RE-MAPPING OPPORTUNITY

Making Best Use of the Economic Potential of Russia’s Regions

Washington, DC — Moscow
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EXECUTIVE SUMMARY

Russia can unlock new sources of economic growth if the economic potential of its regions is enhanced and better exploited. There is great disparity in productivity amongst the regional economies of Russia. Even after controlling for price differences, Gross Regional Product (GRP) per capita in the most productive Russian region is 25 times greater than in the least productive, with oil- and gas-producing regions the most productive. The national economy has recently experienced two years of recession; while the economy is showing signs of improvement\(^1\), growth rates below 1.5 percent are expected for the next two years\(^2\). However, the Russia government is forecasting higher growth rates based on an increase in the amount of private investment, which is forecasted to grow at 5.3 percent per annum during 2018-2020\(^3\). The resource-rich regions that were once engines of growth have been hit by low energy prices as well as sanctions. Given these challenges, it is imperative that sustainable avenues of growth are fostered nationally. New sources of growth for the national economy can be tapped and developed by better understanding the factors — beyond resource endowments — that determine the productivity of regional economies.

Urbanization, access to markets, advanced human capital, and the presence of high- and mid-tech industries are the most important determinants of economic development in the European part of Russia. Russia's current economic geography has largely been shaped by a sequence of shocks that hit the country over the last 25 years. While the boom in the oil industry created rapid growth in peripheral, resource-rich regions, some regions in densely populated parts of the country were stymied by the persistence of structural constraints including industrial legacy, population decline, and aging. This has led to a geographic pattern of development counter to what is observed in other large countries where wealth and productivity is highest in well-connected and populous regions. The analysis in this paper shows that natural resource wealth is not the sole driver of regional development in Russia — even if it is still a major contributor when all of Russia's regions are considered. In the European part of the country, the productivity of individual regions is primarily explained (60 percent of variation) by factors traditionally seen as determinants of regional development: urbanization, access to markets, the quality of human capital, and the presence of high-tech industries. Regions with high economic potential are also not limited to Moscow, St. Petersburg, and their immediate surroundings; in fact, several regions across the European part of Russia are, or are positioned to be, major contributors to productivity growth\(^4\).

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\(^3\) Ministry of Economic Development of Russian Federation.
\(^4\) In this report, productivity is defined as the ability to achieve a high level of economic output per capita in a given region, and thus is used interchangeably with a region’s “level of development.” While this usage differs somewhat from conventional economic tradition, it is based on the fact that indicators such as GDP per capita are commonly used as a measure of economic productivity. Multiple studies in Russia use GRP per capita as a measure of productivity, (e.g., Grigoryev, L., Urozhaeva, V., Ivanov, D. (2011) Synthetic classification of regions: Basis for Regional Policy in Grigoryev, L., Zubarevich, N., Khasayev G., (Eds.). Russian Regions: Economic Crisis and Problems of Modernization. Moscow, TEIS (pp. 55-56). [In Russian]).
Economic policy and the business environment at the regional level have an important impact on economic development outcomes. The example of Ulyanovsk Oblast shows that a change in approach to governance and in the development strategy can bring measurable improvements in regional economic performance. The examples of Bashkortostan and Krasnodar Krai demonstrate the important role that regional governments play in shaping the perception of a region’s attractiveness to investment and in fostering a business-friendly environment. However, structural conditions that are specific to the region yet often beyond the regional government’s control or capacity often have a critical impact on regional development. For example, Ulyanovsk Oblast’s progress is held back by the underperformance of its largest Soviet-era, legacy industries, while by contrast Bashkortostan is propelled by the oil extraction and petrochemical cluster developed in the Soviet period.

National policies should give priority to fostering structural conditions associated with higher productivity in regional economies. Urbanization is the factor most closely associated with higher regional productivity, yet there are few large cities in Russia, and many of these large cities grow by ‘suburbanizing’ rather than by ‘densifying’. National policies should aim to alter conditions that distort efficient forms of urbanization (e.g., housing construction targets) and support regions and cities in improving the quality of urban services and overall livability. Investments in the inter-regional transport infrastructure of the European part of Russia can boost economic potential there, but these investments should be identified and implemented based on a thorough analysis of their impact on individual regional economies.

