industries. Even compared to other food processing industries (see Confectionery Case), linkages between processors, farmers and wholesalers are critically important given the short shelf life of raw and processed milk.
Industry definition

The dairy processing industry consists of four functions: raw milk receiving, fluid and non-fluid milk processing, and packaging. Dairy farming and distribution are excluded. Major processed dairy products are fluid milk (the largest product category), cream, butter, cheese and milk powder (Exhibit 1).

As of 1997, 199,000 people are employed in the industry across 1,753 plants.

Industry evolution

Since 1990, domestic production of processed dairy products has plummeted by 63%. This is due to a 20% reduction in dairy consumption, an increase in imports and a substitution of raw for processed milk (Exhibit 2).

Currently, per capita dairy consumption in Russia is around 40 indexed to the US at 100.

PRODUCTIVITY PERFORMANCE

We calculate labor productivity in dairy as value added per hour worked. To calculate value added, we used the US Census of Manufacturing definition (= sales - cost of goods). Value added was converted at the food processing PPP for cross-country comparisons. In order to cross-check value added figures, physical productivity measures were also used.

Overall dairy processing productivity

Russian labor productivity in dairy is at 8 indexed to the US at 100. Russian dairy processors produce a fifth of US output per capita using more than twice as many people (Exhibit 3). In terms of physical productivity, Russia is at 12 indexed to the US at 100. The lower quality of Russian output (see the Supplier Relations section below) explains the difference between our physical and value added figures.

Since 1990, labor productivity has almost halved although there was some recovery in 1997 (Exhibit 4).

Dairy processing productivity by plant size

Due to the importance of scale economies in dairy processing, we segmented existing plants into two categories: “large plants” with capacity larger than minimum efficient scale in the West (around 55,000 tons per year); and “small plants” which lack the minimum efficient scale to invest in automated packaging. The latter category includes small Soviet processors as well as farmer-owned “mini-plants” which have appeared after the collapse of the Soviet Union.
The 72 large plants achieve productivity of 12 (indexed to US=100) using 19% of total employment in the sector. Their share of capacity and production are 43% and 35% respectively. Within this group, the 2 largest plants achieve productivity of 39 (indexed to US=100), producing 9% of output, using 2% of employment and 4% of capacity.

The productivity of the 1,681 small plants is 7 (indexed to US=100) using 81% of total employment in the sector. Small plant share of capacity and production are 67% and 65% respectively (Exhibit 5). Within this group, farmer-owned “mini-plants” have productivity of 8 (indexed to US=100), producing 19% of output, using 18% of employment and 11% of capacity.

REASONS FOR DIFFERENCES IN PRODUCTIVITY PERFORMANCE

We first discuss the productivity gap at the production process level, and then explain industry dynamics and external factors that drive firms to operate in the way they do. In the causality analysis, we focus on milk production, which accounts for 41% of dairy consumption.

A summary of causal links is provided in Exhibit 6.

Production processes

Exhibit 7 summarizes the operational differences that drive productivity differences with the US for both large and small Russian dairy plants. For large plants (which account for 43% of industry capacity), 59 percentage points of the gap with the US are due to low capacity utilization and inefficient organization of functions and tasks (OFT). In other words, large plants have the potential to increase their productivity to 58% by improving these two factors, neither of which requires major investment. The remainder of the gap is due mostly to automation and some supplier relations. If they are fully utilized (80% capacity utilization), these large plants have enough capacity to produce current output by themselves.

In contrast, small processors need to undertake major investments to reach minimum efficient scale – an investment that will not be economical, as we shall discuss in the Future Outlook section at the end. The productivity improvement potential of small plants from fixing capacity utilization and organization of functions and tasks is 20-40% of the US (depending on what other steps are taken).

Below, we discuss each of the important production process causality factors in detail.

Low capacity utilization

After the collapse of the Soviet Union, dairy farmers set up their own small processing facilities -“mini-plants”- which now account for 27% of employment. By processing their own milk, mini-plants reduce raw milk supply to existing
processors. Together with a reduction in total milk consumption and a rise in raw milk consumption, this has reduced the average capacity utilization of milk processors to 27% - down from around 60% in 1990 and much lower than 77% in the US (Exhibit 8). The low capacity utilization, which results in underutilized fixed labor, is responsible for 24 points of the productivity gap.

Low capacity utilization is an industry-wide phenomenon, except in mini-plants and the largest plants in Moscow and St. Petersburg (which have capacity utilization of 48% and 61% respectively).

*Lower capital intensity / outdated technology*

In an industry with large scale-economies, only 72 out of 1,743 plants have capacity above minimum efficient scale (55,000 tons per year). These large plants account for 43% of industry capacity and have an average scale approximately twice the US average. The few largest plants located in Moscow and St. Petersburg are almost 9 times larger than the US average. In the dairy industry, minimum efficient scale is determined by scale economies from fixed labor (in maintenance, quality control, purchasing, etc.) and cost advantages from investments in packaging that become economical only after a certain level of production.

The other 1,671 small plants that cover 57% of industry capacity have a scale of only 11% of the US, driving down the Russian average scale to only 19%.

This low scale is a legacy of the Soviet planning system, which stipulated that all towns with a population above 20,000 operate a dairy plant. As a result, many sub-scale dairy plants are now scattered around the country. It should be noted that thirty years ago, US dairy plants were similarly dispersed and had the same plant scale as in Russia today.

In addition to the legacy effect, the establishment of low scale mini-plants by dairy farmers in recent years has exacerbated the issue. If one excludes mini-plants, the scale of small plants would increase from 11 to 16 (Exhibit 9).

As mentioned above, low scale hampers investment in automation and technology since only plants with large scale can justify the investment. As a result of the low scale, average Russian capital per unit of capacity is only 18% of the US (Exhibit 10). Much packaging is still conducted manually.

Moreover, expensive UHT (Ultra-High Temperature) or less expensive super-pasteurizing processing technology which increase the shelf life of the final product are only economical at large plants.

*Inefficient organization*

¶ **Organization of Functions and Tasks.** Most Russian plants have retained their workers from the Soviet era although output has halved, providing ample opportunity for downsizing. According to several multinational brown-field operators, the workforce in many Russian plants can be reduced by 20% without compromising the level or the quality of output. Only newly built plants (almost entirely mini-plants) do not suffer from excess workers.
Supplier Relations. Russian dairy farmers have low cow yield, and deliver low quality raw milk with wide seasonal fluctuations. Each of these supply problems hamper dairy processing productivity.

Low Russian cow yield (3,500 liters per cow per year compared to 8,200 in the US) limits the supply of raw milk to processors and reduces capacity utilization. Wide seasonal fluctuations in Russia (where Summer output is twice the Winter output as opposed to being almost the same in the US) also cause low capacity utilization (Exhibit 11). Low quality milk (bacteria levels ten times that of the US) leads to more rejects and a shorter shelf life for the final product (Exhibit 12). Large plants with UHT are less vulnerable to the latter two issues: they sell juice using UHT equipment to smooth out capacity utilization and UHT increases the shelf life of final products.

Industry Dynamics

Exposure to best-practice competition in Russian dairy processing is low – especially in the largest dairy product category, fluid milk – and domestic competitive intensity is limited due to the regionally fragmented nature of the Russian market (Exhibits 13 and 14).

Pressure from global best practice

High levels of imports expose the butter, cheese and milk powder segments to best-practice competition. However, the fluid milk segment which is bulky, low-margin, and has a short shelf-life remains almost entirely domestic. Finally, foreign direct investment in the sector has been limited only to products such as yogurt (Danone/Campina) and branded UHT milk (Parmalat) – although it should be noted that foreign direct investment in fluid milk is quite rare everywhere.

Domestic competitive intensity

Consumers’ substitution of raw milk for processed milk, coupled with an increase in the consumption of low-end milk from mini-plants, has increased the domestic competitive intensity in Russia somewhat. However, due to the short shelf life and regional (as opposed to national) wholesaling industry, the Russian dairy market still remains regionally fragmented and, therefore, not very competitive.

Non-level playing field

The playing field is non-level in the dairy industry and productive players find it difficult to drive out less productive firms. Local governments implicitly subsidize unproductive companies through tax arrears. They also prevent productive companies from implementing layoffs, thereby putting a ceiling on potential productivity improvements. These points are discussed in more detail in the External Factors section below.
External Factors

Three external factors explain the low and decreasing Russian dairy productivity: (1) problems in up- and down-stream industries; (2) macroeconomic instability and the resulting high cost of capital; and (3) local government interventions.

Since (1) problems in up- and down-stream industries are caused mainly by (2) macroeconomic instability and the resulting high cost of capital, we can summarize that two factors – macroeconomic instability and the high cost of capital; and local government interventions – are the root causes of underperformance in dairy.

Related industry barriers

Dairy farmers are responsible for ineffective supply relations. In addition, their mini-plants exacerbate low scale and low capacity utilization. However, dairy farmers are simply the last link in a chain of problems initiated by wholesalers. In other words, one needs to fix the wholesaling industry in order to fix the dairy farming industry.

Relying on their strong bargaining power, wholesalers frequently force arrears onto processors (see Box 1 for discussion of wholesalers and their strong bargaining power). Dairy processors, in turn, pass the arrears onto dairy farmers who then cannot purchase raw materials and quality-enhancing equipment required to improve supply relations (see Box 2 for a description of problems in Russian dairy farming and their causes). Payments that are supposed to take place within 10 days are prolonged up to 30 days in 60% of cases and up to a year in the other 40% of cases. Some farmers avoid the arrears by setting up mini-plants and delivering directly to retailers (circumventing existing processors and wholesalers). Mini-plants decrease average scale and reduce capacity utilization of existing plants that can no longer source raw milk. (Exhibit 15)
Box 1: Non-competitive wholesalers

Large fixed costs in storage and distribution facilities “naturally” reduce the competitive intensity of the wholesale industry. Given the low competitive intensity in wholesaling, large retailers in best practice countries have vertically integrated into wholesaling in an attempt to reduce their distribution costs. As a result, they have also increased competitive pressures for remaining wholesalers, thereby reducing their bargaining power and margin.

In Russia, similar restructuring within the wholesaler industry has been prevented mainly due to two reasons:

¶ Macroeconomic instability/fiscal deficits: High capital costs create an entry barrier in this capital intensive industry limiting competition. In addition, macroeconomic instability induces many wholesalers to have a short-term outlook – not developing long-term relationship with processors.

¶ Inefficient food retailers: Low supermarket penetration in Russia reduces the retailers’ ability to integrate into wholesaling. As mentioned in the Food retailing case, the low supermarket penetration is due to local government intervention, high capital costs and the absence of productive local food processors.

As we will discuss below (see Macroeconomic Instability/Cost of Capital section), the dairy industry suffers more from uncompetitive wholesaling due to the low shelf life of its products which reduces the industry’s bargaining power vis-à-vis wholesalers.

In Poland where macroeconomic conditions have stabilized and supermarkets/hypermarkets have rapidly gained share, arrears from wholesalers to processors have declined, and the overall efficiency of wholesaling has improved. Large processors provide their products to large hypermarkets which distribute them nationally.

As discussed in Box 1, the primary cause of non-competitive wholesaling is the high cost of capital and a short-term outlook – both caused by macroeconomic instability and fiscal deficits. As Box 2 explains, unproductive farming is primarily a consequence of wholesalers’ arrears. It follows that, at their root, problems in up- and down-stream industries can be fixed only if macroeconomic stability leads to a lower cost of capital and more competitive wholesaling. Next, we will discuss how macroeconomic instability and the resulting high cost of capital directly (in contrast to indirectly through up- and down-stream industries) hamper dairy productivity.
Box 2: Unproductive dairy farming

Dairy farming yield has declined by 20% since 1990 (Exhibit 16). The decline in yield has been caused by farms’ inability to grow quality forage, purchase high quality concentrate and feed, and to improve hygienic conditions in stables. These, in turn, have been caused by a lack of cashflow stemming from wholesalers’ arrears. In fact, where wholesalers, and thus processors, have properly paid farmers, we have found that cow yield has not decreased. Where processors have provided additional training to farmers as a part of a long-term supplier relations strategy – known as “contract growing” – yield has increased from 3,500 to 5,200 tons per year. This 50% increase in yield more than makes up for the 20% decline in yield since Soviet times, and if implemented nationally, will solve the current capacity utilization problems in dairy processing (Exhibit 17).

For Russia to improve its yield from 5,200 to 8,200 tons per year (the yield achieved in the Netherlands, the best-practice dairy farming country), new breed needs to be introduced. To replace the current breed with the new breed of high yield cows will require substantial capital. Two things will need to take place for this investment to be worthwhile. First, farms would need to group together so that they have more scale to justify such investments. Since dairy farmers inherently lack bargaining power vis-à-vis processors (due to the short shelf life of raw milk), grouping will also assure that reasonable prices can be charged to recoup the investment in the new breed. Currently, more than half the Russian farms negotiate individually with processors as opposed to none in the West where they form cooperatives or joint-marketing groups. Second, the cost of capital will need to be reasonable for the investment to take place.

To summarize, the first priority for improving dairy farming productivity should be to increase competition and discourage a short-term outlook in wholesaling. This, combined with more long-term supplier relations (such as contract growing), has the potential of increasing cow yield by 50%. This analysis is contrary to the conventional wisdom that states that dairy farms will need to be subsidized or helped with low cost capital immediately. Such steps will be helpful as a second step to reach cow yield of the Netherlands, but should not be the immediate policy emphasis.

Macroeconomic barriers

Macroeconomic instability results in a high cost of capital (relative to low Russian wages) and low income/demand that hamper dairy productivity.

High cost of capital. The impact of high cost of capital is two fold. First, it leads to less automation and less scale, which hamper labor productivity directly. Dairy farmers can only invest in mini-plants as opposed to acquiring large brown-field plants or building large green-field plants. Even multinationals that can source capital globally are inclined to limit their investment positions in economies with macroeconomic instability and large risk premia. Second, the high cost of capital leads to less investment in shelf-life enhancing technology (eg.
Super pasteurized or UHT) which results in lower bargaining power vis-à-vis retailers.

¶ **Drop in demand / low income.** Reduced purchasing power has resulted in price sensitive consumers substituting raw for processed milk. As a result, the share of raw milk in domestic consumption has increased by 12 percentage points since 1992 (Exhibit 2). This substitution has exacerbated the processors’ capacity utilization problem.

*Sector-specific barriers*

In addition to shielding wholesalers from competition (as discussed in Box 1), local governments directly hamper restructuring of the dairy industry by deterring bankruptcies of inefficient plants and industry layoffs.

¶ **Lack of bankruptcy enforcement.** Three-quarters of plants have accrued arrears with farmers – not to mention tax, wage and utilities arrears. Even if currently accumulated large amounts of arrears were written off, experts say that nearly half the processors are loss making and often technically bankrupt. However, without rigorous bankruptcy enforcement, these unproductive firms continue to exist. Despite the number of firms that are in arrears, unprofitable, and in some cases not even in operation, no dairy plant has become bankrupt. By sustaining a long tail of small, underutilized and unproductive plants in the industry, the lack of bankruptcy enforcement seriously drags down industry scale and capacity utilization (Exhibit 18). Although bankruptcy law is a federal law, we have included the bankruptcy issue under local government interventions since local governments have effective control over the implementation of bankruptcy (mainly through their influence on local judges and firms that have filed for bankruptcy).

¶ **Regulatory harassment: pressures against layoffs.** In the current environment of macroeconomic instability and high capital costs, industry restructuring is more likely to take place via turnarounds of large brown-field operations (which can achieve 58% productivity without major investments as mentioned above) than through expensive green-field investments. However, local governments often impede layoffs in brown-field plants through “regulatory harassment” (for example, increasing the number of plant inspections on health, fire and tax regulations). Given the large number of excess workers in Russian plants, such regulatory harassment is a serious impediment to efficiency. Local governments intent on saving local jobs are known to also deter green-field investment by giving new entrants administrative burdens through red tape.

*Other, less important factors*

Weak corporate governance and an underdeveloped transportation system are often cited as key impediments to restructuring in the Russian dairy industry. We believe these factors to be of secondary importance;
**Weak corporate governance.** Managers respond to incentives provided by opportunities and threats. In an environment where local governments shield losers (by not enforcing bankruptcies) and obstruct potential winners (by blocking layoffs), managers have little incentive to improve performance. As such, weak corporate governance is the result of, not the cause of, a lack of restructuring in the industry.

**Poor infrastructure: underdeveloped transportation system.** Although the Russian transportation system is undeniably underdeveloped compared to the US, it does not deter long shelf life products from traveling around the country (as evidenced by long shelf life confectionery products; see Confectionery Case). The key impediment to national distribution of fluid milk in Russia is its short shelf life. Reducing the cost of capital so that firms can increase scale and invest in UHT or super-pasteurized technology is, therefore, the most important step to facilitate wider distribution (see Macroeconomic Instability/Cost of Capital section).

**POLICY IMPLICATIONS AND FUTURE OUTLOOK**

In order for Russia to improve its dairy processing productivity, major restructuring needs to take place. In sum, large/productive plants should expand, while small/unproductive plants should exit.

Fortunately, the largest 72 plants (out of around 2,000 plants in Russia), which are located in major population centers, have the capacity to supply all the demand in Russia today. Simply by increasing the capacity utilization to 80% and eliminating excess workers, and shutting down existing small plants, we estimate that the current Russian productivity of 8% of the US level can rise to 58%. Capital expenditures required in these two steps will be minimal. In order to improve productivity from 58 to 70%, additional investment will be required; however getting to 58% should be the primary mid-term objective.

As described above, barriers to increased utilization and layoffs in large plants, as well as barriers to exit of small plants, need to be removed for the Russian dairy processing industry to reach 58% of the US average. The main barriers for increased utilization and layoffs in large plants are: arrears from wholesalers; and local government interventions against layoffs. The main barrier to exit for small plants is the lack of bankruptcy enforcement.
Appendix on Methodology

To compare the performance of the Russian dairy industry with that of other countries we investigated output, labor inputs and labor productivity.

Output: Net value added definition of output (Net sales - cost of goods sold) was adopted across all countries. In Russia, the data was provided by the Russian Central Statistical Office (Goskomstat). For the exchange rates, PPP exchange rates reported by the United Nations and by Goskomstat were used. These PPPs were also adjusted to take out the effects of different retail margins and raw material prices in each country.

Labor inputs: Number of hours worked in the industry (FTEs x average number of hours worked) was calculated across countries.

Labor productivity: Output divided by labor inputs.
DAIRY INDUSTRY VALUE CHAIN

Percent

Exhibit 1

Source: USDA; Attache Query Report (10/1/98)

BREAKDOWN OF DAIRY CONSUMPTION

Million tons of raw milk equivalent

Exhibit 2

Source: USDA; Attache Query Report; Interviews (Russian Dairy Research Institute)
LABOR PRODUCTIVITY IN DAIRY - 1997
Indexed to US = 100 in 1997

*Productivity in 1995. Assumes hours worked per employee equal to food processing industry average
Source: Goskomstat; US Census of Manufacturing; OECD; McKinsey

Exhibit 3

RUSSIAN DAIRY LABOR PRODUCTIVITY TREND
Indexed to US = 100 in 1997

*Physical productivity defined as raw milk processed per capita. Value added figures for 1990-91 extrapolated from physical output trend
Source: Goskomstat; US Census of Manufacturing; OECD; McKinsey

Exhibit 4
INDUSTRY COMPOSITION: RUSSIAN DAIRY - 1997
Productivity indexed to US=100 in 1997

<table>
<thead>
<tr>
<th>Large Plants</th>
<th>Small Plants</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Productivity</strong></td>
<td><strong>Capacity</strong></td>
</tr>
<tr>
<td>55,000 tons per year or more</td>
<td>12</td>
</tr>
<tr>
<td>0-54,999 tons per year</td>
<td>7</td>
</tr>
</tbody>
</table>

Source: Goskomstat; US Census of Manufacturing; Interviews

CAUSALITY FOR PRODUCTIVITY DIFFERENCES: DAIRY
Russia vs. US

- **External factors**
  - Macroeconomic barriers
    - Drop in demand/low labor cost/low income
    - Country risk/high capital cost (political instability/budget deficit)
  - Labor barriers
    - Mobility restrictions
    - Inadequate education
  - Capital barriers
    - Government ownership
    - Problems with minority shareholders’ rights
  - Sector specific barriers (non-level playing field)
    - Non-level taxes
    - Non-equal allocation of government procurement and land
    - Threat of red tape/harassment
    - Non-level energy payments
    - Others (property rights, barriers to trade/FDI)
  - Related industry barriers
    - Upstream/downstream sectors
    - Poor infrastructure
  - Other barriers (climate, geology, etc.)

- **Industry dynamics**
  - Pressure from global best practice
  - Domestic competitive intensity
  - Non-level playing field

- **Production process**
  - Low capacity utilization
  - Inefficient organization
    - Organization of functions and tasks
    - Marketing/product mix
    - Supplier relations
    - Blue collar trainability
  - Lower capital intensity/technology
    - Obsolete assets (subscale/obsolescence technology)
    - Lack of viable investment in non-obsolete assets (upgrades/green fields)
    - Non-viable investment due to factor costs (labor, capital, and energy)

Productivity
(Indexed to US = 100)
PRODUCTIVITY DIFFERENCES ACROSS SIZE BANDS - 1997
Indexed to US = 100 in 1997

Large plants
55,000 tons per year or more

Current level
- Utilization of functions
- Organization of functions
- Supplier relations
- Lower capital intensity/technology

Small plants
0 - 49,999 tons per year

Industry

Source: Interviews

LOW CAPACITY UTILIZATION OF RUSSIAN DAIRY PLANTS
Physical output indexed to US=100 in 1997

Average

By size band (Russia)

Source: Goskomstat; US Census of Manufacturing; Interviews
LOWER CAPITAL INTENSITY/TECHNOLOGY: LOW SCALE OF RUSSIAN DAIRY PLANTS
Indexed to US = 100 in 1997; Thousand tons

<table>
<thead>
<tr>
<th></th>
<th>Average</th>
<th>By size band (Russia)</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Russia</td>
<td>19</td>
<td>203</td>
</tr>
<tr>
<td>% of total plants</td>
<td>Including mini-plants</td>
<td></td>
</tr>
<tr>
<td>Large [43%]</td>
<td>16</td>
<td>11</td>
</tr>
<tr>
<td>Small [57%]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Goskomstat; US Census of Manufacturing; Interviews

Exhibit 9

LOWER CAPITAL INTENSITY/TECHNOLOGY: OUTDATED CAPITAL STOCK - 1997
Percent; capital stock per unit of capacity

Methodology

- Russian calculation based on a typical (average Russian scale) Soviet plant (19% of US average) as originally estimated by planning agency
- Expert re-valued Soviet investment to current asset prices
- “Sudden death” depreciation method with an average service life equal to the average age of plants for Russian industry

<table>
<thead>
<tr>
<th></th>
<th>US</th>
<th>Russia</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESTIMATE</td>
<td>100</td>
<td>18</td>
</tr>
</tbody>
</table>

Source: Interviews; McKinsey analysis

Exhibit 10
SUPPLIER RELATIONS: SEASONAL FLUCTUATIONS OF RAW MILK SUPPLY TO PROCESSORS
Indexed to summer = 100

Effects on productivity

• Low capacity utilization in winter
• Seasonal fluctuations in labor requirements result in excess labor in the presence of labor/mobility rigidities
• Given the threat of mini-plants, processors either purchase the excess supply in summer (to secure winter supply) or receive only residual supply in winter
• Only the few largest plants with UHT technology are able to partially solve the problem by using their equipment to process juices during winter

SUPPLIER RELATIONS: QUALITY OF RAW MILK
Thousand bacteria per ml

Effects on productivity

• Added complexity in production process
  – Rejects
  – Down-time
  – Quality testing
• Lower value added of final product
• Lower shelf life of processed product
DOMESTIC COMPETITIVE INTENSITY

<table>
<thead>
<tr>
<th>Structure</th>
<th>US</th>
<th>Russia</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Consolidating but still fragmented</td>
<td></td>
<td>• Highly fragmented industry</td>
</tr>
<tr>
<td>Competitive behavior</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Negligible import pressures due to import protection</td>
<td></td>
<td>• Strong import pressures for non-fluid milk dairy products</td>
</tr>
<tr>
<td>• Some world-class processors</td>
<td></td>
<td>• Negligible FDI from best practice players</td>
</tr>
<tr>
<td>• Strong national competition on both price and quality</td>
<td></td>
<td>• Increased competition from mini-plants and substitution to raw milk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Almost no national competition</td>
</tr>
<tr>
<td>National competitive market although trade is limited</td>
<td></td>
<td>Regionally fragmented and concentrated market with limited competition for fluid-milk segment</td>
</tr>
</tbody>
</table>

Source: Interviews; McKinsey analysis

PRESSURE FROM GLOBAL BEST PRACTICE: BREAKDOWN OF RUSSIAN DAIRY CONSUMPTION AND IMPORTS

<table>
<thead>
<tr>
<th>Year</th>
<th>Fluid milk</th>
<th>Butter</th>
<th>Cheese</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>0.4</td>
<td>71</td>
<td>28</td>
</tr>
</tbody>
</table>

Also, very low share of FDI, e.g., Danone, Campina, Parmalat

*Calculated as raw milk equivalents
Source: USDA Query Report; Interviews (Russian Dairy Research Institute)
DOWNSTREAM SECTORS: NON-COMPETITIVE WHOLESALERS

Source: Interview (Russian Dairy Research Institute)
UPSTREAM SECTORS: PRODUCTION, NUMBER OF COWS, AND YIELDS IN DAIRY FARMING
Indexed to 1990 = 100

Source: USDA Attache reports and “Europe’s Dairy Industry 1996/97” by Michael Bessey and Barry Wilson

UPSTREAM SECTORS: REASONS FOR UNPRODUCTIVE FARMING SECTOR
Tons of yield per cow

Productivity improvements will be larger because better forage and hygiene will increase product quality and reduce seasonal fluctuations.

Source: Interview with Dutch dairy expert in Russia

Exhibit 16

Exhibit 17
NON-LEVEL PLAYING FIELD: LACK OF BANKRUPTCY ENFORCEMENT
Percent (of total number of processors)

Loss-making processors

For 1997

1,754 processing plants (excluding mini-plants)
824 loss making
930 profit making
350 voluntary ceased to operate
540 still operating
824 loss making
930 profit making

$\bullet$ No bankruptcy reported
$\bullet$ Trying to sell assets/enterprise to repay debt
$\bullet$ Surviving due to low cash needs (arrears and barters)

Source: Interviews; Articles
Exhibit 18
EXECUTIVE SUMMARY

**Industry overview.** The confectionery industry consists of four functions: raw material receiving; mixing; processing; and packaging. Farming and distribution are excluded from this study. Following the official Russian industry definition, biscuits and crackers are included in addition to regular confectionery. In 1997, 120,000 people were employed in the industry across 925 plants. This sector has been relatively successful in attracting best practice foreign companies, although these investments are still too small to make any significant difference to the overall sector’s performance.

**Productivity performance.** Labor productivity in the Russian confectionery industry is at 10% of the US level, down from 13% in 1990. Productivity differs between large (capacity of 35,000 tons per year or more) and small plants: eleven large plants achieve productivity of 22%, using 20% of total employment in the sector. The productivity of 914 small plants is 7%, using 80% of total employment.

The main reasons for the productivity gap at the operational level are low scale and capital intensity. Even the large plants that have minimum efficient scale have to rebuild their multi-storied structures in order to use new equipment. Large confectionery plants already have a high capacity utilization and thus the potential for improvements is smaller than in the large dairy plants. The productivity potential for large plants and small plants without major investment – fixing capacity utilization, organization of functions and tasks and product proliferation/value added within category - is around 50% of the US level for the large plants and less than 30% for the small plants.

The most important external barriers to productivity and output growth are low labor cost, an unfavorable tax structure, unequal tax enforcement, and an inefficient wholesaling industry. The low labor cost renders automation uneconomical even for multinationals with a low cost of capital. Deductibility of advertising expenses for tax purposes is very limited, and advertising expenses can be taxed in some regions. This discourages expansion of best practice firms through brand building. The playing field is further distorted when local governments deter layoffs by best-practice firms by subjecting them to numerous inspections, and condone tax arrears from unproductive companies, which end up being more profitable than their global best practice competitors. Rights of brand ownership are not enforced, further hampering investment into branding and expansion, and the procedure for approving shelf-life claims can be very slow and subject to undue influence. Due to the large number of wholesalers in the confectionery distribution chain, wholesale margins in Russia are twice the
US level, which protects local players by making cross-regional expansion more difficult for productive players.

**Policy implications and future outlook.** In order for the industry to increase its overall productivity restrictions on layoffs must be removed, taxes from all firms collected equally, tax disincentives to advertising removed, brand property rights enforced, and shelf-life approval process streamlined. Under such conditions, the industry overall would be able to reach 30% of the US productivity level (without major investments) and compete more successfully against imports.
Confectionery

This case study benchmarks the performance of the Russian confectionery industry against the US, the best practice country for confectionery production. By identifying the barriers that prevent the Russian confectionery industry from achieving higher productivity, we aim to derive implications for policy makers and firms that will lead to growth in the sector.

We will start with an overview of the industry, then present productivity performance comparisons across countries, explain causes of differences in performance, and end with recommendations to policy-makers and firms to close the gap.

INDUSTRY OVERVIEW

Importance of the sector

The importance of the confectionery industry, as in the dairy industry, stems from the significance of the food processing sector – one of the biggest manufacturing sectors with a large impact on food prices. Confectionery is the fourth largest food processing industry (after bread, dairy, and fish) occupying 10% of its employment. Improvements in its performance would enhance the overall food processing performance and hence the aggregate performance and standards of living.

The sector's contribution to the study

The confectionery industry is particularly interesting because, unlike in dairy (see Dairy Case), it is a highly concentrated industry with much foreign direct investment. Major multinationals have entered Russia, both as green-field and brown-field operators, exposing Russian companies to best practice competition.

Industry definition

The confectionery processing industry consists of four functions: raw material receiving; mixing; processing; and packaging. Farming and distribution are excluded. In addition to sweets and chocolates, the Russian definition of confectionery industry includes biscuits, crackers and cakes. Major processed confectionery products are sweets, chocolate-covered candies, chocolate bars, biscuits, crackers, and cakes (Exhibit 1).
As of 1997, 120,000 people are employed in the industry across 925 plants.

**Industry evolution**

Between 1990 and 1997, physical production of confectionery plummeted by half. During the same period, imports increased from almost nothing in 1990 to over a quarter of consumption by 1997 (Exhibit 2). Currently, per capita confectionery consumption in Russia is around 13 indexed to US as 100, almost 25% lower than in 1990.

**PRODUCTIVITY PERFORMANCE**

We calculate labor productivity in food processing as value added per hour worked. We used the US Census of Manufacturing definition to calculate value added ($= sales - cost of goods$). Value added was converted at food processing PPP for cross-country comparisons. In order to cross check value added figures, physical output measures were also used.

**Overall confectionery processing productivity**

Russian labor productivity in confectionery is at 10 indexed to the US at 100. Almost the same number of hours per capita are employed in the sector to produce a tenth of the US output (Exhibit 3).

Productivity in 1990 was 13 to 16% of the US average depending on whether value added or physical measures are used (value added for the former, physical for the latter). Hours worked have declined by almost 30% since 1990, but the output reduction has been larger (Exhibit 4).

**Confectionery processing productivity by plant size**

Due to the importance of scale economies in confectionery processing, we have segmented the plants into two categories: “large plants” with capacity larger than minimum efficient scale in the West (around 35,000 tons per year); and “small plants” which lack the minimum efficient scale to invest in automated processing and packaging. While some plants with capacity of under 35,000 tons per year still exist in developed countries, it is not economical to automate them, especially not in boxing. Theoretically, small plants could achieve a higher product-specific scale than non-specialized large plants by specializing. However, in practice, the level of specialization is no different for large or small plants in Russia. Moreover, the very low average scale of small plants (6% of the US) does not allow most small plants to achieve sufficient scale even if they specialized.

The 11 large plants achieve productivity of 22 (indexed to US=100) using 19% of total employment in the sector. Their share of capacity and production are 21% and 36% respectively.
The productivity of 914 small plants is 7% of US average using 81% of total employment. Small plant share of capacity and production are 79% and 64% respectively (Exhibit 5).

REASONS FOR DIFFERENCES IN PRODUCTIVITY PERFORMANCE

We first discuss the productivity gap at the production process level, and then explain industry dynamics and external factors that drive firms to operate in the way they do. In the causality analysis, we focus on the non-cake segments that account for around 80% of production.

A summary of causality factors is provided in Exhibit 6.

Production process

Exhibit 7 summarizes the causes for the labor productivity gap with the US for both large and small Russian confectionery plants.

For both large and small plants (but more so for small plants), the most important operational causal factor is scale and capital intensity. Capital intensity is very important even for large plants that have minimum efficient scale because they would have to rebuild their current multi-storied structure in order to fit new equipment. This is in stark contrast to large plants in the dairy industry which could more or less rely on their existing structure and equipment. Another key difference between large confectionery plants and large dairy plants is that large confectionery plants already have a high capacity utilization and thus the potential for improvements is small.

The productivity potential for large plants and small plants without major investment – fixing capacity utilization, organization of functions and tasks and product proliferation/value added within category - is around 50-65% of US average for large plants and 21-60% for small plants (depending on what other steps are taken).

Below, we discuss each of the production process causality factors in the order of their importance as they affect productivity.

Lower capital intensity / inefficient technology

Obsolete assets (subscale / outdated technology). In an industry with large economies of scale, only 11 out of 925 plants have capacity above minimum efficient scale. The average scale of large Russian plants is 32% higher than the US average. The three largest Russian plants, which are located in Moscow, have a scale twice the US average.

The other 914 small plants which cover 79% of industry capacity have a scale of only 6% of the US, driving down the Russian average scale to only 7% (Exhibit 8).
Lack of viable investment in non-obsolete assets (upgrading). The low scale of the small plants deters investment in automation and technology since only plants with minimum-efficient-scale can justify the investment. As a result, almost all packaging is conducted manually in small plants.

Even large plants are not heavily automated. According to a multinational brown-field operator in Russia, about a third of the workforce could be eliminated in Russian plants if they were automated to the same level as the US. No operator in Russia automates boxing, with a resulting productivity penalty of 20%.

Higher capital intensity would also allow Russian manufacturers to produce longer-shelf life products, which would allow efficient plants to distribute their products more widely around the country.

Non-viable investments. Even in plants with enough scale, filling the investment gap with the US would be economically non-viable. Many of the machines used in the US would not even fit in the multi-storied and compartmentalized structure of most Russian brown-field plants. In order to install such machines, new structures would have to be built, which would render the investment even less economical.

Inefficient organization

Marketing / product mix. Russians produce a much wider product variety than to the US. This feature reduces the scale economies for individual products and increases complexity costs and time. According to multinational brown-field operators, the product range could be reduced by 50-80% with minimal reduction in total sales – even in the confetti segment where consumers are known to value some variety (Exhibit 9).

The wide product variety also hampers the value added within category as advertisement and branding costs for specific products cannot be profitably recovered if individual sales are small – a problem that affects small plants more than large plants. This problem is further exacerbated by the fact that around 35% of the brands produced by local players are shared with other producers (Exhibit 10). As a result, Russian firms spend less than a tenth of US firms in advertisement (as a percentage of sales) and therefore create very little brand awareness and resulting brand premia (Exhibits 11).

Skilled marketing managers are required to streamline the product range, create distinctive products, and advertise those products effectively to the target customer. Despite best-practice presence, the Russian confectionery industry as a whole still suffers from a lack of management skills in this area.

Excess workers / inefficient organization of functions and tasks. The experiences of downsizing of brown-field factories by best-practice firms show that 11% and 16% of labor for large and small plants respectively can be shed without additional capital expenditure or
reduction in output. Only newly built green field plants do not suffer from excess workers.

Russian firms have inefficient organization of functions and tasks because they do not multi-task the operations of their workers.

*Low capacity utilization*

Large plants, which account for 21% of industry capacity, are utilized at, or above, international best practice levels (which is around 80%). Small plants that cover the remaining 79% of industry capacity are only 38% utilized driving down the Russian average utilization to 47% (*Exhibit 12*). In an industry with large fixed costs, this under-utilization increases unit costs and decreases productivity. The low capacity utilization, which results in underutilized fixed labor, is responsible for 7 points for large plants – assuming that all plants reach at least 80% capacity utilization (and higher if current levels are higher, so that the new average capacity utilization is 88%). For small plants that are less utilized, capacity utilization explains 16 points of the productivity gap.

*Industry Dynamics*

Pressure from global best practice is high in Russia with major multinationals already present in the market. Domestic competitive intensity is also high with multinational and domestic firms competing fiercely for market share. However, the industry suffers from a non-level playing field.

*Pressure from global best practice*

Production by multinationals (foreign direct investment) and imports already occupy 30% of the Russian confectionery market. Best-practice firms include green-field operators, such as Cadbury, Mars and Stollwerck, as well as brown-field acquirers such Nestle and Danone (*Exhibit 13*).

*Domestic competitive intensity*

The domestic competitive intensity for the Russian confectionery industry is high compared to the rest of the Russian food processing industry. Large players have gradually consolidated to control around 36% of the market and compete across product categories (*Exhibit 14*). Although producers are still regional (*Exhibit 15*), competition within each region is strong across product categories.

*Non-level playing field*

Best-practice brown-field operators are prevented from laying off their excess workers by local governments. By not allowing best-practice firms to restructure and improve labor productivity, local governments are distorting competition. The nature of local government intervention is described in detail in the following section on external factors.
External Factors

Four external factors explain the low and decreasing Russian confectionery productivity: (1) low labor cost; (2) unfavorable tax structure; (3) sector-specific barriers; and (4) problems in downstream industries.

Macroeconomic factors

¶ **Low labor cost.** The low labor cost renders automation uneconomical even for multinationals with a low cost of capital (see section on Non-viable capital investments).

¶ **Unfavorable tax structure.** The current tax structure in Russia discourages advertising. In Russia, advertisers incur the VAT for advertising, advertising is deductible as an expense for only up to 2% of sales, and in some regions there is a separate 5% tax on advertising expenses. Such tax penalties on advertising deter brand-building for even those large firms that have the scale to advertise *(Exhibit 16)*.

¶ **High cost of capital.** Although not a significant barrier, it should be noted that the high cost of capital slows the pace of industry consolidation by making acquisitions more costly. A handful of confectionery firms (whose plants are already fully utilized) that own nationally-known brands can acquire under-utilized plants, have them produce the same brand and increase their capacity utilization, thereby allowing the acquiring firm to amortize its marketing expenses over larger sales. Red October and Babayevskaya factory, the best-known Russian confectionery manufacturers have acquired plants in regions other than their own to pursue such a strategy. However, most domestic firms lack the capital for such acquisitions, at least on a large scale.

Sector-specific barriers

Local governments hamper restructuring of the confectionery industry by deterring layoffs by best-practice firms and condoning tax arrears from unproductive firms. Also, lack of brand property rights enforcement discourages advertising. Furthermore, a slow shelf life approval procedure hampers the domestic competitive intensity.

¶ **Regulatory harassment: pressures against layoffs and restructuring.** The poor performance of manufacturing plants in most regions (see the Steel, Dairy and Cement case studies), together with the existing labor mobility barriers, increases local government’s pressure to prevent layoffs. The impact of this pressure is threefold. First, it affects Organization of Functions and Tasks by preventing layoff of excess workers through the threat of “regulatory harassment” (for example, increasing the number of plant inspections on health, fire and tax regulations). Given the large number of excess workers, such regulatory harassment is a serious impediment to efficiency. Second, local governments’ pressures against layoffs also deter firms from streamlining their product range (product proliferation), since it is
rational for firms to pursue labor-intensive differentiation given fixed excess labor. Finally, in areas where the 11 large confectionery plants exist, the local government would hamper green-field investment that would displace existing workers and reduce the overall employment. Where only small plants exist, the local government would not hamper green-field investment; however, given the high inter-regional wholesaling margin and the fact that Soviet plants were allocated in line with regional population, such a location (with minimal local demand) would not be desirable for the investor.

¶ Lack of brand property rights enforcement. During the Soviet era, confectionery plants across the country used the same recipes to produce the same brands at the local level. Many brands still have no clear owners and are awaiting court rulings. Players using shared brands have lower incentives to advertise and improve product quality as they lack the mechanism to appropriate the returns on brand development.

¶ Red tape: slow shelf-life approval procedure. Long shelf life is a prerequisite for national competition since distribution takes time. According to best-practice operators, they would not consider national distribution unless the product has a shelf life of at least three months. However, the federal procedure in Russia for setting shelf life is cumbersome and time-consuming. Products that have passed shelf life tests around the world need to be tested again. Those tests require products to be actually aged for the entire shelf life (e.g. one year to test one year shelf life) as opposed to a much shorter period required under the “accelerated-aging process” adopted in other countries. Furthermore, the approval committee has been criticized for allowing industry executives to become members and evaluate competitors’ products, thereby condoning conflicts of interest. The slow shelf life approval procedure therefore hampers national competitive intensity, and reduces scale and capacity utilization (since small players are shielded from competition).

Related industry barriers: wholesale

There are no national wholesalers in Russia. Several layers of wholesalers exist in each region, each taking a margin as it passes the product gradually from the manufacturer to the retailer. Due to the large number of wholesalers, wholesale margins in Russia are twice the US levels (Exhibit 17). The high wholesale margin offsets productivity gains of efficient players, thereby limiting their ability to drive out inefficient players around the country. Furthermore, multilayered wholesaling increases the time required for national distribution and exacerbates the impact of low shelf life on national competition (and therefore reduces scale and capacity utilization).

The wholesaling industry in Russia is underdeveloped because: supermarkets are not present to exert competitive pressure; many wholesalers have an extremely short-term outlook due to macroeconomic instability; and because the high cost of capital deters consolidation in this capital intensive industry (see the Dairy Case for a detailed discussion of wholesalers).
POLICY IMPLICATIONS AND FUTURE OUTLOOK

In order for Russia to improve its confectionery productivity, a major restructuring needs to take place. In sum, large/productive plants should expand, while small/unproductive plants should exit.

First, we discuss the productivity potential without substantial investments (i.e. improving current brown-field operations without investing in green-field plants).

In the case of large plants (11 of around 1,000 plants in Russia), average productivity of 45% of US levels can be achieved by increasing the capacity utilization, eliminating excess workers, streamlining product variety, and increasing branding. Many large plants already have capacity utilization above 80%, but if they keep their current utilization, and increase the utilization of those plants that have less than 80%, the overall capacity utilization would increase to 88% thereby increasing productivity and output. Capital expenditures required in these two steps would be minimal. In order to improve productivity from 47 to 100% of US levels, additional investment in better layout and production automation will be required.

Unfortunately, the large plants alone do not have the capacity to supply all the demand in Russia today. An additional 60 small plants are needed in order to satisfy current demand. For these smaller plants, productivity potential with minimal investment is only 20%, and in the medium term, 30% if the remaining smaller players exit (Exhibit 18).

For the industry to increase average productivity beyond 30% of US average in the medium term, substantial investments into green-field plants need to take place. In order to achieve this, barriers to both expansion and exit need to be removed. The main barriers to expansion are: the high cost of capital; and inefficient wholesalers. The main barrier to exit is the local government’s pressure against layoffs.

Given the current low productivity level and the amount of excess workers in the industry, the confectionery industry will not be a source of employment growth in the future. Although higher standards of living will lead to higher demand and output, productivity gains under all scenarios will outstrip it, leading to a reduction in employment.

In order for the industry to restructure, the government should remove restrictions on layoffs, collect taxes from unproductive firms, change tax laws to facilitate advertising, enforce brand property rights, and streamline the shelf life approval process.
Appendix: Methodology

To compare the performance of the Russian confectionery industry with that of other countries we investigated output, labor inputs and labor productivity.

¶ **Output:** Net value added definition of output (Net sales - cost of goods sold) was adopted across all countries. In Russia, the data was provided by the Russian Central Statistical Office (Goskomstat). For the exchange rates, PPP exchange rates reported by the United Nations and by Goskomstat were used. These PPPs were also adjusted to take out the effects of different retail margins and raw material prices in each country.

¶ **Labor inputs:** Number of hours worked in the industry (FTEs x average number of hours worked) was calculated across countries.

¶ **Labor productivity:** Output divided by labor inputs.
CONFECTIONERY INDUSTRY VALUE CHAIN

Percent of physical output in 1997

<table>
<thead>
<tr>
<th>Inputs:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cocoa</td>
</tr>
<tr>
<td>Sugar</td>
</tr>
<tr>
<td>Flour</td>
</tr>
<tr>
<td>Packaging material, etc.</td>
</tr>
</tbody>
</table>

Focus of the study

21% Sweets
- Chocolate-covered candies 20%
- Chocolate bars 5%
- Wafers 31%
- Biscuits 23%
- Crackers 23%
- Cakes and other

Not included in the US confectionery definition but added for comparability

Source: Goskomstat

Exhibit 1

BREAKDOWN OF CONFECTIONERY CONSUMPTION

Physical volume indexed to 1990 = 100

Source: Goskomstat; Cusoms data; McKinsey analysis

Exhibit 2
LABOR PRODUCTIVITY IN CONFECTIONERY - 1997
Indexed to US = 100 in 1997

Source: Goskomstat; US Census of Manufacturing; OECD; McKinsey analysis

Exhibit 3

RUSSIAN CONFECTIONERY LABOR PRODUCTIVITY TREND
Indexed to US = 100 in 1997

*Value-added figures estimated by extrapolating physical production trend from 1990-92

Source: Goskomstat; US Census of Manufacturing; OECD; McKinsey analysis

Exhibit 4
### INDUSTRY COMPOSITION: RUSSIAN CONFECTIONERY - 1997

<table>
<thead>
<tr>
<th>Productivity Indexed to US = 100 in 1997</th>
<th>Capacity utilization Percent</th>
<th>Production as % of total</th>
<th>Employment as % of total</th>
<th>Number of plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Plants</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35,000 tons per year or more</td>
<td>22</td>
<td>79</td>
<td>36</td>
<td>19</td>
</tr>
<tr>
<td>Small Plants</td>
<td>7</td>
<td>38</td>
<td>64</td>
<td>81</td>
</tr>
<tr>
<td>0-34,999 tons per year</td>
<td></td>
<td></td>
<td></td>
<td>914</td>
</tr>
</tbody>
</table>

Source: Goskomstat; US Census of Manufacturing; Interviews

### CAUSALITY FOR PRODUCTIVITY DIFFERENCES: CONFECTIONERY

Russia vs. US

- **External factors**
  - Macroeconomic barriers
    - Drop in demand/low labor cost/low income
    - Country risk/high capital cost (political instability/budget deficit)
  - Labor barriers
    - Mobility restrictions
    - Inadequate education
  - Capital barriers
    - Government ownership
    - Problems with minority shareholders’ rights
  - Sector specific barriers (non-level playing field)
    - Non-level taxes
    - Non-equal allocation of government procurement and land
    - Threat of red tape/harassment
    - Non-level energy payments
    - Others (property rights, barriers to trade/FDI)
  - Related industry barriers
    - Upstream/downstream sectors
    - Poor infrastructure
  - Other barriers (climate, geology, etc.)

- **Industry dynamics**
  - Pressure from global best practice
  - Domestic competitive intensity
  - Non-level playing field

- **Production process**
  - Low capacity utilization
  - Inefficient organization
    - Organization of functions and tasks
    - Marketing/product mix
    - Supplier relations
    - Blue collar trainability
  - Lower capital intensity/technology
    - Obsolete assets (subscale/outdated technology)
    - Lack of viable investment in non-obsolete assets (upgrades/green fields)
    - Non-viable investment due to factor costs (labor, capital, and energy)

Productivity (Indexed to US = 100)
PRODUCTIVITY DIFFERENCES ACROSS SIZE BANDS - 1997

Indexed to US = 100 in 1997

**Large plants**
35,000 tons per year or more

**Small plants**
0 - 34,999 tons per year

**Industry**

Source: Interviews
LOW SCALE OF RUSSIAN CONFECTIONERY PLANTS

Physical output indexed to US = 100 in 1997

[ ] % of total plants

Average

By size band (Russia)

<table>
<thead>
<tr>
<th></th>
<th>US</th>
<th>Russia</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Large</th>
<th>Small</th>
</tr>
</thead>
<tbody>
<tr>
<td>132</td>
<td>6</td>
<td>[21%]</td>
</tr>
<tr>
<td>6</td>
<td>[79%]</td>
<td></td>
</tr>
</tbody>
</table>

Source: Goskomstat; US Census of Manufacturing; Interviews

MARKETING: HIGH PRODUCT PROLIFERATION

Number of products

BROWN FIELD OPERATOR EXAMPLE

<table>
<thead>
<tr>
<th></th>
<th>1996</th>
<th>1997</th>
</tr>
</thead>
<tbody>
<tr>
<td>350</td>
<td>60</td>
<td>-83%</td>
</tr>
</tbody>
</table>

Benefits

- Less complexity
- Less downtime
- Higher economies of scale for remaining products
- Larger sales per product to justify branding

NOTE: Output level did not change as a result of product portfolio rationalization.

Source: Interviews

Exhibit 8

Exhibit 9
MARKETING: THE PROBLEM OF MULTIPLE OWNERS OF BRANDS - 1997

Percent of brands shared
Percent; top 115 brands of Red October

Implications

- Low incentives to advertise
- Difficult to obtain market data
- Low incentives for quality improvement on shared brands

Example
• Caramel (Victoria, Strawberries and cream, Gusinie Lapki)
• Chocolate covered candies (Clumsy Cub, Truffel, Citron)

Original

Shared with Rot-Front/Babayevskaya

65

35

Source: Troika-Dialog; CAIB

Exhibit 10

MARKETING: BRAND AWARENESS - 1997

Alyonka (Red October) 50
Skazki Pushkina (Red October) 50
Silvochny (Babayevskaya) 43
Krasny Oktyabr (Red October) 36
Detsky (Babayevskaya) 36
Orechovy (Rot-Front) 34
Dove (Mars) 33
Fruit & Nut (Cadbury) 30
Alpen Gold (Import) 27
Dorozhny (Rot-Front) 25

*Leading US brands have over 80% Advertising as percent of sales is only 0.2% in Russia vs. 2.8% in the US

Source: Sources

Exhibit 11
LOW CAPACITY UTILIZATION OF RUSSIAN CONFECTIONERY PLANTS

Percent

Average
Percent of US level

US
Russia

77
47

By size band (Russia)

Large
Small

[21%]
[79%]

79
38

Source: Goskomstat; US Census of Manufacturing; Interviews
PRESSURE FROM BEST PRACTICE
Percentage of total consumption

Source: Goskomstat; McKinsey analysis

RUSSIAN CONFECTIONERY INDUSTRY IS GRADUALLY CONSOLIDATING
Share of large and small players over time

Source: Goskomstat; McKinsey analysis
LOCAL AND REGIONAL NATURE OF RUSSIAN CONFECTIONERY MARKET: TOP PLAYERS - 1997

Percent

*Exports to CIS countries

Source: Flemings; RMC; CAIB

Exhibit 15
### IMPACT OF UNFAVORABLE TAX STRUCTURE

<table>
<thead>
<tr>
<th>Legal tax structure</th>
<th>Results and examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>• VAT: Advertising firms do not pay VAT tax (so advertisers incur the burden)</td>
<td>• Reduces incentives to advertise</td>
</tr>
<tr>
<td>• Advertising deductibility: Only 2% of sales is deductible for advertising</td>
<td></td>
</tr>
<tr>
<td>• Advertisement tax: 5% tax on advertisement expenses</td>
<td></td>
</tr>
<tr>
<td>• Profit tax: Sales and profits are taxed regardless of the presence of losses (e.g., 4% tax on revenues, 39.5% tax on payroll)</td>
<td>• Discourages FDI (as opposed to imports)</td>
</tr>
<tr>
<td>• Tax on balance sheet items: Tax on all assets except cash (instead of only on long-term assets)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Interviews
DOWNSTREAM SECTORS: DISTRIBUTION SYSTEM

Confectionery shelf-life
Average number of days

<table>
<thead>
<tr>
<th>Russia</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>180</td>
</tr>
</tbody>
</table>

Wholesale margin

<table>
<thead>
<tr>
<th></th>
<th>5-7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

Implications

- Higher distribution costs
- Inefficient distribution (especially at the national level)
- Markets still remain regionally fragmented
- Increases product proliferation as makes fully specialized nationwide plants non-viable

Source: Interviews
FUTURE OUTLOOK: PRODUCTIVITY POTENTIAL

* Organization of functions and tasks

**Exhibit 18**
EXECUTIVE SUMMARY

Industry overview. The food retailing industry employs 4% of the Russian workforce and is one of the largest sectors in the economy. Since food constitutes 45% of Russian household spending and food retailing accounts for 20% of that cost, the sector affects 9% of total household spending. The sector has experienced a dramatic transformation in recent years. Open-air wholesale market stands, kiosks, pavilions and agricultural markets have taken shares away from Soviet-era formats (whose shares have declined from 90% in 1990 to 41% in 1997).

Productivity performance. The Russian labor productivity is at 23% of the US level. Street vendors are at 9%, traditional Soviet-era formats (the smaller Gastronoms) at 24%, open-air wholesale markets at 24%, kiosks and pavilions at 26%, and supermarkets at 78% of the average US productivity.

The main reasons for the productivity gap at the operational level can be grouped into two. First, Russia lacks modern productive formats such as supermarkets and hypermarkets. The market share of modern formats is less than 1% in Russia compared to over 70% in the US. Second, format-to-format, Russian stores suffer from over-manning, low scale of chains and stores, and low capital intensity compared to their US counterparts.

The most important external barriers to productivity and output growth are those that prevent the penetration of modern formats. Modern formats cannot gain share against the less productive open-air wholesale market stands, kiosks and pavilions because the latter benefit from lower tax liabilities, less control on the origin of their goods (which are often illegal imports or counterfeits), and cheaper access to prime locations. Inefficient Russian food processors also impede the entry of modern formats since best practice firms will not invest in a country unless they can source quality products domestically.

Policy implications and future outlook. If the main barriers are removed, modern formats should gain substantial market share. For example, in the city of Obninsk in Central Russia, supermarkets gained 15-20% market share (compared to less than 1% for all of Russia) after the local government provided equal opportunities (for supermarkets and open-air wholesale market stands) in terms of land allocation and tax/tariff/counterfeit enforcement. As another example, Polish supermarkets and hypermarkets gained 18% market share in less than five years – having started from a similar format mix as Russia – after the government put into place equal tax legislation and clear land allocation procedures.
Food retailing

This case study benchmarks the performance of the Russian food retailing industry against those of the US, Korea, Brazil and occasionally Poland, with a primary focus on the US comparison.

We will start with an overview of the industry, then present productivity performance comparisons across countries, explain the causes of differences in performance, and end with a future outlook for the industry.

INDUSTRY OVERVIEW

Importance of the sector

Food retailing is an important sector due to its size and effect on the standard of living.

- Food retailing constitutes 4% of employment in Russia, and is one of the largest sectors in the economy (Exhibit 1).
- Since food constitutes 45% of Russian household spending and food retailing accounts for 20% of that cost, the sector affects 9% of total household spending in Russia.

The sector's contribution to the study

Food retailing is an important service sector that has experienced a dramatic change in industry structure.

The service sector in Russia accounts for only 40% of GDP, compared to 70% in the US. By studying the food retailing industry – a representative sector – we hope to shed light on barriers that prevent growth of the service sector in Russia.

Food retailing is also interesting because it is one of the few sectors in Russia that has undergone dramatic change since the collapse of the Soviet Union. From ’92 to ’97, the dominant Soviet format (gastronoms) lost half of their market share to new formats. However, the sector has not evolved towards the most productive formats due to barriers which we will discuss below.
Industry and format definitions

Food retailing is the final link in the food value chain before the consumer. We study retail stores only, and exclude restaurants, hotels and catering from our scope.

For the purposes of our study, we define eight Russian food retailing formats as follows (Exhibit 2):

Soviet-era formats

Gastronoms: Over-the-counter stores with trade floor areas of less than 500 sq. m. represented the predominant retail format in Russia in Soviet times. In Russian over-the-counter stores, customers first choose the product at the product counter, then go to a separate cashier desk to pay for the good and receive a ticket, and lastly present the ticket at the food counter in exchange for the good. The same system applies for universams discussed below. The over-the-counter system requires 30-40% more employees than self-service and negatively affects sales by precluding the customer contact with the goods. These are the most important drivers of the low productivity level of this format. Gastronoms can be further divided into two groups: specialized stores for products such as dairy, bakery and seafood, and general stores that sell a range of products (known as “produkty”).

Universams: Over-the-counter stores with trade floor areas of over 500 square meters which were built in densely populated districts of large cities. Universams were suitable for one stop shopping since they carried a large number of SKUs (stock-keeping units).

Agricultural markets: Markets with rows of counters selling fresh agricultural products. As the prices in agricultural markets could be three times higher than in gastronoms, this format was not affordable to the majority of the population in Soviet times. However, after the artificial price setting of the planned economy was replaced by market pricing, price levels of agricultural markets and gastronoms converged.

Post-1992 formats

Supermarkets: Self-service stores with five or more cash registers that include hypermarkets and cash’n’carries. The trade floor area for this format is usually over 800 sq. m.

Mini-markets: Self-service stores with fewer than five cash registers. Usually smaller than supermarkets with a trade floor area of around 200-600 sq. m. Located mostly in city centers, mini-markets incur high rent costs and, hence, offer highly priced products affordable only to the upper income bracket of population.

Retail/wholesale markets: Markets of free-standing containers and booths selling primarily non-fresh products - both to retailers and to small wholesale customers. The number of containers per market can be as high as five hundred.
Kiosks/pavilions: Newly built stores made of prefabricated material often found standing on pavements or open spaces close to stations. Kiosks are smaller (trade floor area: under 10 sq. m) and sell products through a window, while pavilions are larger (trade floor area: 20-60 sq. m) and can be entered. Major categories sold are beverages, confectionery and other high frequency items.

Street vendors: Individuals selling mainly non-fresh products, laying them on the street or on unroofed stands.

Industry structure evolution

The share of over-the-counter Soviet formats – especially gastronoms – diminished radically from 90% in 1992 to 40% in 1997. Their shares were taken by agricultural markets that grew from 10% to 26%, retail/wholesale markets that grew from 0% to 16% and kiosks/pavilions that grew from 0% to 9% (Exhibit 3). These three formats gained share because each of them had a competitive advantage over gastronoms. Also, Russia saw the emergence of a few supermarkets mainly in large cities (Exhibit 4).

Retail/wholesale markets gained 16% in market share because their prices were 17% lower than gastronoms. With food occupying 45% of household spending, this price advantage translated into a higher share. However, retail/wholesale markets have been able to offer low priced products not because of superior operations, but as a result of tax, tariff evasion and sale of counterfeit products. Besides, this format is very inconvenient for the customer: one has to shop in an open-air, dirty environment; each container is specialized making it impossible to meet all consumer needs at one place; there is no product quality guarantee – counterfeit products made of inferior ingredients could lead to food poisoning, and violation of hygiene norms can cause germs get into unpackaged products.

After price liberalization agricultural markets increased their share from 10 to 26% by offering superior quality fresh produce at almost the same price level as gastronoms. Fruits, vegetables, fish and meat are visibly more fresh in agricultural markets.

Kiosks/pavilions gained 9% of the market based on higher convenience to the customer. Located on major traffic routes and/or open around the clock, they are more convenient than gastronoms, many of which are in residential areas and are open only during business hours.

A few supermarkets also started to appear, mainly in large cities, offering high quality products, a clean and spacious store environment, prices comparable to gastronoms and an extremely wide product selection. These supermarkets are different from mini-markets, which are more expensive due to their higher cost base resulting from their expensive central locations (25% more expensive than gastronoms) and cater to niche, high-end markets, which value convenience highly. Once
supermarkets start forming chains, economies of scale will allow them to further decrease their prices and become affordable to more people.

PRODUCTIVITY PERFORMANCE

We calculate labor productivity in food retailing as value-added per hour worked. Value-added is calculated as sales minus cost of goods (=gross margin). Since the state statistical office does not collect format-specific information, original surveys were conducted by McKinsey Global Institute to calculate productivity figures. The value added was converted at food PPP for cross-country comparisons (see Appendix 1 for details on sources and methodology).

Overall food retailing productivity

Russian food retailing labor productivity is at 23 indexed to the US at 100, which is 4 points lower than in Korea and 9 points higher than in Brazil (Exhibit 5). Russian food retailers work twice as much to provide only half the retail services offered per capita in the US (Exhibit 6).

Food retailing productivity by format

Labor productivity by format shows that, as in other countries, modern self-service formats are the most productive in Russia – supermarkets are at 78 and minimarkets at 67 indexed to the US average at 100 (the productivity gap will be 10 to 15 points larger for format-to-format comparison). Universams are at 47 and are more productive than gastronoms at 23 because of differences in assortment, scale and location. The rest of the formats are as follows: agricultural markets at 28, kiosks/pavilions at 26, gastronoms at 24, retail/wholesale markets at 24 and street vendors at 9 (Exhibit 7). A detailed methodology to calculate productivity by format is provided in Appendix 1.

REASONS FOR DIFFERENCES IN PRODUCTIVITY PERFORMANCE

The productivity gap between Russia and the US can be disaggregated into two factors: a different format mix (i.e. high share of the less productive formats) which accounts for 42 points of the gap; and productivity differences within each format responsible for the other 35 points (Exhibit 8).

Format mix

Keeping current Russian productivity by format unchanged, Russian food retailing sector with the US format mix would achieve an overall productivity level of 65 indexed to the US average.
The format mix gap is explained entirely by the low penetration of supermarkets. The share of supermarkets in Russia is only 0.2% compared to 13% in Poland, 36% in Brazil and 71% in the US (Exhibit 9). Considering that Poland had a similar starting point in formats in 1990 (see Appendix 2 for a discussion of the Polish food retailing development), and that Brazil has almost the same per capita income and car penetration as Russia, this figure is obviously low (Exhibit 10). Four barriers prevent supermarkets from capturing a higher share in Russia: 1) unequal tax, tariff and quality control laws and enforcement across formats; 2) underdeveloped food processors; 3) red tape and corruption; and 4) the high cost of capital.

**Sector-specific barriers**

By evading even the lower official taxes and selling smuggled and counterfeit products, retail/wholesale markets gain an 18 point cost advantage over supermarkets. This cost advantage undermines supermarkets’ ability to compete based on high productivity. With equal laws and enforcement, retail/wholesale markets would be rendered uncompetitive, as they would be deprived of their only source of competitive advantage – low price. As retail/wholesale markets offer less product selection, no product quality guarantee and an inferior shopping experience, 80% of consumers have expressed their preferences to shop at supermarkets at a similar price (Exhibit 11). The sources of unfair cost advantage for retail/wholesale markets are as follows:

- **Unequal tariff enforcement** allows them to sell smuggled products. These smuggled products can occupy 40 to 60% of sales in some categories - e.g. tea and coffee. This factor accounts for 6 points (34%) of the cost advantage.

- **Non-level taxes.** New tax laws allow retail/wholesale markets to pay 20-80 times less than supermarkets (depending on the region). Also differential tax enforcement allows retail/wholesale markets to avoid paying value-added, income and sales-based taxes. It is estimated that retail/wholesale markets, on average, pay 90% less tax than supermarkets with similar sales. Tax savings account for 4 points (22%) of the cost advantage.

- **Unequal copyright and quality control enforcement** allows retail/wholesale markets to sell counterfeit or expired products. Counterfeit products occupy over half the sales in some categories. Over 30% of vodka on the consumer market is counterfeit and the larger part of it is sold at the retail/wholesale markets. Sales of counterfeit and expired products are responsible for 8 points (44%) of the cost advantage.

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1 Despite higher supermarket penetration, average Brazilian productivity is lower than the average Russian productivity because much of Brazilian food retailing employment is in unproductive street vending. People move into street vending when there is a lack of growth and employment in other sectors.

2 Effectively lower tax rates are applied to service establishments with less than 30 employees if such entities choose a simplified taxation and accounting option.
If retail/wholesale markets were subject to the same laws and enforcement as supermarkets, they would have to increase their prices by 23 points to maintain the same margin. Given the poor shopping conditions in these markets, the disappearance of a price advantage would render retail/wholesale markets absolutely uncompetitive. By eliminating retail/wholesale markets society would achieve gains both through increased tax revenues and a higher quality shopping experience. Once supermarkets take over the market share of retail/wholesale markets, they will be able to form chains, thus driving their costs and prices further down.

Related industry barriers: underdeveloped food processing

Inefficiency of the domestic food processing industry forces supermarkets to source at least 40% of their products from overseas - especially for quality products that supermarkets focus on. However, global retailers require at least 70% local sourcing as a prerequisite for new market entry. A high reliance on imports increases transportation costs, import duties and foreign exchange exposure of supermarkets. Also, food processors in the US mark bar-codes and maintain certain inventory levels – functions that Russian supermarkets would have to undertake themselves, thereby increasing the headcount and further deterring entry.

Sector-specific barriers: red tape in registration, permits and land

Supermarkets in Russia encounter excessive red tape for set up and operations which deters entry. New mobile formats (i.e. markets, kiosks and pavilions) often serve as a source of "side income" for regulators and inspectors who grant them differential treatment on tax, tariff and quality control issues (see previous paragraph).

¶ Set-up: As many as twenty-six organizations are involved in the application process of supermarkets. Complexity of the process increases the time period required for set-up and often fosters corruption. Corruption is also common in land lease since official rates are set low even for plots that are in high demand (land cannot be purchased in most regions). According to supermarket developers, bribes in the set-up phase can amount to as much as half of the initial investment, thus increasing the required rate of return for entry. Officials who have already allocated land to retail/wholesale markets for a bribe also have incentives to limit the entry of new supermarkets. Besides, limited access to the official who would take a bribe serves as a barrier to entry for a company without strong local connections. As a result, Russian food retailers require almost four times as much time as Polish food retailers to register (Exhibit 12).

¶ Operations: Once in operation, supermarkets in Russia are subject to excessive inspections on draconian regulations. On average, Russian food retailers face twice as many inspections per year as Polish retailers (Exhibit 12). In a survey of Moscow food retailers, red tape and corruption were listed as important impediments to growth of the sector (Exhibit 13). Some examples of efficiency-undermining regulations are as follows:
• **Product certification:** Even when the product has not changed, Russian food retailers have to obtain new product certifications. With tens of thousands of SKUs, supermarkets have the most to lose from the administrative burden.

• **Advertising:** Advertising expenses are tax deductible only up to 2% of sales. Advertising is essential for supermarkets to attract a large number of customers and to leverage economies of scale. As such, limits on deductibility for advertising hampers supermarket entry and expansion.

*Macroeconomic barriers: high cost of capital*

The cost of capital for retailers is around 35% in Russia as opposed to 7% in the US. Since supermarkets can cost up to 30 million dollars to build, a lack of low cost capital deters domestic investors from building this relatively capital-intensive format. The high cost of capital is also responsible for the emergence of less capital-intensive formats such as kiosks and pavilions.

While the high cost of capital should slow the pace of supermarket development, it is not an absolute barrier, as can be seen by Brazilian supermarkets gaining 36% market share in spite of a similarly high cost of capital. However, even in Brazil, the high cost of capital slowed down the expansion of domestic supermarket chains that had to rely on retained earnings, as opposed to external sources, for financing (Exhibit 14).

The high domestic borrowing rates are not an issue for multinationals who can source money on the international capital market. However, other factors that determine the required rate of return for a multinational company make Russia a less attractive investment option than other emerging economies. For example, high country risk, intransparent legislation, and uncertainty over the future due to arbitrary decisions of local governments in Russia.

*Gap within each format*

Two formats – supermarkets and gastronoms - are analyzed to understand the causes of the productivity gap within the same format. Productivity of Russian supermarkets is at 65% of US supermarkets and productivity of gastronoms is at 40% of US mom-and-pop stores. The gap between Russian and US supermarkets accounts for 19 out of the 35 point format-to-format productivity gap.

**Supermarkets**

Russian supermarket productivity is at 65% of US supermarkets (78% of the US average). The causes of the gap are as follows:

**Production process level.** The inefficient organization of functions and tasks and the low scale of stores and chains explain the productivity gap with the US.

• **Inefficient organization of functions and tasks.** Russian supermarkets employ 40% more employees per sales in store.
operations compared to the US - partly due to a high share of non-self-service sections, and partly due to an inefficient work configuration. Fresh produce such as cheese, meat and seafood are often weighed and packaged by shop-attendants in Russia (as opposed to being sold packaged), thereby increasing the labor required in such functions by 30-40%. Other departments are also over-manned. In addition, Russian supermarkets need over five security guards per store, as opposed to one of two in the US to protect against widespread shoplifting in Russia.

- **Low scale of chains and stores.** Russian supermarkets are on average 2.5 times smaller in area than US supermarkets (Exhibit 15). This results in fewer SKUs and fewer customers, leading to lower economies of scale and scope within each supermarket. More importantly, the low penetration of chains reduces the large economies of scale in such chain-wide functions as purchasing, distribution, marketing, and management training. Russian chains have almost twice as many workers per sales in such chain-wide functions compared to the US.

Industry dynamics. Supermarkets constitute only 0.2% of turnover in Russia. Those few supermarkets that operate are not competing against best practice supermarket chains (e.g., Carrefour, Tesco, Sainsbury, Metro) which are absent from the Russian market. The only foreign supermarket in Russia is Ramstore, a subsidiary of the Turkish supermarket chain Migros. The absence of best practice supermarkets lowers the competitive intensity of the industry. However, domestic competitive intensity in Russia is reasonably high because supermarkets face strong price competition from retail/wholesale markets who draw their competitive advantage from tax/tariff evasion and the sale of counterfeit and low quality products.

External Factors. The main barriers preventing productivity improvements in Russian supermarkets are those that affect the low penetration of supermarkets (see Sector-specific barriers). The absence of best-practice supermarkets results in lower competitive intensity, which leads to less incentive for domestic supermarkets to improve. In addition to the four barriers, widespread theft necessitates more security staff in Russia.

**Gastronoms**

Russian gastronom productivity is at 40% of US mom-and-pop stores (small traditional stores), that is 24% of the US average.

Production process level. Inefficient organization of functions and tasks, and low capital intensity/technology explain the productivity gap with the US.

- **Inefficient organization of functions and tasks.** The extremely labor intensive over-the-counter system of sales in gastronoms (described under “Gastronoms” in the “Industry and format definition” section
above) is responsible for 65% of the gap. Poor merchandising and cost control, inconvenient hours of operation - many stores still have a lunch break during daytime - and low service levels (e.g. unfriendly personnel) decrease customer flow, thus contributing to the lower productivity of gastronoms as compared to US mom-and-pops.

- **Low capital intensity and technology.** The majority of US Mom-and-pops use scanners, whereas the technology is almost non-existent among gastronoms. Low capital intensity in Russia leads to more hours worked for cashiers while low technology (POS information technology) leads to sub-optimal merchandizing and low value added. Run down premises and a lack of ventilation also lead to an unpleasant shopping environment that reduces customer flow.

- **Industry dynamics.** Most mom-and-pops in the US were driven out by the emergence of supermarkets. The absence of supermarkets in Russia shields gastronoms from the most productive format (although their share has eroded nevertheless from the onslaught of other formats).

- **External factors.** The barriers that prevent supermarket penetration again explain why gastronoms are not restructuring faster. An additional factor that burdens the restructuring of gastronoms is corporate governance. The majority of gastronom managers are also owners who were formerly store-directors in the Soviet era; they had never been exposed to market economy practices and now find it hard to adjust to the new environment. Lack of outside pressures and skills have slowed restructuring in the sector.

A summary of all causal factors is provided in **Exhibit 16.**

**POLICY IMPLICATIONS AND FUTURE OUTLOOK**

Developments in the city of Obninsk (population 100,000), in the Central region of Russia, illustrates the rapid pace of change that can occur in the Russian food retailing industry given the right policies. The city has two affordable supermarkets with a combined market share of 15-20% - far above the 0.2% market share for Russia overall. Their presence has increased the competitive intensity in the industry whereby 10% of gastronoms have shut down and remaining retailers have upgraded their services (e.g. better merchandizing, longer opening hours). The only two policies needed to achieve this result were: less red tape (transparent land allocation process); and effective tax enforcement (the city enjoys a budget surplus as a result).

Poland points to an even more impressive development. Starting from a similar format mix, supermarkets and hypermarkets now enjoy an 18% market share and are growing fast. Stable macroeconomic conditions, fair tax legislation (therefore a very small share of wholesale/retail markets in food), a stronger domestic food processing industry and less red tape all contributed to the
growth of supermarkets and hypermarkets. French and German hypermarkets have invested heavily in growth, thus providing Poland with the much needed capital. Details on Polish retail development are provided in Appendix 2.

Going forward, the government should provide a level playing field for all the formats and streamline red tape and corruption in order for the food retailing sector to develop.

*Providing a level playing field.* Taxes need to be leveled between retail/wholesale markets and supermarkets, not only in terms of official rates, but also in terms of enforcement. Tariff and counterfeit enforcement also needs to be leveled.

*Streamlining red tape in regulation, permits and land.* The land allocation process should be made transparent so as to root out corruption and vested interests (of regulators and retail/wholesale markets). Private ownership of land and/or a market-based leasing system should be promoted. The multitude of red tape in regulation and permits should be streamlined so as to facilitate investment and market entry.

It should also promote the domestic food processing sector (see the Dairy and Confectionery cases), in addition to stabilizing macroeconomic conditions (see the Synthesis chapter).
Appendix 1: Sources and methodology

Sources of information

Since the national statistical office (Goskomstat) does not provide exhaustive or format-specific retail data, MGI conducted three original surveys.

- **Productivity survey of retailers.** 44 food retailers were surveyed for their sales, cost of goods and employment data across three settlements of varying sizes - Moscow (pop: 8.6 mil.), Vladimir (pop: 0.34 mil.) and Yurievets (small town in the Vladimir region).

- **Expenditure survey across formats.** 2,400 people across 89 regions all around Russia were surveyed on their expenditure levels across formats.

- **Price check across formats.** prices of 48 equivalent food items were checked across 30 retailers in different formats in Moscow.

Calculation methodology

To compare labor productivity of the Russian food retailers with that of other countries, we divided output by hours worked.

- **Output.** Output was calculated as sales minus cost of goods (=gloss margin). Both sales and cost of goods data were obtained from the Productivity Survey of Retailers mentioned above. World Bank purchasing power parities were used to convert Russian output to US dollar output.

- **Hours worked.** Total hours worked, including those of full-time workers and part-time workers were obtained from the Productivity Survey of Retailers.

After deriving format productivity by size of settlement (Moscow, Vladimir and Yurievets) the result was grossed up for Russia using the number of stores by format and settlement size. The number of stores by format and settlement size was calculated by dividing “total expenditure by format and settlement” (from the Expenditure Survey Across Formats) by “sales per store by format and settlement (from the Productivity Survey of Retailers).
Appendix 2: Supermarkets in Poland

Despite similar starting points in retail structure, Poland and Russia have seen very different levels of development of modern retailing formats. Supermarkets and hypermarkets account for approximately 18% of food retail turnover in Poland, compared to 0.2% in Russia. The supermarket/hypermarket format emerged in Poland in the mid-1990’s and has rapidly gained share from traditional stores and markets.

There are five primary reasons that the supermarket/hypermarket format has been more successful in Poland than in Russia. First, Poland has a more attractive macroeconomic environment than Russia. Tax legislation is relatively stable, and a substantial middle class provides supermarkets with a solid customer base. Second, domestic food processing is stronger in Poland, allowing supermarkets to source 80% or more of their stock locally and avoid the costs associated with import. Third, supermarkets in Poland do not face unfair competition from artificially low prices in wholesale/agricultural markets. Markets are primarily used by consumers for local fruits and vegetables and thus cost advantages from tariff evasion are negligible. Fourth, Poland requires less “red tape” for registration and permits than does Russia, reducing costs and uncertainty. Finally, the cost of capital in Poland is lower than in Russia, making investment in food retail more accessible to domestic players.

Format definition

There are three primary types of food retail outlets in Poland

- **Traditional stores.** Over-the-counter or, occasionally, self-service stores with a floor area less than 300 sq. m. These stores are usually owned by small entrepreneurs and are not part of a chain. 75% of outlets in this category are under 40 sq. m. Approximately 25% are specialty stores, selling one category of goods exclusively. The rest carry an assortment of basic food products.

- **Bazaars.** Markets with rows of counters or free-standing containers selling food and non-food items. The term “bazaar” encompasses a variety of market types, from the large wholesale markets targeted at shuttle traders to small groups of farmers selling fresh produce to final consumers. About 5% of bazaar turnover is food products, the bulk of which is agricultural products sold directly by small farmers.

- **Hypermartks/supermarkets.** Self-service stores with a floor area greater than 300 sq. m. Supermarkets carry food items almost exclusively. Hypermarkets are significantly larger (2500 sq. m or more), approximately 30-40% of which is usually devoted to non-food items. These outlets are generally part of chains.
Industry structure evolution

During Soviet times, food retail in Poland consisted primarily of small, state-run stores, either specializing in one product type (dairy, meat, bakery, etc.) or selling a range of products (the equivalent of Russian “Produkty” stores). The majority of these stores were under 40 sq.m. Goods, often grouped by type, were displayed behind different counters in the store. Customers waited in line to get to the counter selling a particular good, received the good and then continued down the line to pay for good at a cash register at the end of the counter. This process was repeated for each counter that contained a good a customer wished to purchase. Most traditional stores maintain this system of payment today.

The number of traditional stores has declined 17% since 1994 and is expected to continue to decrease. Their share of turnover has been taken primarily by the supermarkets and hypermarkets which emerged in Poland in the mid-1990s and now have a combined share of 18%. Bazaars, which appeared in the late 1980’s, have never played a significant role in food retailing in Poland, and have less than a 3% share of turnover today (Exhibits 17 and 18).

The supermarket/hypermarket format was brought to Poland in the mid-1990s by foreign investors. Though hypermarkets are primarily foreign, a number of Polish supermarkets have emerged. By the end of 1997, there were approximately 1500 supermarkets and 57 hypermarkets throughout Poland. Hypermarkets account for approximately 5% of food retail turnover and supermarkets for 13%. Further growth is likely as existing players expand their presence and new players, such as British Tesco, enter the market.

Supermarkets and hypermarkets cater to Poland’s growing middle class, generally offering the lowest prices (on average about 7% below bazaars and 8% below traditional stores) in addition to service and one-stop shopping. Hypermarkets are usually located on the outskirts of town; thus, despite competitive prices, they are not yet fully accessible to people without a car.3

There are 2412 permanent bazaars and approximately 5500 seasonal bazaars throughout Poland. “Bazaars” emerged in the late 1980’s to make up for the growing weakness of traditional trade. These open-air markets offered an abundance of choice for the time and competitive prices. Though primarily geared towards non-food items, the early bazaars also carried a variety of Western food products that were popular both with the Poles and with Eastern European traders. After hitting a peak in 1994-96, bazaars have seen their overall turnover decline by 40-50%. The total number of bazaars has not decreased. Food accounts for about 5% of total bazaar turnover, while bazaars generate 3% of food retail turnover. Bazaars offer neither the convenience of the small neighborhood stores nor the prices, service or variety of the hypermarkets and supermarkets.

3 Car penetration in Poland in 1997 was 221 per 1000 people.
There were approximately 160,000 traditional grocery stores in 1994 and only 133,000 in 1997 – a decline of nearly 17%. Their numbers are expected to continue to decrease rapidly as supermarkets grow in popularity. Nonetheless, traditional stores continue to handle over 80% of food turnover.

Traditional stores have less competitive prices than bazaars and hypermarkets, but the advantage of convenience. They are ubiquitous in both residential and business areas throughout Poland and easily accessible to people without a car or for quick daily shopping.

Primary causes of differences in industry structure development: Poland vs. Russia

Poland has avoided or overcome many of the barriers that have prevented modern retail format development in Russia (Exhibit 19):

Macroeconomic factors

- **Country risk.** Poland enjoys a lower country risk rating than Russia and is perceived by the investment community as significantly more stable. One major investor in Poland noted that a primary barrier to entry of the Russian market after August ’98 was the perception of the world financial community; top executives of feared that the company’s stock price might drop if they were seen as having exposure to Russia.

- **Taxes.** Polish tax legislation is considered to be clearer and less complex than Russian legislation, which is open to multiple interpretations and undergoes frequent revision. In addition, the Polish government provides some forms of tax relief to large investors.

- **Middle class.** Poland has a growing middle class that provides modern retail formats with a solid customer base. Approximately 45% of employees earn over USD 300 per month, compared to 18% in Russia. Though competitive prices on food make hypermarkets accessible to a lower income population, 30-40% of hypermarkets’ turnover is made up of non-food products that require a higher income level to support. Russia does not yet have a broad enough middle class (outside of Moscow and St. Petersburg) to support widespread hypermarket development.

Upstream industry development: food processing sector. The strength of food processing in Poland has allowed supermarkets to source 80% or more of their stock locally, eliminating costs associated with imports and currency exposure. Russian food processing is simply not as strong: Poland exports 12% of its production and imports 14% of consumption, whereas Russia exports approximately 3% of its production and imports 40% of consumption. Though the Polish food

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4 Income figures are based on pre-crisis data.
industry went through a difficult period of restructuring between 1990 and 1996, an influx of foreign players and the emergence of strong domestic players has helped the sector back on its feet. Many MNCs have established production facilities here, including Pepsico, Nestle, Mars, Danone, Wrigley, Kraft Jacobs Suchard and Gerber. Total FDI in food processing since 1990 is USD 3.6 billion, with an additional USD 1.3 billion in commitments.\(^5\) In addition, there are currently 11 Polish food and beverage processing companies listed on the Warsaw stock exchange.

\[\text{Tax/tariff/product laws and enforcement in Poland.}\]

Unlike Russia’s wholesale markets, Poland’s bazaars do not act as unfair competition to modern formats. Bazaars play a very small role in food retail, accounting for only 3% of turnover. Very few of the foodstuffs sold in bazaars are imported; there is thus no price benefit from tariff evasion as there is in Russia. In addition, all bazaars and stalls are registered with the authorities and pay regular taxes/fees. 22% VAT on the stalls’ value added is generally avoided (on those products to which it applies), but this is not sufficient to bring prices down to the level of the supermarkets.

\[\text{Local government intervention}\]

- **Red tape.** Polish bureaucracy requires less “red tape” than its Russian counterpart. For example, the average Polish store receives 46 inspections per year, versus 83 for its Russian counterparts; it takes only 0.7 months to register a store in Poland versus 2.7 months in Russia. In addition, land lease procedures are significantly less complex than in Russia, making it easier to acquire the rights to develop the large amount of land required for a hypermarket.

- **Corruption.** Though some “palm-greasing” of authorities is commonplace, Poland is not plagued by the widespread, constant corruption that typifies business activities in Russia.