In order to unlock the economic potential of regions, the federal government can help regions gain greater fiscal stability, increase their involvement in the design and implementation of business regulations, and enhance their role in the implementation of federal development programs. Over the last 15 years, the federal government’s regional development policies have focused on spatially-targeted or sector-targeted support programs that have been funded and controlled from the center. Today the budgetary system is highly centralized; regions have limited control over their revenues as most of their revenue comes from federal grants and federal taxes shared between the center and regions. Consequently, expenditures from regional budgets are largely driven by targets set by the national government. While regional debt is not high by international standards, it is mostly made up of short-term loans from both commercial banks and the federal budget; on average 10 percent of a region’s revenue is spent on servicing this debt. Under these circumstances, regions are dependent on the federal government’s support for any long-term capital investments or for development initiatives. Regions actively use federal support programs to overcome these challenges, but their effectiveness is often impeded by overregulation and the lack of flexibility to adapt to regional circumstances. At the same time, attempts by regions to promote economic growth by improving the environment for business and streamlining regulations are often impeded by regulations introduced at the federal level accompanied by inspections that are not accountable to regional authorities. Therefore, the federal government can catalyze the economic potential of regions by (1) right-sizing regions’ revenue streams against their statutory obligations, (2) simplifying federal development
programs and fully delegating their implementation to regional authorities (e.g., management of free trade zones), and (3) giving regions greater say in formulating and enforcing business regulations.

**Regional governments should foster an environment in their regions that attracts talent and investors and should aim to achieve greater policy and fiscal self-sufficiency in their governance.** In the short run, regional governments can improve their economic outcomes by learning from policies that brought success to other regions. Investment promotion, business environment reforms, small business support schemes, and the introduction of “institutions for development” to improve efficiency in governance are all strategies that have helped regions in Russia boost their economies with minimal upfront investment. Regions should also fully utilize national development programs to finance transportation infrastructure improvements, research centers, business incubators, and industrial zones. However, to increase long-term prosperity, regions need to increase self-sufficiency and gain the ability to address larger development challenges without the central government’s support. This will require increasing own source revenues and implementation capacity of regions. First steps in this direction can be made by maximizing the utilization of tax authority given to regions, as well as the development of public-private coalitions that work to expand a regions’ implementation capacity over the long term.
In order to understand a country as large and diverse as Russia, it is extremely important to consider spatial patterns of economic development. Regions — in central Russia, in the Far East, in the subtropical and mountainous south and in the Arctic north — differ distinctly in the many characteristics that affect economic development such as climatic conditions, natural resource endowments, population density, demography, and soil fertility. Furthermore, the economic outcomes of these regions also differ greatly; oil-producing Tyumen Oblast, for example, matches the GDP per capita of Norway, while Ingushetia Republic matches that of Iraq. It is the interaction of these diverse economic landscapes that comprises the Russian economy. Without understanding the forces that shape the economies of individual regions, it is impossible to understand how to unlock economic growth for the country as a whole.

As Russia looks for new drivers of economic growth, it is important to understand the structural conditions that have defined economic development in Russia’s regions. The Russian economy is gradually recovering from a recession; however, with lower commodity prices, increasing costs for natural resource extraction, and restrictive sanctions, the country can’t rely on oil and gas exports to drive growth as it did in the 2000s. Russia’s regional diversity offers opportunities to identify new sources of economic potential. If the conditions that have helped some regions achieve higher levels of productivity (other than natural resource endowments) are properly understood, policies can be developed to identify such conditions and help regions exploit them more effectively. This would in turn help right-size the economy as well as unlock new economic, demographic, and other sources to promote long-term economic development.

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This report uses the Economic Potential Index (EPI) methodology to identify the conditions that drive regional development. Economic potential is the level of productivity that is possible for a region to achieve given its structural endowments, which are characteristics that are hard to alter in the short run. The methodology used in this report combines quantitative analysis of the drivers of productivity across regions with in-depth case studies that focus on the role of regional governments and institutions in converting endowments into economic outcomes. This methodology generates insights that are relevant for both the national government and regional governments.