Local governments in Poland have generally been supportive of supermarket development. Supermarkets offer a regular source of tax revenue and employment. Though they pose obvious competition to existing grocery stores, there has been no coordinated outcry from traditional stores against supermarket entry. This is primarily due to a lack of organization and sophistication on the part of traditional stores, which are typically owned by individual entrepreneurs. In addition, because most of the large supermarkets/hypermarkets are located in less populous areas of town, many store owners have not perceived them as a threat.

\[\text{Cost of capital.}\]

Because the supermarket/hypermarket sector has been primarily developed by foreign investors, cost of capital has not been an issue. Affordable real interest rates – 13% per annum compared

---

\(^5\) As of June 1998.
to 35% in Russia – also have allowed local players to invest independently.
FOOD RETAILING EMPLOYMENT

Employment
Million of employees

<table>
<thead>
<tr>
<th>Country</th>
<th>1997</th>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>2.8</td>
<td></td>
</tr>
<tr>
<td>Brazil</td>
<td></td>
<td>2.9</td>
</tr>
<tr>
<td>US</td>
<td></td>
<td>2.5</td>
</tr>
</tbody>
</table>

Share of national employment
Percent

<table>
<thead>
<tr>
<th>Country</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>4.0</td>
</tr>
<tr>
<td>Brazil</td>
<td>3.8</td>
</tr>
<tr>
<td>US</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Source: McKinsey productivity survey; Goskomstat; McKinsey analysis
INDUSTRY AND FORMAT DEFINITIONS

- **Food processing**
- **Food wholesaling**
- **Food retailing**
- **Consumer**

**Gastronoms:** Counter stores built before 1991 with floor space under 500m²

**Universams:** Counter stores built before 1991 with floor space at or over 500m²

**Agricultural markets:** Markets selling primarily fresh produce

**Supermarkets:** Self-service stores with 5 or more cash registers. Includes hypermarkets and cash’n’carries

**Mini-markets:** Self-service stores with less than 5 cash registers

**Retail/wholesale markets:** Containers selling primarily non-fresh products

**Kiosks/pavilions:** Counter stores newly built after 1992

**Street vendors:** Individuals selling goods on the street

*Excludes restaurants and catering*
FORMAT MIX
Percent of sales

Change in format mix

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>1997</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural markets*</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Universams and gastronomes</td>
<td>90</td>
<td>41</td>
</tr>
</tbody>
</table>

Format mix: small towns and Moscow - 1997

<table>
<thead>
<tr>
<th></th>
<th>Small towns &lt;50,000</th>
<th>Moscow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Kiosks/pavilions Retail/wholesale markets</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Agricultural markets</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Universams** and gastronomes</td>
<td>32</td>
<td>18</td>
</tr>
</tbody>
</table>

*Includes some other small Soviet-era formats
** Universams account for 3% of market share in Russia as a whole (0% in small towns, 4% in Moscow)
Source: McKinsey consumer expenditure survey; Goskomstat

COMPETITIVE ADVANTAGE OF NEW FORMATS VS. GASTRONOMS

<table>
<thead>
<tr>
<th></th>
<th>Relative prices* Indexed to gastronomes = 100</th>
<th>Product quality</th>
<th>Service/convenience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gastronomes</td>
<td>100</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Retail/wholesale markets</td>
<td>83</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>Agricultural markets</td>
<td>107</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>Kiosks/pavilions</td>
<td>102</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Supermarkets</td>
<td>96</td>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>

*All price comparison anchored to gastronomes; representative product basket used for each format
Source: McKinsey price survey; Retail experts; McKinsey analysis
**FOOD RETAILING LABOR PRODUCTIVITY**
Indexed to US = 100 in 1995

*Brazilian productivity assuming the same share of street vendors and make-shift stores as in Russia
Source: McKinsey analysis

**FOOD RETAILING SECTOR LABOR PRODUCTIVITY**
Indexed to US = 100 in 1995

Source: McKinsey surveys; MGI Brazil study; McKinsey analysis

Exhibit 5

Exhibit 6
RUSSIAN LABOR PRODUCTIVITY BY FORMAT
Indexed to US average = 100 in 1995

Source: McKinsey productivity survey; McKinsey analysis

Street vendors 9
Gastronom 24
Retail/wholesale markets 24
Kiosks/pavilions 26
Agricultural markets 28
Universams 48
Mini-markets 66
Supermarkets 78

Russian average 23
IMPACT OF MORE SUPERMARKETS ON PRODUCTIVITY*
Indexed to US = 100 in 1995

*Assumes format mix reaches US level first and then productivity format-to-format catches up

Source: McKinsey analysis

SHARE OF HYPERMARKETS AND SUPERMARKETS - 1997
Percent of sales

Source: McKinsey surveys; MGI Brazil; McKinsey analysis
LEVELS OF CAR PENETRATION
Cars per 1,000 people

Note: Russian income per capita is 70% of that in Brazil
Source: DRI McGraw Hill, McKinsey analysis

Low level of car penetration did not prevent supermarkets from reaching 36% market share in Brazil
LACK OF EQUAL TAX AND TARIFF LAWS AND ENFORCEMENT ACROSS FORMATS
Indexed to price in gastronoms = 100

Over 80% of consumers prefer to shop in supermarkets if prices were at least equal

Nature of equal laws and enforcement
- Same tax structure and equal enforcement (VAT, labor and corporate taxes)
- Full payment of tariffs on imports
- Eliminate counterfeit products

Retail/wholesale markets

Source: McKinsey price survey; McKinsey productivity survey; Gubernia; Expert interviews

RED TAPE IN REGULATION, PERMITS AND PUBLIC OWNERSHIP OF LAND

<table>
<thead>
<tr>
<th>Time to register stores</th>
<th>Inspections per year</th>
<th>Percentage of shops fined by inspectors</th>
<th>Affect supermarkets more than smaller stores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland*</td>
<td>0.7</td>
<td>46</td>
<td>- Supermarkets will take more time to register than smaller stores</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Cost of uncertainty high with large investments</td>
</tr>
<tr>
<td>Russia*</td>
<td>2.7</td>
<td>83</td>
<td>- Local government can block entry by not selling or leasing a large piece of land</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Sample of 50 retailers and 55 retailers in Warsaw and Moscow respectively

BARRIERS TO RETAIL DEVELOPMENT: LOCAL GOVERNMENT - 1997
Percent of people surveyed; n = 50 (multiple choice)

Complaints against local government

<table>
<thead>
<tr>
<th>Issue</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red tape</td>
<td>60</td>
</tr>
<tr>
<td>Lack of assistance</td>
<td>35</td>
</tr>
<tr>
<td>Excessive requirements</td>
<td>25</td>
</tr>
<tr>
<td>Extortion</td>
<td>20</td>
</tr>
</tbody>
</table>

Organizations hampering development

<table>
<thead>
<tr>
<th>Organization</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tax authorities</td>
<td>55</td>
</tr>
<tr>
<td>Sanitary inspection</td>
<td>50</td>
</tr>
<tr>
<td>Fire inspection</td>
<td>50</td>
</tr>
<tr>
<td>Department of consumer market</td>
<td>45</td>
</tr>
<tr>
<td>Police</td>
<td>35</td>
</tr>
</tbody>
</table>

Source: Vitrina industry magazine

Exhibit 13

HIGH COST OF CAPITAL FOR RETAILERS - 1997
Real interest rate

Cost of building a supermarket:
- Renovation USD 0.5 ~ 1m
- New (small) USD 1 ~ 5m
- New (large) USD 10 ~ 30m

High capital costs did not stop super/hypermarkets from reaching 36% market share in Brazil

Cost of building a supermarket:
- 7* in US
- 35 in Russia (x 5)

*Interest payment for 699 US food retailers

Source: RMA; Vitrina; McKinsey analysis

Exhibit 14
SUPERMARKET STORE SIZE AND CHAIN PENETRATION

Store size
Sq. m

<table>
<thead>
<tr>
<th></th>
<th>US (Top 25 chains)</th>
<th>Russia (Top 2 chains)</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.</td>
<td>2,300</td>
<td>1,000</td>
</tr>
<tr>
<td>Russia</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of stores per chain

<table>
<thead>
<tr>
<th></th>
<th>US (Top 25 chains)</th>
<th>Russia (Top 2 chains)</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.</td>
<td>670</td>
<td>10</td>
</tr>
<tr>
<td>Russia</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: The Food Institutes Food Industry Review - 1998 edition; McKinsey analysis
## CAUSALITY FOR PRODUCTIVITY DIFFERENCES: FOOD RETAILING

**Russia vs. US**

<table>
<thead>
<tr>
<th>External factors</th>
<th>Industry overall</th>
<th>Format mix gap</th>
<th>Format to format gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>• <strong>Macroeconomic barriers</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Drop in demand/low labor cost/low income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Country risk/high capital cost (political instability/budget deficit)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Labor barriers</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Mobility restrictions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Inadequate education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Capital barriers</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Government ownership</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Problems with minority shareholders’ rights</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Sector specific barriers (non-level playing field)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Non-level taxes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Non-equal allocation of government procurement and land</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Threat of red tape/harassment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Non-level energy payments</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Others (property rights, barriers to trade/FDI)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Related industry barriers</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Upstream/downstream sectors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Poor infrastructure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Other barriers (climate, geology, etc.)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Pressure from global best practice</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Domestic competitive intensity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Non-level playing field</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Low capacity utilization</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Inefficient organization</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Organization of functions and tasks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Marketing/product mix</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Supplier relations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Blue collar trainability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Lower capital intensity/technology</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Obsolete assets (subscale/outdated technology)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Lack of viable investment in non-obsolete assets (upgrades/green fields)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Non-viable investment due to factor costs (labor, capital, and energy)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Productivity

(Indexed to US = 100)

<table>
<thead>
<tr>
<th></th>
<th>Very important</th>
<th>Important</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macroeconomic barriers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labor barriers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital barriers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sector specific barriers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Related industry barriers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other barriers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low capacity utilization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inefficient organization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower capital intensity/technology</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
POLISH FOOD RETAILING STRUCTURE - 1998

<table>
<thead>
<tr>
<th>Format</th>
<th>Number of outlets</th>
<th>Turnover</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypermarkets</td>
<td>5</td>
<td>138,300</td>
</tr>
<tr>
<td>Supermarkets</td>
<td>13</td>
<td>5</td>
</tr>
<tr>
<td>Bazaars*</td>
<td>18</td>
<td>3</td>
</tr>
<tr>
<td>Large (100-300m²)</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td>Medium (40-100m²)</td>
<td>45</td>
<td>18</td>
</tr>
<tr>
<td>Small (&lt;40 m²)</td>
<td>74</td>
<td>45</td>
</tr>
<tr>
<td>Traditional</td>
<td>94</td>
<td>91</td>
</tr>
</tbody>
</table>

Estimates: 

*Includes permanent bazaars only

Source: CAL; Articles; Interviews

COMPETITIVE ADVANTAGES BY FORMAT - 1998

<table>
<thead>
<tr>
<th>Format</th>
<th>Relative prices Indexed to traditional stores = 100</th>
<th>Product quality</th>
<th>Service</th>
<th>Convenience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional stores</td>
<td>100</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Bazaars*</td>
<td>97</td>
<td>Medium/ high</td>
<td>Low</td>
<td>Low/ medium</td>
</tr>
<tr>
<td>Supermarkets</td>
<td>94</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Hypermarkets</td>
<td>91</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
</tr>
</tbody>
</table>

*Local fruits and vegetables are often cheaper at bazaars than hypermarkets or supermarkets; basket of local vegetables at bazaars was indexed at 1997

Source: McKinsey price survey; Interviews
### SUMMARY: IMPEDIMENTS TO MODERN FORMAT FOOD RETAILING IN POLAND AND RUSSIA

<table>
<thead>
<tr>
<th>Barrier to modern format development</th>
<th>Russia</th>
<th>Poland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macroeconomic</td>
<td>• Very high country risk</td>
<td>• Medium country risk</td>
</tr>
<tr>
<td></td>
<td>• Very high level of corruption</td>
<td>• Medium-low level of corruption</td>
</tr>
<tr>
<td></td>
<td>• Vague, constantly changing tax legislation</td>
<td>• Clear, stable tax legislation</td>
</tr>
<tr>
<td></td>
<td>• No middle class outside Moscow, St. Petersburg</td>
<td>• Substantial, growing middle class</td>
</tr>
<tr>
<td>Upstream industry development</td>
<td>• Weak domestic food processing sector</td>
<td>• Strong domestic food processing sector</td>
</tr>
<tr>
<td></td>
<td>• Only 40% of food can be sourced locally</td>
<td>• 80% of food can be sourced locally</td>
</tr>
<tr>
<td>Tax and regulation enforcement</td>
<td>• Uneven tax/tariff laws and enforcement leads to unfair competition from wholesale markets</td>
<td>• Taxes evenly enforced across formats</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Bazaars have very low level of imported food; tariff evasion is not an issue</td>
</tr>
<tr>
<td>Local government intervention</td>
<td>• Deep-rooted &quot;vested interests&quot; prevent development of modern formats</td>
<td>• Red tape less than in Russia, though still significant</td>
</tr>
<tr>
<td></td>
<td>• High level of red tape results in added expenses, increased corruption</td>
<td>• No widespread opposition from existing players</td>
</tr>
<tr>
<td>Cost of capital</td>
<td>• Local players have difficult time sourcing affordable financing</td>
<td>• Has not been an issue, as primary development led by MNCs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Medium cost of capital for domestic players</td>
</tr>
</tbody>
</table>

Poland has created a significantly more attractive environment for investors in food retailing than Russia.
General merchandise retailing

EXECUTIVE SUMMARY

Industry overview. The general merchandising industry employs 2% of the workforce and generates 2.5% of GDP in Russia. Between 1990 and 1997, general merchandising turnover dropped by 40% and the share of imports rose from 15% to 80%. The share of Soviet-era formats declined from 100% to 20%, they were replaced by new more convenient or cheaper formats, especially open-air wholesale markets, which captured 65% market share.

Productivity performance. The Russian labor productivity is at 26% of the US level. Soviet-era multi-product stores are at 10%, Soviet-era single-product stores at 24%, open-air wholesale markets at 27%, kiosks and pavilions at 28%, and the few modern chains (mostly in electronics) at less than 80% of the productivity level of their US equivalent.

The main reasons for the productivity gap on the operational level can be grouped into two. First, Russia lacks modern chains that are more productive than non-chains. The market share of modern chains is at 8% in Russia compared to 70% in the US. Nearly all the modern chains are consumer electronics chains. Second, open-air wholesale markets stands have low productivity because they are both sub-scale and undercapitalized. Finally, and much less importantly, Russian (consumer electronics) chains have lower productivity than their US counterparts because they do not use part-time workers to match demand fluctuations, and enjoy less economies of scale.

The most important external barriers to productivity and output growth are those that prevent the penetration of modern chains. Modern chains cannot gain share against the less productive open-air wholesale market stands, kiosks and pavilions because the latter benefit from lower tax liabilities, less control on the origin of their goods (which are often illegal imports or counterfeits), and cheaper access to prime locations. In addition, the high cost of capital deters domestic investors from financing capital-intensive hypermarkets or malls.

Policy implications and future outlook. If the main barriers are removed, modern chains should gain substantial market share. Foreign multinationals can overcome financing limitations and are thus attractive candidates for investment. Such multinationals invested only USD 0.1 billion in Russian retailing (both food and general merchandise) compared to USD 2.1 billion in Poland (with another USD 2.7 billion in the pipeline), where the playing field is much more level with serious law enforcement. As a result, Poland enjoys a 22% market share for chains, while bazaars (the equivalent of Russian wholesale markets) are in marked decline, with only 10% market share in 1999.
General merchandise retailing

This case study benchmarks the performance of the Russian general merchandise retailing industry against that of the US.

We will start with an overview of the industry, present productivity performance comparisons across countries, explain causes of differences in performance, and end with a future outlook for the industry.

INDUSTRY OVERVIEW

Industry definition

We have defined general merchandising as retailing of non-food products excluding cars, fuel, and pharmaceuticals (Exhibit 1). The industry represents a significant share of the economy in the US, generating 4% of GDP and accounting for 3.5% of employment. In Russia these numbers are much smaller, 2.5% and 2% respectively. This gap suggests a growth potential for both employment and output. In addition, general merchandise retailing accounts for as much as 30% of consumer expenditure in Russia versus 16% in the US. However, in absolute value terms, it is only 25% of the US level (Exhibit 2).

Scope of the study

Since no public data was available in Russia, we conducted a bottom-up survey focusing on the three largest product categories - namely clothing and footwear, consumer electronics, and personal care products, which together account for 80% of general merchandise consumption in Russia. (See Appendix 1 for the methodology of the survey.) For the US, we covered the whole general merchandising industry.

Format definitions

For the purpose of this study, the industry is segmented into five formats. The classification is based on customer value, but also incorporates age and physical characteristics of the formats.

Soviet-era formats
Multi-product stores: Independent stores selling several product categories, with none of them accounting for more than 80% of the total sales. They are located in fixed buildings and sell mainly over-the-counter. In over-the-counter stores, customers first choose the product at the product counter, then go to a separate cashier desk to pay for the good and receive a check, and finally present the check at the counter in exchange for the product. These stores, "univermagi", include large department stores (on average 1-2 per large city) as well as sub-scale (1,000 sq. m. selling space) stores located in residential districts.

Single-product stores: Independent stores with one product category contributing over 80% of the total sales. They are located in fixed buildings and sell mainly over-the-counter. Some post-Soviet single-product stores are also included in this category.

Post-Soviet formats

- Pavilions and kiosks: These use small, light structures and are mainly located in high traffic areas: at subway stations and busy streets. Kiosks (total space <10 sq. m.) sell goods through a window, so that the customer can not go inside. Pavilions are larger (20-100 sq. m.) and can be entered. We exclude Pavilions and kiosks that are located inside markets.

- Markets: Flea markets occupied by points of sale: containers, tables, tents and booths. Markets sell mainly clothing and footwear. The number of points of sale varies from 50 to 2,500 per market.

Modern formats

- Modern chains: Chained single-product stores - either standalones, tenants of malls, or concessions in large multi-product stores.

Industry and format mix evolution

General merchandise consumption is more income elastic than food consumption. Since 1990, general merchandising turnover has dropped by 40% (Exhibit 3). The liberalization of foreign trade in the beginning of the 90-s led to a rapid increase in imports of consumer goods. Between 1990 and 1997, the share of imports in general merchandise grew from 15% to 80%.

The format mix evolved rapidly as Soviet-era formats were replaced by new formats that offered superior customer value (Exhibit 4 and 5)

- Soviet-era stores were broken up and privatized as independent employee-owned stores. The market share of these Soviet-era stores declined from 100% in 1990 to 19% in 1998 as new formats replaced them.

- Markets dominate the industry with a 65% market share that reflects their advantage both in price and product range. The 13% price advantage over other formats in clothing, footwear and personal care
has been more than sufficient to attract customers despite poor service levels and product quality (Exhibit 6). However, the penetration of markets in consumer electronics has been relatively low.

¶ Pavilions and kiosks gained 8% market share primarily due to their convenient locations. The ease of set-up facilitated the growth of this small format in high-traffic areas where larger stores could not be built. Location is especially important for frequently purchased goods, such as personal care products, where pavilions and kiosks have 19% market share.

¶ Modern chains are typically owned by large-scale domestic wholesalers who have vertically integrated into retailing. Modern chains have gained significant market share (40%) only in consumer electronics. In other product categories, modern chains have less than 1% market share, making their overall market share 8%.

PRODUCTIVITY PERFORMANCE

Retail productivity definition

Labor productivity is defined as gross margin per hour worked. The official statistics in Russia do not provide format-specific data on gross margin and employment. Moreover, the accuracy of official data is questionable since a major part of the industry is within the shadow economy. Given these constraints, the McKinsey Global Institute has conducted three original surveys to calculate productivity (see methodology in Appendix 1).

Labor productivity, output and employment

Russian general merchandising productivity is 26% of the US level - which is 6 points lower than in Korea, and 3 points higher than in Russian food retailing. Output per capita is 18% of the US and hours worked per capita is 69% of the US (Exhibit 7).

Labor productivity by format

Modern chains in Russia, 90% of which are represented by consumer electronics chains, have the highest productivity at 101% of the US average (US consumer electronics chains are at 136% of the US average). Other formats have significantly lower productivity - markets 27%, pavilions and kiosks 28%, single-product stores 24% and multi-product stores 11% (Exhibit 8).

The high productivity of modern chains stems from economies of scale for all business functions (Exhibit 9).
REASONS FOR DIFFERENCES IN PRODUCTIVITY PERFORMANCE

The 74 point gap between the Russian and the US general merchandising productivity can be disaggregated into two components (Exhibit 10). First, the unfavorable format mix, where Russia has fewer chains compared to the US, is responsible for more than half the gap. Second, format-to-format differences in productivity account for the remaining gap.

Format mix gap

If Russia had the same format mix as the US, its productivity would be 45 points higher, taking it to 71% of US level. The most productive format, modern chains, currently have only 8% market share in Russia compared to 70% in the US and 20% in Poland and Korea. Given that in Poland modern chains have emerged from a similar economic background, one would expected a higher level of penetration in Russia. This has not happened.

What are the difficulties impeding the growth of specialized chains and malls in Russia? They are, in their order of importance: uneven enforcement of taxes, tariffs and counterfeits; the high cost of capital and country risk; and red tape in regulations, permits and land (Exhibit 11).

Sector-specific barriers

Compared to other formats, markets underpay taxes. In addition, they sell more counterfeit and smuggled products. Combined, this gives markets an 11 point cost advantage over modern chains, thereby limiting their entry (Exhibit 12), and reducing competitive intensity. With equal enforcement, the price gap between markets and modern chains would narrow to the 2 points that would be left due to higher operating expenses of stores. This price gap would not be enough for markets to compensate for their lower levels of service and thus customers would switch to modern chains.

There are three types of uneven laws and enforcement:

- **Differential tax laws and enforcement** gives markets a 5 point cost advantage over modern chains and consists of two components:
  - First, the taxes for markets and stores are different. Local governments do not apply value-added, sales, and other taxes to markets. Instead, they collect an implied income tax or a flat license fee, which are lower than taxes paid by modern chains.
  - Second, market operators evade taxes. The lower level of tax compliance than in stores is explained by lower risks, as they have no fixed assets to lose as a penalty. There is also widespread reporting of bribery to tax officials.

- **Differential import tariff enforcement** accounts for 3 points of the cost advantage for markets. The effect of tariff evasion is largest in personal
care products. Multinational fast-moving consumer goods firms not only control custom clearance themselves, but also monitor retail trade. As a result, there is a price gap between modern chains that sell legally imported products, and markets that also sell smuggled ones. In other product categories, the share of legal imports is too small to affect the price difference between stores and markets.

**Differential anti-counterfeit law enforcement** gives markets the remaining 3 points of cost advantage. The level of counterfeits depends on the difficulty of manufacturing them and the brand premium. Therefore, counterfeits do not exist in consumer electronics - where counterfeits are too difficult to manufacture - and play the biggest role in personal care products where they are easy to manufacture and enjoy a large brand premium.

**Macroeconomic barriers: country risk / high cost of capital**

High cost of capital and country risk impede investments into new modern chains. Real interest in dollar-terms for domestic investors is around 30% compared to 7% in the US. Also, Russia has one of the highest country risk ratings which deters foreign investors. The impact of the high cost of capital and country risk depends on the type and the size of investments.

**Existing buildings** can accommodate stores with a selling space of up to 1,000 sq. m. which represent only 10% of the US modern stores’ sales. The investment to refurbish existing buildings (up to USD 100,000) or to purchase them (up to USD 200,000) is small. Even domestic retailers can use internal sources of financing.

**New buildings** with selling spaces from 3,000 to 50,000 sq. m. are required for large scale stores which represent 90% of the US modern stores’ sales. Building a large discount store or a hypermarket costs up to USD 30 million and a mall up to USD 350 million. The cost of capital would deter domestic investors from investment into such large scale projects. Also, foreign investors have expressed strong concerns about negative stock market reactions to large exposures in a market with high country risk.

Since malls and discount stores in the US represent 90% of modern chains, the importance of the cost of capital is high.

**Sector-specific barriers: red tape and regulatory harassment**

Red tape and regulatory harassment in permits, land and non-transparent processes raise uncertainties and foster corruption. Red tape affects retailers not only when they open stores, but also as they operate. According to some real estate companies, the cost of building large scale stores could double because of bribes. Furthermore, a relationship between officials and retailers built on bribes can create vested interests that block new entry.

Contrary to the popular belief, the low income of the Russian population is not a barrier for labor productivity growth in retail. As soon as uneven government enforcement is removed, specialty chains and discount stores will gradually
become the leading format due to higher customer value: similar prices as markets but with much higher service levels.

**Format-to-format gap**

Even with the same format mix, Russian general merchandising productivity would still be 29 points below the US level. Focusing on modern chains, the following gaps in performance have been identified *(Exhibit 13)*.

*Production process level*

In inefficient organization of functions and tasks, in addition to low scale, explain the gap with the US at the production process level.

- **Inefficient organization of functions and tasks.** Russian general merchandising chains use almost no part-time workers whereas US chains use them extensively to match fluctuations in demand. Excess workers in the non-peak periods reduce overall Russian productivity. In addition, Russian chains need more accountants and security staff compared to those in the US.

- **Low scale.** Average number of stores per chain is less than 15 in Russia compared to more than 1,000 in the US. The share of fixed labor in Russian chains is currently 20% and can go down substantially as the number of stores increase. Furthermore, scale provides chains with economies particularly in purchasing but also in other functions such as distribution and advertising.

*Industry dynamics*

Chains constitute 40% of Russian consumer electronic retailing compared to over 75% in the US. In addition, Russian chains are not competing with best practice chains. The lower overall chain penetration, coupled with a lack of exposure to best practice operators, results in less competitive intensity. In the absence of high competitive pressures, managers are not forced to use part-timers or to push for higher scale.

*External factors*

The high cost of capital limits large chain entry since consumer electronics retailing requires large amounts of working capital and advertising. The prevalence of tariff evasion deters the entry of foreign chains that cannot afford to risk their corporate image by evading, but cannot compete otherwise. The complex tax and accounting rules are responsible for the large number of accountants required, and high crime rate is responsible for additional security staff.

A summary of the causality analysis – combining format mix and format-to-format causalities – is provided in *Exhibit 14*. 
FUTURE OUTLOOK AND POLICY IMPLICATIONS

Russia already has a high share of modern chains in consumer electronics. What it lacks in comparison to other countries, such as Brazil and Poland, are modern chains in other product categories, especially hypermarkets, that are growing fast in both countries.

Hypermarket development tends to be financed through foreign direct investment (FDI). Poland attracted USD 2.1 billion of FDI in retail (including food) in 1991-1997 with further investment commitments of USD 2.7 billion in the pipeline. Russia attracted only USD 0.1 billion in the same period. However, the interest of multinationals in Russia is high. Several multinationals interviewed in this study expressed a very strong interest in investment - if the government would remove the barriers.

The most important step for the government is to level taxes and tariffs across formats. This will significantly reduce the cost advantage enjoyed by markets, thereby creating a favorable environment for investment into modern chains. The format mix will evolve in favor of productive chains, thus improving the average productivity.
Appendix 1: Sources and methodology

Market share by format

The consumer survey was conducted with the help of the leading Russian public opinion research agency WCIOM. A random sample of 1,600 people from 84 settlements, representative of the population of Russia was used. The respondents were selected randomly within several strata, taking into account the sex and age of respondents as well as size of settlements and regional coverage.

Respondents were personally interviewed about distribution of their expenditures on each of three product categories studied (clothing and footwear, consumer electronics, and personal care products) across different formats as per MGI definitions. They were also asked about the share of expenditures made outside their home towns. The format mix was thus obtained (Exhibit 6). The share of modern chains was estimated based on industry expert interviews since survey respondents would not be able to distinguish chains from non-chains.

Productivity by format

The retail survey was conducted with the help of the leading international market research agency AC Nielsen. On the basis of the format mix obtained from the consumer survey, a sample of 60 retail outlets in Moscow, Samara and Alexandrov was constructed. These settlements were chosen as representative of various settlement size bands where differences in productivity were expected. The managers of the outlets were personally interviewed on gross margin and hours worked to derive labor productivity. Market operators were not covered in the retail survey because of their extreme unwillingness to disclose any information. This problem was overcome by conducting a third survey: census of points of sales by product category at markets in Vladimir, Voronezh and Samara. Although these settlements vary both in terms of population (0.3, 0.9, 1.2 mln. people) and income per capita (40%, 60%, indexed to Samara = 100% respectively), they have the same number of markets’ points of sale per capita in clothing and footwear. The number of employees in markets was estimated by applying this number to the whole Russian population. The gross margin rate of general merchandising at markets was taken from the Central Bank of Russian Federation and cross checked with several industry experts who agreed to share the information. Thus, labor productivity in markets was calculated.

Overall productivity

In order to obtain country average productivity, the number of employees in each format was derived by dividing consumer expenditures (source: consumer
survey, Goskomstat) by the sales per employee ratio (source: retail survey, market census).

Value-added was converted into USD at the product-specific PPPs (source: World Bank). These PPPs were double-deflated for different input prices in the US and Russia across formats and products.
Appendix 2: Differences in productivity across product categories

Success of modern chains in consumer electronics is explained by the combined effect of: tariffs and counterfeit enforcement; nature of demand; and building-type. These factors differentiate consumer electronics from the other product categories in the following ways:

¶ Tariff enforcement is equal for all imported consumer electronics. The same level of tariff evasion exists for chains and non-chains.

¶ Counterfeits are not feasible in consumer electronics where manufacturing is too complex.

¶ The importance of product quality and service levels (including warrantee and after-sale service) is much higher for expensive consumer electronics compared to other product categories. Therefore, the markets’ price advantage becomes somewhat less important.

¶ Since the product range requirement in consumer electronics retailing is lower than in clothing, a large selling space is less important. This allows consumer electronics chains to operate in existing buildings, whereas clothing needs malls, discount stores and hypermarkets which require new constructions. This makes chain formation in consumer electronics cheaper and easier.
GENERAL MERCHANDISE RETAILING BREAKDOWN
Percent

<table>
<thead>
<tr>
<th>Category</th>
<th>US 1997</th>
<th>Poland 1997</th>
<th>Russia 1997</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other products</td>
<td>7</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Household goods</td>
<td>33</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>Personal care</td>
<td>9</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>Consumer electronics</td>
<td>16</td>
<td>22</td>
<td>58</td>
</tr>
<tr>
<td>Clothing, footwear</td>
<td>35</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td><strong>100% (PPP USD per capita)</strong></td>
<td>3,373</td>
<td>609</td>
<td>617</td>
</tr>
</tbody>
</table>

Source: Goskomstat; National statistics; OECD

CONSUMER EXPENDITURES PER CAPITA - 1997
Indexed to US = 100 in 1992

<table>
<thead>
<tr>
<th>Category</th>
<th>US 1997</th>
<th>Poland 1997</th>
<th>Russia 1997</th>
</tr>
</thead>
<tbody>
<tr>
<td>Services and other products</td>
<td>66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food</td>
<td>16</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td>General merchandise</td>
<td>18</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td><strong>GDP per capita</strong></td>
<td>100</td>
<td>23</td>
<td>18</td>
</tr>
</tbody>
</table>

Source: National Statistics; OECD
GENERAL MERCHANDISE CONSUMPTION EVOLUTION: 1990-97
Indexed to private consumption for the US = 100 in 1997

Source: Goskomstat; PlanEcon

FORMAT EVOLUTION: 1990-98
Percent of turnover

Source: Goskomstat; McKinsey consumer survey
COMPETITIVE ADVANTAGE OF NEW FORMATS

<table>
<thead>
<tr>
<th>Relative price estimate</th>
<th>Product quality</th>
<th>Location</th>
<th>Services</th>
<th>Variety</th>
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<tbody>
<tr>
<td>Modern stores = 100</td>
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<tr>
<td>Multi-product stores</td>
<td>112</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Single product stores</td>
<td>111</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Pavilions and kiosks</td>
<td>112</td>
<td>Low/medium</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Markets</td>
<td>87</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Modern stores</td>
<td>100</td>
<td>Medium/high</td>
<td>Medium</td>
<td>High</td>
</tr>
</tbody>
</table>

Source: McKinsey analysis

HOUSEHOLD SPENDING BY FORMAT AND PRODUCT - 1998
Percent; n=1,600

<table>
<thead>
<tr>
<th>Multi-product stores</th>
<th>Single product stores</th>
<th>Pavilions and kiosks</th>
<th>Markets</th>
<th>Modern stores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clothing, footwear</td>
<td>Consumer electronics</td>
<td>Personal care products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>18*</td>
<td>14</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>9</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>22</td>
<td>19</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>75</td>
<td>19</td>
<td>58</td>
<td>65</td>
<td></td>
</tr>
</tbody>
</table>

*Can partly be sales by concessions of retail chains
** Weighted by sales turnover by product category

Source: McKinsey consumer survey

Exhibit 5

Exhibit 6
LABOR PRODUCTIVITY/OUTPUT/HOURS WORKED
Indexed to US = 100 in 1992

Source: National statistics, McKinsey analysis
### LABOR PRODUCTIVITY BY FORMAT - 1998
Indexed to US = 100 in 1992

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Multi-product stores</td>
<td>N/A</td>
<td>97</td>
<td>59</td>
</tr>
<tr>
<td>Single-product stores</td>
<td>24</td>
<td>24</td>
<td>35*</td>
</tr>
<tr>
<td>Pavilions and kiosks</td>
<td>28</td>
<td>26</td>
<td>25*</td>
</tr>
<tr>
<td>Markets</td>
<td>27</td>
<td>24</td>
<td>N/A</td>
</tr>
<tr>
<td>Modern chains</td>
<td>101</td>
<td>78</td>
<td>124 (136**)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>43***</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
<td>23</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>32</td>
</tr>
</tbody>
</table>

*Mom-and-pops
** Consumer electronics
*** "Specialty stores" but may include non-chains

Source: MGI Korea study; McKinsey analysis

### CHAINED VS. INDEPENDENT STORES BUSINESS SYSTEM

#### Most important

- **Merchandising**
  - Scale affords easier access to
    - Sophisticated planning systems
    - Experiments and trials

- **Logistics/purchasing**
  - Better buying terms and cheaper trade finance
  - Cheaper third party services
  - Efficient use of in-house systems

- **Customer management**
  - Media advertising
  - Loyalty cards

- **Store portfolio management**
  - Prime locations for stores
  - Wider pool of management

Exhibit 8

Exhibit 9
PRODUCTIVITY DIFFERENCE: RUSSIA VS. US
Indexed to US = 100 in 1992

CAUSALITY FOR PRODUCTIVITY DIFFERENCES: FORMAT MIX
Weighted average across product categories; Russia vs. US

External factors
- Macroeconomic barriers
  - Drop in demand/labor cost/labor income
  - Country risk/high capital cost (political instability/budget deficit)
- Labor barriers
  - Mobility restrictions
  - Inadequate education
- Capital barriers
  - Government ownership
  - Problems with minority shareholders’ rights
- Sector specific barriers (non-level playing field)
  - Non-level taxes
  - Non-equal allocation of government procurement and land
  - Threat of red tape/harassment
  - Non-level energy payments
  - Others (property rights, barriers to trade/BDI)
- Related industry barriers
  - Upstream/downstream sectors
  - Poor infrastructure
- Other barriers (climate, geology, etc.)

Industry dynamics
- Pressure from global best practice
- Domestic competitive intensity
- Non-level playing field

Production process
- Low capacity utilization
- Inefficient organization
  - Organization of functions and tasks
  - Marketing/product mix
  - Supplier relations
  - Blue collar trainability
- Lower capital intensity/technology
  - Obsolete assets (subscale/outdated technology)
  - Lack of viable investment in non-obsolete assets (upgrades/green fields)
  - Non-viable investment due to factor costs (labor, capital, and energy)

Legend:
- Very important
- Important
- Secondary

- Less investment opportunities for large stores
- Non-level laws and enforcement
- Excessive regulations
- No global best practice
- Markets enjoy non-level cost advantage
- Subscale markets and stores
- Lack of chains
- Investments into large-scale malls not viable
MARKETS VS. MODERN STORES COST COMPARISONS: GENERAL MERCHANDISE
Indexed to modern stores = 100

<table>
<thead>
<tr>
<th>Markets</th>
<th>Markets with full compliance</th>
<th>Modern stores</th>
</tr>
</thead>
<tbody>
<tr>
<td>COGS</td>
<td>76</td>
<td>82</td>
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<tr>
<td>Operating expenses</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Taxes</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Profit</td>
<td>87</td>
<td>98</td>
</tr>
</tbody>
</table>

Source: Interviews; McKinsey analysis
**CAUSALITY FOR PRODUCTIVITY DIFFERENCES: FORMAT-TO-FORMAT**

Consumer electronics: Russia vs. US

<table>
<thead>
<tr>
<th>External factors</th>
<th>Industry dynamics</th>
<th>Production process</th>
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</thead>
<tbody>
<tr>
<td>• Macroeconomic barriers</td>
<td>• Pressure from global best practice</td>
<td>• Low capacity utilization</td>
</tr>
<tr>
<td>– Drop in demand/low labor cost/low income</td>
<td>• Domestic competitive intensity</td>
<td>• Inefficient organization</td>
</tr>
<tr>
<td>– Country risk/high capital cost (political instability/budget deficit)</td>
<td>• Non-level playing field</td>
<td>– Organization of functions and tasks</td>
</tr>
<tr>
<td>• Labor barriers</td>
<td></td>
<td>– Marketing/product mix</td>
</tr>
<tr>
<td>– Downward wage flexibility (mobility restrictions)</td>
<td></td>
<td>– Supplier relations</td>
</tr>
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<td>– Blue collar trainability</td>
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<td>– Lack of viable investment in non-obsolete assets (upgrades/green fields)</td>
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<tr>
<td>• Sector specific barriers (non-level playing field)</td>
<td></td>
<td>– Non-viable investment due to factor costs (labor, capital, and energy)</td>
</tr>
<tr>
<td>– Non-level taxes</td>
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</table>
CASUALTY FOR PRODUCTIVITY DIFFERENCES: GENERAL MERCHANDISE RETAILING
Russia vs. US

<table>
<thead>
<tr>
<th>External factors</th>
<th>Industry overall</th>
<th>Format mix gap</th>
<th>Format-to-format gap</th>
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<td>– Drop in demand/low labor cost/low income</td>
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<td><strong>Sector specific barriers (non-level playing field)</strong></td>
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<tr>
<td>– Non-level energy payments</td>
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</tr>
<tr>
<td>– Others (property rights, barriers to trade/FDI)</td>
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<tr>
<td><strong>Related industry barriers</strong></td>
<td></td>
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<tr>
<td>– Upstream/downstream sectors</td>
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<td></td>
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<tr>
<td>– Poor infrastructure</td>
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<tr>
<td><strong>Other barriers (climate, geology, etc.)</strong></td>
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<table>
<thead>
<tr>
<th>Industry dynamics</th>
<th>Industry overall</th>
<th>Format mix gap</th>
<th>Format-to-format gap</th>
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<tr>
<td><strong>Pressure from global best practice</strong></td>
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<tr>
<td><strong>Domestic competitive intensity</strong></td>
<td></td>
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<tr>
<td><strong>Non-level playing field</strong></td>
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<table>
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<tr>
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<tr>
<td><strong>Low capacity utilization</strong></td>
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</tr>
<tr>
<td><strong>Inefficient organization</strong></td>
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<td></td>
</tr>
<tr>
<td>– Organization of functions and tasks</td>
<td></td>
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<tr>
<td>– Marketing/product mix</td>
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<td></td>
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<tr>
<td>– Supplier relations</td>
<td></td>
<td></td>
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<tr>
<td>– Blue collar trainability</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Lower capital intensity/technology</strong></td>
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<tr>
<td>– Obsolete assets (subscale/outdated technology)</td>
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<td>– Lack of viable investment in non-obsolete assets (upgrades/green fields)</td>
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<tr>
<td>– Non-viable investment due to factor costs (labor, capital, and energy)</td>
<td></td>
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</table>

Productivity (Indexed to US = 100)

Exhibit 14
Hotels

EXECUTIVE SUMMARY

**Industry overview.** Approximately 100,000 people are employed in ca. 5,000 hotels located in Russia. Unlike most Russian sectors that have been privatized, over 80% of hotels remain in the hands of municipal, regional or federal government. Recently 4 and 5-star hotel foreign chain operators have entered the high-end segment of the market; they currently account for 15% of turnover.

**Productivity performance.** Russian labor productivity in the hotel sector (for lodging only, excluding food and beverage) is at 18% of the US level. Russian chains (exclusively the 4 and 5-star hotels) are at 60% of the productivity of US chains while Russian non-chains are at 19% of the productivity of US non-chains.

The main reasons for the productivity gap at the operational level can be separated into three groups. First, comparing Russian non-chains to US non-chains, Russian hotels are less utilized, do not implement multi-tasking of personnel, have lower value-added rooms, and are more sub-scale. Second, comparing Russian chains (managed by Western operators) to US chains, Russian hotels are penalized by the need to train their personnel (e.g. cleaning ladies). Third, Russia lacks chains, which are more productive than non-chains (e.g. central booking leading to higher utilization); chains account for only 15% of turnover in Russia compared to 40% in Poland and 70% in the US.

The most important external barriers to productivity and output growth are also separated into three groups. For non-chains, government ownership stifles managerial incentives for improving efficiencies. Also, the collapse in demand has reduced capacity utilization, while low income has limited the demand for higher value added rooms. For chains, lack of multi-tasking should be resolved over time as a skilled labor pool is developed. Lastly, for chain penetration, collapse in demand, high cost of capital and country risk, underdeveloped tourist attractions, high construction costs, and red tape/corruption involved in land allocation have been the main barriers.

**Policy implications and future outlook.** If the main barriers are removed, the Russian hotel industry could achieve productivity of up to 60 to 65% of US levels. International experience shows that demand for hotels increases rapidly as income per capita grows. Removing the barriers is likely to increase investment in new hotels, especially in chains. Besides the improvements in the format mix, this higher chain penetration will also foster productivity in non-chains by increasing the industry’s competitive intensity.
Hotels

The purpose of this case is to derive policy implications for improving the hotel sector performance in Russia. To do this, we first analyze Russia’s productivity gap relative to the US. Then we seek to understand the main barriers to productivity improvements and productive investments as a key to output and employment growth in the sector. Based on this, we draw conclusions on the actions needed to improve the sector’s economic performance in the future.

We will start with an overview of the industry, then present productivity performance comparisons across countries, explain causes of differences in performance, and end with a future outlook for the sector.

INDUSTRY OVERVIEW

Importance of the sector

We have selected the hotel industry as an example of the service sector. The primary importance of the sector stems from its potential for employment growth. With less than 100,000 workers, employment per capita in the Russian hotel industry stands at 27% of the US levels (Exhibit 1). As a result, in spite of its potential for productivity improvements, this sector is likely to play an important role in the absorption of the labor force from other restructuring sectors.