The first chapter of this report provides an overview of regional development in Russia over the last 25 years and identifies "Russia-specific" national structural conditions that may affect regional development. The second chapter discusses the results of an assessment of economic potential at the regional level and the factors that shape it in Russia. The third chapter focuses on the role of national and regional governance, policy, and institutions in promoting economic development of the regions. The final chapter proposes policy priorities for both regional and national authorities.
CHAPTER 1

What shapes the economic development of Russia’s regions?

Russia’s diverse geography and its complex economic history are important factors explaining the disparities in its regional economic development. In recent decades, spatial inequality of economic development in regions across the globe has been well documented in economics literature. There is now a large body of evidence identifying characteristics common to areas achieving high levels of economic productivity. Such characteristics include a high level of urbanization and economic density, proximity and connectedness to large markets, and a highly skilled population. These ideas shape the foundation of the economic potential analysis used in this paper. However, to understand the factors that shape the economic potential of the regions, specific aspects of the country’s context must be considered. This chapter discusses the importance of two such country specific factors: the legacy of the planned economy and the role of natural resource extraction.

Is the legacy of a planned economy still a burden for regions?

Soviet-era central planning resulted in artificially-equalized regional development and in an inefficient allocation of resources. Investments were not driven by profit incentives, but rather by government decisions often rooted in an expansionist vision of development: exploit new territories and spread economic activity across the vast country. Allocating investment in this way led to sub-optimal outcomes, such as the development of large cities north of the Artic circle. This investment process also resulted in the uniform distribution of economic activity across space that would have been inefficient and unsustainable under market conditions.

The inefficiencies of Soviet-era resource allocation were revealed by the rapid growth of regional economic disparities in the 1990s. During the transition to a market economy, regions specializing in heavy industrial sectors (industrial machinery, defense, chemical) suffered a rapid decline, as their core sectors failed to rebuild supply chains and identify new markets. The peripheral regions reliant on the state to supply energy sources and other basic commodities were also hit really hard. The adjustments from this period produced a rapid growth in disparities in regional economic performance. By the early 2000s, the best regional performer produced 64 times more industrial output than the worst regional performer, and the region with the worst labor market conditions had an unemployment rate 19 times higher than the best performing region.

Persisting sub-optimal spatial allocation of capital and labor resources may still play a strong role in determining levels of regional productivity. In its transition to capitalism, Russia needed to re-allocate labor and capital to more productive sectors of its economy. Individual industries in the Soviet Union tended

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8 Ministry of Economic Development of the Russian Federation.
to be extremely concentrated spatially — with lots of settlements built around large manufacturing complexes. This meant that any re-allocation of resources by sector required their redistribution in space including across regions\(^9\). However, continuing restrictions on labor and capital mobility impeded this process throughout the transitional years. After a short spike in the early 1990s, inter-regional migration in Russia remained relatively low (almost 10 times lower than in the US on a per capita basis). The lack of labor mobility led to rapid divergences between regions in terms of wages and levels of unemployment. Low labor mobility is most often the result of institutional constraints, such as mandatory household registration, a system that restricted access to services for people who didn’t own housing in the region to which they’d moved.\(^10\) In the 1990s, ‘poverty traps’ created additional constraints to mobility. A large share of the population did not have the means to cover the cost of migration, and while capital markets were also underdeveloped, taking out a loan to cover these costs was not financially possible.\(^11\)

**Breaking down some barriers to mobility in the 2000s could have mitigated the impact of the Soviet legacy on regional productivity.** Throughout the 2000s, wages and incomes were converging across the regions, which was likely the result of the integration of regional labor markets (Figure 1). Empirical research shows that as income rose and financial markets matured, many people were able to access resources needed to cover relocation. If 85 percent of the regions were considered poverty traps in 1995,\(^12\) only one region remained a poverty trap in 2010. Similarly, a recent analysis of financial flows found little correlation between savings and investment volumes at

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**Figure 1**

**Convergence of income and wages among Russia’s regions**

<table>
<thead>
<tr>
<th>Year</th>
<th>GRP per capita</th>
<th>Income per capita</th>
<th>Unemployment level</th>
<th>Average wage</th>
</tr>
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<tr>
<td>1995</td>
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<td>2005</td>
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<tr>
<td>2010</td>
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**Figure 2**

**Change in distribution of pairwise distances between registered enterprises in Russia**

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<tr>
<th>Year</th>
<th>Probability density function</th>
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<td>2013</td>
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<td>1989</td>
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Source: Dmitriev, Chistyakov (2017) Reform agenda for the forthcoming policy cycle in Russia.