Unlike most Russian sectors that have been privatized, a large proportion of hotels still remain in the hands of local and Federal government (which has resulted in the stifling of competition as discussed below).

Industry definition

For the purpose of this study, the scope of the hotel industry includes accommodation services only, following the Russian industry definition. Therefore, restaurant and food services, which account for 45% of total industry revenues in the US, are also excluded in the comparison countries. (Exhibit 2).

As of 1997, around 100,000 people are employed in the Russian industry across more than 5,000 hotels.
**Industry evolution**

Between 1990 and 1997, the occupancy rate plummeted by more than a half.

During the same period, the market share of international chain operators increased from almost zero in 1990 to around 15% by 1997. These hotels are almost entirely concentrated in the Moscow and St. Petersburg and are usually managed by international operators and owned by joint ventures between private investors and local governments.

Currently, occupied rooms per capita in Russia are around 5% of US levels, almost 50% lower than in 1990.

**PRODUCTIVITY PERFORMANCE**

We calculate labor productivity in hotels as value added per hour worked. For calculating value added, we used the following definition: sales minus cost of goods and services purchased. Value added was converted using a hotels Purchasing Power Parity (PPP) for cross-country comparisons.

Value added figures were obtained from official statistics (Goskomstat) and were cross checked using physical estimates from interviews with more that 40 industry players and experts in 5 different regions (Exhibit 3).

Due to shortcomings of the PPPs published by Goskomstat, we needed to construct our own hotel PPP. To do this we compared prices of hotels in various market segments in Russia and the US, controlling for quality-levels, service range, and location. In principle, as long as the services are in the same market, we would only need the PPP for one service and we could then use the market relative prices to reflect the relative valuation for the rest of the service ranges. However, this methodology could not be applied in the case of hotels in Russia because there are two separate market segments in which different players and consumers interact (ex-soviets and new high-end hotels). The official Goskomstat PPP does not count both these markets.

**Overall hotels productivity**

Russian labor productivity in hotels is at 18% of the US. Around a fourth of the number of hours per capita are employed in the sector to produce only a twentieth of the US output (Exhibit 4).

We estimate productivity in 1990 to have been around 33% of the US level in 1997 -using trends in physical production (number of occupied rooms) and adjusting for differences in quality and services provided (room size and quality, room services, booking system and check-in procedures). Hours worked have decreased by almost 20% since 1990, but the output reduction has been more than 50% (Exhibit 5). The 20% decrease in hours worked reflects more use of part time workers and longer leave periods in low demand seasons.
Hotels productivity by format

Due to the productivity benefits from belonging to a chain, we have divided the hotels industry into two segments: “Chains” and “Non-chains”. Chains (a group of 6 or more hotels) are about 50% more productive than non-chains because they use standardized work procedures and enjoy economies of scale in branding, purchasing and staff development (through a wider range of career opportunities for their staff).

In Russia, chain hotels achieve productivity of 75% of the US average. Their share of total industry revenues is 15%, using 4% of total employment in the sector.

The productivity of non-chains is 16% of the US average. Non-chains’ share of total industry revenues is 85%, using 96% of total employment (Exhibit 6).

The 15% chain penetration in Russia is considerably lower than in the US, where chains account for 70% of revenues and 40% of industry employment (1996). In Poland, chains account for around 40% of industry revenues (Exhibit 7).

REASONS FOR DIFFERENCES IN PRODUCTIVITY PERFORMANCE

We first discuss the productivity gap at the production process level, and then explain industry dynamics and external factors that drive firms to operate in the way they do. To facilitate the discussion, we decompose the productivity gap into two components: the format-to-format gap; and the format mix gap. The format-to-format gap refers to productivity gaps within the same format – i.e. Russian non-chains versus the US non-chains, and Russian chains versus US chains. The format mix gap refers to productivity differences caused by lower chain penetration vis-à-vis the US (Exhibit 8).

A summary of causality factors for each component is provided in Exhibit 9.

Gap within each format

The productivity of Russian non-chain hotels is at 19% of US non-chains, while the productivity of chains is at 60% of US chains.

If Russian chains and non-chains were to improve their performance to US levels, the overall Russian productivity would increase from the current 18% to 81% of the US average. Of the 63 point improvement, 52 points are due to higher productivity within non-chains, while 11 are due to higher productivity within chains.

Non-chains (Exhibit 10):

¶ Production process. The inefficient organization of functions and tasks, low capacity utilization, lower quality service, and obsolete assets explain the productivity gap with the US.
• **Low capacity utilization.** The sharp drop in capacity utilization since the Soviet period accounts for 25 points of the productivity gap within non-chains. In Soviet times, occupancy rates were kept high at 74% with state companies and ministries providing hotel rooms to workers and their families at subsidized prices. Following price liberalization, higher market prices and lower disposable income drastically reduced workers’ demand for hotels leading to lower occupancy rates which fell to 29% (Exhibit 11). The lower utilization rate for non-chains resulted in a labor productivity penalty due to the fixed portion of workers (management, maintenance, and floor ladies). A large share of variable workers (e.g. room-cleaners) also remained employed in most hotels, exacerbating the productivity penalty. These “excess workers” are employees who could be laid off “Monday morning” without changing the existing work configuration.

• **Inefficient organization of functions and tasks.** Eighteen points of the productivity gap within non-chains are due to inefficient work configuration. Attendants (“dezhurnayas”) on each floor attend to keys and security, as opposed to centralizing the functions at the reception desk. These attendants, a legacy of the past Soviet control system, are clearly underutilized and require only a small fraction of their time to fulfill the assigned duties. In addition, bed-cleaning activities are also over-manned due to the lack of multi-tasking. For example, cleaning ladies are typically pre-assigned to specific floors regardless of the occupancy rates.

• **Marketing/Lower service quality.** Rooms in Russian non-chains are on average half the size of US non-chained rooms. Larger and better quality rooms would yield higher productivity by increasing the industry’s value added for a given level of labor. Moreover, the quality of Russian non-chain hotels is also lower due to a lack of maintenance and refurbishment.

• **Obsolete assets (subscale/outdated technology).** Fifteen to twenty-five percent of Russian non-chained rooms are in hotels which are below the minimum-efficient-scale (hotels with less than 20 rooms). Lower economies of scale in functions such as purchasing, accounting, security, and reception imposes a 9 point productivity penalty. These hotels tend to be concentrated in rural regions and train stations. In some cases, they can also be the result of a partial conversion of larger hotels into office space.

¶ **Industry dynamics.** The Russian hotel sector suffers from little exposure to best-practice (i.e. less chain penetration), as well as low domestic competitive intensity due to widespread government ownership and (some) tax arrears. Non-chain hotels in the US were driven out by the emergence of chains in all market segments. The absence of medium and low-end chains in Russia (e.g. Motel 6, Ibis, Formula 1) shields ex-Soviet hotels from the most productive format.
Low domestic competitive intensity is due to the widespread government ownership which decreases incentives of hotels managers to improve operations and profits. In addition, tax arrears and non-payments from cash-constrained hotels also distort competitive intensity by allowing less productive players to survive.

**External factors.** Besides the external factors affecting chain penetration (see the section below on format-mix causality), the government ownership, drop in demand, low income and non-level taxes are the barriers that explain the productivity gap within non-chains.

- **Government ownership.** In Russia, 47% of hotels are fully owned by the Local or Federal government (Exhibit 12). An additional 36% are jointly owed by the Local/Federal government and private enterprises (mostly in heavy industries). Compared to the profit-based management contracts common in the US, existing government contracts give managers of non-chain hotels lower incentives to eliminate excess workers and improve organization of functions and tasks. Moreover, some of these hotels are managed directly by government employees and are typically required to keep rooms available for official (non-profitable) use.

- **Drop in demand/low income.** The collapse in demand in the post-Soviet period has reduced capacity utilization in non-chains to 29% compared to around 70% in the US. As opposed to chains, which target mainly foreign business visitors, lower quality non-chains have suffered from the sharp drop in domestic consumption and the end of Soviet subsidies in the sector. This trend has been aggravated by the recent increase in Russians traveling abroad. The only reason most hotels are still operating with such dismally low capacity utilization is because of the low variable operating costs (especially for low-end hotels). Similarly, lower income levels of Russian consumers also limit their demand for larger and higher quality rooms which are common in US non-chains.

- **Non-level taxes.** Weaker tax enforcement and arrears also allow sub-scale hotels to stay in business. Cash-drained hotels are usually able to delay tax payments or make barter payments when they are cash constrained. Moreover, government ownership also affects directly tax payments for “official” hotels serving government guests.

**Chains**

Russian chain productivity is at 60% of US chains (75% of US hotels’ average). The causes of this gap are as follows (Exhibit 13):

- **Production process level.** The inefficient organization of functions and tasks explains the productivity gap with the US. On average, Russian chain hotels use 65% more labor inputs per unit of value added compared to their US counterparts. The additional workers are
concentrated in room-cleaning (52%), accounting (7%), and security operations (6%).

¶ **Industry dynamics.** Almost all major international chains are present in Russia (e.g. Marriott, Forte, Sheraton, Kempinsky) although they are concentrated in the 4-5 star segment in Moscow and St. Petersburg. They compete on price and service – especially after the 1998 crisis which reduced the overall demand and thus capacity utilization.

¶ **External factors.** A lack of a skilled labor pool (due to legacy) is the cause of the inefficient organization of functions and tasks. In the US, chains can adjust for seasonal labor requirements by drawing from an existing pool of trained workers. In countries like Russia where such a pool is not available, it takes a long time to fully train an inexperienced worker. For example, skilled/trained workers can clean 60% more rooms per day compared to non-skilled workers under training (55 as opposed to 35 rooms per day). To a lesser extent, more complex tax/accounting rules and higher safety concerns also contribute to the increase in labor requirements.

**Format mix**

The share of chains in Russia is only 15% compared to 70% in the US, 30% in the UK, and 40% in Poland. Considering that Poland had a similar starting point as Russia in 1990, this figure is obviously low. Why are there so few chains? There are four main barriers, by order of importance the are: 1) high country risk and cost of capital; 2) the drop in demand; 3) underdeveloped tourist attractions and high construction costs; and less importantly 4) threat of red tape/harassment.

¶ **Country risk and high cost of capital.** Chain operators would not manage Russian hotels without at least refurbishing them since standardized structure and image are prerequisites for reaping their 50% productivity advantage. Higher cost of capital, resulting from increased political and economic instability, deter domestic investors from committing the USD 13-30 million dollars required to refurbish or build a hotel. Similar considerations apply to foreign investors, for whom higher instability translates into higher country risk thereby limiting their investment, especially in long-term projects tied to highly fixed assets such as hotels (Exhibit 14). For example, a European international chain has failed to find investors willing take on the country risk in financing the refurbishment of several hotels in the 3-4 star segment.

¶ **Drop in demand.** The 40% drop of income per capita following the end of the Soviet Union severely reduced the flow of domestic business and leisure visitors in Russia. Most domestic consumers can no longer afford to vacation as they used to with the subsidies of the Soviet system, thereby restraining entry potential for medium and low end chain hotels. Moreover, salesmen, who are one of the main targets of low-end chains in Western countries, are less common in Russia.
than in other countries with similar income (e.g. South Africa). This is the result of continued economic stagnation as well as legacy from the limited role of the sales function under the Soviet economic system.

¶ **Upstream/downstream sectors.** In addition to the drop in disposable income, underdevelopment of the Russian tourism industry further restricts demand for hotel services. As a result, the number of leisure visitors per capita is at 18% of the US levels (Exhibit 15). First, cumbersome and expensive visa procedures deter leisure foreign visitors, especially for impulse (weekend) trips. A visa is required for nationals of most countries (including European countries and the US) with issuing time of around a week unless heavy “express” fees are paid (e.g. USD 150 in London). Moreover, according to the latest regulations, issue of tourist visas also requires hotel pre-payment. This reduces flexibility and discourages “adventure” travelers. Second, the low maintenance of existing attractions and the lack of development of new ones further decrease domestic and foreign tourism. The main Russian tourist attractions are often old and in disrepair and attract less visitors than the top sites in the US or in other European countries (Exhibit 16).

Finally, high construction costs, mainly due to façade-maintenance requirements and high import tariffs, increase investment requirements in the sector (Exhibit 17). In order to refurbish a hotel in Russia, more than 60% of the materials and equipment need to be imported. High tariffs increase the cost of materials to 40% above the US level. Moreover, in most cases, requirements to maintain the façade are imposed on refurbishment projects further increasing construction costs by an additional 25%.

¶ **Threat of red tape and corruption.** Although existing chain operators have employed local government representatives to alleviate corruption and red tape in the allocation of new land, these factors may still deter new entrants. Red tape and corruption stem mainly from the government’s conflict of interest, being both an owner of many hotels and a regulator of (competing) new entry. They also stem from the sunk nature of the investment which together with the large amounts of cash generated by hotel operations provide fertile grounds for corrupt officials and organized crime groups to extract additional surplus. Examples include criminal attacks on managers of international chains in Moscow and arrears in loan repayment for the refurbishment of hotels in St. Petersburg. It should be noted that there are wide regional variations in the level of red tape observed. Investor-friendly regions such as Novgorod have managed to attract investors to built a chain hotel while investment projects in larger regions such as Nizhny Novgorod and Krasnodar have been repeatedly delayed by local officials.
POLICY IMPLICATIONS AND FUTURE OUTLOOK

As the case has shown, the key to improving Russian hotel productivity lies in improving the current Russian non-chain hotels, which are responsible for 52 points out of the 82 point overall gap.

Given current conditions, if no economic reforms are undertaken in Russia, little of this will happen. At most, some western chains will increase their presence in the Russian market, mainly in response to the existing (unsatisfied) demand in the 3-4 star segment. Some international operators in this segment are currently looking for investors to finance the required refurbishment/green field projects. As a result, in 10 years chains could account for up to 20-25% of the market (from the current 15%). Under this scenario, productivity in the sector would increase up to 20-25% of US levels (in ten years) with output per capita around 6-8% of US levels.

Alternatively, if the productivity of the Russian hotel industry is to improve beyond 20-25% of US levels, a major restructuring accompanied by economic growth needs to take place. Given these reforms, we estimate that current Russian non-chain hotels can reach around 50% of the US average productivity (in ten years).

As international experience has shown us, demand for hotels increases with economic growth (Exhibit 18). In particular, after privatization of the hotel stock and implementation of market liberalization reforms, the number of rooms in Poland has increased by roughly 50% as a result of the entry of new hotels, especially chains. Higher chain penetration improves industry productivity in two ways. First, by increasing the market share for chains it improves the format mix. Second, larger penetration of chains also increases competitive intensity for non-chain hotels. Under higher competitive pressure, non-chains are more likely to improve operations and reduce inefficiencies.

Based on this experience, the Russian hotel industry could expect to increase its productivity up to 60-65% of the US level in ten years – given format-to-format and format-mix improvements. In non-chains, improved productivity would be the result of higher occupancy rates (up to 55-60%) and improved organization of functions and tasks. These two improvements will increase the productivity three-fold from 16% to around 50% of the US average. Chains will also benefit from improved organization to reach 100% of the US average level. The remaining improvement in the overall productivity will stem from higher chain penetration (accounting for up to 25% of industry employees).

In order to achieve this performance, specific government action is required. In addition to addressing the macro issues for the whole country, the government will need to privatize the existing hotels, streamline red tape and corruption and promote domestic and foreign tourism.

Privatize existing hotels

Given the large share of government owned hotels (83%) and the resulting distortions on managerial incentives, privatizing the hotel stock should be the
government’s top priority. In the medium and low end segments (where non-chains are concentrated), private ownership would increase domestic competitive intensity and provide incentives for managers to improve organization and reduce excess workers. In the high-end market, where international chains operate, private ownership will eliminate the government’s conflict of interests and facilitate new entry. In turn, this will increase pressure on chain operators to close the existing productivity gap and contribute to the formation of a skilled labor pool in the industry.

Promote domestic and foreign tourism

In order to take full advantage of its tourist potential, Russia should facilitate foreign tourism and develop and promote attractions. First, visa procedures should be simplified and expedited. Second, special efforts should be made to decrease safety concerns. Finally, improved maintenance of existing attractions and the development of new ones are needed to improve domestic and foreign tourism. In particular, zoning laws and permits for related industries need to be streamlined in order to attract investment in theme parks and recreational centers.

Incentivize local governments to streamline red tape and corruption

Currently the hotel sector is not perceived by most Russian officials as an important source of employment growth. This is partly the result of the Soviet legacy where tourism and leisure services were considered a secondary and “soft” industry. In contrast, the hotel industry has been a key source of employment and hard currency in many countries, especially in the light of important spillovers with related industries such as tourism and construction. However, in order to increase investment and employment in this sector, investors need more transparent and streamlined bureaucratic procedures in the purchase/lease of land and the approval of construction projects (including façade-maintenance requirements).
EMPLOYMENT POTENTIAL IN HOTELS
Employment per capita; Indexed to US = 100 in 1996

*Estimate
Source: Goskomstat; GUS; MGI UK study

Exhibit 1

HOTEL VALUE CHAIN

*Includes health clubs, business services, stores, etc.
Source: National Statistics; McKinsey analysis

Exhibit 2
<table>
<thead>
<tr>
<th>Region</th>
<th>Local government’s attitude to liberalization</th>
<th>Share of rooms in Russia</th>
<th>Share of Russian chains</th>
<th>Number of Interviews</th>
<th>Hotels and experts</th>
<th>Local government</th>
</tr>
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<tbody>
<tr>
<td>Moscow</td>
<td>Average</td>
<td>18%</td>
<td>44%</td>
<td>4</td>
<td>1</td>
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<tr>
<td>St. Petersburg</td>
<td>Average</td>
<td>5%</td>
<td>23%</td>
<td>9</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Nizhny-Novgorod</td>
<td>Average</td>
<td>4%</td>
<td>0%</td>
<td>6</td>
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<tr>
<td>Novgorod</td>
<td>Positive</td>
<td>&lt;1%</td>
<td>&lt;1%</td>
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<td>3</td>
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<tr>
<td>Krasnodar, Sochi</td>
<td>Negative</td>
<td>9%</td>
<td>32%</td>
<td>5</td>
<td>1</td>
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</table>

Source: Goskomstat; Interviews; McKinsey analysis

Exhibit 3
HOTELS LABOR PRODUCTIVITY IN RUSSIA - 1997
Indexed to US = 100 in 1996

Output per capita

Labor productivity

Source: US Bureau of Census; Goskomstat; MGI UK study

Exhibit 4

RUSSIAN LABOR PRODUCTIVITY TREND (1990-97): HOTELS
Indexed to US = 100 in 1996

Output per capita*

Labor productivity*

*1990 estimated using physical productivity trends (with 15% quality improvements assumed in the 1990-92 period)

Source: Goskomstat; McKinsey analysis

Exhibit 5
HOTEL LABOR PRODUCTIVITY BY FORMAT
Indexed to US average = 100 in 1996

<table>
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<th></th>
<th>Russia 1997</th>
<th>US 1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chains</td>
<td>75 [4%]</td>
<td>125 [40%]</td>
</tr>
<tr>
<td>Non-chains</td>
<td>16 [96%]</td>
<td>83 [60%]</td>
</tr>
</tbody>
</table>

Source: Goskomstat; Pannell Kerr Forster (Eurocities 1997)

FORMAT MIX: INTERNATIONAL COMPARISON
Percent of total revenues

*Includes international chains only. Domestic hotel “groups” (e.g., Orbis, Gromada) comprise additional 35%. They are excluded as they do not fully benefit from chain advantages

Source: Goskomstat; McKinsey analysis
LABOR PRODUCTIVITY DIFFERENCES: RUSSIA VS. US
Indexed to US = 100 in 1996

Source: Interviews; McKinsey analysis
CAUSALITY FOR PRODUCTIVITY DIFFERENCES: HOTELS
Russia vs. US

<table>
<thead>
<tr>
<th>External factors</th>
<th>Industry overall (82)</th>
<th>Format-to-format Non-chains (52)*</th>
<th>Format-to-format Chains (11)*</th>
<th>Format mix (19)*</th>
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<tbody>
<tr>
<td><strong>Macroeconomic barriers</strong></td>
<td>• Drop in demand/low labor cost/low income</td>
<td>• Non-chains (52)*</td>
<td>• Chains (11)*</td>
<td>• Format mix (19)*</td>
</tr>
<tr>
<td>• Country risk/high capital cost (political instability/budget deficit)</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td><strong>Labor barriers</strong></td>
<td>• Mobility restrictions</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>• Inadequate education</td>
<td></td>
<td></td>
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<tr>
<td><strong>Capital barriers</strong></td>
<td>• Government ownership</td>
<td></td>
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<td></td>
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<tr>
<td>• Problems with minority shareholders’ rights</td>
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<tr>
<td><strong>Sector specific barriers (non-level playing field)</strong></td>
<td>• Non-level taxes</td>
<td></td>
<td></td>
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<tr>
<td>• Non-equal allocation of government procurement and land</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>• Threat of red tape/harassment</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>• Non-level energy payments</td>
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<td></td>
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</tr>
<tr>
<td><strong>Related industry barriers</strong></td>
<td>• Others (property rights, barriers to trade/FDI)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>• Upstream/downstream sectors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Poor infrastructure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other barriers (climate, geology, etc.)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pressure from global best practice</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Domestic competitive intensity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Non-level playing field</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Production process</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Low capacity utilization</td>
<td>• Organization of functions and tasks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Inefficient organization</td>
<td>• Marketing/product mix</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Supplier relations</td>
<td>• Blue collar trainability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lower capital intensity/technology</strong></td>
<td>• Obsolete assets (subscale/outdated technology)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Lack of viable investment in non-obsolete assets (upgrades/green fields)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Non-viable investment due to factor costs (labor, capital, and energy)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Russia:</th>
<th>US:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Productivity (Indexed to US industry average)</td>
<td>18</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>83</td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>125</td>
</tr>
</tbody>
</table>

* Productivity gap responsible (percentage points)
NON-CHAINS FORMAT-TO-FORMAT: CAUSALITY ANALYSIS*

Labor productivity indexed to US average = 100 in 1996

*Figures are independent of the order in which operational factors are improved

Source: Non-chain interviews

Exhibit 10
CAPACITY UTILIZATION IN RUSSIA - 1997
Percent of occupied rooms per year

US vs. Russia

<table>
<thead>
<tr>
<th></th>
<th>US</th>
<th>Russia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chains</td>
<td>65</td>
<td>31</td>
</tr>
</tbody>
</table>

Russia Chains vs. non-chains

<table>
<thead>
<tr>
<th></th>
<th>Chains</th>
<th>Non-chains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>62</td>
<td>29</td>
</tr>
</tbody>
</table>

Source: Goskomstat; Interviews; McKinsey analysis
EFFECT OF GOVERNMENT OWNERSHIP
Percent of total number of rooms in 1997

<table>
<thead>
<tr>
<th>Share of ownership</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully private</td>
<td>• Corporate governance: Managers lack the incentive to reduce excess labor and improve OFT</td>
</tr>
<tr>
<td>17</td>
<td>“Efficiency of Russian hotels would be much higher if the government gave their managers the same contracts privately-owned US chain operators get.”</td>
</tr>
<tr>
<td>Mixed ownership</td>
<td>– Local Government Hotel development official</td>
</tr>
<tr>
<td>36</td>
<td>“The problem with the productivity of this hotel is the fact that government is not controlling it well.”</td>
</tr>
<tr>
<td>Fully government owned</td>
<td>– Government-owned hotel manager</td>
</tr>
<tr>
<td>47</td>
<td></td>
</tr>
</tbody>
</table>

Source: Goskomstat, Interviews, McKinsey analysis
CHAINS FORMAT-TO-FORMAT: CAUSALITY ANALYSIS

Labor productivity indexed to US average = 100 in 1996

Source: Chain interviews

Exhibit 13
FORMAT MIX: HIGH COUNTRY RISK AND COST OF CAPITAL

<table>
<thead>
<tr>
<th>Construction/refurbishment costs*</th>
<th>Barriers for investors</th>
</tr>
</thead>
<tbody>
<tr>
<td>USD Million</td>
<td></td>
</tr>
<tr>
<td>New building</td>
<td>• High country/project risk</td>
</tr>
<tr>
<td>30</td>
<td>- High country/project risk</td>
</tr>
<tr>
<td>Refurbished building</td>
<td>- Macroeconomic instability</td>
</tr>
<tr>
<td>13</td>
<td>&quot;The risk of investing in this country is too high for hotel financing to be attractive to foreign investors.&quot; - Manager of international chain</td>
</tr>
<tr>
<td>*For a 2-4 stars hotel assumes 100 rooms</td>
<td></td>
</tr>
<tr>
<td>Source: Interviews; McKinsey analysis</td>
<td></td>
</tr>
</tbody>
</table>

FORMAT MIX: UNDERDEVELOPED TOURISM

<table>
<thead>
<tr>
<th>Issues by type of tourism</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign</td>
<td>Number of international leisure visitors per capita (France = 100)</td>
</tr>
<tr>
<td>• Visa procedure</td>
<td>Russia 1.7</td>
</tr>
<tr>
<td>- Visa needed for citizens of most countries (including European Union, Japan, Korea and US)</td>
<td></td>
</tr>
<tr>
<td>- It takes a week to obtain tourist visa. Therefore, no impulse (weekend) trips</td>
<td></td>
</tr>
<tr>
<td>Foreign/domestic</td>
<td>US 9.4</td>
</tr>
<tr>
<td>• Lack of attractions: most tourist attractions are in disrepair</td>
<td></td>
</tr>
<tr>
<td>• Higher safety (crime/mafia/corruption) concerns compared to the US, UK or France</td>
<td></td>
</tr>
<tr>
<td>Foreign</td>
<td>UK 26.7</td>
</tr>
<tr>
<td>Foreign/domestic</td>
<td>France 100</td>
</tr>
<tr>
<td>Source: WTO; MGI UK Report</td>
<td>Exhibit 15</td>
</tr>
</tbody>
</table>
### Lack of Major Attractions

Yearly attendance of top tourist attraction

#### Russia

<table>
<thead>
<tr>
<th>Name</th>
<th>Construction date</th>
<th>Attendance Million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kremlin</td>
<td>15th century</td>
<td>2.4</td>
</tr>
<tr>
<td>Hermitage Museum</td>
<td>1764</td>
<td>1.8</td>
</tr>
<tr>
<td>Petergoff Palace</td>
<td>18th century</td>
<td>1.6</td>
</tr>
<tr>
<td>Tretyakov Gallery</td>
<td>1892</td>
<td>1.4</td>
</tr>
<tr>
<td>Trinity in Sergiev Posad</td>
<td>16th century</td>
<td>1.4</td>
</tr>
<tr>
<td>Peter and Pavel Fortress</td>
<td>1900</td>
<td>1.5</td>
</tr>
<tr>
<td>Tsar Village</td>
<td>1796</td>
<td>0.9</td>
</tr>
<tr>
<td>Pushkin Museum</td>
<td>1912</td>
<td>0.8</td>
</tr>
<tr>
<td>Russian Museum</td>
<td>1895</td>
<td>0.5</td>
</tr>
<tr>
<td>Pavlovsk</td>
<td>End of 18th century</td>
<td>0.4</td>
</tr>
</tbody>
</table>

#### UK

<table>
<thead>
<tr>
<th>Name</th>
<th>Construction date</th>
<th>Attendance Million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackpool Pleasure Beach</td>
<td>1896</td>
<td>7.5</td>
</tr>
<tr>
<td>British Museum</td>
<td>1847</td>
<td>6.2</td>
</tr>
<tr>
<td>National Gallery</td>
<td>1838</td>
<td>5.0</td>
</tr>
<tr>
<td>Palace Pier</td>
<td>1890</td>
<td>4.3</td>
</tr>
<tr>
<td>Alton Towers</td>
<td>1970s</td>
<td>2.7</td>
</tr>
<tr>
<td>Madame Tussauds</td>
<td>1884</td>
<td>2.7</td>
</tr>
<tr>
<td>Tower of London</td>
<td>1100 (1660)</td>
<td>2.5</td>
</tr>
<tr>
<td>Westminster Abbey</td>
<td>1200 (1700)</td>
<td>2.5</td>
</tr>
<tr>
<td>York Minster</td>
<td>1220</td>
<td>2.3</td>
</tr>
</tbody>
</table>

#### France

<table>
<thead>
<tr>
<th>Name</th>
<th>Construction date</th>
<th>Attendance Million</th>
</tr>
</thead>
<tbody>
<tr>
<td>EuroDisney</td>
<td>1992</td>
<td>11.7</td>
</tr>
<tr>
<td>Tour Eiffel</td>
<td>1889</td>
<td>5.5</td>
</tr>
<tr>
<td>Musée du Louvre</td>
<td>1500 (1793)</td>
<td>5.0</td>
</tr>
<tr>
<td>Cité de Sciences</td>
<td>1986</td>
<td>3.9</td>
</tr>
<tr>
<td>Versailles</td>
<td>1600s (1837)</td>
<td>2.9</td>
</tr>
<tr>
<td>Parc Futuroscope</td>
<td>1984</td>
<td>2.2</td>
</tr>
<tr>
<td>Parc Aquaboulevard</td>
<td>1987</td>
<td>2.8</td>
</tr>
<tr>
<td>Musée d’Orsay</td>
<td>1900 (1837)</td>
<td>2.1</td>
</tr>
<tr>
<td>Parc Asterix</td>
<td>1989</td>
<td>1.7</td>
</tr>
<tr>
<td>Parc Marineland</td>
<td>1970</td>
<td>1.2</td>
</tr>
</tbody>
</table>

#### US

<table>
<thead>
<tr>
<th>Name</th>
<th>Construction date</th>
<th>Attendance Million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disneyland</td>
<td>1955</td>
<td>14.1</td>
</tr>
<tr>
<td>Magic Kingdom FL</td>
<td>1971</td>
<td>12.9</td>
</tr>
<tr>
<td>Epcot Center</td>
<td>1982</td>
<td>10.7</td>
</tr>
<tr>
<td>Disney Studios, FL</td>
<td>1989</td>
<td>9.5</td>
</tr>
<tr>
<td>Universal Studios, FL</td>
<td>1990</td>
<td>8.0</td>
</tr>
<tr>
<td>Sea World, FL</td>
<td>1973</td>
<td>5.0</td>
</tr>
<tr>
<td>Universal Studios, CA</td>
<td>1964</td>
<td>4.7</td>
</tr>
<tr>
<td>Statue of Liberty</td>
<td>1886</td>
<td>4.2</td>
</tr>
<tr>
<td>Six Flags, NJ</td>
<td>1974</td>
<td>4.0</td>
</tr>
<tr>
<td>Bursch Gardens, FL</td>
<td>1959</td>
<td>3.8</td>
</tr>
</tbody>
</table>

Source: MGI UK study; Russian Ministry of Culture

Exhibit 16
HIGH HOTEL CONSTRUCTION/REFURBISHMENT COSTS
Indexed to US = 100 in 1996

* A mandatory requirement in 80% of cases

Source: Interviews

Exhibit 17
OUTPUT GROWTH POTENTIAL
Correlation between income and hotel physical output

Annual person-nights occupancy per 1,000 inhabitants

Source: Goskomstat, Polish Central Statistical Office, MGI UK report

Exhibit 18
Software

EXECUTIVE SUMMARY

Industry overview. We address two distinct sub-sectors in our software case: packaged software and project services, in total employing ca. 8,000 people in Russia (compared to more than 600,000 in the US).

Productivity performance. The overall labor productivity in the sector is 38% of the US level, an average of 13% for packaged software and 72% for project services (consulting, implementation and training in IT area). This latter sub-sector is the most productive of all the industries we have studied in Russia.

The main reasons for the productivity gap at the operational level for packaged software, a high fixed (development) cost business, are low scale (on average, Russian packaged software companies are 100 times smaller than their US counterparts), and a low value-added product mix. This latter factor is also responsible for the (small) productivity gap in project services.

The most important external barriers to productivity and output growth differ between sub-sectors. In packaged software, the causes are the prevalence of software piracy and lack of leading-edge demand from business customers. The piracy rate is 90% in Russia—one of the world’s highest, so Russian software firms lose most of their resources to pirates and can not invest in research and development of better products. Software-consuming sectors, whose demand drives development of software firms, are both very small in Russia and less interested in productivity-enhancing software tools than their Western counterparts. For example, banks, important software consumers elsewhere, in Russia depend on relationships with authorities, rather than cost control or good service. Kiosks, unlike supermarkets, do not consume software.

The customized nature of project services makes this sub-sector immune to piracy. The low value-added service mix of Russian project services firms, the main culprit of the (small) productivity gap, comes from the low level of customer demand. The low level of domestic demand can be partially overcome by serving overseas customers via offshore programming. The Russian business of offshore programming is growing at 50-60% per year, although from a very small base. With time, this industry should be able to obtain the requisite track record and international certification, and become a force in the world offshore programming market along with India.

Policy implications and future outlook. The following four policy measures should improve the economic prospects for the software sector in Russia: removal of barriers to productivity and output growth in the other (software-consuming) sectors (see all other sector case studies), stepping up enforcement of anti-piracy
laws (which are already in place), support to ISO- and SEI-certification initiatives (e.g. through setting up a number of specialized certification centers to ease the process for Russian companies), and removal of red tape in software export procedures. The future of the domestically oriented packaged software and project services sub-sectors will depend on growth of the whole economy. Offshore programming can be expected to continue growing output and employment at the current rate of 50-60% per year.
Software

This case study benchmarks the performance of the Russian software industry against those of the US (primarily) and Germany.

We will start with an overview of the industry, then present productivity performance measures across countries, explain the causes of differences in performance, and end with a future outlook for the industry.

INDUSTRY OVERVIEW

The software industry is interesting because it is a new market sector, a source of high value jobs and subject to very little regulation. Furthermore, although it currently contributes under 0.1% to Russian GDP, this sector is representative of the novel high-growth business services industries.

We focus this case on the packaged software and project services segments, which account for more than 30% of the worldwide information technology market (Exhibit 1). These two sub-segments grew at 14% between 1997 and 1998 and are projected to grow at this rate through 2002. They generated revenues of $257 bn in 1998 (Exhibit 2).

We first define and give an overview of the packaged software and project services segments worldwide before describing these industries in Russia.

Packaged software and project services worldwide

Both segments are similar in size and can be further divided into sub segments (Exhibit 3).

¶**Packaged software.** We define packaged software as commercially available programs for sale or lease. This segment generated $133 bn in worldwide revenues in 1998. US companies are dominant with 75% of the market. The packaged software segment can be further subdivided into three sub segments by type of software:

- **Systems infrastructure** includes system management software (used to manage the full range of computing resources of a company), middleware (used to provide interface between different computing technologies), serverware (products that coordinate resources between distributed servers or nodes in a network) and system-level software (software products that operate hardware platforms and

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* For an explanation on sources of data and possible errors see the Appendix.
communications networks). The nature of this segment determines the prevalence of solitary first-mover dominant players, who now enjoy immense economies of scale (e.g. IBM, Microsoft, Computer Associates, etc.).

- **Application tools** include information access tools (e.g. spreadsheets, executive information systems) and program development tools that support professional software developers in design, development and implementation of various software systems and solutions. Since the (low) number of professional developers or sophisticated users limits the size of this market, it is under the heavy influence of few global players (e.g. IBM, Oracle, etc.) who enjoy the first mover advantage and consequent economies of scale. There are limited opportunities for the successful operation of new players in this segment.

- **Application solutions** include consumer, commercial and technical programs designed to provide packaged solutions for specific problems (programs for end users, e.g. databases, games or word processors). This segment is already the largest of the three (Exhibit 3), and also the most promising for new companies: players who manage to develop a winning product (e.g. Netscape) may take their niche by storm despite the presence of established global manufacturers.

While a vast majority of lawful packaged software companies would choose to specialize in one of the three described segments, there is a particular type of operator who is present in all three: software pirates.

- **Software piracy** is defined as unauthorized use or illegal copying of a copyrighted software product. It occurs in a number of forms, from sharing of source disks between students, to mismanagement of network software licenses and production of counterfeit CD-ROMs, including "compilation disks" that contain thousands of dollars worth of products. Given that in its milder forms piracy is present in all countries and may in some instances actually be enhancing revenues of software publishers*, in this study we will concentrate only on the "industrial" (profit oriented) type of piracy.

Discussion of the software industry in Russia without mention of the pirates would be incomplete, and we will address the issue of piracy in detail later. However, we do not include the output (very small given the very low prices), employment (also very small) and productivity of software pirates into overall industry numbers. Doing so would be similar to calculating the productivity of shoplifters. Thus, although we mention software pirates to the extent that they are important for understanding the barriers to productivity, we do not consider them as part of the software industry.

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* see, for example, the article by Y. Bakos, E. Brynjolfsson, D. Lichtmann, published in April 1999 issue of *Journal of Law and Economics*
Project Services. We combine IT consulting, implementation (including offshore programming) and training under the heading of project services:

- **IT Consulting** covers information systems (IS) strategy, IT and network planning, architectural assessments, IS operational analysis, technical system and network design, supplier assessment, and maintenance planning. It does not include strategic planning, tax, audit, benefits, financial and engineering consulting.

- **Implementation** activities are aimed at building technical and business solutions. This is the largest segment of the three (Exhibit 3).

- **Training** covers education used to enhance general knowledge and expand the abilities to use IT.

Most large players in the sub-sector of project services (e.g. Andersen Consulting, American Management Systems, etc.) engage in all three types of activities.

- We define **offshore programming** as work in the area of software and services performed by an overseas contractor (e.g. a large multinational could outsource some of its IT work – often linked to adaptation of old data to new technologies, known as "migration" – to an Indian or Russian company). Since the bulk of work done by offshore programming firms relates to implementation activities, we study them within the project services domain.

The software and services industry as defined by International Data Corporation (IDC) also includes support services (activities aimed at ensuring that products and systems are performing properly) and operations management (services aimed at taking responsibility for managing components or the whole of a company’s IS infrastructure). We did not include these sub-sectors into the scope of the present study since their performance and barriers to productivity growth appear to be very similar to those of project services, and also out of practical considerations with regards to data availability. We also excluded from our scope the IT departments within companies whose main business lies outside packaged software or project services.

Packaged software and project services industry in Russia

In Russia, the software and services industry is very young, with the oldest player being only 7-8 years old. Although some activities that are now being performed within the scope of this industry were known in Soviet times, the sector, as such, did not really exist back then. Not a single, separate software or services company existed, just software-related branches of state enterprises or institutes.

Some of the factors driving the emergence of this industry, as we now know it were:

- Scaling back of the military following the dissolution of the Soviet Union, which led to a major release of IT professionals into the market
Formulation of the new legal framework, allowing for private entrepreneurial activities

Significant number of graduates in mathematics, physics and electronics who provided the first wave of professionals to the software and services industry, and

Worldwide boom of IT markets.

Throughout its existence, the industry in Russia and elsewhere benefited from its young age: no sector-specific regulations existed to hinder its growth, no old assets interfered with production processes or created vested interests. Relatively low capital intensity provided for low barriers to entry or exit.

After the mushrooming of small software cooperatives' in areas of concentration of high-tech activities in the early 1990s (Moscow, St. Petersburg, Novosibirsk, Ekaterinburg, etc.), this unregulated industry saw a rapid consolidation, which still continues (e.g. Diasoft joining efforts with ProgramBank in developing a better banking system), although at a much slower pace.

Also in the early 1990s, the first representative offices of multinational software and services companies were established. Their employment levels, however, remain small (e.g. 70 people at Microsoft in 1998) mainly because, as discussed later, of high piracy rates in the case of packaged software, and a lack of customer demand in the case of project services.

Curiously, pirates entered the scene even before the lawful companies: unauthorized copying of software products took off immediately after the first IBM PC computers appeared in the country in 1986, and evolved together with the market and demand from customers. One could also see consolidation, enhancement of product offerings, etc.

The offshore programming outlets started appearing in early 1990s, when low-paid but skilled IT professionals based in Russia first offered their services to foreign clients.

At present, the Russian software industry employs approximately eight thousand people, of which over six thousand work in project services (including ca. 1,600 in offshore programming) (Exhibit 4). Compared, on a per capita basis to the USA, this translates into employment levels of 3 % in project services and 0.9 % in packaged software. The most successful firms displayed growth rates of 50-60 % per year, although from a very small starting point.

* Chronologically, cooperatives were the first legal form of private enterprises in Soviet Union.
PRODUCTIVITY PERFORMANCE

Labor productivity

We have measured productivity in this sector in Russia using annual revenues per employee as a proxy to value added for two reasons: a lack of better statistics, and a high value added to revenues ratio in this industry (see the Appendix for a detailed explanation of the methodology used). We also had to rely heavily on company interviews for obtaining essential data, extrapolating our findings from a sample of companies towards the whole industry. Companies in our sample produced ca. 40% of output in project services, and ca. 70% in packaged software.

In diversified IT companies only the relevant software-related portion of output and employment was considered.

According to our measurements, overall productivity in the sector stands at 38% of the US average level or 53% of the German average level (Exhibit 5). This relatively high performance masks a very low productivity for packaged software at only 13% of the US packaged software industry, while project services achieve the highest productivity of all the sectors we have studied in Russia, with 72% of the US project services productivity level.

High productivity in project services is driven by the few local implants of the global best practice firms (e.g. SAP, Andersen Consulting, etc.), operating at productivity higher than the US average. The local companies, including offshore programming, still manage to achieve more than 50% of the US productivity level (Exhibits 6-7).

In packaged software on the other hand, the majority of the companies analyzed operate at very low productivity levels (10 to 15%), with Russia’s best practice company at only 50% (Exhibits 8-9).

Output and Employment

Software is a growing high value service sector. In the US, employment in this sector accounts already for more than 1% of total employment, and salaries are twice as high as the average (Exhibit 10). Unfortunately in Russia, both output and employment in this sector are still negligible (shown in Exhibits 5, 6 and 8). We discuss at the end of this Chapter the growth potential of this sector. We now turn to the explanation of both productivity differences in this sector (very high in project services and very low in packaged software).

REASONS FOR DIFFERENCES IN PRODUCTIVITY PERFORMANCE

Exhibit 11 shows the framework within which we have analyzed the productivity gap between software producers in Russia and the United States. It divides the causes of the gap into two groups. At the lowest level we explain productivity gaps by differences in production process and staffing levels within firms. We
then try to understand what key external factors are preventing the Russian software and services industry from bridging the productivity gap. These external factors can influence management decisions either directly (e.g. through different labor and capital costs) or indirectly, by affecting the level of competition in the industry.

As we have noted before, productivity of the Russian project services companies is comparable to that of Germany and the US. What makes this sector so different from the other Russian industries that we studied (including packaged software)? There are three major differences:

¶ Since the software sector has been created over the last few years essentially from scratch, the only type of legacy it inherited from the Soviet times was the education and mentality of employees and entrepreneurs. As we see in this study, neither of the two has prevented the sector from achieving high productivity levels.

¶ The sector (like in all countries) is unregulated and enjoys a fairly free market environment.

¶ Project services are not susceptible to piracy and thus do not suffer from the non-level playing field prevailing in the packaged software sub-sector.

As discussed later, a very high piracy rate in Russia is the main explanation for very low productivity in packaged software because it leads to sub scale official operations and discourages investment in software development.

Production process

Studying the software and services industry in Russia, we have observed the following operational causes to its lower productivity: low scale of operations and sub-optimal product mix.

Low scale of operations

The 87% productivity gap in packaged software is mostly due to the very low scale of Russian companies (Exhibit 12). Economies of scale are huge in packaged software (high development fixed costs and close to zero marginal/copying cost - as the pirates are proving). Project services companies are also much smaller in Russia, but economies of scale are much less pronounced in this sector. This is because project services companies provide tailor made applications and consulting delivered in situ (or through the Internet) by teams of professionals.

Sub-optimal product mix

Another factor dragging down the productivity of Russian software companies in both sub-sectors is the fact that they tend to supply less sophisticated and consequently cheaper products and services. The only exception from this is a handful of best practice global operators in the project services domain (e.g. SAP, Andersen Consulting, etc.), who deliver very similar products and services around the world, and charge comparable (on a ppp basis) fees.
Industry Dynamics

Pressure from global best practice

We found significant competitive pressures from global best practice operators in both sub-sectors:

¶ Packaged software from the global players is freely available (often with Russian interfaces) and accepted by local consumers, so that Russian packaged software companies have to compete against the best practice;

¶ Worldwide best practice players in project services have significant presence in this market, and are competing for customers with the local companies;

¶ Russian offshore programming outlets compete for global clients with a large number of established players, for example Indian offshore programming specialists.

Domestic competitive intensity

Domestic competitive intensity appears quite high in both of the surveyed sub-sectors: none of the players are shielded from others, concentration and barriers to entry are relatively low, and so a number of companies in both sub-sectors compete for the same customer base.

Non-level playing field

The playing field is extremely non-level in packaged software, where pirates are de facto permitted to steal products of lawful companies. As they have not incurred the high fixed development cost, they can sell them for a fraction of the official price. As a result, when lawful companies come up with a winning product the profit stream gets swiftly diverted into the pirate shops. Lawful companies, repeatedly bled by the pirates, end up in a weak condition with their resource base artificially kept at a very low level.

External Factors

In this section we will try to determine the external reasons for the major operational differences leading to lower productivity in the Russian software industry.

As we have described in previous sections, the two largest operational causes for productivity differences between Russian and US software industries are the low scale of operations and lower value products and services. These two factors are closely interrelated. In the software industry success and growth are driven by the ability of companies to develop and market innovative high-value added products and services.

We will examine the external causes of operational barriers to productivity sub-sector by sub-sector.
Within the **packaged software** sub-sector we distinguish the following external causes of productivity differences: software piracy, lack of leading-edge business customers, and red tape in export procedures. We will discuss them in order of decreasing importance.

**Sector-specific barriers: software piracy**

Software piracy is the primary reason for both the low scale and low value added products of the Russian packaged software companies.

*Pirates take away sales leading to low scale.* Pirates in Russia are selling packaged software at less than 1% the official price to very poor (price sensitive) customers in an environment where the risks of legal punishment (for both the seller and the buyer) are close to zero. The legal framework for prosecution of piracy is pretty much in place, with both Criminal Code and Administrative Code containing relevant articles (146 and 150.4 respectively). The main issue with curbing the piracy is poor law enforcement. Employees of enforcement agencies lack understanding of the harmful effects of software piracy, and due to low salaries can also be easily bribed by pirates to turn a blind eye. As a result, Russia has one of the world’s highest piracy rates – 90% of packaged software in Russia is copied illegally, against only 30% in the US ([Exhibits 13 and 14](#)). Recapturing only a third of these lost sales would allow Russian companies to triple productivity.

*Pirates deplete the resources of lawful companies.* Because of these foregone revenues, legal software houses have limited resources left to invest in R&D budgets and employment. Companies lose the ability to develop high value-added, competitive products and to expand on their basis, and end up producing small amounts of mediocre software. Consequently, companies starting out in a market with high piracy rates have virtually no chance of joining the ranks of global players, and even their mid to long-term survival is often jeopardized.

Bypassing the high level of piracy by branching into foreign markets is rarely an option. Development of good quality software requires proximity to leading edge customers (discussed later). Thus, in a high piracy environment, packaged software companies are forced to either struggle in the local market or convert to a service operation of offshore programming.

This piracy phenomenon, particularly strong in Eastern Europe, is both a blessing and a curse. While giving domestic software consumers the benefit of access to quality products very inexpensively, piracy discourages investment and growth of local packaged software producers.

**Related industry barriers: the lack of leading-edge business customers**

The lack of leading-edge business customers limits the capacity of Russian companies to come up with innovative business applications. Packaged software is dominated worldwide by business applications, from which Russian companies are virtually absent. The Russian export successes have been in games and text recognition.

In the world, most packaged software companies depend on downstream industries as their customers; among these industries, manufacturing, financial services, trade and communications are the most important ([Exhibit 15](#)). In other
words, purchasing by these four sectors essentially defines the demand for (and thus, output of) the packaged software sub sector. Moreover, the demand from downstream sectors determines not only the amount but also the nature of software produced both in the country and internationally (companies will force software producers to manufacture leading edge, productivity enhancing, products which will thus be in demand in foreign markets as well). This chain leads to international success of software producers that serve leading-edge clients (Exhibit 16).

In Russia, the size of the main software-consuming sectors is very small compared to the USA or other developed countries as measured on a per capita basis (see the aggregate analysis and other cases of the present study). Thus, companies in general have less money to spend on software. Besides that, demand for productivity-enhancing software tools in the Russian economy is severely limited by the fact that higher productivity in many sectors does not lead to higher profitability or market success, as is demonstrated in the other case studies.

For example, in Russian banking, which is a major software-consuming sector elsewhere, financial success primarily depends on the bank’s privileged relationships with the authorities, rather than on its ability to serve customers or contain costs. As a result, Russian banks are not interested in investing in high quality expensive software.

In retail, ubiquitous kiosks and wholesale markets are not consuming software, while productive software-hungry supermarkets have a hard time penetrating the market (see retailing case studies for more details).

Generally, there are almost no examples of highly productive best practice companies in the whole Russian economy. Consequently, Russian companies spend a disproportionately small share of their output on procurement of packaged software and project services, not giving a chance to local software companies to improve their offering and expand (Exhibit 17). This leads to a situation where the Russian packaged software houses produce very few products that are bought in the rest of the world, and these products are ones that do not depend on demand from a particular sector (e.g. text recognition software). The remaining locally produced packaged software is either leisure-oriented (e.g. games), or targeted towards meeting Russia-specific regulations (e.g. accounting programs).

Other less important barriers

Red tape in export procedures is a secondary factor causing low productivity of Russian software houses. Although lack of leading-edge domestic customer demand significantly decreases the chances of local software companies to enter international markets, we still observed solitary examples of foreign (predominantly CIS) customers willing to buy software developed in Russia. In the case we saw, the Russian producer of a popular software package encountered an additional problem: excessive bureaucratic requirements surrounding the process of exporting software. Luckily for the producer and its customers, the problems in that particular case were solved with moderate "private incentives" aimed at customs officers.
In **project services**, the main external barrier to higher productivity, output and employment is the lack of leading edge business customer demand, which we already observed in packaged software sub-sector.

**Related industry barriers: the lack of leading-edge business customers**

The lack of leading edge business customer demand also limits, although to a lesser extent, the capacity of Russian companies in project services to develop and sell new and high value services. Rather than a productivity penalty, the main impact from the underdeveloped and unsophisticated downstream sectors manifests itself “only” through very low output and employment.

Growth in offshore programming could partially compensate for the lack of internal customers. As is proven by the example of India and some other, predominantly Asian, countries, there is a sizeable global market for a specific type of project services, namely offshore programming, into which the Russian companies are only starting to tap. The size of global demand for IT services was $327 billion in 1997, and is estimated to exceed $1 trillion in ten years; Russian companies now capture less than $100 million of this market, compared to almost $2 billion for Indian offshore programming outlets (**Exhibit 18**).

**Exhibit 19** demonstrates that intrinsically Russia possesses the capabilities to succeed in addressing external markets at least as a significant player in offshore programming business. Russian software firms already have three out of six crucial factors necessary to succeed in offshore programming, and putting in place the remaining ones seems to be merely a question of time and management attention. These remaining factors are arranging the communication flow in a way to circumvent the language barrier by channeling it through one or two bilingual project managers; establishing a track record with prestigious customers; and obtaining the necessary certifications (**Exhibits 20-22**). In fact, there are already several companies who have launched the process of ISO 9000 certification, and one offshore programming firm (Digital Design, St. Petersburg) has just received the certificate.

The process of turning Russia into an offshore programming haven is already going full speed. A growing number of Russian software houses and foreign firms are setting up specialized outlets, and several leading multinationals along with multiple smaller potential customers display their readiness to source their software from Russia. Offshore programming has already allowed several hundreds of IT specialists working in specialized companies to detach their income from the uncertainties and problems of the Russian market. We expect the output of offshore programming operators to continue to grow at the current 50-60% per year, and with already relatively high levels of labor productivity, they will be able to grow highly paid employment along with the output. Projecting the trend forward for five years, one can expect approximately 12,000 relatively well paid employees in offshore programming business in Russia.
FUTURE OUTLOOK AND POLICY IMPLICATIONS

Growth potential

The future of the Russian software industry provides a mixed picture:

¶ Negative side

• Growth of output and employment is held back by stagnation of the rest of the economy,

• Growth of legal packaged software companies is further limited by software pirates,

• Entry into international markets takes time and is hindered by the lack of leading-edge domestic demand, especially in the sub-sector of packaged software.

¶ Positive side

• Productivity in the project services sub-sector is already high, and not suffering from regulatory restrictions or law enforcement issues,

• Russian firms are capable of offering an attractive proposition to the international markets, and are starting to do so via offshore programming arrangements.

As Russian companies catch up in productivity, they will have to rely on more software and services. This means that the software sector is expected to grow faster than the economy, a correlation analysis suggests twice as fast (Exhibit 23).

Policy implications

On the basis of the previous discussion, we believe that the following policy actions can boost the growth of the Russian software and services industry:

¶ Remove sector-specific and macroeconomic barriers to growth of other sectors to boost growth of domestic (including some leading-edge) demand from downstream sectors

¶ Step up enforcement of anti-piracy laws which are already in place; this may also facilitate Russia’s negotiations with WTO

¶ Remove red tape in export procedures.
Appendix on Methodology

To compare the performance of the Russian software industry with that of other countries we investigated output, labor inputs and labor productivity.

Conducting this study, we operated under the conditions of lack of reliable and consistent data sources on output, employment and productivity. We recognize the imprecision of our sources of information. However, based on discussions with industry players and experts, we believe that the margin of error we allow does not have a material impact on our understanding of industry trends, outlook or overall recommendations.

Output

Output was calculated using international software spending (consumption) data from International Data Corporation (IDC), which includes retail margins where applicable. In case of benchmark countries, packaged software consumption figures were corrected for estimated trade flows between countries. In Russia, the share of imported software was estimated from interviews and available statistics. All country figures were made comparable using OECD (for Germany) and Bureau of Economic Analysis (for Russia) GDP ppps. For project services we assumed that in the countries in question (except for Indian and Russian offshore programming segments, where a separate calculation was done) production and consumption were co-located.

Labor productivity

Labor productivity was estimated using a sample of companies for each of the countries studied. For example, in Russia our sample of packaged software companies produces 70% of sub-sector output (as reported by IDC), and the sample of project services companies is responsible for 40% of its sub-sector’s output. We chose the sample-based method because there are no consistent sources that give both output and employment figures at the country aggregate level. We estimated value added per employee by using companies’ revenues per employee as a proxy. In case of global companies with worldwide packaged software sales, no ppp corrections were made. For predominantly local packaged software companies, and for companies in project services sector, we used ppp-adjusted revenues per number of domestic employees.

Labor inputs

Labor inputs were measured as employment per capita, derived from the output and productivity numbers described above. Consequently, precision of our
employment estimates depends on the precision of output and productivity data. For example, a portion of output produced by small informal (non-incorporated) teams of IT professionals may be lacking from the output data we used; if true, employment in this sector would also be underestimated. Additionally, there are no reliable national statistics that separate the two software sub-sectors: even within the computer services employment data, companies are not consistent in their classification.
WORLDWIDE IT MARKETS
Percent of worldwide market, 1997

100% = USD 720.4bn

- Packaged software: 16%
- Project services: 15%
- Other services*: 21%
- Hardware: 48%

*Includes operations management (with processing services) and support services

Source: IDC

Exhibit 1

GROWTH OF WORLD MARKET FOR PACKAGED SOFTWARE AND PROJECT SERVICES
USD Billion at market exchange rates

- CAGR 13.5%

- Worldwide markets for software and services are forecast to grow rapidly
- Expansion of packaged software and project services is relatively uniform

Source: IDC

Exhibit 2
SUBDIVISION OF SOFTWARE SECTORS
Percent of worldwide market in corresponding sector, 1998

Source: IDC

Packaged software

100% = USD 132.6bn

Systems infrastructure

Application tools

Application solutions

23

26

51

Consulting

Training

Implementation

Project services

USD 124.6bn

25

16

59
EMPLOYMENT IN SOFTWARE INDUSTRY
Percent of total

100% = 8,000* 55,000 640,000
Packaged software

Project services


25% of it is employed in offshore programming

* Lower bound of estimate; see Appendix for information on methodology and possible sources of error.
Source: IDC; Company information; McKinsey analysis

PACKAGED SOFTWARE AND PROJECT SERVICES:
OVERALL PRODUCTIVITY
Indexed to US = 100*

Productivity
Revenues per employee

Output
Sales per capita

Employment
Employees per capita

Source: IDC; EIU; McKinsey analysis
PROJECT SERVICES PRODUCTIVITY
Indexed to US = 100*

Source: IDC; EIU; McKinsey analysis

<table>
<thead>
<tr>
<th>Productivity</th>
<th>Revenues per employee</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>100</td>
</tr>
<tr>
<td>Germany</td>
<td>100</td>
</tr>
<tr>
<td>Russia</td>
<td>72</td>
</tr>
</tbody>
</table>

Output
Sales per capita
100
US
Germany
Russia

Employment
Employees per capita
100
US
Germany
Russia


PRODUCTIVITY OF RUSSIAN PROJECT SERVICES COMPANIES - 1998
Indexed to US = 100 in 1996

Source: Interviews; Financial reporting

<table>
<thead>
<tr>
<th>Best practice multinational in Russia</th>
<th>293</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>77</td>
</tr>
<tr>
<td>B</td>
<td>68</td>
</tr>
<tr>
<td>C</td>
<td>62</td>
</tr>
<tr>
<td>D</td>
<td>49</td>
</tr>
<tr>
<td>E</td>
<td>40</td>
</tr>
</tbody>
</table>

Purely Russian companies

Traditional project services

Offshore programming

Weighted average of these companies

Companies in the sample produce ca. 40% of output of the project services subsector
PACKAGED SOFTWARE PRODUCTIVITY
Indexed to US = 100*

Source: IDC; EIU; McKinsey analysis

Exhibit 8

PRODUCTIVITY OF RUSSIAN PACKAGED SOFTWARE INDUSTRY
Indexed to US = 100 in 1996

Source: Interviews; Financial reporting

Exhibit 9
WAGE LEVELS IN SOFTWARE INDUSTRY IN US - 1996
Average annual wages, USD Thousand

Source: Bureau of Labor Statistics

Exhibit 10

CAUSALITY FOR PRODUCTIVITY DIFFERENCES: SOFTWARE
Russia vs. US

<table>
<thead>
<tr>
<th>External factors</th>
<th>Industry overall</th>
<th>Packaged software</th>
<th>Project services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macroeconomic barriers</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Labor barriers</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Capital barriers</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Sector specific barriers (non-level playing field)</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Related industry barriers</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Other barriers (climate, geology, etc.)</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Industry dynamics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure from global best practice</td>
<td>•</td>
</tr>
<tr>
<td>Non-level playing field</td>
<td>•</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Production process</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Low capacity utilization</td>
<td>•</td>
</tr>
<tr>
<td>Inefficient organization</td>
<td>•</td>
</tr>
<tr>
<td>Supplier relations</td>
<td>•</td>
</tr>
<tr>
<td>Blue collar trainability</td>
<td>•</td>
</tr>
<tr>
<td>Lower capital intensity/technology</td>
<td>•</td>
</tr>
</tbody>
</table>

Productivity (Indexed to US = 100)

- Package software: 38
- Project services: 13
- Overall: 72

Exhibit 11

* Footnote
Source: Sources
SCALE OF COMPANIES IN SOFTWARE AND SERVICES SECTOR
Annual revenues, USD Million*

<table>
<thead>
<tr>
<th>Packaged software</th>
<th>Project services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average of sample of Russian companies</td>
<td>6</td>
</tr>
<tr>
<td>Largest Russian company</td>
<td>11</td>
</tr>
<tr>
<td>Average of sample of German companies</td>
<td>619</td>
</tr>
<tr>
<td>Average of sample of US companies</td>
<td>1,323</td>
</tr>
</tbody>
</table>

*Russia, 1998; Other countries, 1996
Source: Pierre Audoin Conseil; Dresdner Kleinwort Benson; Company information
PREVALENCE OF SOFTWARE PIRACY - 1997
Unlicensed copies of application software as percent of total number of copies

Russia
Poland
Western Europe average
US

World average = 40

Source: BSA

SOFTWARE PIRACY AND LEVEL OF GDP PER CAPITA - 1997

Piracy rate
Percent

GDP per capita

Source: BSA; EIU
### US SOFTWARE INDUSTRY RESPONSE TO LEADING EDGE DEMAND - EXAMPLES

<table>
<thead>
<tr>
<th>Software company</th>
<th>Comment</th>
</tr>
</thead>
</table>
| HBO & Co. (Founded 1974)     | • Demand from US healthcare industry for more efficient and cost effective patient information and hospital administration led to its first product MedPro  
                                 • HBO & Co. has since expanded its services to hospitals and now serve 52% of US hospitals with total sales of USD 1.2bn in 1996  
                                 • Company is well placed to take advantage of international healthcare opportunities                                                                 |
| Adobe (Founded 1982)         | • Demand for a computer language to transmit complex text and images to a printer, Adobe created PostScript which became the industry standard  
                                 • As desktop publishing grew, Adobe created leading products like Illustrator (1987), Photoshop (1989) and, most recently, Acrobat (1993) for electronic documents  
                                 • Sales USD 786m in 1996                                                                                                                                 |
| Cadence Design (Merger of SDA and ECAD in 1988) | • Demand from leading US electronics companies for ever more complex integrated circuits led to Electronic Design Automation software  
                                 • Cadence is now leader in EDA with sales USD 916m                                                                                                                                |
| Vantive Corp. (Founded 1990) | • Increased competition to retain customers and improve customer service led Vantive to develop front office automation software called Customer Asset Management. First product launched in 1992  
                                 • Now has over 500 customers, is expanding internationally and has grown from USD 10m in 1994 to USD 64m in 1996                                                                                                                                 |

Source: Websites; Text lines; McKinsey analysis
Increasing consumption of software in Russia will require removing barriers to growth of productivity and investment in the major software-consuming sectors (see other case studies).

**CONSUMPTION OF SOFTWARE BY SOME SECTORS OF THE ECONOMY**

Software spending as percent of output of the sector

<table>
<thead>
<tr>
<th>Financial and business services</th>
<th>Trade</th>
<th>Manufacturing</th>
<th>Total economy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>N/A</td>
<td>0.03</td>
<td>0.1</td>
</tr>
<tr>
<td>Germany</td>
<td>1.0</td>
<td>0.70</td>
<td>1.0</td>
</tr>
<tr>
<td>US</td>
<td>1.2</td>
<td>0.90</td>
<td>1.0</td>
</tr>
</tbody>
</table>

* Russia, 1997; other countries, 1996

Source: IDC; OECD; EIU; interviews
Demand for offshore programming services is large, and serving it can become a source of income for Russia.

Exhibit 18

Global demand for IT services
USD Billion*

<table>
<thead>
<tr>
<th>Year</th>
<th>Demand for IT services USD Billion*</th>
<th>CAGR 10.8%</th>
<th>1,010</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>327</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td></td>
<td>1,010</td>
<td></td>
</tr>
</tbody>
</table>

Offshore programming revenues
USD Million*

<table>
<thead>
<tr>
<th>Country</th>
<th>Offshore Programming Revenues USD Million*</th>
<th>Percent of GDP*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>1,750</td>
<td>70**</td>
</tr>
<tr>
<td>1998</td>
<td></td>
<td>0.01</td>
</tr>
<tr>
<td>India</td>
<td>1,750</td>
<td>0.46</td>
</tr>
<tr>
<td>1997-98</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*At market exchange rates
**Upper border of the range of estimates
Source: IDC; EIU; Press reports; Dataquest; Nasscom

Exhibit 19

Can Russia Become an Offshore Programming Haven?

<table>
<thead>
<tr>
<th>Criterion</th>
<th>India</th>
<th>Russia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large underutilized talent pool</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Low labor cost</td>
<td>○</td>
<td>-</td>
</tr>
<tr>
<td>Ability to communicate in English</td>
<td>-</td>
<td>○</td>
</tr>
<tr>
<td>Good track record and buyer relations</td>
<td>-</td>
<td>●</td>
</tr>
<tr>
<td>ISO 9000/SEI CMM certification</td>
<td>○</td>
<td>●</td>
</tr>
<tr>
<td>Access to good quality cheap telecommunications</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

- Important barrier
- Secondary barrier
- Not a barrier

Source: Interviews; Press reports

Exhibit 19

To leverage its low cost position in offshore business, Russian software industry needs to establish a positive quality reputation.

To a large extent this seems to be simply a question of time.
## Communication Structure in Offshore Programming Business

A skilled bilingual project manager or on-site representative should eliminate the "language barrier."  

<table>
<thead>
<tr>
<th>Home company</th>
<th>Offshore company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project manager</td>
<td>Project manager (offshore)</td>
</tr>
<tr>
<td>Group leader</td>
<td>Group leader (offshore)</td>
</tr>
<tr>
<td>Only if approved</td>
<td>Developer (offshore)</td>
</tr>
</tbody>
</table>

### Less successful communication structure
- Project manager
- Group leader
- On-site representative
- Only if approved

### Successful communication structure
- Project manager
- Group leader (offshore)
- Developer (offshore)

---

### Partnerships Between Indian Software Companies and Western Firms

**Number of partnerships in total and start date of specific examples**

Russia's track record in international software cooperation is still at the level of India, 1985.

- **Baan**
- **Cadence**
- **Oracle**
- **Microsoft**
- **Novell**
- **IBM**
- **Apple**
- **Bull**
- **Unisys**
- **Siemens**

Number of partnerships in Russia, 1998.
**NUMBER OF CERTIFIED SOFTWARE COMPANIES - 1999**

<table>
<thead>
<tr>
<th>ISO 9000</th>
<th>SEI CMM 5*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>1</td>
</tr>
<tr>
<td>India</td>
<td>109</td>
</tr>
<tr>
<td>US</td>
<td>156</td>
</tr>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

*Before starting to compete with India in offshore programming, Russian software industry needs to "pass the tests"*

*The main reason why Russian companies have not got the certification yet, is managers' misunderstanding of the role of ISO/SEI "blessing"*

*SEI CMM is a software-specific certification; level 5 implies top-class processes*

Source: International Standards Organization; Interviews; Software Engineering Institute
GDP PER CAPITA AND SHARE OF OUTPUT SPENT ON INFORMATION TECHNOLOGIES - 1997

Share of IT consumption in GDP

Percent

0.00%
0.50%
1.00%
1.50%
2.00%
2.50%
3.00%
3.50%
4.00%
4.50%
5.00%

0 10,000 20,000 30,000

GDP per capita
USD at ppp

Source: IDC, EIU
Exhibit 23
Synthesis and Implications

In this Chapter the results from the ten sector case studies are synthesized. It is organized in the following four sections:

- Approach: identifying the key barriers to growth with micro analyses
- Operational factors causing low productivity
- External factors preventing productivity and output growth
- Implications

This Synthesis Chapter builds up our detailed findings gradually from the bottom up. A shorter presentation of the main findings can be found in the Executive Summary Chapter at the beginning of this report.

APPROACH: IDENTIFYING THE KEY BARRIERS TO GROWTH WITH MICRO ANALYSES

There have been numerous studies explaining why Russia continues to decline seven years after the start of economic reforms. They collectively present the Russian government with an intimidating list of changes that, it is claimed, must be made. The aim of this study is to identify, through microeconomic analyses, a limited number of targeted steps that should be taken by the federal, regional and/or local governments to kick start sustainable growth in Russia.

To set the scene for our findings (developed in the following sections), we summarize in this section the main points from the Aggregate Analysis and Objective and Approach Chapters.

Russia’s continued economic decline

From the start of economic reforms in January 1992 till the end of 1998, Russia’s GDP per capita fell by as much as 40% (aggregate data are extremely unreliable) and is now at around 15% of the US level (Exhibit 1). Unlike in the most successful transition economies, notably Poland, output has failed to rebound following the initial drop (Exhibit 2). The investment picture is even more dramatic; during the same period, business investment dropped by around 60% and is now at less than 13% of GDP, with very little foreign direct investment. Private consumption fell relatively less, with the rise in imports of consumer goods, but income disparity has markedly increased. Unemployment is also on the rise at more than 12% in 1998, with many more workers engaged in subsistence forms of employment. As a result of these
negative evolutions in output and employment, labor productivity is now at less than 20% of the US level, compared to around 30% in 1991.

The decline in output and investment

The actual output decline is difficult to measure due to the difficulties in tracking improvements in quality and the production of the shadow economy, notably in services. The available estimates of the output decline between 1991 and 1998 vary from 25%, which is based on the drop in electric consumption, to 50%.

¶ The adjustment period (1992-94). The biggest drop in output (around 30%) occurred, as in all transition economies, in the first few years following basic economic reforms. In effect, Soviet products and services found it difficult to pass the market test following the price liberalization in January 1992 and the drop in government spending. Manufacturing and construction output dropped by more than 50%. Overall output in services remained stable, the drop in previously subsidized services like air travel and hotels was compensated by an increase in retail, personal and business services, which had been grossly underdeveloped during Soviet times (Exhibit 3).

¶ The current “muddling through” period (1995-99). Since 1995, the fall in output has slowed down, around a 10% decline for the period. Russia experienced a small economic growth in 1997 and “only” a 5% decline in 1998 despite the August financial crisis. This is by no means a satisfactory development when compared to other transition economies like Poland or Hungary. Business investment is still falling, less than 13% of GDP in 1997, and the share of foreign direct investment remains very small (0.8% of GDP compared to 7% in Poland in 1998). The rise in industrial production in 1999 should thus be seen as a one-time adjustment, which followed the August 1998 devaluation and the subsequent collapse of imports, as opposed to the start of a prolonged economic recovery.

Evolution of employment

Given the very low unemployment benefits, employment levels fell much less than output and investment.

After shadow employment has been accounted for, the overall employment level fell by “only” 10% since 1991. Employment went down in manufacturing (mostly in textile and machine building) and construction, by 30% since 1991. Employment increased in the new private services, especially in retail where it grew by more than 50%. It remained roughly stable in the other sectors of the economy (Exhibit 4). It should be noted that in addition to the 12% unemployment rate, many workers are now engaged in subsistence forms of employment, mostly in agriculture.
Most common explanations for Russia’s continued economic decline

There have been numerous studies on Russia’s economic problems. Put together they amount to an intimidating list.

The most commonly cited problems are chronic macroeconomic instability, poor corporate governance, lack of effective and independent legal infrastructure, lack of clear property rights, rampant corruption and increasingly powerful organized crime, poor infrastructure, prevalence of non-cash transactions, bankrupt banks, absence of land code, red tape, and inadequate management skills. The perception that Russia has a host of problems was confirmed by the 1999 World Competitiveness Report, which compiled the views of 4000 global business leaders. According to them, Russia is ranked last of the 59 countries surveyed (Exhibit 5).

This list of problems is too long for a government with limited means and political support to tackle effectively. There is no consensus on which ones to tackle in priority and the recommendations given to the government are often contradictory.

Identifying priority reform areas with extensive microeconomic analyses

The rise of the standards of living in Russia will be determined at the micro level by two complementary dynamics. First, labor productivity should increase in the existing assets, resulting in the freeing up of more excess labor. Second, new assets should be put in place to offer new, and hopefully more productive, employment opportunities to the workers released as a result of productivity growth in the old assets (Exhibit 6). Over the past year, a full time team of ten consultants and economists has systematically analyzed, for a representative sample of ten economic sectors (Exhibit 7), the main barriers to both productivity improvement in the “old Soviet assets” and investment in new productive operations. The analyses followed a three-step approach, which is described below (Exhibit 8). The main findings for each of these steps are synthesized in the rest of this Chapter.

Understanding the recent economic developments at the company and industry level

In order to identify the key regulatory reforms needed to provide managers and investors with the right incentives to invest and improve productivity, it is first essential to develop a very detailed diagnostic of operational performance; what is it that managers and investors should do and are not doing.

¶ Measuring sector level productivity. Because Russian statistics are often unreliable or incomplete, the sector level productivity measures had to be cross-checked with original surveys and more than three hundred company visits and expert interviews (Exhibit 9). In that way, it was possible to assess the evolution of labor productivity since 1992 for the old Soviet assets as well as the rate of entry (and productivity) of new entrants. Capital productivity has
also been estimated, from the bottom up, in steel and oil, the two most capital intensive sectors in the sample. The US has been chosen as the labor productivity benchmark for consistency purposes since, although it is not always the global best practice, it is consistently always close to it.

**Determining the causes of low productivity at the operational level.** For both old and new operations we first determine the reasons for the labor productivity gaps with the US, in terms of the difference in the way businesses are operating. Many operational factors can explain these gaps, such as, lower capacity utilization, less effective organization of functions and tasks, lower labor skills, lower scale, inferior technology or lower capital intensity (e.g. absence of automated packaging). In order to determine the relative importance of these factors, the team has relied on the accumulated local and global knowledge of McKinsey in addition to company visits and expert interviews.

**Analysis of industry dynamics.** In each sector, the level and nature of competition have been analyzed to verify if the most productive companies are also the most profitable. Indeed, in a market economy, productivity growth causes higher profits, at least for an interim period until competition catches up. Higher productivity translates into lower costs and/or higher value products and services. In addition, more productive (and profitable) firms have the means and incentives to expand and gain market share, increasing productivity for the whole industry. We will explain why this is not the case in Russia.

**Identifying the most important external factors leading to low productivity and investment**

The common view in Russia is that managers are taking advantage of poor protection of minority shareholders to “milk” the company assets as opposed to improving operations, while investment in new best practice operations are discouraged by the overall macroeconomic and political instability. Although this is somewhat true, microeconomic analyses and interviews have revealed that there are more fundamental micro regulatory/enforcement reasons, which explain the current behavior of managers and potential investors. These are sector level market distortions, which by creating a non-level playing field, allow low productivity companies in Russia to be more profitable (on a cash flow basis) than their high productivity competitors (developed in the third section).

**Deriving implications**

By looking at common patterns across our ten sectors, the common causes of operational gaps as well as the most important external factors causing managers and investors not to close them faster have been identified. Also, based on the sector case studies and the actual experience of countries slightly ahead of Russia in their economic development, namely Poland and Brazil, the sectors with the highest future growth potential have been determined. This then suggests which regulatory/enforcement issues should be tackled in which sectors first to kick start sustainable economic growth in Russia.
OPERATIONAL FACTORS CAUSING LOW PRODUCTIVITY

Labor productivity is very low in both the old (put in place before 1992) and the new operations. Productivity fell in the old assets because, in the absence of industry consolidation, the viable ones have not been upgraded, which would have allowed them to “pass the market test” notably in terms of product or service quality. Surprisingly, the new assets that have been put in place also achieve very low productivity levels (Exhibit 10). Despite high competitive intensity, the few new high productivity operations are struggling financially and this is not explained by the high capital cost. These findings are developed in turn below.

Low productivity for both the old and new operations

The average labor productivity (weighted by share of employment) for the ten sectors is 18% of the US, remarkably close to the economy wide level of 19% given by national statistics. For most sectors and operations (including the new ones), labor productivity does not exceed 30% of the US level.

Labor productivity performance of selected sectors

Labor productivity was at less than 40% of the US in 1997 in all the ten sectors, including the completely new software sector. We did find very high productivity (72% of the US) in project services, a subsector of software, and we will explain later why this is “the exception which confirms the rule”. Productivity in manufacturing is very low; four out of the five selected manufacturing sectors are at less than 15% of the US labor productivity level. The exception being the steel sector at 28% of the US level. Within services, residential construction and hotels are the worst performers at 10% and 18% of US productivity respectively. The growing sectors of food retail and general merchandising are only at around 25% of the US productivity level (Exhibit 11).

Productivity difference between the old and new operations

The old assets are on average at 17% of the US productivity level. Surprisingly, most of the new operations also have low productivity (30% of the US level on average). Only a handful of companies achieve close to best practice productivity levels (Exhibit 12).

There has been no new operations put in place among our five manufacturing sectors with the exception of three confectionery plants and a pilot UHT (Ultra High Temperature) milk processing facility at 70% and 100% of the US productivity level respectively. The best old operations do not exceed 45% productivity (the three large integrated steel plants), and even the few partially restructured operations that can be found in the other four manufacturing sectors do not exceed 30% productivity levels. In all these sectors, we found a long tail of old operations at less than 10% of the US productivity level, accounting typically for around one third of the sector’s employment.

Unlike in manufacturing, the presence of new operations is significant in the five selected service sectors. Their share of sector employment ranges from...
3% in hotels, around 20% in retail and residential construction, 65% in general merchandising and up to 100% in software. But only a handful of these new operations achieve close to best practice performance. These are the only hypermarket present in Russia in 1998, a few electronics retailers and five star hotels. Surprisingly, most of the new operations put in place in retail and residential construction do not exceed 30% productivity levels. The notable exceptions are the companies in the project services sub segment of software, which manage on average 72% of the US productivity level.

Operational factors causing low productivity in the old operations

The most important finding is that despite their productivity drop to 17% of the US level, from 30% in 1991, around 75% of the old assets’ capacity could achieve more than 60% of the US productivity level with new forms of organization and relatively modest targeted investments.

Causes for productivity drop

The drop from 30% to 17% of the US productivity level is a consequence of the drop in demand for the old Soviet products and services combined with the lack of industry consolidation and company restructuring (Exhibit 13).

- **Output/demand** for products and services provided by the old Soviet assets has dropped by 50% on average for the studied sectors. The drop occurred mostly during the adjustment period (1992-94). It can mostly be explained by the fact that Soviet products and services found it difficult to pass the market test following the price liberalization and the drop in government spending. Output failed to recover since then due to the lack of restructuring and upgrading in these assets (discussed later).

- The drop in defense spending, public infrastructure and housing investments led to a 60% drop in domestic demand for steel, which was not compensated for by a 40% increase in exports and therefore lead to an overall 40% decline in output. The production of cement, which is difficult to export, declined by 65%.

- Oil production declined by 40% because of lower domestic demand (notably defense and agriculture) and much lower exports to the ex communist bloc. Exports to hard currency countries are at their maximum given the current export infrastructure, which has not been enlarged.

- Output halved in dairy and confectionery because of an increase in higher quality imports (mostly in the case of confectionery) and an increase in the consumption of raw milk.

- Construction of the traditional panel type Soviet apartments also declined by more than 50%. This is due to the combination of three factors. First, overall demand for housing is depressed by the adverse demographic trends and low labor mobility
(discussed later). Second, the federal and local governments have been forced by very low tax collection to drastically reduce the amount of financing available for housing. Last, when Russians can afford to finance housing by themselves (in the absence of a mortgage market), they have shown a marked preference for brick single family houses.

- The number of hotel nights in the traditional Soviet hotels, which still account for 90% of the current capacity, has more than halved with the end of company subsidized vacations. The demand from traveling businessmen and salesmen has yet to pick up.

- The traditional Soviet stores in both food retail and general merchandising lost more than 40% of their market share to new formats offering greater convenience (kiosks and pavilions) or lower prices (open air wholesale markets).

Since employment in these old assets only went down on average by less than 10% as output dropped by more than 50%, labor productivity almost halved from an average of 30% to 17% of the US level. This reflects the fact that there were virtually no shutdowns of capacity, or outright layoffs. We estimate that on average, even assuming no industry consolidation, 15% of workers are redundant in the old Soviet assets, and that is before any improvements in the way functions and tasks are being performed. These “excess workers” are involved in production-volume-dependent activities such as packaging or room cleaning. Another 20% of workers would be made redundant if the industries were to consolidate around the viable assets at current output level.

- Capacity utilization is in old assets on average below 40%. Even the best steel and cement plants do not exceed 70%, while many of the worst operations are around 20% utilization. Only a few companies have started to rationalize production, but it almost never involves layoffs or shutdowns:
  - A large steel plant is closing down its obsolete open-hearth furnace and transferring the production to other debottlenecked lines.
  - One of the best practice cement producers is gradually transferring production from its worst to best plant.
  - A famous Russian confectionery manufacturer is increasing capacity utilization at acquired plants through advertising.
  - Only a few hotels and gastronoms have been shut down, either for safety concerns or to be converted into offices or minimarkets.

Reductions in staffing levels have been mostly due to natural attrition or, as in residential construction, by the fact that the (best) workers left for better-paid jobs in the new construction companies. Best practice companies in oil and cement are now reducing the
number of employees by spinning them off into new service companies.

¶ The picture across the board of manufacturing is very similar to the one depicted above. The most notable exception is textile, where employment did come down significantly by 43%, but output dropped by more than 80% (Exhibit 14).

65% productivity potential for 75% of the old assets

At full capacity utilization, 75% of the old assets’ capacity could reach more than 65% of the US productivity with modern modes of organization and some targeted investments (Exhibits 15 and 16).

¶ 25% of the old assets’ capacity are not worth upgrading either because they are sub-scale or rely on obsolete technology. These non viable assets account for around 30% of employment and 50% of the number of companies/plants. The fact that they remain in operation leads to lower capacity utilization of the viable assets, which discourages their upgrading. Also, there is more sub scale and obsolete capacity in the sectors where, as we will discuss, additional capacity is most needed, (more than 50% of capacity is nonviable in dairy and confectionery, whereas in steel and cement less than 20% is nonviable capacity) (Exhibit 17). Sub scale plants are a legacy of the policy of not reducing production capacity and of scattering food processing plants around every medium and large city to secure their supply of food. Obsolete technologies (e.g. open-hearth steel furnaces and wet/coal technology in cement) were still in place because of almost free energy, little emphasis on quality and lack of environmental concerns during the previous regime.

Most of the residential construction cranes are still operational, and cash strapped traditional construction companies have started to lease them. Only 25% of rooms are in hotels which are below the minimum efficiency scale of twenty rooms.

¶ Productivity of the old viable assets is plagued by antiquated modes of organization characterized by poor organization of functions and tasks and lack of marketing skills. Undoing old habits is difficult, especially for middle managers and older workers, but a few companies are showing that with time and effort it can be done. The reward is worth at least a 30% improvement in productivity, which, if generalized, would allow old assets to reach, assuming full capacity utilization, close to 50% of the US productivity level (Exhibit 18).

• The organization of functions and tasks has been following a Taylorist model with a functional orientation and high task specialization leading to significant downtimes. This mode is now in sharp contrast to modern best practice organizations split around separate business units (responsible for their profit and loss) relying increasingly on multi functional teams and high degrees of multitasking. Also, there are neither threats nor positive incentives for workers to increase productivity, and in
particular, to improve quality. Below are just a few examples from our cases:

- In steel, workers do not feel responsible for their equipment, which results in breakdowns or defects going unreported because of the fear of getting blamed for it. In best practice steel operations, workers are responsible directly for the well being of their equipment, and manage it through a specific management accounting system.

- In some cases, maintenance levels in the viable assets are not sufficient, leading to more frequent breakdowns and replacements. This is partly a legacy from Soviet times, when there were no constraints on the supply of equipment. In oil, for example, the lack of maintenance is reducing to ten years (compared to twenty in Texas) the average service life of drilling pumps and mud cleaning systems.

- Also in oil, Russian companies still rely on large teams of geologists as opposed to multidisciplinary teams (geologists, field engineers and financiers) better equipped to develop optimal depletion plans for each field.

- In dairy, idle workers in boiling would not deal with activity peaks in packaging.

- In residential construction, a newly appointed manager has increased the productivity of workers by 50% by basing compensation on satisfactorily completed tasks. The increase in the quality of panel type construction is noticeable when they are destined to cash paying customers (as opposed to government financed), which have had to spend a lot of time on the premises to make sure the job was being done properly.

- In gastronoms, the three-way over-the-counter system, as opposed to the single cash register/self service system which exists even in “mom and pop” stores in the West, is leading to 50% overstaffing and is forcing customers to line up three times for a single purchase.