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\(^12\)Poverty trap is defined as a condition where the average income is below the level of income that in a model is associated with a decline in rates of mobility.

\(^13\)Pairwise distance is the distance between two randomly selected enterprise headquarters in a country. The chart shows the distribution of the measure.
a regional scale, which suggests that capital is not trapped within regions anymore. This conclusion is confirmed by changes observed in the spatial distribution of registered enterprises in Russia. If in 1989 the pairwise distribution of distances between enterprises suggested almost uniform distribution across space, by 2010 enterprises were much more concentrated, which is indirect evidence of spatial re-allocation of factors of production (Figure 2). It is, however, unclear whether improved mobility of labor and capital completely mitigated the lasting effects of the Soviet legacy on regional economies. The ongoing socio-economic challenges of Soviet-era industrial monotowns suggest that legacy is still important.

**Industrial monotowns from the Soviet era persist as manifestations of the challenges of the transition to a market economy.** Today, 519 settlements in Russia are legally identified as monotowns — settlements highly reliant on a single industrial plant or industry. Ninety-four of them are classified as monotowns with a high level of socio-economic deprivation, largely due to the economic struggles of the factory that accounts for most of the local economy and employment. It is broadly recognized that the economic potential of monotowns is limited, and that they generally struggle to contribute to the economic development of regions. Thus, they are a focus of support programs implemented by the federal government.

**Natural resources: a blessing or a curse?**

**In the last 15 years, fluctuations in commodity prices were the main factor defining the relative dynamics of regional economic development in Russia.** Rising oil prices in the early 2000s benefited resource-rich regions and large urban areas (primarily Moscow and St. Petersburg), where the inflow from large oil incomes stimulated development of the financial and service sectors as well as the construction and real estate industries. However, the regions that grew the fastest in 2000-2007 were also hit the hardest by the 2008 international financial crisis. Oil-rich regions were hit by the drop in energy prices, while the metropolitan areas suffered from declining demand and poor access to affordable credit on European markets. In the short run, this led to a downward convergence of leaders and laggards in regional GDP per capita. However, in the years after the 2008 crisis the less-developed regions were hit by a decline in federal subsidies, which stifled the convergence trend. (Figure 3)

**The close correlation between regional economic convergence and oil price fluctuations was not unique to Russia.** For example, Canada followed a very similar path whereby differences in regional productivity grew in 2000-03 as oil-producing regions (primarily the Northwest Territories) experienced rapid economic growth. However, the trend reversed after the 2008 crisis and as oil prices declined. There is greater disparity in productivity among Russia’s regions than in other comparable countries, which is largely driven by the resource-rich regions. Regional disparities are common in both developed and developing nations as they reflect the natural tendency of economic activity to concentrate in productive places.

15 Analytical Centre for the Government of the Russian Federation (2013). Shifts in the regional structure of the Russian Economy. [In Russian]
In fact, a sharp rise in regional inequality is often associated with periods of rapid economic growth. This was the case in Thailand, Vietnam, and Indonesia, as well as in Poland, which like Russia went through a transition to a market economy. However, Russia appears to have higher levels of regional inequality than most comparable economies. Nevertheless, most of the difference between levels of variation of regional GDP per capita in Russia and countries like India, China and Brazil disappears if 6 regions that rely most on natural resource extraction are removed from the analysis (Figure 5).

Oil- and gas-rich regions have been the powerhouses of the Russian economy. Mineral wealth drives the high levels of GDP per capita achieved by some of the sparsely-populated regions in Russia. In fact, the extractive industries contribute more than half of total output for the top five regions in GDP per capita. The regions where extractives make up more than 30 percent of total output (with the exception of Komi Republic, Orenburg Oblast and Nenetskiy AO) are located in Siberia or the Far East, and are sparsely populated with little economic activity outside resource extraction.

The recent experience of resource-rich regions shows that their economies are volatile and their growth is unsustainable. The contribution of resource-rich regions was paramount for Russia’s economic growth over the last 25 years. However, after experiencing rapid growth throughout the mid-2000s (8 percent a year), the nine Russian regions where natural resource extraction accounts for more than 30 percent of total output have increased their real GDP by only 2 percent combined

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17 Prices are equalized across regions in the base year using the Consumer Basket price index, while values for a non-base year are calculated using the chain index of physical volume.

18 For all countries, regional chain physical volume indexes are used for construction of the time series. The shape of the curve for Russia is different from Figure 1 because regional differences in price levels in the base year are not accounted for. This is done in order to ensure for comparability with other countries where such data was not available.


20 Ibid.

21 In the context of the methodology used in this report, this refers to nine regions where natural resource extraction contributes more than 30 percent of total output, as discussed later in more detail.

22 RosStat.
Economic theory and empirical evidence from countries across the globe demonstrate that overreliance on natural resource exports has negative effects on regional economies and institutions. Economists have shown that the success of natural resource exports leads to loss of competitiveness in other tradable sectors of the economy — a phenomenon widely known as the “Dutch disease.” Additionally, oil and gas industries in particular seem to be hard to diversify. These industries support development of local supply chains and professional skills and qualifications that are highly specific and not widely used in other sectors (see Box 1.). Research also suggests that resource dependence has a negative effect on institutions. The availability of natural resource rents removes the need to generate revenue through taxes and often limits incentives for government capacity-building. In cases where rents from natural resources are accruing to the state, or where the state has control over their distribution, access to public office becomes the most valuable asset; this induces patronage dynamics and creates incentives for actors to seek political influence. It also promotes a class form of rent-seeking where business elites become intertwined with the state in order to maintain control of rents and protect the status quo. These and other possible effects often result in a decline in the quality of governance and market institutions.

The methodology used in this report accounts for both Russia-specific factors discussed here: the impact of the Soviet legacy and the distortions resulting from natural resource export revenues. Specific efforts are made to control for the overpowering influence of the natural resource economy on patterns of regional productivity in order that the impact of the factors associated with more sustainable and less volatile models of economic development can be examined. The role of the Soviet legacy is investigated through the introduction of an additional variable to the regression model and is discussed later in the qualitative analysis of regional institutions. The next chapter presents the results of the quantitative analysis.

Sources: RosStat, China Data Center of the University of Michigan, Eurostat, Ministry of Statistics and Implementation of India, IBGE, Statistics Canada, and Australia Bureau of Statistics.
In the 1970s, countries that were major exporters of natural resources struggled to achieve simultaneous development of their manufacturing sectors. Economists labeled this phenomenon the "Dutch Disease". The Dutch Disease is best explained using a model of an economy with three sectors: an extractive sector, a tradable sector—selling goods to other areas, and a non-tradable sector—selling only local services. Rapid growth based on natural resource extraction brings a large amount of extra income into an economy causing inflation on the local market for non-tradable goods. Growth of non-tradable prices pushes up local wages. This in turn squeezes the profit margins of tradable sector producers, because while their labor costs grow, prices for their goods remain static because they are not established on the local markets. This makes tradable industries in a resource-rich region—for example, manufacturing—less competitive than in other locations. In such regions, natural resource extraction becomes the dominant tradable industry, which means greater exposure of an economy to external price shocks and almost inevitable decline once the resource is depleted (Figure 6).

It is particularly difficult for regions dependent on oil and gas industries to diversify their economy. The Product-Space concept developed by Hidalgo, et. al. mapped all products traded on global markets in terms of their relatedness. By their definition, relatedness of products means that they require a similar supply chain, institutions, capital, infrastructure, and technology, and thus are likely to be co-produced in the same location. Figure 7 shows that oil and gas extraction are on the periphery of the network, meaning that they are not closely related to any other products, which makes co-production unlikely.26