- In hotels, a team of receptionists could absorb the functions currently performed by the “dezhurnayas” on each floor (e.g. key handling and surveillance).

- Another strong legacy is the lack of marketing skills, leading, for example, to high levels of product proliferation in confectionery (even taking into consideration the Russian consumer preference for a wide choice of confetti) and absence of effective booking systems in hotels. In most of manufacturing, the lack of in-house marketing and sales skills and customer knowledge has facilitated the milking of the old production assets by separate trading and wholesaling companies.
• These management shortcomings are further aggravated by the lack of basic management information, which is also partly the result of inappropriate accounting rules and practices.

• Even when the (new) top management is motivated to change the organization or working habits, it finds it very difficult to undo old habits, especially among middle management and older workers. New companies in confectionery, retail and hotels are, as a matter of policy, only recruiting young people with no prior experience in the industry.

¶ A few targeted investments in the viable old assets would be economically justifiable, even at the current high capital costs (around 30% real discount rate), if they could at least double capacity utilization. In fact in some cases (e.g. milk and cement), these investments, by raising the quality of the products and services, lead to an increase in capacity utilization (Exhibit 19). Only a handful of companies have committed to such investments so far despite the great potential for productivity improvement; we will explain in the third section why it is so.

• Most of the wet/gas cement plants should be upgraded to double their energy efficiency and be able to produce the Western standard 500-grade cement (two-year payback period assuming 60% utilization; double the current average). Only three cement plants have done so, so far, two in the Central region to meet the needs of high quality construction in Moscow and one in the Urals, which is now producing API-certified (American Petroleum Institute) high resistance cement for oil wells.

• In oil, higher quality bits would allow to double the drilling speed, if and when drilling of new fields re-starts. Also, the cumulative oil output from a given well could be increased by 30% over the remainder of its life by wider adoption of hydrofracturing and better in-fill drilling, both at relatively low incremental cost.

• Investing in the relatively low cost super-pasteurized technology would enable the large dairy plants to increase their milk quality and shelf life, thus strengthening their negotiating power with wholesalers, which would eventually help them increase capacity utilization.

• We found only one panel factory (in St. Petersburg) investing in flexible production line capabilities to expand its product offering, emulating Skanska, the Swedish best practice.

• Most of the gastronomes are in quite attractive locations and could be converted into convenient stores at reasonable cost (i.e. $50 000), 20% of gastronomes are even large enough to be upgraded and grouped into minimarket chains (e.g. 7/11), which would allow them to quadruple their productivity. Minimarkets account for less than 0.5% of food sales today in Russia.
Filling the remaining 35-point labor productivity gap (on average) would require more investments, difficult to justify given the very low labor costs and high capital costs prevailing today in Russia. Examples of such non viable investments include:

- Automated process management in steel.
- Conversion of wet/gas cement plants to dry/electricity.
- Telemetric oil well remote control equipment.
- Fully automated packaging in cement, dairy and confectionery.
- Transfer of confectionery production lines to single floor areas (as opposed to the current three to five store lay outs) to improve the process flow.
- Automated security and fire hazard equipment in the old hotels.

**Poor performance of the new economy**

Almost no new capacity is being added in oil, dairy and confectionery where it could help Russia improve its trade balance by both increasing oil exports and substituting for current food imports. The new companies, which have captured significant market shares in retail and residential construction, only achieve 30% of the US productivity level (Exhibit 20). This reflects the fact that best practice foreign companies are still quasi absent from Russia in most sectors. Foreign direct investment amounted to less than 1% of GDP in 1998 against 7% for Poland, where it is the key force behind the “Polish economic miracle”.

*Lack of new capacity*

Almost no new capacity in oil, food processing (by extension light manufacturing) and some sub segments of service sectors where demand exists.

In oil, new fields should be developed immediately if the world price of oil is expected to remain at above $12 a barrel. There are large proven reserves in Western Siberia, that would be economical to develop even with the current low drilling productivity of Russian companies and a punitive 30% discount rate (Exhibit 21). Given this and the potential of large labor and capital productivity improvements, Russia could double its oil production in ten years as opposed to ending up being a net importer as existing fields dry up (Exhibit 22). Oil revenues already account for 6% of Russia’s GDP, and as one of the few earners of hard currency, oil is a key sector in helping Russia to import the capital goods it needs to grow.

As illustrated by the confectionery case and recent positive developments in Poland, Russia should be adding much more new capacity in the food/consumer goods industry. The fact that almost no new capacity has been added in these sectors despite strong domestic demand (50% imports), a sizeable market and very low
labor costs is a dismal performance. This is exemplified by Poland, which received $5 billion of FDI in these sectors in 1998 alone, amounting to 3% of its GDP (compared to 0.1% in Russia in 1997).

¶ The same is true in the service sectors where demand for new and/or better offerings is clearly latent. In retail, super/hypermarkets account for less than 1% of food sales in Russia against 18% in Poland (growing fast) and 36% in Brazil (Exhibit 23). The picture is similar in Moscow despite relatively high income and car penetration levels. When given a chance, and despite a cost disadvantage against wholesale markets (see later), supermarkets still managed to capture close to 15% market share in Obninsk (Kaluga region). In hotels, the choice is mostly between five star ($250 a night) or zero star ($5 a night) hotels. Western hotel operators have failed to find investors to build the first two to three star hotels in Russia.

Where new companies have captured significant market share (residential construction and retail), they achieve, in most cases, less than 30% of the US labor productivity level.

¶ There have been a large number of new entrants in the new segments of brick apartments and single family residential construction (accounting now for around 35% of the sector’s output). Most of them have been Russian startups; their productivity is at less than 30% of the US level because of lack of scale (small housing programs), very little reliance on special trade and low capital intensity. No best practice Western firm has entered this segment yet, unlike in Poland where both Skanska and JW are present.

¶ Similarly in retail, new Russian specific formats emerged immediately (kiosks, pavilions and wholesale markets) and account now for around 40% of sales. But here again their productivity is low, at 25% of the US average (shaded bars in Exhibit 24). These new Russian formats are sub scale, have low capital intensity, and not being part of chains prevents them from achieving economies of scale, notably in purchasing. Even the few Russian supermarkets fail to achieve high productivity, not being confronted, as in Poland, with the global best practice retailers.

¶ The productivity of the new packaged software companies is at less than 15% of the US productivity level because they cannot achieve sufficient scale due to the fact that their production is being systematically pirated and sold at a fraction of the official selling price.

**Industry dynamics: the productive companies are not profitable**

In a market economy, competition is the driving force, which ensures that the more productive (profitable) companies grow at the expense of the least productive. Surprisingly in Russia, relatively high levels of competitive
intensity (following price liberalization and privatization) are not sufficient to allow/encourage best practice companies to invest and force the old assets to restructure. In fact, the most productive firms are often struggling financially. This is because they are subject to tougher laws and enforcement, a problem that is referred to as the non level playing field and which is developed in the next section.

Domestic competitive intensity is relatively high in nine out of the ten studied sectors. The exception being the hotel sector, which has yet to be privatized.

Competition is high in confectionery, food retail, general merchandising and software. In confectionery, more than in dairy, players are subject to the competitive pressure from imports and industry consolidators. Very rapid evolution of the format mix in both food retail and general merchandise is also a clear sign of high competitive intensity. Packaged software companies are under pressure from both imports and pirates. Even competition between pirates is fierce, forcing prices of pirated packages down to close to marginal cost. In the project services segment of software, Russian companies have to compete against locally established global best practice.

Competition is somewhat lower in steel, cement, oil and residential construction because of the high share of barter transactions and government procurements in these sectors leading to non-transparent prices. But relative to the West, this is somewhat compensated by the fact that the number of players is much larger in Russia, especially taking into account the very large number of intermediaries, which are interested in “dumping” these goods as fast as possible into the market. This is explained by the fact that such intermediaries are short lived and part of milking, tax evasion or energy subsidy schemes (developed later).

This relatively high competitive intensity was not sufficient to lead to rapid productivity improvements, even after output/demand started to stabilize in 1995. Indeed, and it is a paradox, the most productive players are often struggling financially and are thus prevented from growing and putting pressure on the less productive companies (Exhibits 25 and 26).

The largest three integrated steel plants, although more successful on the export markets, find it very difficult to take domestic market share away from the small and much less productive steel plants.

Although three of the best global cement producers are present in Russia, they have yet to commit to any significant investments and/or restructuring. This is despite the fact that they are under competitive pressure and that they know exactly what it would take to multiply productivity threefold.

The best practice green field confectionery plant is struggling to grow and to make profits. And although two other best practice companies in confectionery have been acquiring low productivity brown fields, restructuring has been limited so far.
Government financed housing programs are supposedly allocated through open bids, but new construction companies have yet to make any inroads into these markets, despite being three times more productive than the traditional providers.

In retail, supermarkets are not gaining any significant market share against the much less productive wholesale markets, kiosks and pavilions. In some instances, they even had to close down (Moscow and Cherepovets of Vologda region).

EXTERNAL FACTORS PREVENTING PRODUCTIVITY AND OUTPUT GROWTH

This paradox of struggling productive players despite relatively high competition is primarily explained by the fact that the government, through unequal regulations and/or enforcement, is distorting the playing field. This is the main explanation for the lack of productivity and investment growth in eight out of the ten selected sectors.

These market distortions are sector specific and take many different forms. For example, cheap energy is provided to nonviable steel plants and wholesale markets are subject to eight times fewer tax liabilities than supermarkets. Non-level playing fields are more important than macroeconomic instability in explaining Russia’s economic problems, in fact they contribute to it by leading to either more government expenditures (e.g. energy subsidies to inefficient manufacturing companies) or less tax revenues (e.g. tax favors given to inefficient service companies).

Other commonly mentioned problems such as poor corporate governance, labor market rigidities and poor infrastructure have also been found to be less important in explaining Russia’s economic problems.

Social concerns and corrupt practices discussed in the following section are often the fundamental underlying reasons for these distortions.

Exhibits 27 and 28 summarize these findings, which are detailed below.

Sector level market distortions: the most important barriers to growth in Russia

In nine out of the ten selected sectors, the non-level playing field is the key explanation for the lack of restructuring of the old assets and/or investments by best practice companies. The project services sub-sector of software confirms indirectly this finding, since it shows that in the rare cases where there is no market distortions, high productivity can be achieved in Russia (ca. 70% of the US level).

The sector level market distortions result from unequal laws and enforcement, originated in most cases by regional or municipal authorities in the absence of clear laws and/or strong control mechanisms at the federal level. This is the
consequence of either (sometimes legitimate) social concerns or corrupt practices.

Non-level playing fields are being established in many different ways, which tend to be sector specific. The most important ones have been found to be unequal taxes, unequal energy payments, privileged access to government procurements and land allocation, harassment through red tape, unequal enforcement of custom tariffs and lack of crackdown on counterfeits. Non-level playing fields further damage the economy through negative spill over effects between related sectors and also contribute to the macroeconomic instability.

Unequal taxes and enforcement

Despite gradual progress, nominal taxes remain too high, too complex, contradictory and filled with arbitrary exemptions. If all taxes were collected, government budget revenues would amount to 60% of GDP, against around a 20% cash collection in 1998 (Exhibit 29).

This state of affairs leaves the collection of taxes effectively at the discretion of tax inspectors and government officials, opening the door to major market distortions. Unequal tax payments mostly penalize productive companies, notably rule abiding foreign companies, which are the most likely to invest.

Furthermore, it affects, in particular, the sectors with the highest output growth potential, namely food and general merchandise retailing, dairy and confectionery.

¶ Investments in new large retail formats, such as hypermarkets, discount stores and shopping malls are being discouraged by the fact that they have close to a 15% of sales cost disadvantage against wholesale markets. The most important reason is the fact that large retail formats have to pay ca. 8% of sales in taxes versus less than 1% for the others. This is further aggravated by unequal enforcement of tariffs, counterfeits and privileged access to prime locations (land being still owned by local governments) (Exhibit 30).

¶ Non-level enforcement of taxes is also affecting all the other sectors and similarly tends to benefit the local low productivity incumbents like the small dairy and confectionery plants, which are accumulating tax arrears. This is particularly true for the non-viable heavy manufacturing plants. But for them, paying only for a fraction of their energy liability is an even greater source of subsidy.

¶ The law on Production Sharing Agreement (PSA), which provides a basic tax framework for the development of new oil fields, was finally passed in 1999. However, it is still not functioning since most of the normative acts (enabling legislation on the level of ministries and state departments) have yet to be created and approved.

Non level energy payments

This factor has been found to be most important in the two heavy manufacturing sectors, steel and cement, for which energy (in the form of gas and electricity) is the main component of costs (25% and 50% for steel and
cement respectively). The total (net) stock of customers’ arrears to Gasprom and UES (gas and electricity) amounted to 7.5% of GDP at the end of 1998. Similar distortions prevail for oil, where oil exports are limited to force cheap oil to be delivered to “strategic customers” like defense and agriculture. These oil export limitations discourage investment in new oil production.

- **Non level playing field in gas and electricity.** Like for taxes, the playing field is tilted in favor of the obsolete (very low energy efficiency) steel and cement plants. These companies pay for only a fraction of their gas and electricity bills (through arrears or advantageous barter deals) to the local gas or electricity distribution companies, which are controlled/owned by the local governments. (Exhibit 31)

- **How it works.** Local energy distribution companies accumulate arrears to Gazprom and UES, which by law almost finds it impossible to bankrupt them. Gazprom in many cases cannot cut off the gas supply to these gas distribution companies without cutting off the whole city, which would be very damaging politically. Gazprom on the other hand has gas pipelines going directly to the largest manufacturing plants. Being the most productive (energy efficient) and under a credible threat of being cut off, these large companies end up paying close to the full price for their energy.

- **Why it works.** Gazprom can sustain not being paid by the local gas distribution companies and UES (60% of Russian electricity is produced with gas turbines) for two reasons. First, it passes on a large part of its arrears to the federal government by not paying its full taxes. Second, the list price for gas seems high as compared to costs, especially given the fact that Russia is, at least for now, demand constrained for its gas exports (low opportunity cost). In addition, the current system of high gas prices and arrears gives enormous political clout to Gazprom and, according to interviews, leaves the door open to corrupt practices all along the energy supply chain.

- **The main economic consequence** of these energy distortions is that the most productive plants cannot gain market share at the expense of less productive plants. They cannot even acquire them (to shut them down) since these small plants have significant arrears to local governments (which are de facto the owners). The resulting low capacity utilization makes it uneconomic for the better plants to upgrade their equipment. Another indication of how important these energy subsidies are is the fact that many plant shut downs did occur in the sectors where energy is only a small component of costs like textile and machine building.

- **As for oil,** the Russian government is today controlling and limiting access to export pipelines, through the state monopoly Transneft. In doing so, it makes sure that oil companies supply strategic but poor customers, like the defense and agriculture sectors. Oil companies are compensated with tax offsets of dubious value, which are clearly
a second best alternative for them to exporting more crude oil. The net effect of these export limitations is to discourage any significant investment in increasing oil production.

Non equal allocation of government procurements and land

This factor was found to be the most important in the (very large - 5% of GDP) residential construction sector and, to a lesser extent, in steel and cement (contract allocation) and, as discussed above, in the retail sectors (land allocation).

More than half of residential construction is still government financed in Russia (directly or through large institutions and companies close to the government). Although this construction is officially submitted to open tenders, contracts almost invariably end up being carried out by the former traditional construction companies (Exhibit 32).

These companies build large panel type apartment buildings which are both less popular and more expensive to build (these companies have very low productivity) than single family houses. Beyond the possibility for these tenders to be skewed, new construction companies are most of the time de facto excluded because they do not have the equipment required to build multi apartment buildings as specified by the terms of the tender.

Here again, local governments have the same social/political incentive to keep employment levels at the traditional style construction companies (3% of the total workforce). Local governments can rely on the barter chain going all the way to the federal government budget through construction companies, cement plants, UES and Gazprom to pass on the additional construction costs. In addition, it has no incentive to develop social housing on large suburban land lots which would require significant additional development costs (roads, electricity, sewage, etc.) for which it has no secured source of financing, the property tax being insufficient.

A local government would purchase steel from the local steel plant to develop local infrastructure. By which means, the local government can both keep the plant busy and get cheap steel since the plant would be allowed not to pay its taxes and energy bills.

Similarly, local governments can use their control over land (still not privatized due to the outdated nature of the federal land code) to favor friendly companies or block threatening new entrants (residential construction, retail and hotels).

Main sources of barter in Russia: energy subsidies, tax evasion and government procurement

Much more than macroeconomic instability, these are the factors behind the prevalence of barter in the Russian economy; in 1998 there was 50% of barter transactions in the manufacturing sectors and construction. Barter is bad in itself because it leads to high transaction costs (e.g. steel plants are busy
selling cars) and reduces price transparency, which affects fair-price-based-competition.

¶ Paying for energy through barter deals is a convenient way to hide the extent of the energy subsidies. In addition, managers take advantage of weak corporate governance in the gas and electricity companies to set up (either directly or through close relatives) profitable and short-lived trading companies responsible for clearing barter deals.

¶ In addition, companies receiving energy subsidies, which tend to be in tax arrears, also resort to barter deals to avoid 100% marginal tax rate on any cash in the bank. This is the result of a law which forces companies in tax arrears to use only one bank account with a preemption right to the account balance given to the tax authorities.

¶ Finally, the government itself is at the origin of barter deals in the form for example of tax offsets (disadvantageous to the government like in the case of oil supplies to defense) or land and flat allocation to construction companies building social housing. There are no good economic reasons for the government to rely on barter deals, since it could for example, levy the oil taxes in cash or sell its existing stock of land and empty flats to finance new housing on a cash basis. Again, as for the energy subsidies, the popularity of barter deals originated by the government seems to stem from both, the possibility to extract more out of the federal budget (e.g. cheap energy for social housing cement), and the personal enrichment opportunities they provide by their opacity.

¶ Macroeconomic instability, often mentioned as the key reason for the high share of barter in the Russian economy because it leads to high transaction costs through banks, is a much less important explanatory factor for barter. In fact, macroeconomic instability did not lead to much barter in the non-energy-non-government related sectors such as food processing and food retail, nor did it lead to much barter in Brazil when it had hyperinflation.

Red tape

Red tape and regulatory harassment are among the main threats used by local governments to discourage best practice firms from restructuring existing viable plants in dairy and confectionery or block new entrants in retail. This red tape is facilitated by the fact that Russia is still subjected to a maze of archaic regulations with respect to, for example, fire and health safety regulations, where enforcement is very much under the control of local governments. The level of red tape is, according to a survey, two to three times higher in Moscow than in Warsaw (Exhibit 33). Red tape is also preventing the entry of smaller Western oil field servicing companies, which results in higher prices for such services in Russia. This is a problem even in packaged software, where the most successful Russian company is subject to regulatory harassment on its exports.

Lack of property right enforcement


The lack of property rights enforcement makes it difficult for productive companies with good marketing skills to acquire or develop brands (confectionery) or for packaged software companies to fight against piracy (Exhibit 34). Lack of crackdown on counterfeits and illegal imports in wholesale markets is another source of their undue cost advantage vis a vis supermarkets.

Lack of effective judiciary and appeal mechanisms

It is difficult for the productive companies to appeal against these unfair treatments by the government either because the law itself is non-reasonable/enforceable (e.g. too high taxes) or because the appeal mechanisms are still underdeveloped and often lack independence from the government. The current status of the bankruptcy proceedings illustrates both of these problems. First, although there has been good progress in drafting an appropriate bankruptcy law, special clauses now limit its effectiveness. The law sets up a specific process for large (socially sensitive) companies, by which they can be placed under the control of the regional executive branch of government for up to ten years. Also, the law determines that local energy distribution companies virtually cannot be bankrupted. Finally, the experience so far shows that arbitration managers put in place by the bankruptcy arbitration courts are often the previous company managers or persons linked to the regional government. This reflects the fact that, being local and underpaid, judges are subject to undue local influence. The lack of legal commercial contract enforcement has also been a problem, but private parties are finding ways to work out secured transaction arrangements (e.g. cash on delivery) or resort to arbitration.

Sector with no market distortions

The project services sub-sector shows that when there are no market distortions, high productivity can be achieved in Russia, ca. 70% of the US. Project services is a rare case of level playing field because it is a completely new sector with no incumbents to be protected and, being based on customized programming, it is not susceptible to piracy.

Macroeconomic and political instability

It has been one of the main barriers to productivity growth in only oil and hotels and was somewhat secondary for the other eight sectors in the form of a high discount rate (i.e. around 30%) applied to investment decisions. Solving the non level playing field issue would help Russia reduce its budget deficit (the key source of macroeconomic instability) and help improve foreign investors’ perception of Russia (lower country risk).

High budget deficit leads to macroeconomic instability

Macroeconomic instability can take various forms, and Russia experienced all of them, such as high inflation, very high real interests rates, financial crisis in the form of brutal devaluation and government default (Exhibit 35). They all stem from the same fundamental problem, the chronic budget deficit. If the budget deficit is higher than the level with which domestic or foreign investors are comfortable, it leaves the government with two equally bad
alternatives to solving the problem. The first one is to print money, which led to hyperinflation, as experienced in Russia from 1992 until 1995. The second one is to offer very high real interest rates, throwing the government in a borrowing spree, and making it extremely vulnerable to any external shock. This is what happened in late 1997 with the Asian crisis and the drop in oil price. Faced with worried investors, the government had to raise the interest rate on government bonds (GKOs) to very high levels. When it became clear that this was not a sustainable solution in the context of insufficient progress in tax collection, the access to additional financing got cut off and the government had to devalue and default on its debt (August 1998). Also, the lack of trust in both the currency and the banking system limits the possibility for the government to finance its deficit with domestic savings.

Sector level market distortions are a fundamental cause of the chronic budget deficit

The recent progress made towards balancing the budget should be little cause for comfort. More than 40% of budget revenues still originate from oil and gas, the prices of which have soared in 1999, and key government expenditures, like the wages of law enforcement officials, are still grossly inadequate.

Government expenditures are increased by large, poorly targeted and implicit federal subsidies to doomed manufacturing enterprises, while tax collection or official rent on land from the inefficient but well-connected service firms is at low levels.

The consequences of macroeconomic and political instability

The main consequence is to raise the effective cost of capital for all players. Domestic companies have difficulties accessing local financing pools as the government is crowding them out. Foreign companies, with access to cheap foreign sources of capital, increase the required rate of return on investments in Russia since future cash flows, demand level and exchange rates are difficult to forecast. Private investors (both foreign and domestic) are also deterred by the prevailing political instability, which leads to regulatory uncertainty (e.g. risk of re-nationalization). From our cases, we have estimated the cost of capital in Russia, for an average risk, to be around 30% compared to 10% in the West. Not surprisingly, the two cases where high cost of capital acted as a strong deterrent to productivity/output growth are the ones in the most need of long term investments (more than five years), namely oil and hotels. But in all sectors, we found many positive NPV investment opportunities, even with a 30% discount rate, not being carried out because of the micro factors leading to non-level playing fields.

The development of new oil fields is clearly difficult to expect in the current Russian macroeconomic context, since these are billions of dollars investments with five years of negative cash flow.

In hotels, a 30% discount rate makes the construction of the missing two to three star hotels a losing proposition. Best practice foreign operators have been unable to convince investors of such ventures. Unlike for the five star segment, the level of demand is less clear, especially if high prices had to be charged to reflect the higher cost of capital.
This factor was less important for the other sectors. The August 1998 financial crisis did act as a deterrent to foreign best practice companies about to enter the food retail and dairy industries. It also affects the residential construction sector, since the impossibility of providing mortgage finance in an unstable macroeconomic environment is limiting the demand for mass market single family houses, limiting the output and productivity growth of the new residential construction companies. Finally, high capital costs contribute, together with low labor costs, to make some investments such as green fields (dairy and confectionery) and packaging automation (cement and confectionery) non-economic.

**Negative spillover effects between related troubled sectors**

Productivity and investment are impeded in a sector by problems either in an upstream supplier industry or a downstream customer industry. These effects have been found to be very important in four of our sectors and somewhat important in three others. This is thus another important indirect negative impact of sector level market distortions.

**The food chain**

Negative spillover effects are running up and down the all-important food chain. Large organized retailers, who tend to purchase directly from food processors, would have provided an alternative to monopolistic wholesalers for strangled food processors. Similarly, more best practice food processors would help, like in Poland, the restructuring of the agricultural sector (e.g. contract growing agreements).

**Software**

Although software has been found to be the most productive of our ten sectors (38% of the US productivity level), it is also the smallest; employment in Russia is at much less than one percent of the US level. The growth of software (both packages and services) depends primarily on the demand from business customers. Thus, the regulatory/enforcement problems discussed above are, by discouraging productive business investment, indirectly slowing down the growth of the software sector (Exhibit 36).

**Other examples**

In the hotel sector, high import tariffs on construction materials lead to high hotel construction costs while demand is restricted by the lack of travelling salesmen as well as by the underdeveloped tourist sector. In residential construction, the lack of special trade companies is forcing construction companies to perform most functions in-house, which leads to lack of skill specialization and sub-optimal labor utilization. In the oil sector, obscure barter deals lead to the continued provision of low quality cement and drill bits, which contribute to the low productivity of oil production.
Less important external factors

Poor corporate governance, restrictions on labor mobility and poor infrastructure have been found to be much less important explanatory factors of Russia’s economic problems than the ones leading to non-level playing fields.

Poor corporate governance

Included under this heading are, government ownership, lack of minority shareholders’ rights and manager-controlled companies. Except for government ownership in the hotel sector, none of these factors have been found to be the primary cause of sub-optimal operational performance. Nevertheless, more progress on these fronts, notably the quick resolution of the current shareholder battles in the oil sector and the passing of stronger minority shareholder rights would contribute to restore investors’ confidence in Russia.

Federal and local governments fully or partially own 83% of Russian hotels. Consequently, and not surprisingly given the current overall employment picture, nothing in the management contracts gives hotel managers the incentives to reduce employment levels through layoffs of excess workers (cleaning ladies) or changes in the organization of functions and tasks (dezhurnayas). Many local governments did try to privatize their hotels, but could not obtain a “good” price, a reflection of the current over-capacity in the industry and high capital costs. More generally, it can be seen that there has been almost no restructuring of the remaining government companies, electricity utilities, railways, etc.

Privatization to insiders combined with a lack of legal recourse for minority shareholders, is delaying the restructuring of heavy manufacturing (steel and cement) and discouraging investment in oil by leading to long battles for corporate control and encouraging milking. In effect, managers with a controlling stake had, in the absence of strong minority shareholder rights, the incentive to transfer all of the company profits/cash to a trading company wholly owned by them. But, fights for corporate control and milking are now coming to an end for the most viable assets (the large three integrated steel plants, the best two oil companies, the best three cement plants and the best dairy and confectionery plants). Milking is still prevailing in the nonviable assets, for which it is one of the rational “strategic” options. The real problem resides in the continuous flow of implicit government subsidies, which makes the endless milking of these assets (with the complicity of local authorities) a more attractive proposition to managers than selling cheap to industry consolidators seeking to shut down excess capacity.

Restrictions on labor mobility

Although they pose a very serious social issue, the current restrictions on labor mobility in Russia are not for the time being a serious barrier to economic growth given the amount of available labor, even in Moscow (idle
construction workers in state housing). Addressing the problem, notably in the nonviable company towns, would nevertheless help release the current pressure on local governments to oppose restructuring.

¶ **Nature of the problem.** The current labor registration system (Propiska) combined with weak tenant rights effectively restricts labor mobility. Workers need to be registered where they live in order to enjoy their rights to numerous social benefits like healthcare, childcare and pensions. To change legal residence, especially between regions (of which there are 89), a worker needs to either buy a flat or have his landlord sign him up. For most workers, buying a flat is not an option, given the absence of mortgages and the fact that current flats (in stranded company towns) are likely to be worthless. Also landlords are very reluctant to sign them up, because once permanently registered, the tenant becomes virtually impossible to evict and temporary registration is not enough for the tenant to qualify for many essential social benefits. It is thus very difficult for a worker to leave his stranded town to look for a job in a more promising place like Moscow, unless he is willing to be unregistered. This explains why there is little migration to Moscow, despite low unemployment and much higher wages.

¶ **Direct impact on labor productivity.** Workers in stranded towns thus have little alternative but to accept a reduction in wages, relying on subsistence agriculture to survive. This downward wage flexibility reduces in principle the incentives for managers to lay off. But in the case of the nonviable steel and cement plants, the issue is secondary to the energy subsidy, which prevents them from shutting down.

¶ **Indirect impact on local government actions.** These restrictions on labor mobility, combined with the fact that the federal government is not paying enough unemployment benefits, help explain why local governments subsidize their local plants and oppose restructuring.

**Lack of an effective banking system**

The lack of trust in both the Ruble and the banks (especially following the August 1998 debacle) deters people from making their savings available for subsequent lending by the banks (savings are mostly kept at home in dollar notes). Although this is certainly bad news for Russia, it should be noted that the virtual absence of long term lending in Poland did not prevent it from achieving strong economic growth due to foreign direct investment and retained earnings, the main source of business investments in the West.

**Poor infrastructure**

Surprisingly, the combination of great distances and poor infrastructure has not been found to be an important explanatory factor of the lack of productivity and investment growth in Russia. It only shields a few isolated manufacturers of bulky products like steel and cement from more productive players. Most of the population and production facilities are west of the Urals, where distances are much shorter. Trucking is now well developed,
and most of Western Russia can be reached fairly quickly and cheaply despite the poor state of the roads.

* * *

Overall, the facts show that inequalities in the rules of competition at the sector level are the main roadblocks on the path of economic growth in Russia. Notwithstanding corrupt practices or plain disbelief in the market economy, many of these distortions have been put in place by the government to meet social objectives. Unfortunately, they keep Russia at a very low level of economic performance and thus damage the social provisions they were intended to improve.

IMPLICATIONS

We discuss in this section:

¶ Russia’s economic growth potential without sector level market distortions

¶ The policies and dynamics that could unlock the current system of intertwined social, political and financial interests.

Growth potential without sector level market distortions

The non-level playing fields, especially in the high growth potential sectors prevent Russia from rebounding. They discourage foreign direct investment, which would be the key source of foreign equipment and managerial skills needed to increase productivity and put in place new capacity. Such investment would also provide new job opportunities for workers currently stranded in heavy manufacturing. Based on the ten sector case studies and the experience in Poland, (productive) business investment could reach 19% of GDP in Russia if the playing fields are leveled, at least in the high growth potential sectors. With such a business investment rate, around 8% annual economic growth would be within reach, allowing standards of living to double in less than ten years.

Sectors with the highest growth potential

As discussed in the second section of this Synthesis, much more productive new capacity should be added in oil, light manufacturing and services. We have estimated the relative output growth potential of Russia’s economic sectors, based on Russia’s starting point and the experience of other countries slightly ahead in their economic development (namely Poland and Brazil). This analysis confirmed that in addition to oil, light manufacturing (e.g. automotive, consumer goods and food processing), trade, business and personal services have the highest growth potential (see shaded bars in Exhibit 37).

Eight percent economic growth possible with foreign direct investment
Labor productivity growth and an increase in labor inputs can both contribute to output growth. We have seen that productivity can be increased with relative ease in the old assets (see section Operational factors causing low productivity) and that there is a large number of unemployed and idle workers. Thus, the main constraint on Russia’s future growth is its ability to create productive new jobs. This, in turn, is limited by the level of business investment and hard currency required to finance the purchase of capital goods (many of which have to be imported). This investment is required both to upgrade the viable old assets and put in place additional (productive) capacity. Based on the ten sector case studies and the experience in Poland, leveling the playing fields, at least in the high growth potential sectors, could stimulate a business investment rate equal to 19% of GDP (with a large inflow of foreign direct investment), enabling Russia to grow at 8% a year.

¶ 19% of GDP business investment rate possible. Russia could reach this 19% investment rate (up from 13% in 1997) by leveling the playing field in the high growth sectors, with most of the increase coming from foreign direct investment (Exhibit 38). This is a higher level than achieved by Poland in recent years - around 16% of GDP business investment, but we believe it is possible, firstly because Russia could count on a very large influx of foreign investment in the oil sector (Exhibit 39). In addition, favorable economic policies would add to the available flow of investment funds by helping Russia to reschedule its foreign debt and recover some of the capital which fled the country since 1992.

¶ The benefits from foreign direct investment

- More foreign direct investment would help Russia achieve macroeconomic stability. FDI inflow could finance the capital goods imports necessary for rapid growth and as production starts, reduce consumer good imports. The experience from other countries shows that, as long as the conditions remain favorable, FDI tends to develop local sourcing and to reinvest retained earnings in the country, resulting in a continuous net positive flow of foreign investment. Economic reforms, leading to a fair competitive environment, together with investment incentives, have attracted large FDI inflows to Poland. This has allowed Poland to achieve, in the absence of long-term lending by banks, fairly high business investment levels (around 16% of GDP), sustain large current account deficits, increase its foreign exchange reserves and weather the storm from the Asian and Russian financial crises.

- Foreign direct investment will also help Russians to acquire best practice skills more rapidly and make sure that the investments are productive. The experience from other countries also shows, that in addition to recruiting locally for most of their workforce, global best practice companies aspire to develop local management talent as rapidly as possible.

- Despite these great potential benefits, there has been a lot of resistance against FDI in many countries. One reason is national
pride, a desire for growth derived from local companies. While natural, rejecting foreign investment would be costly for the Russian economy. Today more and more companies are global and, surprisingly, the US is one of the largest recipients of foreign direct investment. One objection is that foreign companies come to “milk” poorer countries. This can be a problem when foreign manufacturers produce under the protection of, for example, high import tariffs and repatriate high profits. It is thus very important to provide the conditions for maximum (fair) competition, in order to force all companies (Russian and foreign) to continuously improve and invest and to avoid abnormally high profits based on undue favors.

Around 8% economic growth possible with 19% of (productive) business investment. Sixteen percent of GDP business investment has allowed Poland to grow at around 6% a year since 1994 and 13% business investment in 1997 allowed Russia to experience a small growth. Nineteen percent of productive business investment should bring high economic growth to Russia, around 8% a year, for two reasons:

- First, Russia has a lot of potentially viable spare capacity. Upgrading it would allow production in these assets to increase by around 40% on average (Exhibit 40) for relatively modest investment, which would amount to around 5% of GDP for the next five years (Exhibit 41).

- Second, less investment would be required if Russia relies on best practice modes of operations. For example, adopting new drilling techniques would allow oil companies to use half as much capital for new wells.

The Novgorod region of Russia is a rare positive example of what can be done in today’s Russia by regional governments. It managed to attract more foreign direct investment than almost any other Russian region, including nearby St. Petersburg, by removing red tape, facilitating access to land and offering tax holidays to investors. As a result, the region has enjoyed economic growth since 1995, and over half of industrial output is now coming from productive foreign companies (Exhibit 42).

Key necessary economic reforms. We concluded that the main barriers to economic growth, unequal conditions of competition, tend to be industry-specific. Thus, they have to be removed on a sector-by-sector basis. Given the political difficulty of reform, this process probably should start with the high growth potential sectors.

Overcoming barriers to economic reforms

Despite the attractive prospect of rapid economic growth, the drive towards establishing a sound market economy in Russia has essentially stopped since 1995. There are three fundamental explanations for this: social concerns,
corruption and lack of information. We discuss below how these factors interplay to lock Russia at the current level of economic performance and what could be the ways to unlock it.

Social concerns

Many of the market distortions are kept in place in the name of preserving existing employment. When justified, these social concerns would be better addressed with a system of explicit targeted subsidies to the workers, rather than through the current mechanism of implicit subsidies to companies that also serves to enrich government officials and company managers.

¶ Ill founded social concerns. Based on our understanding of labor productivity gaps in Russia, we have estimated how fast productivity could grow in the sectors we studied once the market distortions have been removed. These estimates are in line with what other countries have experienced (Exhibits 43 and 44). Combining these with the relative output growth estimates implied by the analysis shown on Exhibit 37, we found that employment should continue to grow in services and remain roughly stable in light manufacturing and construction (Exhibit 45). Thus, workers who would lose their jobs as a result of strong productivity growth or shutdowns in these sectors should be able to find new jobs of similar profile, especially if they are around large urban areas. This is what is happening in Poland, with employment growing in all the high growth potential sectors, including in light manufacturing (Exhibit 46). As a result there are no social reasons to keep in place the following barriers which have been identified in the cases:

• Red tape limiting the restructuring of potentially viable dairy and confectionery plants. In light manufacturing, on the one hand, employment should be expected to come down for some basic products like milk, where Russia has twice as many employees per capita than the US. On the other hand, new jobs should be created in the manufacturing of consumer goods, not produced in Russia before, like yogurt. In any case, because existing light manufacturing plants are relatively small and scattered around large cities, the risk of stranded workers in company towns is much less than in the case of oil and heavy manufacturing.

• Directed housing contracts to preserve employment levels in the traditional (panel type) housing construction companies. The first direct and short term employment impact of increased business investment is to create new jobs in infrastructure, industrial and commercial property construction. This effect is significant; it allowed in Poland employment in construction to remain constant despite the collapse of residential construction.

• Tax and other advantages given to open-air wholesale markets, kiosks and pavilions. Despite the low productivity of most formats, employment in retail is still relatively low in Russia. It is 25% lower than in Poland and 50% lower than in developed
economies. Output should therefore be expected to grow faster than productivity, especially in general merchandising where consumption and service levels tend to rise at a faster rate than GDP.

- **Barriers in other high employment growth potential sectors.** As shown by the software case, employment growth in business services will largely depend on the growth of the other sectors. Best practice FDI, in particular, tends to be by large users of business services. Another largely underdeveloped business and personal service sector is finance and insurance, which already accounts for 6% of service employment in Poland against less than 2% in Russia.

**Alternative for addressing well founded social concerns.** In the heavy manufacturing sectors, productivity would grow faster than output, leading to substantial employment losses (Exhibit 47). This prospect does raise serious social issues, especially in doomed company towns, because workers’ mobility is restricted by the registration (propiska) system. For example, 40% of the nonviable steel plants account for more than 15% of their town’s employment (Exhibit 48). In such cases, targeted subsidies, preferably given directly to the workers to help them relocate, would be much more efficient than the current barter-based and corrupt system of implicit federal subsidies to unproductive companies. Doing this would allow the removal of the following distortions:

- **Unequal energy and tax payments** slowing down modernization of viable industrial assets.
- **Limits on oil exports** to force cheap oil to be supplied to agriculture and defense, discouraging investment into new oil production.

**Corruption**

Our interviews with companies confirmed the common view that pursuit of personal financial gains within the government and government-related agencies or companies is pervasive in Russia. Like in many other developing countries, the combination of arcane laws, government control over key assets, low salaries of government employees, and weak enforcement and control mechanisms, provides the means and incentives for corrupt practices. We believe that in many cases it is, together with social concerns, the main reason for the market distortions to be kept in place. It also directly affects the economy by discouraging an increasingly large number of best practice companies from coming to Russia, since they are under mounting pressure from their governments and shareholders not to deal with corrupt countries as a matter of principle.

**The conventional wisdom** on how to fix corruption suggests that the highest level of government, remaining untarnished, should initiate the crackdown: “the fish rots from the head”. The salary level of key government officials needs to be increased, laws against
conflict of interest passed and strong independent controls need to be put in place together with credible punishment.

*Based on our case studies*, we believe that a potentially more effective way to reduce corruption in Russia would be to remove the numerous means by which the federal and local governments can interfere with the markets to extract economic rent. This would entail lower and simpler taxes, streamlined red tape, reduced scope for government procurements (e.g. social housing) and privatization of remaining government assets (e.g. land and hotels).

This suggests that corruption is not only a cause of Russia’s current economic problems but also a consequence of incomplete market reforms. But the push for market reforms will have to come from below, since there is a high risk of collusion between corrupt officials and businessmen, who will work together to preserve the existing market distortions “in the name of social objectives”.