Box 1
Why economic growth driven by oil exports is unsustainable

In the 1970s, countries that were major exporters of natural resources struggled to achieve simultaneous development of their manufacturing sectors. Economists labeled this phenomenon the "Dutch Disease". The Dutch Disease is best explained using a model of an economy with three sectors: an extractive sector, a tradable sector—selling goods to other areas, and a non-tradable sector—selling only local services. Rapid growth based on natural resource extraction brings a large amount of extra income into an economy causing inflation on the local market for non-tradable goods. Growth of non-tradable prices pushes up local wages. This in turn squeezes the profit margins of tradable sector producers, because while their labor costs grow, prices for their goods remain static because they are not established on the local markets. This makes tradable industries in a resource-rich region—for example, manufacturing—less competitive than in other locations. In such regions, natural resource extraction becomes the dominant tradable industry, which means greater exposure of an economy to external price shocks and almost inevitable decline once the resource is depleted (Figure 6).

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CHAPTER 2

What is the economic potential of Russia’s regions — and what drives it?

Methodology, analytical challenges, and results

This paper uses the Economic Potential Index (EPI) methodology to understand the factors that are closely associated with the development of regional economies in Russia. The EPI is a methodology developed by the World Bank Group and applied to study regional development in India and the European Union. It is used to identify the structural characteristics that best explain the levels of productivity observed across regions. This study defines economic potential as the level of productivity that a region can achieve given its structural characteristics. Structural characteristics are factors that are shown to have an association with productivity and economic development and are static in nature — meaning they cannot be altered substantially in the short or medium term (1-5 years). These structural factors include the level of urbanization, access to markets, quality of human capital (i.e., life expectancy or share of higher education), geographic characteristics of the regions, and sectoral composition of the economy. As described in Chapter 1, the additional Russia-specific characteristics that should be included in the analysis are the role of extractive industries and the Soviet legacy of central planning.

This paper uses an empirical version of the EPI methodology, which has important implications for the interpretation of results and findings. In its basic version, EPI methodology uses a set of assumptions based on past empirical studies to create a list of structural conditions that define the potential of regions in the country under consideration. The version of the EPI methodology used here starts from a similar assumption, but then uses multivariate regression analysis to test whether the identified structural conditions correlate with the observed level of regional productivity (GDP per capita). With this approach, conclusions may be drawn about the relative importance of various structural conditions for achieving higher levels of economic productivity at a regional level. This approach also allows for a discussion of the potential of different regions to achieve higher levels of economic productivity within the model of economic development currently prevailing in the country. It is thus possible to call this approach an analysis of ‘revealed economic potential’. The approach provides a robust test of the role of the factors contributing to regional productivity. However, it also may result in counterintuitive findings that should be interpreted with caution. For instance, a negative correlation between a given factor and level of productivity doesn’t mean the factor should be eliminated. Rather, it suggests that on average the factor is associated with forms of economic activity that yield lower productivity and possibly that there is a need for additional investigation into ways this factor can be better utilized. A detailed description of the methodology behind the analysis presented in this chapter can be found in Annex 2.

The overpowering role of natural resource extraction as a driver of regional economies in Russia creates obstacles for analysis of the role of other structural conditions. Most of the regions specializing in natural resource extraction are located in the northern and eastern parts of Russia far from the most populated parts of the country and thus far from large markets or large agglomerations. They have low population density, and have climatic conditions that are unsuitable to agriculture. In other words, these regions do not possess the characteristics that we expect to find in highly-developed areas. Yet, due to the availability of natural resources, these regions attain substantially higher levels of GDP per capita than other parts of the country. As a result, these regions, due to the powerful impact that the oil and gas industry has on their economy, overpower the impact of most of the other structural conditions on regional development in Russia. A good illustration of this is the overall negative correlation between the measure of access to markets and level of regional productivity in Russia (see Annex 2). For this reason, when an EPI model is estimated for all regions the results are uninformative, even after removing output of extractive industries from GDP and introducing additional controls (the results of EPI modeling for all regions are presented in Annex 2).