*Lack of information*

Such vicious dynamics have been broken in other countries through the democratic process with the election of political leaders committed to reduce corruption and to push market reforms. We hope to contribute a useful fact base to future policy debates, as we show with micro economic analyses:

- The extent of the performance gaps for both the old and new economy
- The absence of fundamental obstacles to high economic growth in Russia
- The economic sectors with the highest growth potential
- The often underestimated importance of services in stimulating overall economic growth (e.g. supermarkets triggering positive spillover effects down the whole food chain)
- The key role that could be played by foreign direct investments, especially in a “strategic” sector like oil
- The most important economic reforms (to be pursued in priority in the high growth potential sectors)
- How these economic reforms can be made compatible with the pursuit of legitimate social objectives
- How these economic reforms would help reduce the scope for corrupt practices
- The key role and responsibility of local governments in fostering economic growth.
The changes described above require painstaking efforts in the political process to overcome conflicts of interest and reach compromises. Today’s advanced democracies have taken decades to achieve good economic policy, both at the macroeconomic and sector levels. However, the result has been that they have achieved the highest levels of economic performance in the world. Russia can benefit from the hard lessons learned by others, but for historical reasons, the obstacles in Russia are more difficult. How to lead a democratic political process to overcome these obstacles is beyond the scope of this project and beyond McKinsey’s experience and expertise. However, we have found no structural constraints on the economic side that would prevent Russia from quickly joining the ranks of the advanced economies.
GDP PER CAPITA AT PURCHASING POWER PARITY
US level = 100 in 1995

*Middle of estimate ranges
** 1997 figure:16
Source: Goskomstat; BEA; WEFA; OECD, EIU

GDP PER CAPITA AT PURCHASING POWER PARITY
US level = 100 in 1995

Source: Goskomstat; Polish Central Statistical Office; OECD, EIU
EVOLUTION OF RUSSIA'S OUTPUT BY SECTOR
Percent of 1991 level

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*Includes restaurants and catering
Source: Goskomstat

Adjustment period  Muddling through

Probably underestimated

EVOLUTION OF RUSSIA'S EMPLOYMENT BY SECTOR
Percent of 1991 level

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>14</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>30</td>
<td>25</td>
<td>21</td>
</tr>
<tr>
<td>Construction</td>
<td>12</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Transport/communications</td>
<td>8</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Trade*</td>
<td>8</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>Other services</td>
<td>28</td>
<td>28</td>
<td>29</td>
</tr>
</tbody>
</table>

*Includes restaurants and catering
Source: Goskomstat
PERCEPTION OF TOP 4,000 GLOBAL BUSINESS LEADERS ON RUSSIA, 1999

Overall competitiveness rankings, 1999

Top 5
1. Singapore
2. US
3. Hong Kong
4. Taiwan
5. Canada

Bottom 5
55. Bolivia
56. Bulgaria
57. Zimbabwe
58. Ukraine
59. Russia

Russia's ranking by topic
Out of 59 countries

- Labor: 25
- Technology: 55
- Openness: 56
- Finance: 58
- Infrastructure: 58
- Management: 58
- Institutions: 59
- Government: 59

Source: Global Competitiveness Report; World Economic Forum
RUSSIA’S GDP PER CAPITA TREE
US = 100 in 1995

Exhibit 6

Output per capita

Employment per capita*

Labor productivity

Russia’s challenges

*Based on hours worked per capita
** In 1998 - 15%
Source: Goskomstat; BEA; EIU; McKinsey analysis

Exhibit 7

SECTOR COVERAGE OF ECONOMY IN 1997
Percent, share of total employment

100% = 66m employees

Non-market services*

27
Agriculture

23
Manufacturing

27
Market services

28% coverage

Construction

50% coverage

16% coverage

Sector case studies

Share of total employment

Food retailing
4.00
General merchandise retailing
2.00
Hotels
0.50
Software
0.01
Residential construction
5.00
Oil
1.00
Steel
1.00
Dairy
1.00
Confectionery
1.00
Cement
0.05

~16.00

*Government services, education, healthcare and defense
Source: Goskomstat, McKinsey analysis

Exhibit 7
WORKPLAN OF STUDY

July 1998

Ten sector case studies

<table>
<thead>
<tr>
<th>Analysis of productivity gaps at operational level</th>
<th>Analysis of external factors leading to low productivity</th>
<th>Deriving implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 1</td>
<td>Section 2</td>
<td>Section 3</td>
</tr>
<tr>
<td>• Measurement of productivity</td>
<td>• Unequal laws and enforcement affecting productive companies</td>
<td>• Identification of sectors with highest growth potential</td>
</tr>
<tr>
<td>– Old assets</td>
<td>– Taxes</td>
<td>– Oil</td>
</tr>
<tr>
<td>– New assets</td>
<td>– Government contract and land allocation</td>
<td>– Light manufacturing</td>
</tr>
<tr>
<td>• Operational factors leading to lower productivity</td>
<td>– Energy payments</td>
<td>– Trade</td>
</tr>
<tr>
<td>– Capacity utilization</td>
<td>– Red tape</td>
<td>– Business and personal services</td>
</tr>
<tr>
<td>– Organization</td>
<td>– Counterfeits</td>
<td></td>
</tr>
<tr>
<td>– Equipment</td>
<td>– Lack of appeal mechanisms</td>
<td></td>
</tr>
<tr>
<td>• Industry dynamics</td>
<td>– Macroeconomic and political instability</td>
<td></td>
</tr>
<tr>
<td>– Evolution in market share</td>
<td>– Other less important factors</td>
<td></td>
</tr>
<tr>
<td>– Competitive intensity</td>
<td>– Corporate governance</td>
<td></td>
</tr>
<tr>
<td>– Profitability</td>
<td>– Restrictions on labor mobility</td>
<td></td>
</tr>
<tr>
<td>• Unequal laws and enforcement affecting productive companies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Identification of sectors with highest growth potential</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Operational factors leading to lower productivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Industry dynamics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Evolution in market share</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Industry dynamics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Evolution in market share</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Operational factors leading to lower productivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Industry dynamics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Evolution in market share</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Operational factors leading to lower productivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Industry dynamics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Evolution in market share</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Operational factors leading to lower productivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Industry dynamics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Evolution in market share</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Operational factors leading to lower productivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Industry dynamics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Evolution in market share</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Operational factors leading to lower productivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Industry dynamics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Evolution in market share</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Operational factors leading to lower productivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Industry dynamics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Evolution in market share</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Operational factors leading to lower productivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Industry dynamics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Evolution in market share</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Operational factors leading to lower productivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Industry dynamics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Evolution in market share</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Operational factors leading to lower productivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Industry dynamics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Evolution in market share</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Operational factors leading to lower productivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Industry dynamics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Evolution in market share</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Operational factors leading to lower productivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Industry dynamics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Evolution in market share</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Operational factors leading to lower productivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Industry dynamics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Evolution in market share</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Operational factors leading to lower productivity</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Exhibit 8

McKINSEY GLOBAL INSTITUTE'S INDUSTRY STUDIES IN RUSSIA:
SOURCES OF INFORMATION

<table>
<thead>
<tr>
<th>Industry</th>
<th>Interviews</th>
<th>With companies</th>
<th>With experts</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Steel industry</td>
<td>5</td>
<td>10</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>• Cement industry</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>• Oil industry</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>• Residential construction</td>
<td>40</td>
<td>15</td>
<td>25</td>
<td>45</td>
</tr>
<tr>
<td>• Dairy industry</td>
<td>13</td>
<td>15</td>
<td>7</td>
<td>28</td>
</tr>
<tr>
<td>• Confectionery industry</td>
<td>12</td>
<td>9</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>• Food retailing</td>
<td>51</td>
<td>11</td>
<td>40</td>
<td>62</td>
</tr>
<tr>
<td>• General merchandise retailing</td>
<td>76</td>
<td>3</td>
<td>73</td>
<td>79</td>
</tr>
<tr>
<td>• Hotel business</td>
<td>34</td>
<td>8</td>
<td>26</td>
<td>42</td>
</tr>
<tr>
<td>• Software production</td>
<td>11</td>
<td>5</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>248</td>
<td>76</td>
<td>324</td>
<td></td>
</tr>
</tbody>
</table>

Source: McKinsey Global Institute

Exhibit 9
THE OLD AND NEW ECONOMY*

US = 100 in 1995

Old economy (Pre-1992 assets)  New economy (Post 1992 assets)

<table>
<thead>
<tr>
<th>Output per capita</th>
<th>Employment</th>
<th>Output per capita</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old economy</td>
<td>27</td>
<td>13</td>
<td>30</td>
</tr>
<tr>
<td>New economy</td>
<td>90</td>
<td>73</td>
<td>0</td>
</tr>
</tbody>
</table>

*Estimates based on sector case studies
Source: Goskomstat; EIU; McKinsey analysis

AVERAGE LABOR PRODUCTIVITY BY SECTOR, RUSSIA 1997

US level = 100

<table>
<thead>
<tr>
<th>Sector</th>
<th>Packaged</th>
<th>Unpackaged</th>
<th>Project</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software</td>
<td>13</td>
<td>38</td>
<td>72</td>
<td></td>
</tr>
<tr>
<td>Steel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General merchandise</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>retailing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food retailing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotels</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confectionery</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dairy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case average</td>
<td></td>
<td></td>
<td></td>
<td>18***</td>
</tr>
<tr>
<td>Russia's overall average</td>
<td></td>
<td></td>
<td></td>
<td>19</td>
</tr>
</tbody>
</table>

** Actual Russian labor productivity is 25, but only 15 if measured on a geology-comparable basis
*** Weighted by employment share

Source: McKinsey analysis

Exhibit 10

Exhibit 11
# Labor Productivity in Old and New Assets

US level = 100

<table>
<thead>
<tr>
<th></th>
<th>Old assets</th>
<th>New assets</th>
<th>Share of sector employment in new assets</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Software</strong></td>
<td>N/A</td>
<td>38</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Steel</strong></td>
<td>28</td>
<td>N/A</td>
<td>0%</td>
</tr>
<tr>
<td><strong>General merchandise retailing</strong></td>
<td>34</td>
<td>30</td>
<td>65%</td>
</tr>
<tr>
<td><strong>Food retailing</strong></td>
<td>20</td>
<td>25</td>
<td>20%</td>
</tr>
<tr>
<td><strong>Hotels</strong></td>
<td>16</td>
<td>75</td>
<td>3%</td>
</tr>
<tr>
<td><strong>Oil</strong></td>
<td>25</td>
<td>N/A</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Residential construction</strong></td>
<td>8</td>
<td>20</td>
<td>20%</td>
</tr>
<tr>
<td><strong>Confectionery</strong></td>
<td>10</td>
<td>70</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Dairy</strong></td>
<td>8</td>
<td>100</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Cement</strong></td>
<td>7</td>
<td>N/A</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Case average</strong></td>
<td>17</td>
<td>30</td>
<td>15</td>
</tr>
</tbody>
</table>

Source: McKinsey analysis
REASONS FOR THE PRODUCTIVITY DROP IN OLD ASSETS

Output drop 1997 as a percentage of 1991 level

Employment drop 1997 as a percentage of 1991 level

Productivity evolution US level = 100

<table>
<thead>
<tr>
<th>Industry</th>
<th>Output Drop 95</th>
<th>Employment Drop 95</th>
<th>Productivity Evolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>60</td>
<td>95</td>
<td>100</td>
</tr>
<tr>
<td>Cement</td>
<td>35</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>Oil</td>
<td>60</td>
<td>100</td>
<td>90</td>
</tr>
<tr>
<td>Dairy</td>
<td>50</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>Confectionery</td>
<td>50</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Residential</td>
<td>60*</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Retail</td>
<td>50</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Hotels</td>
<td>50</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>Case average</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Based on the drop in their market share

Source: McKinsey analysis

Exhibit 13
**EVOLUTION OF OUTPUT AND EMPLOYMENT IN MAIN MANUFACTURING SECTORS IN 1995**

US level = 100 in 1990

<table>
<thead>
<tr>
<th>Manufacturing sectors</th>
<th>Output</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>80</td>
<td>138</td>
</tr>
<tr>
<td>Fuel</td>
<td>69</td>
<td>106</td>
</tr>
<tr>
<td>Non ferrous</td>
<td>55</td>
<td>113</td>
</tr>
<tr>
<td>Ferrous</td>
<td>57</td>
<td>93</td>
</tr>
<tr>
<td>Food processing</td>
<td>52</td>
<td>98</td>
</tr>
<tr>
<td>Construction materials</td>
<td>44</td>
<td>89</td>
</tr>
<tr>
<td>Chemicals</td>
<td>47</td>
<td>86</td>
</tr>
<tr>
<td>Wood processing</td>
<td>44</td>
<td>77</td>
</tr>
<tr>
<td>Machine building</td>
<td>40</td>
<td>63</td>
</tr>
<tr>
<td>Textile</td>
<td>18</td>
<td>57</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>50</td>
<td>76</td>
</tr>
</tbody>
</table>

Source: Goskomstat

**LABOR PRODUCTIVITY POTENTIAL OF VIABLE OLD ASSETS**

US level = 100 in 1995

<table>
<thead>
<tr>
<th>Viable share of old assets</th>
<th>Current productivity</th>
<th>Potential productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>80% Steel</td>
<td>35</td>
<td>90</td>
</tr>
<tr>
<td>85% Cement</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>90% Oil*</td>
<td>25</td>
<td>70</td>
</tr>
<tr>
<td>45% Dairy</td>
<td>10</td>
<td>70</td>
</tr>
<tr>
<td>50% Confectionery</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>90% Residential construction</td>
<td>10</td>
<td>60</td>
</tr>
<tr>
<td>70% Retail</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>75% Hotels</td>
<td>15</td>
<td>50</td>
</tr>
<tr>
<td><strong>75% Case average</strong></td>
<td>20</td>
<td><strong>65</strong></td>
</tr>
</tbody>
</table>

*Impact from favorable geology included

Source: McKinsey analysis
LABOR PRODUCTIVITY POTENTIAL OF VIABLE OLD ASSETS
US level = 100 in 1995

Increased capacity utilization (requiring shut down of nonviable old assets)
Improved modes of organization and marketing/management skills
Targeted upgrading investments
Remaining gap (requiring additional investment non-economic at current low labor relative to capital costs)

Source: McKinsey analysis

OBSOLETE OLD ASSETS

<table>
<thead>
<tr>
<th>Reasons for being nonviable</th>
<th>Share of capacity Percent</th>
<th>Share of employment Percent</th>
<th>Share of plants Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subscale</td>
<td>Outdated technology*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steel</td>
<td></td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Cement</td>
<td>–</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>Oil</td>
<td>–</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>Dairy</td>
<td>–</td>
<td>55</td>
<td>75</td>
</tr>
<tr>
<td>Confectionery</td>
<td>–</td>
<td>50</td>
<td>65</td>
</tr>
<tr>
<td>Residential construction</td>
<td>–</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Retail</td>
<td>–</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Hotels</td>
<td>–</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Case average</td>
<td></td>
<td>25</td>
<td>28</td>
</tr>
</tbody>
</table>

*Low energy efficiency and/or inferior quality of output

Source: McKinsey analysis
### MAIN ORGANIZATIONAL ISSUES IN VIABLE OLD ASSETS

<table>
<thead>
<tr>
<th>Poor organization of functions and tasks</th>
<th>Steel</th>
<th>Cement</th>
<th>Oil</th>
<th>Dairy</th>
<th>Confectionery</th>
<th>Residential construction</th>
<th>Retail</th>
<th>Hotels</th>
<th>Case average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not enough teams/too much specialization</td>
<td>○</td>
<td>○</td>
<td>●</td>
<td>○</td>
<td>●</td>
<td>○</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Lack of incentives</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Lack of marketing skills</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Problems with related industries</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Lack of trainable blue collar workers</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

**Productivity growth potential**

- **US level = 100**

<table>
<thead>
<tr>
<th></th>
<th>Steel</th>
<th>Cement</th>
<th>Oil</th>
<th>Dairy</th>
<th>Confectionery</th>
<th>Residential construction</th>
<th>Retail</th>
<th>Hotels</th>
<th>Case average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>55</td>
<td>15</td>
<td>40</td>
<td>30</td>
<td>20</td>
<td>30</td>
<td>25</td>
<td>30</td>
<td>35 → 50</td>
</tr>
</tbody>
</table>

Source: McKinsey analysis

### MAIN UPGRADING OPPORTUNITIES IN VIABLE OLD ASSETS

<table>
<thead>
<tr>
<th>Higher energy efficiency</th>
<th>Higher quality/yield</th>
<th>More automation</th>
<th>Productivity growth potential</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>US = 100 in 1995</strong></td>
</tr>
<tr>
<td>* Steel</td>
<td>○</td>
<td>○</td>
<td>80 → 90</td>
</tr>
<tr>
<td>* Cement</td>
<td>●</td>
<td>●</td>
<td>25 → 50</td>
</tr>
<tr>
<td>* Oil</td>
<td>●</td>
<td>●</td>
<td>60 → 100</td>
</tr>
<tr>
<td>* Dairy</td>
<td>●</td>
<td>●</td>
<td>50 → 70</td>
</tr>
<tr>
<td>* Confectionery</td>
<td>●</td>
<td>○</td>
<td>25 → 30</td>
</tr>
<tr>
<td>* Residential construction</td>
<td>○</td>
<td>○</td>
<td>50 → 60</td>
</tr>
<tr>
<td>* Retail</td>
<td>○</td>
<td>○</td>
<td>40 → 50</td>
</tr>
<tr>
<td>* Hotels</td>
<td>○</td>
<td>○</td>
<td>45 → 50</td>
</tr>
<tr>
<td>Case average</td>
<td>○</td>
<td>○</td>
<td>50 → 65</td>
</tr>
</tbody>
</table>

Source: McKinsey analysis
COST CURVES OF PROVEN OIL RESERVES

Oil production and transportation costs* in 2009
USD per barrel Urals

Volga-Urals
Timan
Pechora

New field production in 2009
Million barrels per day

*Includes opex and capex and transportation infrastructure financing costs (to get oil to the closest world market), assuming constant ruble/USD exchange rate; the cost curve will shift up by 15% if ruble appreciates 50% against the dollar

Note: East Siberian and Arctic Shelf oil fields have total cost over 25 USD/bbl even under high productivity and low discount rate assumptions

Source: RPI data; McKinsey analysis

Exhibit 21
POSSIBLE SCENARIOS FOR FUTURE OIL PRODUCTION

Millions of barrels per day

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Old fields</th>
<th>New fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low productivity and no new field development</td>
<td>2.9</td>
<td>7.5</td>
</tr>
<tr>
<td>Low productivity and new field development</td>
<td>4.0</td>
<td>8.0</td>
</tr>
<tr>
<td>High productivity (with FDI) and new field development</td>
<td>11.5</td>
<td>16.0</td>
</tr>
</tbody>
</table>

Source: McKinsey analysis
SHARE OF HYPERMARKETS AND SUPERMARKETS
Percent of food sales, 1997

Source: McKinsey surveys; MGI Brazil study; McKinsey analysis
**EVOLUTION OF FORMAT MIX IN RUSSIA**

Percent of sales, 1997

<table>
<thead>
<tr>
<th>Food retailing</th>
<th>General merchandise retailing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>1998</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>75</td>
<td>19</td>
</tr>
<tr>
<td>9</td>
<td>0.2</td>
</tr>
<tr>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>Pavilions and kiosks</td>
<td>Wholesale markets</td>
</tr>
</tbody>
</table>

*Average across food retail and general merchandise retailing

Source: Goskomstat, McKinsey consumer surveys, Pannell Kerr Forster

**FOOD RETAILING INDUSTRY DYNAMICS**

<table>
<thead>
<tr>
<th>Productivity</th>
<th>Profitability</th>
<th>Market share</th>
</tr>
</thead>
<tbody>
<tr>
<td>US average = 100</td>
<td>100</td>
<td>Percent</td>
</tr>
<tr>
<td>Supermarkets</td>
<td>78</td>
<td>6</td>
</tr>
<tr>
<td>Wholesale markets</td>
<td>24</td>
<td>10</td>
</tr>
<tr>
<td>x 3</td>
<td></td>
<td>16.0</td>
</tr>
</tbody>
</table>

Source: McKinsey analysis

Exhibit 25
**CONFECTIONERY INDUSTRY DYNAMICS**

<table>
<thead>
<tr>
<th>Productivity</th>
<th>Profitability</th>
<th>Market share</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Average = 100 in 1997</td>
<td>Return on sales, percent</td>
<td>Percent</td>
</tr>
<tr>
<td><strong>Green field FDI</strong></td>
<td>70</td>
<td>-5</td>
</tr>
<tr>
<td><em><em>Russian plants</em> (Ex-Soviet)</em>*</td>
<td>10</td>
<td>17</td>
</tr>
</tbody>
</table>

*Excludes brown-field plants operated by multinationals (13% market share)

Source: Goskomstat, Institute for confectionery industry
**SUMMARY OF CAUSES FOR LOW LABOR PRODUCTIVITY**

<table>
<thead>
<tr>
<th>Category</th>
<th>Steel</th>
<th>Cement</th>
<th>Oil</th>
<th>Dairy</th>
<th>Confectionery</th>
<th>Residential construction</th>
<th>Food retailing</th>
<th>General merchandise retailing</th>
<th>Hotels</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Macroeconomic barriers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drop in demand/low labor cost/low income</td>
<td>⬤</td>
<td>⬤</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country risk/high capital cost (political instability/budget deficit)</td>
<td>⬤</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Labor barriers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Mobility restrictions</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inadequate education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Capital barriers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government ownership</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problems with minority shareholders' rights</td>
<td>⬤</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sector specific barriers (non-level playing field)</strong></td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>Non-level taxes</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-equal allocation of government procurement and land</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Threat of red tape/harassment</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-level energy payments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others (property rights, barriers to trade/FDI)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Related industry barriers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upstream/downstream sectors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor infrastructure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other barriers (climate, geology, etc.)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: McKinsey analysis

**SIMPLIFIED SUMMARY OF CAUSES FOR LOW LABOR PRODUCTIVITY**

<table>
<thead>
<tr>
<th>Category</th>
<th>Steel</th>
<th>Cement</th>
<th>Oil</th>
<th>Dairy</th>
<th>Confectionery</th>
<th>Residential construction</th>
<th>Food retailing</th>
<th>General merchandise retailing</th>
<th>Hotels</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Macroeconomic barriers</strong></td>
<td>⬤</td>
<td>⬤</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Labor barriers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Capital barriers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sector specific barriers (non-level playing field)</strong></td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td><strong>Related industry barriers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: McKinsey analysis
TAX REVENUES IN RUSSIA IN 1998
Percent of GDP

*Half contributed by the energy sector (oil, gas and electricity)
Source: Economics Expert Group, Ministry of Finance

UNEQUAL TAX AND LAW ENFORCEMENT ACROSS RETAIL FORMATS
Indexed to price in gastronoms = 100

ESTIMATE

Nature of equal laws and enforcement
- Same tax structure and equal enforcement (VAT, labor and corporate taxes)
- Full payment of tariffs on imports
- Eliminate counterfeit products

Over 80% of consumers prefer to shop in supermarkets if prices were at least equal

Source: McKinsey price survey; McKinsey productivity survey; Gubernia, Expert interviews
**MECHANISM OF PROVIDING ENERGY SUBSIDIES**

- Exhibit 31

*9% ownership of UES - seeking 25% stake in return for arrears; also control of several Energos (e.g., Tatenergo)

** Equity in return for arrears - e.g., Kamaz

Source: Interviews; Morgan Stanley Dean Witter
TOP DOWN ALLOCATION PROCESS OF HOUSING PROJECTS IN ONE OF THE CITIES

Source: Interviews
# RED TAPE IN REGULATION, PERMITS AND PUBLIC OWNERSHIP OF LAND

<table>
<thead>
<tr>
<th></th>
<th>Poland*</th>
<th>Russia*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to register stores Months</td>
<td>0.7</td>
<td>2.7</td>
</tr>
<tr>
<td>Inspections per year Number</td>
<td>46</td>
<td>83</td>
</tr>
<tr>
<td>Percentage of shops fined by inspectors Percent</td>
<td>9</td>
<td>19</td>
</tr>
</tbody>
</table>

- **Affects supermarkets more than smaller shops**
  - Supermarkets will take more time to register than smaller stores
  - Cost of uncertainty high with large investments
  - Local government can block entry by not selling or leasing a large piece of land

*Sample of 50 retailers and 55 retailers in Warsaw and Moscow respectively

---

# EFFECTS OF SOFTWARE PIRACY ON PRODUCTIVITY

<table>
<thead>
<tr>
<th>Country</th>
<th>Piracy rates</th>
<th>Relative scale of packaged software companies**</th>
<th>Productivity levels in packaged software**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>89</td>
<td>684</td>
<td>13</td>
</tr>
<tr>
<td>Poland</td>
<td>61</td>
<td>619</td>
<td>84</td>
</tr>
<tr>
<td>Germany</td>
<td>33</td>
<td>1,323</td>
<td>100</td>
</tr>
<tr>
<td>US</td>
<td>27</td>
<td>&gt;1,000.0*</td>
<td>100</td>
</tr>
</tbody>
</table>

- **Piracy rates** Pirated software applications as percent of total, 1997
- **Relative scale of packaged software companies** Average annual revenues of companies in sample, USD Million
- **Productivity levels in packaged software** Percent of US level

*Indicative total worth of software
** Russia, 1998; other countries, 1996
Source: BSA; IDC; "Russian Shield" Association; Financial reporting; McKinsey analysis

Exhibit 33

Exhibit 34
MACROECONOMIC INSTABILITY: INFLATION AND INTEREST RATES

- High uncertainty
- Diversion of management attention to gaming inflation
- Liquidity crunch
- Crowding out of investment

* Estimates from the Economic Expert Group of the Ministry of Finance
Source: BEA, IMF, Goskomstat; IMF; Ministry of Finance; McKinsey analysis
Increasing consumption of software in Russia will require removing barriers to growth of productivity and investment in the major software-consuming sectors (see other case studies)

### CONSUMPTION OF SOFTWARE BY SOME SECTORS

**OF THE ECONOMY**  
Software spending as percent of output of the sector

<table>
<thead>
<tr>
<th></th>
<th>Financial and business services</th>
<th>Trade</th>
<th>Manufacturing</th>
<th>Total economy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Russia</td>
<td>1.0</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>Germany</td>
<td>1.0</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td>US</td>
<td>1.2</td>
<td>0.9</td>
<td>1.1</td>
</tr>
</tbody>
</table>

**ESTIMATE**

* Russia, 1997; other countries, 1996

Source: IDC, OECD, EIU; Interviews

Exhibit 36
RELATIVE OUTPUT GROWTH POTENTIAL OF RUSSIA’S SECTORS
Percentage points of US GDP in 1995 per capita

- Oil expected to grow faster than gas and mining
- Commercial and infrastructure construction to grow faster than housing construction

Source: OECD; McKinsey analysis

Exhibit 37
POTENTIAL INCREASE IN BUSINESS INVESTMENT

Percent of GDP

Russia in 1997

- Agriculture: 1.0
- Heavy manufacturing: 2.0
- Construction: 1.0
- Light manufacturing*: 1.5
- Trade: 1.0
- Other services**: 4.0
- Total: 0.8

Russia's potential with level playing fields

- Agriculture: 1.0
- Heavy manufacturing: 2.0
- Construction: 1.0
- Light manufacturing*: 2.0
- Trade: 2.0
- Other services**: 5.0
- Total: 5.0

Poland in 1998

- Agriculture: 1.0
- Heavy manufacturing: 1.0
- Construction: 1.0
- Light manufacturing*: 3.0
- Trade: 1.5
- Other services**: 1.5
- Total: 6.8

*Includes automotive

** Transport, communication, business and personal services

Source: Goskomstat; PAK; McKinsey analysis

Exhibit 38

OIL INDUSTRY POTENTIAL INVESTMENT PROFILE

USD Billion, 1998 value

Favorable investment conditions scenario

<table>
<thead>
<tr>
<th>Year</th>
<th>Existing fields</th>
<th>New fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>98</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>99</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>01</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>12</td>
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<td>03</td>
<td>17</td>
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<td>04</td>
<td>21</td>
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<tr>
<td>05</td>
<td>24</td>
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<tr>
<td>06</td>
<td>26</td>
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<tr>
<td>07</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>09</td>
<td>35</td>
<td></td>
</tr>
</tbody>
</table>

Share of FDI Percent

- 1997: 5
- 98: 0
- 99: 0
- 2000: 10
- 2001: 20
- 2002: 30
- 2003: 40
- 2004: 40
- 2005: 40
- 2006: 40
- 2007: 40
- 2008: 40
- 2009: 40

Share of GDP*** Percent

- 1997: 2.0
- 1998: 1.2
- 1999: 1.5
- 2000: 1.7
- 2001: 2.5
- 2002: 3.0
- 2003: 4.0
- 2004: 4.5
- 2005: 4.7
- 2006: 5.0
- 2007: 5.0
- 2008: 5.0
- 2009: 5.0

*Includes maintenance and upgrading investment

** Includes maintenance and upgrading investment in later years

*** Assuming 8% overall economic growth from year 2000

Source: McKinsey analysis

Exhibit 39
### NEED FOR NEW CAPACITY UNDER 8% GROWTH ASSUMPTION

<table>
<thead>
<tr>
<th></th>
<th>Current capacity utilization</th>
<th>Capacity utilization after shutting down obsolete assets</th>
<th>Output level in 10 years</th>
<th>Share of new capacity in 10 years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percent</td>
<td>Percent</td>
<td>Current level = 100</td>
<td>Percent</td>
</tr>
<tr>
<td>Steel</td>
<td>30</td>
<td>38</td>
<td>150</td>
<td>0</td>
</tr>
<tr>
<td>Cement</td>
<td>33</td>
<td>39</td>
<td>150</td>
<td>0</td>
</tr>
<tr>
<td>Oil</td>
<td>80</td>
<td>80</td>
<td>260</td>
<td>70*</td>
</tr>
<tr>
<td>Dairy</td>
<td>27</td>
<td>60</td>
<td>300</td>
<td>45</td>
</tr>
<tr>
<td>Confectionery</td>
<td>47</td>
<td>90</td>
<td>300</td>
<td>65</td>
</tr>
<tr>
<td>Residential construction</td>
<td>70</td>
<td>80</td>
<td>150</td>
<td>20</td>
</tr>
<tr>
<td>Retail</td>
<td>70</td>
<td>100</td>
<td>230</td>
<td>55</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>50</strong></td>
<td><strong>70</strong></td>
<td><strong>216</strong></td>
<td><strong>40</strong></td>
</tr>
</tbody>
</table>

*High because of natural depletion in existing fields

NOTE: Output level based on the natural experiment of Poland (except for oil) implying same export levels are achieved

Source: McKinsey analysis

### SIZE OF UPGRADING INVESTMENTS

<table>
<thead>
<tr>
<th>Nature of upgrading investments</th>
<th>Share of sector's value added (over 5 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>6</td>
</tr>
<tr>
<td>Cement</td>
<td>12</td>
</tr>
<tr>
<td>Oil</td>
<td>5</td>
</tr>
<tr>
<td>Dairy</td>
<td>10</td>
</tr>
<tr>
<td>Confectionery</td>
<td>10</td>
</tr>
<tr>
<td>Residential construction</td>
<td>3</td>
</tr>
<tr>
<td>Retail</td>
<td>2</td>
</tr>
</tbody>
</table>

Weighted average 5

Source: Interviews
SUCCESS OF MARKET REFORMS IN NOVGOROD REGION

Starting position
- No strong natural resource base
- The only natural advantage is geographical position (between Moscow and St. Petersburg)
- Regional budget fully dependent on federal transfers
- Few viable enterprises

Reform policies
- Members of regional administration are responsible for clearing investment projects in their domain through all regulatory hurdles
- Investors pay no local taxes until recovering the investment
- Local rules facilitate lease of land to foreigners
- Idle or ailing enterprises can be acquired by an investor for a nominal sum
- Up to 1.5% of regional budget spent to support small businesses
- The regional administration has no commercial participation in companies
- Rapid privatization, especially of light manufacturing and service companies

Current situation

<table>
<thead>
<tr>
<th>Cumulative FDI per capita, 1995-97 USD</th>
<th>Share of FDI in industrial output, 1998 Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novgorod region</td>
<td>49</td>
</tr>
<tr>
<td>Russia</td>
<td>62.4</td>
</tr>
</tbody>
</table>

*Median of cumulative 1995-97 FDI per capita of all regions
** First quarter 1998
*** Joint venture of IFC and IBRD

Source: Goskomstat; Interviews; Bureau of Economic Analysis; IEWS; Press reports

LABOR PRODUCTIVITY GROWTH POTENTIAL IN SECTOR CASE STUDIES

Percent of US level

<table>
<thead>
<tr>
<th>Old assets</th>
<th>Productivity potential in 10 years*</th>
<th>New assets</th>
<th>Productivity level</th>
<th>Share of employment after 10 years**</th>
<th>Resulting overall productivity in 10 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current productivity</td>
<td>Productivity in 10 years*</td>
<td>New assets</td>
<td>Productivity level</td>
<td>Share of employment after 10 years**</td>
<td>Level</td>
</tr>
<tr>
<td>Steel</td>
<td>28</td>
<td>N/A</td>
<td>150</td>
<td>40%</td>
<td>65</td>
</tr>
<tr>
<td>Cement</td>
<td>7</td>
<td>N/A</td>
<td>100</td>
<td>45%</td>
<td>35</td>
</tr>
<tr>
<td>Oil</td>
<td>25</td>
<td>100</td>
<td>60</td>
<td>40%</td>
<td>100</td>
</tr>
<tr>
<td>Dairy</td>
<td>8</td>
<td>70</td>
<td>60</td>
<td>40%</td>
<td>70</td>
</tr>
<tr>
<td>Confectionery</td>
<td>10</td>
<td>70</td>
<td>60</td>
<td>40%</td>
<td>35</td>
</tr>
<tr>
<td>Residential construction</td>
<td>10</td>
<td>60</td>
<td>60</td>
<td>40%</td>
<td>50</td>
</tr>
<tr>
<td>Retail</td>
<td>25</td>
<td>100</td>
<td>60</td>
<td>40%</td>
<td>50</td>
</tr>
<tr>
<td>Hotels</td>
<td>15</td>
<td>90</td>
<td>60</td>
<td>40%</td>
<td>40</td>
</tr>
</tbody>
</table>

*70% of potential identified in Exhibit 15 reached
** Assuming 8% overall economic growth

Source: McKinsey analysis
### LABOR PRODUCTIVITY GROWTH ACHIEVED IN OTHER COUNTRIES

<table>
<thead>
<tr>
<th>Industry</th>
<th>Brazil 1991-95</th>
<th>Korea 1985-95</th>
<th>Poland 1991-97</th>
<th>Russia's potential without effect of low capacity utilization 2000-09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>10</td>
<td>9</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>Automotive</td>
<td>17</td>
<td>16</td>
<td>10</td>
<td>N/A</td>
</tr>
<tr>
<td>Food processing</td>
<td>12</td>
<td>15</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Retail</td>
<td>4*</td>
<td>4**</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Residential construction</td>
<td>3*</td>
<td>4**</td>
<td>N/A</td>
<td>7</td>
</tr>
</tbody>
</table>

*Growth limited by large share of informal gray economy operations
**Growth constrained by very restrictive zoning laws

Source: McKinsey analysis
EMPLOYMENT GROWTH POTENTIAL IN HIGH GROWTH SECTORS - NEXT 10 YEARS WITH LEVEL PLAYING FIELDS

CAGR

<table>
<thead>
<tr>
<th>Sector</th>
<th>Productivity growth potential</th>
<th>Output growth potential</th>
<th>Implied employment evolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy</td>
<td>24</td>
<td>12</td>
<td>-8</td>
</tr>
<tr>
<td>Confectionery</td>
<td>13</td>
<td>12</td>
<td>-1</td>
</tr>
<tr>
<td>Retail</td>
<td>7</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Nonconstruction*</td>
<td>7</td>
<td>6</td>
<td>-1</td>
</tr>
</tbody>
</table>

*Weighted average of these cases

*See Exhibit 43 for more details
**Based on overall 8% economic growth assumption (see Exhibit 37)
***Includes infrastructure and commercial property

Source: McKinsey analysis

EMPLOYMENT EVOLUTION IN HIGH GROWTH SECTORS IN POLAND

Starting point = 100

Source: PAIZ
**EMPLOYMENT DESTRUCTION POTENTIAL IN HEAVY MANUFACTURING - NEXT 10 YEARS WITH LEVEL PLAYING FIELDS**

<table>
<thead>
<tr>
<th>CAGR</th>
<th>Productivity growth potential*</th>
<th>Output growth potential**</th>
<th>Implied employment evolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>9</td>
<td>5</td>
<td>-4</td>
</tr>
<tr>
<td>Cement</td>
<td>17</td>
<td>5</td>
<td>-10</td>
</tr>
<tr>
<td>Oil</td>
<td>15</td>
<td>7</td>
<td>-9</td>
</tr>
</tbody>
</table>

Weighted average of these cases: 15 5 -8

30% fall in 5 years

*See Exhibit 43 for more details

** Assuming 8% annual growth rate for overall economy (see Exhibit 37)

Source: McKinsey analysis

Exhibit 47
COMPANY STEEL TOWNS
Steel plant workforce as a percentage of town employment

Source: Goskomstat
Residential Construction

EXECUTIVE SUMMARY

Industry overview. Residential construction is one of the largest economic sectors in Russia accounting for about 5% of total employment and 3% of GDP. Output in the sector has declined by 25% since 1990. Growth in the construction of privately financed brick houses and apartments has not compensated for the 50% decline in the construction of government financed traditional prefabricated apartment buildings.

Productivity performance. The overall productivity of the sector is estimated at around 10% of the US level. Productivity fell to 10% of the US level in the traditional segment, as many companies did not adjust their staffing levels to the fall in output. New entrants only achieve 20% of the US productivity level, and furthermore, around a quarter of all construction is now being carried out “brick by brick” by individuals (5% productivity level) as financing becomes available.

The main reasons for the productivity gap at the operational level for the traditional companies are very low capacity utilization at both the panel factories and construction sites, and complete lack of incentives for workers to improve efficiency or quality levels. The new companies are mostly affected by both the lack of special trade companies and the small scale of privately financed housing programs.

The most important external barrier to productivity and output growth is the fact that local governments systematically allocate housing programs to the same (ex-Soviet) companies in exchange for no layoffs. New private companies are also penalized by the fact that large single family housing programs (the most productive form of housing construction) are virtually impossible in the absence of an operational land code and mortgage financing.

Policy implications and future outlook. Government financed housing programs should be limited to the most urgent social needs (e.g. relocation of stranded industrial workers) and carried out through open and equal tenders. The following would also help stimulate the demand for private housing: appropriate legislation in the areas of land property and usage rights, tenant rights, a mortgage system (with macroeconomic stability as a prerequisite), removal of administrative barriers to labor mobility (propiska system), and accelerated phasing out of the utility and maintenance subsidies in the existing housing stock.
Residential construction

This study benchmarks the performance of Russian residential construction against the US, the best practice country in residential construction. In the construction of prefabricated panel-type apartment buildings, however, we have used Swedish best practice as the benchmark, since such construction is not common in the US.

We first give an overview of key industry trends, before presenting our productivity results. The causes for the productivity gap with best practice are then explained at both the operational and at the external factor level. Finally, we discuss the future outlook and make recommendations to policy makers.

INDUSTRY OVERVIEW

The construction industry is a very significant part of the Russian economy, accounting for 5.3% of GDP and employing 8.7% of the total workforce in 1997. Residential construction is one of the largest segments of total construction, accounting for approximately 40% of output in 1997. Its significance is due not only to its size, but also to the fact that investments and improvements in residential construction have a direct impact on the quality of life of the population.

Industry evolution: output and employment

Residential construction in Russia has suffered heavily since 1990, when the yearly output was 68 million square meters per year (Exhibit 1). We chose 1990 as the most representative year of the pre-reform period since the output boom of 1986-89 was the result of an ambitious residential construction program instigated by President Gorbachov, during which output levels reached their historical peak.

By 1997, officially declared output had decreased to 43 million square meters. However, when adjustments are made for unregistered houses and differences in quality, the output decrease in period 1990-97 is less severe, estimated to be at around 25 percent. In our analysis, we have not included reconstruction. Its inclusion, however, would not change the picture since levels of reconstruction activity went back down following an initial boom in 1992-93.

In order to get a good overview of recent trends and size the magnitude of changes that have affected output levels, the data has to be analyzed on a more detailed level. Thus we divided Russia’s residential construction into five housing type segments:
Prefabricated panel-type apartment buildings (apartment buildings are referred to as multi-family houses or MFH in the rest of the text)

Traditional Soviet-style brick and monolithic multi-family houses (MFH)

High-end brick and monolithic multi-family houses (MFH)

High-end single-family houses (SFH)

Single-family houses (SFH) built “brick-by-brick” by average Russians

Only by looking at output changes within each of these segments over the period 1990-97, do we notice that the overall change is just an average of larger and opposing changes affecting each segment (Exhibit 2). The output of the first two segments (traditional type Soviet apartment housing) has decreased significantly, by 62% and 45% respectively, while the output of the other three segments has almost tripled.

Quality adjustments were made partly because the output mix has changed towards higher quality housing and partly because prefabricated panel-type housing has improved in quality (due to increased flexibility, larger sized kitchens and bathrooms, use of better construction materials and increased levels of quality control). In order to make estimates of the quality adjustment in the output mix we have compared prices for different types of housing in the same residential area. On average, Soviet-type brick and monolithic have a 15% quality premium over panel-type MFHs, high-end housing a 25% premium and SFH a 20% premium. The quality level of panel-type MFHs has also increased by approximately 5% from 1990 level.

Employment in the construction industry has decreased by approximately 30%, from 8.3 million to 5.7 million over the period 1990-97. Even after the fall in employment, the construction industry still employs 8.7% of the workforce in Russia. Employment in residential construction, which accounts for more than half of the total, is approximately 15% lower than in 1990. We estimated that the decrease in employment in residential construction was less severe than in construction in general, due to a much lower decrease in output, as well as a much larger share of unofficial employment.

Sources of financing

The main explanation of these dramatic changes in output among different segments is the complete shift in sources of construction financing. Previously local and federal governments, together with large state owned companies building for their own employees, financed more than 75% of residential construction, today around 60% of residential construction is paid for by end-users (Exhibit 3).

Local and federal governments have traditionally financed construction in only two segments: panel-type MFH and traditional Soviet-style brick and monolithic MFH. Almost the same can be said about companies that were building housing
for their own employees, something that was very common during Soviet times, especially in cities that had only one or two large industrial enterprises.

In the situation that occurred after the fall of the Soviet system, end-users have been forced to finance a much larger share of total output. They have chosen to finance mostly high-end and single-family housing. These types of housing had been neglected during Soviet times and the demand for them, especially by the more affluent, has been huge since 1990.

**Industry structure**

Although formally, almost all construction companies have been partly or fully privatized, there are large differences in the way business is conducted and the types of houses being built by different types of companies. For simplification, residential construction companies can be divided into three groups:

- **Non-restructured former state companies.** Within these, business activities are done “as in old times”. Almost all orders come from local or federal governments and construction is done in panel-type MFH and traditional Soviet-style brick and monolithic MFH. They comprise approximately 35% of the total output (Exhibit 4).

- **Restructured former state companies.** These companies, although still relying on traditional sources of financing to an extent, have been reaching out to increase the share of financing by the end-customer. This has forced them to enter new segments: high-end brick and monolithic MFH and high-end SFH. Restructured former state companies build around 15% of housing today.

- **New private companies.** These companies started by doing construction in the two segments where it is easier to compete with former state companies: high-end brick and monolithic MFH and high-end SFH. In both of these segments the end-user provides for financing and requires high quality work. However, some of these companies have entered the traditional segments of former state companies (panel-type housing and Soviet-type brick and monolithic housing), mainly in cases when financing comes from end-users. New private companies construct a quarter of total output. It should be added that unlike in commercial construction, best practice foreign companies are still totally absent in residential construction.

Brick-by-brick SFHs account for approximately one quarter of output. These houses are either constructed by the individual who will live in the house, or contracted out to individuals/small groups of workers in the “gray sector”. Construction of such houses is usually done over long periods of time, because construction proceeds as cash becomes available (15-20 years is not an unusual time-period for such projects).
Output performance

Russian housing stock, measured in square meters per capita, is comparable to the housing stock of countries of with similar GDP levels (Exhibit 5). It should also be noted that housing stock per capita does not differ significantly among Russian regions, being lowest in East Siberia (16.6 square meters per person) and highest in Moscow (20.0 square meters per person). The output in 1997 (Exhibit 6) is lower than output of other countries with the notable exception of Poland. In Poland, the state has stopped financing large-scale residential construction and a mortgage system has yet to develop. Brazil has similar financing problems but output in square meters is higher since there are fewer constraints from weather, no land restrictions, higher productivity due to fair competition, a larger high-end segment, higher population mobility and a high rate of population growth.

The share of SFHs in Russia is extremely low in comparison to other countries (Exhibit 7). Only 15% of the housing stock in 1995 consisted of SFHs, while in most of the comparison countries these comprise over 50% of the stock. It is therefore not surprising that the construction of SFHs has boomed in Russia when end-users preferences have been taken into account.

To conclude, the Russian residential construction industry has gone through significant changes in the past 8 years. Output has dropped by 25% and employment by 15% while demand has shifted towards single-family and high-end housing due to increased end-user financing. After a discussion of labor productivity and the factors affecting it, we are going to refer back to the material presented in this section in order to discuss the future outlook.

PRODUCTIVITY PERFORMANCE

Methodology

There have been significant challenges in obtaining data on productivity for the residential construction case. We have used a physical productivity measure, defined as output in square meters per hour, adjusted for quality differences.

For the aggregate numbers, Goskomstat’s information on output levels has been used. This number was adjusted for the informal economy (as estimated by local governments) and for quality. The split of employment among different segments of construction was not obtainable at an aggregate level. The output level of different segments helped us to estimate employment levels within residential construction, a number that was improved by estimates received from local governments and companies.

Company-specific data has not been readily available, since companies themselves do not know their own productivity. Only through extensive interviews and company visits were we able to make productivity estimates. These estimates were consistent with our aggregate results. Overall, we believe
that our numbers on productivity are not exactly correct, but are reasonably good estimates.

Results

Labor productivity of the Russian residential construction industry is around 10% of the US labor productivity level (Exhibit 8). This number, however, disguises significant differences across segments. Labor productivity is highest in the construction of high-end MFHs and high-end SFHs, where it is, on average, at 20% of the US level. Panel-type MFHs and Soviet-type brick and monolithic MFHs both have productivity levels of 10% of the US level, while the “brick-by-brick” built SFHs have the lowest productivity of approximately 5%. It should also be noted that new entrants in high-end segments have, on average, a productivity that is almost twice as high as the average Russian productivity level in 1990.

On Exhibit 9 productivity estimates for various companies interviewed are presented. Although the interviews did not cover all parts of segments (e.g. in Soviet-style bricks and monolithic we received numbers only from the local best practice companies), we believe that the interview results are consistent with our top-down analysis. From the exhibit, we can see that productivity varies significantly both among regions and companies. The tendency that can be observed in, for example, panel-type MFHs is that productivity is highest in those cities that have either experienced a rise in output (Moscow) or forced former state companies to carry out significant restructuring. This has resulted in the survival of only the most productive firms (for example, in St. Petersburg).

Labor productivity overall has decreased by around 12% since 1990. This is a result of an output decrease of 25% (see Exhibit 1) and an employment decrease of approximately 15%. The main reason for the productivity decrease is that former state companies were reluctant to lay off redundant workers when orders in their traditional sectors (panel-type MFHs and Soviet-type brick and monolithic MFHs) plummeted (see Exhibit 8). While their output decreased by 55%, employment has decreased by only 20%, mostly as a result of the (best) workers leaving these companies.

It should also be added that average numbers disguise the fact that best practice companies have been able to achieve much higher productivity levels (Exhibit 10), even up to 50% of US level.

REASONS FOR DIFFERENCES IN PRODUCTIVITY PERFORMANCE

Exhibit 11 presents the framework within which we have analyzed the productivity gap between Russian residential construction companies and those in the United States. It divides the causes of the productivity gap into two groups. At the functional level we explain productivity gaps by differences in production process and staffing levels within the two countries. At the more fundamental level we describe the key external factors that are preventing Russian construction companies from restructuring and increasing productivity.
These external factors influence management decisions either directly (e.g. no layoffs allowed) or indirectly, by affecting the level of competition in the industry.

Production process

At the production process level, organization of functions and tasks and lack of special trades are the most important factors in explaining the labor productivity gap in all sectors of residential construction (Exhibit 11). In addition to these factors, excess variable labor is very important in explaining the gap in panel-type MFHs and Soviet-type brick and monolithic MFHs. (In the rest of this case, we are going to refer to excess variable labor, as labor that can be let go immediately, without any consequences on output levels). Less important factors, although still very relevant, are the lack of design for manufacturing, lower capital intensity and scale.

In Exhibits 16-20 we give details of operational causality for each type of residential construction separately. Please refer to these exhibits if interested in detailed, segment specific explanations of productivity gaps.

Inefficient organization

Organization of functions and tasks (OFT). Poor OFT explains 40 points of the productivity gap in the construction of panel-type MFHs, 25 in Soviet style bricks and monolithic MFHs, 15 in high-end bricks/monolithic MFH and 20 in SFHs.

Organization of functions and tasks includes resource utilization planning, simplification of current processes, training of workers to use new and better methods and changing payment incentives. The following examples highlight some of the current problems and describe how some companies have been dealing with them.

Resource utilization planning is an important factor in decreasing idle time on construction sites, according to a private company manager we talked to in Moscow. He previously worked for a former state company and told us that in this company, no one made sure in advance that materials and equipment were arriving on time. Instead, they waited until the materials were delayed before checking what was happening. In his present company, making one person responsible for scheduling arrival times, phoning and checking in advance whether materials/equipment was coming on time and allocating resources to take care of these issues has eliminated most of the idle time on the construction site.

Another problem we encountered is the management methods that are used in many former state companies. Workers are not encouraged to go directly to managers when something is wrong (e.g. broken equipment, low quality of incoming materials, delays), since they are afraid to be blamed or simply don’t care. Another Moscow company manager pointed out that the introduction of “hands-on” management
and an open working atmosphere has benefited the productivity of his company and has given it a competitive advantage (along with other improvements) over former state owned companies.

Since privatization of state enterprises was introduced in Russia, training of workers has declined. Productivity has also declined since companies depend on trained in house labor for special task skills due to the lack of special trade companies. A private company we interviewed in Nizhnij Novgorod would, when not having expertise in house, hire a subcontractor/special trade company specialized in the area, even from far away locations. Then it would put as many of its own workers as possible to work together with the subcontracted company to acquire the skills. Of course, it is not the best solution to have all special trade types of work in house and the penalty associated with it is discussed in the next section. However, since special trade companies are not available at present, this company was benefiting from a relatively well-trained workforce.

Changing the structure of payment incentives from a monthly or hourly wage towards payment per task can achieve much better employee motivation. A company we interviewed has shortened the time of the construction of prefabricated SFHs by approximately 20-30% by this measure alone. Another measure, which increases both productivity and quality, is allocating bonuses and more responsibility to teams. This has worked well for a Swedish panel-type construction company that, after a trial period, adopted this system instead of task payments.

¶ Supplier relations: lack of use of special trade contractors.
Outsourcing different tasks on the construction site to special trade contractors has many advantages. Each special trade company employs an adequate number of workers to perform a very specific, well-defined task on the construction site. In this way it manages to achieve economies of scale, resulting in better training levels for special trade employees, and is able to keep up with technological innovation. Moreover, special trade contractors are paid by the task and thus have an incentive for both higher labor utilization and less overhead.

The unavailability and the inefficient use of special trade contractors are, along with OFT, the most important explanation of the productivity gap in most residential construction segments in Russia. It explains productivity gaps of 10 points in panel-type MFH, 30 points in Soviet-style bricks and monolithic, 30 points in high-end bricks and monolithic and 35 in SFHs. In Russia, no company interviewed used more than 5 special trade contractors on the construction site as opposed to 40 in the United States and 10 in Brazil, on average. (In Brazil, a lack of specialized trade is one of the biggest causes of productivity gap with US.)

Special trade companies in Russia are mainly used in areas for which the government requires special permits due to the critical nature of the work (for example, electricity and gas connections or relaying of cables under a construction site). These types of companies existed also during
Soviet times. All other sorts of specialized work are done by “in-house” workers, which might have made sense when companies were huge in size and specialized training was provided on the city/region level. Having all specialized workers “in-house” makes much less sense now when companies are much smaller in size and rely solely on themselves for specialized training and acquiring and use of specialized technology.

The development of special trade contractors has, however, been slow. Most of the companies interviewed do not realize the productivity gains that can be achieved by using special trades, and they would need to learn how to use special trade efficiently. The full productivity potential stemming from the use of special trade contractors is obvious only to managers that have experience from American and Western European markets. They have singled out this factor as the most important in explaining the productivity gap. One of the interviewed managers added, “1/3 of the cost difference between Poland and Russia can be explained by this factor alone”.

Excess variable labor. Excess variable labor is an extremely important issue in two segments: panel-type MFHs and Soviet-type brick and monolithic MFHs, where it explains 25 and 15 points of the productivity gap, respectively. In both of these segments, former state companies construct most of the output (see Exhibit 4). These companies usually keep the whole workforce throughout the year regardless of the order schedule, which is a major difference from new private companies that hire a large part of their workers on a contract/project specific basis. Since fixed costs are relatively small, by being able to vary labor costs (which to a large extent are variable costs) depending on the season and contract inflow, best practice companies are not only able to cut their costs, but also to substantially increase labor productivity.

Problems with excess variable labor are biggest in cities that experienced a collapse in government demand for panel-type and Soviet-type brick and monolithic MFHs. The construction companies there have very seldom laid off workers; those leaving were often the most able, who could find work at newly started private companies with higher and/or more secure wages. Due to the reluctance of most of the companies to push aggressively for a reduction in the workforce, they are left with productivity levels at half of what they used to be. One extreme, but not unusual, example of large amounts of excess workforce in a panel factory is presented on Exhibit 12 (In this specific case layoffs of excess variable labor and improvements in OFT and technology, would cause productivity to increase 15 fold)

Even in the former state companies that had not experienced output decline (e.g. most of the Moscow companies), we were told that half of the workers could be laid off without any consequence on the output level. This is the legacy of over-staffing during Soviet times, a phenomenon that we found in many other sectors.
Design for manufacturing (DFM). Lack of DFM explains 15 points of the productivity gap in high-end bricks and monolithic MFHs and 10 points in both Soviet-type bricks and monolithic MFH and in SFH.

Design for manufacturing in construction involves adopting a design for low cost by using standard materials, modularity, cost competitive prefabricated materials and optimal layout. To reap all the benefits from DFM changes both on the company level and in the upstream and related industries are needed.

A lack of DFM is not a large cause of the problem in panel-type construction, since this segment has been very efficiently planned and uses prefabricated materials. The problem in this segment has been a lack of flexibility, since only limited numbers of designs have been used countrywide. Although the lack of flexibility does not impact productivity directly it has an impact on value added since people are prepared to pay more for non-standardized products.

Lack of design planning is typical for companies building for the high-end market in Russia. These companies take pride in using a completely new set of architectural plans, a new set of imported materials and new ways of constructing every time. This attitude is encouraged by the fact that the few cash rich customers are not yet very sensitive to price. Use of design planning is a part of the DFM gap that will not be difficult to change if the companies experience more price/competitive pressure. Use of standard materials and modularity, however, will require structural changes in the industry and may take a long time to achieve.

Lower capital intensity / outdated technology

Capital intensity and technology explain 15 points of the productivity gap in panel-type MFHs, 10 in Soviet-type brick and monolithic MFHs and 5 in high-end brick and monolithic MFHs.

Obsolete equipment. Approximately 75% of the gap in panel-type construction can be bridged by the installment of up-to-date equipment in the factory (flexible production lines of German or Canadian type). Three construction companies interviewed (in Moscow, St.Petersburg and Rostov on Don) are in the process of installing such equipment. Half of the productivity improvement will come from a reduction in labour since fewer workers are needed to operate such equipment and the other half from the improvements in quality. Twenty five percent of the 15 point gap is due to the use of less efficient equipment (cranes) on the construction site. There is plenty of equipment available to former state companies, but it is of poorer quality and not well maintained (waiting time for parts to be replaced can be quite long at some companies). It also seems that Russian equipment needs a somewhat larger workforce to operate it, for example it is common practice to have two people operate a certain type of crane that only requires one worker elsewhere.
In Soviet-type brick and monolithic construction companies, the issues are similar to those in panel-type construction, although smaller cranes and more manual tools are required. Equipment here is often outdated and not well maintained.

In high-end multi-family housing construction, the problem is the lack of equipment. The equipment and technology that companies in this segment use are, in general, of Western quality. The problem is that these companies can usually not afford enough good quality equipment and often rely on manual labor instead. Examples of equipment that usually get replaced by labor are forklifts, small conveyer belts and elevators, as well as different types of electrical and mechanical handheld tools.

Lack of scale. Scale is the most significant factor in describing the productivity gap in construction of SFHs where it explains as much as 30 points of the total gap. High-end brick and monolithic houses would also benefit from larger scale and we estimated the potential of closing the gap there to be 10 points. With the current housing mix, scale is not a very important factor at the aggregated industry level. However, if the industry changes that we advocate are implemented, the share of SFHs will increase, making scale a significant factor for the industry overall.

As previously discussed, these houses in Russia are usually built on a one-by-one basis. Building on a larger scale would provide for savings due to large volume contracts with infrastructure providers, bulk purchasing of materials, less idle time, better equipment utilization and more efficient use of prefabricated materials.

According to the study previously conducted in the United States, minimum efficient scale for SFHs is when 20 houses are built simultaneously. This allows for unit cost savings of 15%, while increasing the scale to 50 houses would increase the saving to 25% per house.

Industry dynamics

We found that a high level of competition is a key driving force behind operational improvements. Within the 40% of the market which is still state or company financed (panel-type and Soviet-type brick and monolithic MFHs) there is almost no competition. In the other segments more competition is emerging, although there is no global best practice yet present in the market.

Pressure from global best practice

In none of the segments have foreign best practice companies entered the market. Although residential construction tends to be local business in most countries, some best practice foreign companies could bring more rapid change and new technology to Russia. A lack of exposure to, and competition with, best practice companies is very important in explaining why many companies in high-end
sector, that have relatively high productivity in the Russian environment, have not been forced to implement measures to increase their productivity even more.

At the end of the next section, we will explain why best practice companies are still absent from Russia.

Domestic competitive intensity

¶ **Panel-type MFH.** In most cities, competitive intensity among panel-type construction companies has been very low since there are very few established players and no new entrants. Historically, each city/region has had a couple of companies working in this segment that were allocated most of the construction by the local/federal government. Companies in this sector have also been forced to compete only in limited regional markets due to the high transportation costs associated with the use of panels. When financing from local/federal government plummeted, each company was allocated far fewer contracts, in some cases amounting to less than 10% of the 1990 output level. In cases where local government did not interfere, most of companies went bankrupt or were forced to restructure and find new sources of finance, or new ways of constructing. In other cases, local government has wanted to keep the companies afloat. These companies have survived by producing very expensive housing due to low productivity and low capacity utilization.

Although most of the companies in this segment do not realize it yet, competition has been slowly moving from within the segment (panel-type companies competing with other panel-type companies) to competition with other segments (for example, companies constructing panel-type housing competing with companies constructing brick and monolithic homes). Traditionally, panel-type construction companies provided the most affordable housing but, due to low productivity levels, customers are increasingly finding that even some of the high-end housing companies are able to compete on price with the panel type construction companies. Some local governments, notably St. Petersburg, are now giving projects for social housing to non-panel-type companies.

¶ **Soviet style brick and monolithic MFH.** The competitive intensity in this segment is low/medium. In some cities, the situation is very similar to that described in panel-type MFH, with the local government protecting former state companies from competition, but also preventing them from restructuring. However there have been more new entrants to this segment since lower levels of capital investment are required here than for panel-type construction. The entrants have been both former state companies, previously building only panel-type housing, as well as newly established companies.

¶ **High-end MFH and high-end SFH.** In these segments competitive intensity is higher. Most of the new private companies have been established in these segments, but it seems that the continuously
growing demand for these types of housing has neither pushed the prices down nor forced productivity improvements.

*Non-level playing field*

Competition in the residential construction market is highly non-level due to the influence of local government on the level and nature of competition. In fact, this is the biggest impediment to productivity improvements in this sector. Details of this non-levelness are in the following section on external factors.

*External factors*

At the external factor level, local government’s undue influence on companies affects fair competition, macroeconomic stability and the development of well-developed special trade (upstream industry). These are the main causes of the labor productivity gap (see Exhibit 11). Local/federal government impediments (such as zoning laws, barriers to labor mobility and subsidized rent and utilities on existing stock), affecting demand for all types of housing particularly large-scale developments, will become increasingly important as state financed housing continues to decline, the macroeconomy stabilizes (hopefully) and special trade companies develop.

Local government has a huge negative impact on the competition level in the industry, unduly interfering throughout the whole construction process, especially for the government-financed part of housing (panel-type and Soviet-style MFH). In these segments, government actions often result in companies experiencing negative productivity growth. We have divided the impact of local government actions into two broad categories: the first group are factors affecting former state companies while in the second category, factors that prevent new construction companies from successfully competing in the market are described.

*Sector-specific barriers*

Local governments in most Russian regions openly support former state companies. This is done due to the allocation of construction contracts, the allocation of land contracts and through barter deals. In return, construction companies are often required to use certain suppliers (also mostly former state companies) and are not allowed to reduce employment. These factors have had a huge impact on the lack of restructuring among former state construction companies, thus preventing layoffs of excess variable labor and improvements in organization of functions and tasks.

Non-equal allocation of government procurement. Allocation of contracts/bidding process. Local and federal governments still finance around 25% of total housing and approximately 50% of the panel- and Soviet-type multi-family housing. Usually the local government claims that such contracts are given away in a fair bidding process. However, in most of the cities surveyed (and especially in those where government still finances a larger part of the construction) local government hinders competitive behavior among construction...
companies. On Exhibit 13, an example of contract allocation in one of Russia’s large cities is described. Local government has been giving 70-80% of its contracts to one management company that has been distributing these contracts to affiliated companies (all of these companies were part of a former state company). Some of these companies have been distributing contracts further to affiliated factories. On each level, some fee has been negotiated, partly legal and partly unofficial, with corruption being widespread. As a result, it is not the most productive companies that have been chosen, but the best connected and the most corrupt companies. Both the high cost and the low quality of construction work in the city reflect this.

In general, local governments’ behavior varies from allocating contracts only to former state companies by their share of total capacity to favoring a certain company that has had special ties with the government, but very rarely has a fair bidding process for government contracts taken place. The result of such behavior is, in addition to the higher price of government financed housing, a lack of pressure on former state companies to improve their productivity through, primarily, changes in OFT.

¶ Non-equal allocation of land. The bidding process for land allocation has been more often fair than in the case of government construction contracts, but it is still often the case that former state companies receive attractive land at a cheap price, without or despite a bidding process.

¶ Regulatory harassment

- Influence on the choice of suppliers/subcontractors. Local authorities do, in some cases, award contracts contingent on the supplier or subcontractor used. A foreign company we interviewed was asked to use a former state company as a subcontractor, before being awarded a project. Since then, they have always used the subcontractor when bidding for the local government projects. According to the manager we interviewed this subcontractor does not only construct inferior quality housing, but is also often far behind schedule so others involved in the construction process have to wait. Construction companies forced to use a certain supplier or subcontractor pay a productivity penalty. This factor also inhibits the development of new/restructured construction material producers.

- No layoffs allowed. Local government does, in some cities, exert pressure on former state companies to not lay off workers. The importance of this factor becomes obvious when considering the amount of excess variable labor in former state companies (constructing panel-type and Soviet-style bricks and monolithic buildings). If these companies decided to lay off workers despite local government’s protests, they would not receive any government contracts. In one instance, we interviewed a company manager who was planning to put a demarcation line into his panel-factory. On one side of the line he planned to keep workers that should be laid
off (in his case more than 75% of workforce), while the other ones would be working on the other side of the line. At the moment that local government allows him to reduce the number of employees, he will be prepared.

¶ Non-level taxes and barter. Very large amounts of residential construction for the local government (sometimes over 80-90% of total) are done through barter deals. Barter deals are also common in construction financed by large, formerly state owned companies. This way of payment for construction gives much fewer incentives for quality improvements due to the lack of end user pressure. Barter is used as a way to obtain federal government subsidies (Exhibit 14). In effect, flats are exchanged at prices well above market prices for supplies (e.g. cement) and taxes. Cement suppliers in turn get cheap energy (gas and electricity) by giving these flats to Gazprom and UES. Finally, at the end of this chain, Gazprom and UES will pay their federal tax obligations with these overpriced flats. Thus, everything happens as if the federal government was subsidizing these local programs. The quid pro quo of this lifeline is that the former state construction companies must not layoff workers. In addition, these opaque barter schemes provide ample opportunities for corrupt practices all along the industry chain (in some cases, city officials have interests in both construction companies and construction material producers).

¶ Non-level playing field created by government for new companies. In addition to essentially preventing new entrants in the segment of government financed construction, local governments also affect competition in other market segments by creating a non-level playing field for new companies. This is done through the absence of a land code, through different sizing of community gains required from different types of companies, through allowing former state companies to use cheap unregistered labor, through red tape and licensing and through unequal policies with respect to infrastructure financing. The effects of these factors are primarily seen in the low level of competition in the industry and the lack of best practice companies entering the market.

• Land code. The absence of a land code mostly affects new companies that might otherwise be constructing large-scale single-family houses in the outskirts of the cities. In Russia, there is still no land ownership law on the federal level and as a result, local governments are unwilling to lease or sell the land outside city borders. Agricultural land has been very difficult to convert to residential developments due to federal laws restricting this change. Non-agricultural land outside city borders is usually sold to private persons, but not to construction companies. One of the results of these land policies is that large-scale, highly productive SFHs developments are virtually non-existent in Russia.
• **Community gains.** The term ‘community gains’ refers to the practice that construction companies are asked/expected to contribute something to the community in which they are constructing. These contributions may be in the form of providing a power generator, water pipes, roads or a children’s playground for the local community. Community gains are not uncommon in Western countries, notably Great Britain, but the way it is done in Russia is unusual and unfair from a competition standpoint. In Russia, foreign companies must pay the highest level of community gains, which they find out once construction is well under way. New private Russian companies are also required to make a contribution to the local community, but they are usually informed about it before start of the construction and are able to decide whether it makes sense for them to go ahead with the project. The community gains required from new Russian companies are also smaller in amount than those required from foreign companies. Former state companies are less often required to contribute to the local community. In extreme cases, community gains can make up as much as 25-30% of construction costs and thus can have a considerable impact on fair competition.

• **Infrastructure financing.** Although local governments are formally responsible for providing infrastructure to land that is leased/sold, they seldom have the financing to do so. In the city sections where former state companies are building (panel-type and Soviet-type MFHs), infrastructure is usually provided. In the outskirts where large-scale developments would ideally take place, engineering and infrastructure are missing and are expensive to provide.

• **Unregistered labor.** In some cities local government allows certain construction companies to use unregistered (non-tax paying) labor. Companies getting away with this are usually former state companies.

• **Red tape/licensing.** The licensing of subcontractors has been an issue in some cities. Local government severely limits the number of permits available for specialized work (e.g. gas and electricity installation, electrification, excavation) and thus the prices of certain types of specialized work have been skyrocketing (in one instance, they were ten times higher than if unlimited permits were granted). Limiting licensing not only increases costs for construction companies, but also distorts competition among subcontractors and hinders the development of the special trade sector.

Obtaining permits for construction is a long and cumbersome process for most new private companies. It is not unusual that more than 100 different permits are needed in order to start a construction project. This is not only very time consuming, but usually also has financial impact on construction companies since many officials find that the ability to issue permits can be an additional source of income. In St. Petersburg we found a good example of how the
industry might deal with this problem. During a land development project financed by a loan from the World Bank, the City government was required to set up a small body that was supposed to obtain all types of permits required by the construction companies. It has functioned as an interface between the city administration and construction companies involved in construction on areas of newly developed land. Companies deal only with this body and are given guaranteed time periods for receiving all permits. Instead of companies trying to obtain 100 permits, the officials sitting in this body have to navigate around the city administration (and on the way have found that some of the routines/processes should be changed). Both sides have been very encouraged by initial success of this project and this body was made permanent (but still for only a limited number of developments).

Related industry barriers

Here we discuss the effects of the underdeveloped special trade sector and industries for high-end prefabricated materials, as well as the impact of import tariffs on materials and equipment. The underdeveloped special trade and prefabricated material industries penalize productivity greatly through a lack of use of special trade subcontractors and through the limited use of standard materials and modularity in high-end MFH and SFH. Import tariffs have a more subtle impact through their effect on quality. It should be noted that problems in upstream and related industries are really a spillover from many other problems stemming from governments’ interference. In effect, the best way to promote special trade is to create a fair competitive environment for both domestic and foreign best practice companies.

¶ Underdeveloped special trade sector. The impact on productivity of the undeveloped special trade sector is very large. The entrance of best practice construction companies, which tend to use special trade companies, would trigger competition in special trades industries through a pull effect.

¶ Underdeveloped industries for high-end and Western style prefabricated materials. Construction materials industries have been developing faster than the special trade sector, but still have a long way to go. Some foreign companies are setting up factories and subsidiaries, which are speeding up the restructuring and growth of Russian companies as well. There are many stories of how good quality materials, like specific types of doors or windows that were impossible to obtain locally a few years ago, are increasingly available on the market. However, there is a lot of room for improvement, especially in enabling more modular type materials to enter the market. One of the companies interviewed complained that while in the West one could get hundreds of matching products from the same catalogue, in Russia one would need to contact a number of producers and still not be able to get matching and modular assortment.

¶ Tariffs on imported construction materials. Because of high tariffs on imported materials, optimal materials are not always used. This also
limits the choice of DFM materials since they become too expensive to buy (Exhibit 15).

¶ Tariffs on imported equipment. Tariffs, in addition to high costs of imported equipment, limit the ability to purchase of up-to-date equipment, penalizing labor productivity.

Macroeconomic barriers

Macroeconomic instability affects the industry through high capital costs, which, in turn, affects capital intensity and scale in operational productivity. It also depresses overall demand for housing and discourages best practice companies from entering the Russian market. Without best practice companies, the pressure on domestic companies to implement OFT, and other changes to increase productivity, is much lower.

¶ High capital costs

- Capital intensity. There are some capital investments that are crucial and some companies are able to find the money to do them (e.g. investments into flexible production lines in panel factories by restructured former state companies). Some other capital investments, mostly planned at new construction companies, are not viable at present due to the current capital/labor cost ratio and the small scale of production.

- Construction and mortgage financing. The high cost of capital discourages large-scale developments where large amounts of financing to construction companies are required. Instead, sub-scale high-end developments that earn an earlier return are more prevalent. Lack of mortgage financing depresses the demand for mass-market housing. In addition to macroeconomic stability, clear and strong tenant rights would be necessary to develop an efficient mortgage/rental market.

¶ Lack of pressure from global best practice. Macroeconomic instability is an important reason given by those foreign companies that are reluctant to enter the Russian market. In addition to political instability (weak guarantees of investment security) best practice companies would not be able to perform in Russia in the same way as in their home countries. One reason for this is the undeveloped special trade sector. Other reasons include low labor cash costs, which reduce the cost advantage of capital intensive best practice, and the absence of large SFH developments (not only because of the lack of financing but also, as discussed next, by unresolved land issues and inadequate infrastructure financing). It is also questionable whether these companies find Russian markets too small, or rather scattered, except in commercial property in Moscow. Moreover, these companies are discouraged by the non-level playing field, that is, the ‘insider’ preference prevalent in the industry and the red tape characteristics of the sector as a whole.
FUTURE OUTLOOK AND POLICY IMPLICATIONS

Residential construction in Russia has undergone significant changes since 1990, however, by trying to sustain the output and employment of former Soviet companies through indirect financing, local government has condoned the inefficient production of apartments for which there is no demand. This has hindered productivity growth in the sector. Please turn to the Synthesis chapter where we demonstrate why we believe that concern about employment levels in residential construction is overdone. If growth occurs in other sectors, such as commercial construction, then employees can transfer there out of current forms of residential construction, as has been seen in Poland, where state owned construction companies have undergone dramatic restructuring.

Future outlook

When discussing the future of Russian residential construction, both Poland and Brazil are interesting benchmarks. If Russia follows the Polish example, with a drastic reduction in government financing, without implementing any of the Brazilian policies, output could decrease much further (see Exhibit 6). On the other hand, if companies are privatized, fair competition is encouraged, access to land is allowed and barriers to mobility are lifted, we might see the Brazilian story. The Brazilian productivity level is 3.5 times higher than the Russian, while output per capita is 75% larger. These remarkable figures are achieved without macroeconomic stability (including high costs of financing) and without the existence of a developed mortgage system.

We believe that a short-term output drop in residential housing is to be expected in Russia as the government further decreases its financing of construction. In the medium and long term output could recover or exceed previous levels if a fair competitive environment emerges, barriers to large-scale single family housing and barriers to increased demand are lifted. In such environment, labor productivity levels will rapidly increase and thus we do not believe that this industry is going to be a source of employment growth, even in the longer term.

Policy implications

The following policy actions would promote the growth of productivity and output in the residential construction industry:

¶ The playing field for all old and new market players should be leveled by establishing the following ground rules:

• An explicit ban on the commercial participation of government-affiliated persons (e.g. relatives of government officials) in bidding for government-financed developments

• The introduction of fair open bidding processes for the allocation of government contracts

• Fair market-based land allocation
• A ban on barter deals favoring unproductive but well-connected incumbents

¶ Barriers to large-scale single family housing developments should be lifted:
• A market-oriented land code must be adopted (enabling companies to develop large pieces of land outside cities)
• Mechanisms for infrastructure financing must be developed (e.g. through price of land or increased property tax)

¶ Measures should be taken to increase the demand for new housing:
• A mortgage system must be put in place, and adequate tenant rights and land ownership rights formulated
• Restrictions on labor mobility should be lifted
• Subsidies for maintaining the existing housing stock should be stopped, as should the subsidization of utility bills for existing dwellings
EVOLUTION OF OUTPUT IN RESIDENTIAL CONSTRUCTION
Millions of square meters

Source: Goskomstat; Interviews

Exhibit 1
EVOLUTION OF OUTPUT BY SEGMENT
Millions of sq. m; quality adjusted

Panel-type MFH
39 -62% 15

Soviet style bricks/monolithic MFH
20 -45% 11

High end bricks/monolithic MFH
4 +150% 10

SFH (both brick-by-brick and high-end)
5 +200% 15*

* Of which 1/5 high end and 4/5 “brick-by-brick”

Source: Goskomstat; Interviews

Exhibit 2
FINANCING OF RESIDENTIAL CONSTRUCTION IN 1997
Percent of total output in quality adjusted sq. m

<table>
<thead>
<tr>
<th>Panel-type MFH</th>
<th>Soviet-style bricks/monolithic MFH</th>
<th>High-end bricks/monolithic MFH</th>
<th>SFH</th>
</tr>
</thead>
<tbody>
<tr>
<td>29</td>
<td>17</td>
<td>9</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Goskomstat; Interviews

OUTPUT OF DIFFERENT TYPES OF CONSTRUCTION COMPANIES - 1997
Percent of total output in quality adjusted sq. m

<table>
<thead>
<tr>
<th>Non-restructured former state companies</th>
<th>Restructured former state companies</th>
<th>&quot;New&quot; private companies</th>
<th>Individuals by themselves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel-type MFH</td>
<td>Soviet-style bricks/monolithic MFH</td>
<td>High-end bricks/monolithic MFH</td>
<td>Brick-by-brick houses</td>
</tr>
<tr>
<td>24</td>
<td>11</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Goskomstat; Interviews
COMPARISON OF HOUSING STOCK IN RUSSIA TO OTHER COUNTRIES
Sq. m. per capita

GDP per capita at PPP
Percent of US level

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>GDP per capita at PPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>US (1995)</td>
<td></td>
<td>79.0</td>
</tr>
<tr>
<td>France (1996)</td>
<td></td>
<td>43.0</td>
</tr>
<tr>
<td>Russia (1997)</td>
<td></td>
<td>18.1</td>
</tr>
<tr>
<td>Poland (1995)</td>
<td></td>
<td>18.0</td>
</tr>
<tr>
<td>Brazil (1995)</td>
<td></td>
<td>25.0</td>
</tr>
</tbody>
</table>

* In 1997
Source: Goskomstat; UN; WEFA; WMM

COMPARISON OF RUSSIAN RESIDENTIAL CONSTRUCTION OUTPUT TO OTHER COUNTRIES
Sq. m built p.a. per 1,000 capita

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Sq. m built p.a. per 1,000 capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>1986-89</td>
<td>510</td>
</tr>
<tr>
<td>Russia</td>
<td>1990</td>
<td>463</td>
</tr>
<tr>
<td>US average</td>
<td>1985-94</td>
<td>918</td>
</tr>
<tr>
<td>France average</td>
<td>1985-94</td>
<td>426</td>
</tr>
<tr>
<td>Russia</td>
<td>1997</td>
<td>310*</td>
</tr>
<tr>
<td>Poland</td>
<td>1997</td>
<td>134</td>
</tr>
<tr>
<td>Brazil</td>
<td>1995</td>
<td>542</td>
</tr>
</tbody>
</table>

* Includes estimates of unofficial construction
Source: INSEE; Baustatistiches Jahrbuch; CBS; US Bureau of Census; Goskomstat; MGI Brazil study
COMPARISON OF RUSSIAN HOUSING STOCK 1995 TO OTHER COUNTRIES

Percent

<table>
<thead>
<tr>
<th></th>
<th>SFH</th>
<th>MFH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland*</td>
<td>67</td>
<td>33</td>
</tr>
<tr>
<td>Russia**</td>
<td>85</td>
<td>15</td>
</tr>
<tr>
<td>Brazil</td>
<td>91</td>
<td>9</td>
</tr>
<tr>
<td>Korea</td>
<td>40</td>
<td>60***</td>
</tr>
<tr>
<td>US</td>
<td>28</td>
<td>72</td>
</tr>
</tbody>
</table>

* Urban dwellings vs. non-urban dwellings
** Percentage of households living in multi-family vs. single-family houses
*** Including town houses and apartments in private houses (10% of total)

Source: Goskomstat; MGI Brazil study; Korean National Statistics Office; Polish Central Statistical Office

LABOR PRODUCTIVITY IN RESIDENTIAL CONSTRUCTION

Indexed to US = 100 in 1995

<table>
<thead>
<tr>
<th></th>
<th>Panel-type MFH</th>
<th>Soviet-style bricks/monolithic MFH</th>
<th>High-end bricks/monolithic MFH</th>
<th>High-end SFH</th>
<th>Brick-by-brick type SFH</th>
</tr>
</thead>
<tbody>
<tr>
<td>US 1995</td>
<td>100</td>
<td>14</td>
<td>12</td>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td>Brazil 1990</td>
<td>N/A</td>
<td>10</td>
<td>N/A</td>
<td>N/A</td>
<td>5</td>
</tr>
<tr>
<td>Russia 1995</td>
<td>N/A</td>
<td>N/A</td>
<td>20</td>
<td>N/A</td>
<td>5</td>
</tr>
<tr>
<td>Russia 1997</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>20</td>
<td>5</td>
</tr>
</tbody>
</table>

Source: Goskomstat; Interviews; McKinsey analysis
### PRODUCTIVITY OF DIFFERENT PLAYERS INTERVIEWED

Percent of US level; quality adjusted

<table>
<thead>
<tr>
<th></th>
<th>Panel-type MFH*</th>
<th>Soviet style bricks/monolithic MFH</th>
<th>High end bricks/monolithic MFH</th>
<th>SFH built by construction companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moscow</td>
<td>20-50</td>
<td>15</td>
<td>20-40</td>
<td>15-30 36*</td>
</tr>
<tr>
<td>Cherepovets</td>
<td>8-16</td>
<td>18</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Nizhny Novgorod</td>
<td>5-12</td>
<td>N/A</td>
<td>30</td>
<td>N/A</td>
</tr>
<tr>
<td>Rostov-na-Donu</td>
<td>N/A</td>
<td>15</td>
<td>20</td>
<td>N/A</td>
</tr>
<tr>
<td>St. Petersburg</td>
<td>20-40</td>
<td>17</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

* Including factory workers
** Prefabricated individual houses

Source: Interviews

### PRODUCTIVITY LEVELS OF BEST PRACTICE COMPANIES IN RUSSIA - 1997

Indexed to US = 100 in 1995

Source: Interviews; McKinsey analysis
### CAUSALITY FOR PRODUCTIVITY DIFFERENCES: RESIDENTIAL CONSTRUCTION

**Russia vs. US**

<table>
<thead>
<tr>
<th>Industry</th>
<th>Panel-type MFH</th>
<th>Soviet-type bricks/monolithic MFH</th>
<th>High-end MFH</th>
<th>High-end SFH</th>
<th>Brick by brick SFH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low capacity utilization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inefficient organization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organization of functions and tasks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marketing/product mix</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplier relations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blue collar trainability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower capital intensity/technology</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obsolete assets (subscale/outdated technology)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of viable investment in non-obsolete assets (upgrades/green fields)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-viable investment due to factor costs (labor, capital, and energy)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Productivity**

(indexed to US = 100)

<table>
<thead>
<tr>
<th>Russia</th>
<th>US</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

Exhibit 11
ORGANIZATION OF FUNCTIONS AND TASKS: POSSIBLE PRODUCTIVITY IMPROVEMENTS IN A PANEL FACTORY

<table>
<thead>
<tr>
<th>Initial state</th>
<th>Current state</th>
<th>Future possibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>• More than 1390 workers</td>
<td>• 500 best employees left</td>
<td>• Lay-off of the largest amount of employees</td>
</tr>
<tr>
<td>• Best workers leaving</td>
<td>• 890 least trained, older and with drinking problems stayed</td>
<td>• Employment of well-trained and motivated workforce</td>
</tr>
<tr>
<td>• Utilization low</td>
<td>• Enforcement of “carrot and stick”</td>
<td>• 200 people needed</td>
</tr>
</tbody>
</table>

Productivity Percent of US level

- 1997
- Beginning 1999
- When, and if, this is allowed by the regional government

Time

- Same equipment
- Installment of new equipment

Less than 100 well-trained workers needed

Improving OFT will boost productivity 4-fold

Source: Interviews

Exhibit 12
TOP DOWN ALLOCATION PROCESS OF HOUSING PROJECTS IN ONE OF THE CITIES

EXAMPLE

Department of residential construction

- Political/social interest of keeping former state companies busy
- Ownership of some of these companies

70-80% of all orders

"There is always a bidding process, but we somehow always win."

Management company

- Distributes orders within its sphere for a certain management fee

Construction company 1  CC2  CCn  Cn

- Distributes orders among factories for a certain management fee

Factory 1  Factory 2  Factory n

Source: Interviews
BARTER CHAIN IN RESIDENTIAL CONSTRUCTION

Flats are overpriced

Local government allocates land and buildings contract

Former state-owned construction company

Cement supplier

Gazprom/UES

Federal Government

Tax offsets

Energy

Flats

Retiring employees

War veterans

Source: Interviews

EXHIBIT 14
Although the imported materials initially costs the same as domestic, at the customer site imported material is over 60% more expensive.
OPERATIONAL CAUSALITY IN PANEL-TYPE MFH
Sq. m per thousand hours worked, quality adjusted
Indexed to US = 100 in 1995

DIFFERENCES BETWEEN MOSCOW'S BEST PRACTICE AND
SWEDISH BEST PRACTICE IN PANEL TYPE MFH
Sq. m per thousand hours worked, quality adjusted
Indexed to Skanska = 200 in 1997
### OPERATIONAL CAUSALITY IN SOVIET-STYLE BRICKS/ MONOLITHIC MFH CONSTRUCTION - 1997

Sq. m per thousand hours worked, quality adjusted
Indexed to US = 100 in 1995

<table>
<thead>
<tr>
<th>Source: Interviews</th>
</tr>
</thead>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>Includes lack of blue collars, trainability, motivation, poor work organization resulting in lots of waiting (e.g., for arrival of materials)</td>
<td>Russia</td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Moscow</td>
<td>Lack of special trade subcontractors</td>
<td>Moscow</td>
</tr>
<tr>
<td></td>
<td>• Less specified labor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Lower labor utilization</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Less sophisticated equipment</td>
<td></td>
</tr>
</tbody>
</table>

### OPERATIONAL CAUSALITY IN HIGH-END BRICKS/MONOLITHIC CONSTRUCTION

Sq. m per thousand hours worked, quality adjusted
Indexed to US = 100 in 1995

<table>
<thead>
<tr>
<th>Source: Interviews</th>
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<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>Improvements in works organization and incentive system</td>
<td>Russia</td>
</tr>
<tr>
<td></td>
<td>Lack of investments into &quot;best practice&quot; technology and equipment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Less specialized labor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Lower utilization of labor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Less sophisticated equipment</td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Moscow</td>
<td>Lack of special trade subcontractors</td>
<td>Moscow</td>
</tr>
<tr>
<td></td>
<td>No design planning and scarce use of prefabricated materials</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lack of investments into &quot;best practice&quot; technology and equipment</td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>OFT</td>
<td>Best practice</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Capital intensity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Capital intensity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scale</td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>Lack of special trade subcontractors</td>
<td>Russia</td>
</tr>
<tr>
<td></td>
<td>• Less specified labor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Lower labor utilization</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Less sophisticated equipment</td>
<td></td>
</tr>
</tbody>
</table>
OPERATIONAL CAUSALITY IN SFH

Sq. m per thousand hours worked, quality adjusted
Indexed to US = 100 in 1995

Source: Interviews

Exhibit 20