To create an informative model, the estimation is limited to 56 regions in the western part of Russia. This approach primarily is utilized in order to remove the regions whose economies are driven by extractives and thus distort the results. Additionally, it mitigates the difficulty of including some of the most remote and inaccessible regions into the model. These remote, but not necessarily resource-rich regions disrupt the model largely because their isolation means they cannot leverage productivity gains from access to the markets of the most populated regions. To draw substantive conclusions from the EPI, the analysis is restricted to a subset of regions in western Russia where the geography of regions is more consistent and natural resource exports are less prominent. The regions included in the final version of the model account for 75 percent of total population and 95 percent of total output (excluding natural resource extraction). All regions in the Far Eastern and Siberian Federal okrugs were excluded from the model. Additionally, any region in which extractives contributed to more than 30 percent of GRP between 2010 and 2014, on average, were excluded from the analysis (see Annex 2 for a detailed explanation of the rationale for selection of regions and Figure 32 for a layout of included and excluded regions).

When the EPI analysis is limited to 56 regions in Russia, the results show the critical role played by urbanization, market access, human capital, and technologically advanced sectors in achieving high levels of productivity. After testing a multiplicity of independent variables and model specifications, the model presented in Table 1 was selected (see Annex 2 for detailed description of the variables used and their interpretation and model specifications). The results of this model confirm that while Russia is peculiar due to its geography and recent development trends (as discussed in Chapter 1), the laws of economic geography still apply and urbanization, access to markets, and human capital are among the key drivers of economic development of Russia’s regions. The following section discusses individual results of the EPI estimation and their policy implications.
Focusing on critical structural characteristics to drive regional development

The results of the analysis presented in Table 1 point to structural conditions as drivers of regional productivity. These structural conditions should be a policy priority, but specific interventions require in-depth consideration. Improving structural conditions is a complicated challenge. Simple solutions are likely to lead to unintended consequences. Masses of people can’t be forced to move into cities, a new road alone cannot produce productivity gains, and investment in education needs to be tailored to the needs of the local economy. Evidence derived from the EPI model offers a starting point for a policy discussion about the role of structural conditions. This section aims to elaborate these results through the introduction of additional evidence.

Maximizing the benefits of urbanization

Urbanization is the factor most closely correlated with high levels of productivity in Russia’s regional economies. Preliminary analysis has shown that the share of urban population explains more than 50 percent of variation in regional GDP per capita in western Russia. The variable share of population living in cities with more than 250,000 inhabitants was used in the model to account for the importance of scale of agglomerations for productivity, and thus illuminate the effect

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**Table 1**

RESULTS OF THE ECONOMIC POTENTIAL MODELING

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>SE</th>
<th>t-statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Access</td>
<td>0.2208***</td>
<td>(3.3840)</td>
<td>0.1862</td>
<td></td>
</tr>
<tr>
<td>Port Access</td>
<td>0.1454***</td>
<td>(5.6982)</td>
<td>0.3030</td>
<td></td>
</tr>
<tr>
<td>Land Suitability</td>
<td>-0.2434***</td>
<td>(-3.2218)</td>
<td>-0.1654</td>
<td></td>
</tr>
<tr>
<td>% University Level Education</td>
<td>0.3168***</td>
<td>(2.7907)</td>
<td>0.1441</td>
<td></td>
</tr>
<tr>
<td>High Tech Employment</td>
<td>0.5644***</td>
<td>(5.1639)</td>
<td>0.3235</td>
<td></td>
</tr>
<tr>
<td>% Population in Monotowns</td>
<td>0.9845***</td>
<td>(6.5103)</td>
<td>0.2454</td>
<td></td>
</tr>
<tr>
<td>Economic Crimes per 1000 Pop.</td>
<td>0.0198</td>
<td>(0.5874)</td>
<td>0.0275</td>
<td></td>
</tr>
<tr>
<td>% Population in Cities Larger than 250k</td>
<td>0.0062***</td>
<td>(6.4429)</td>
<td>0.3383</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>8.9765***</td>
<td>(14.2644)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Observations: 280  
Adjusted R-squared: 0.4580

Note: Dependent variable is gross regional product per capita. Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Robust SE. Standardized coefficients (beta) also report in third row. Market access is calculated as the ratio between the sum of the population of the major city in each region relative to the sum of travel time to those cities from the reference city. Port access is calculated as the ratio between the sum of cargo throughput in each port relative to the sum of travel distance to those ports from the reference city.

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28Calculation using Rosstat data. This percent of urban population variable was not used in the model due to multi-collinearity issues.
of regional differences in assigning urban status to small settlements. The results suggest that on average, a standard deviation increase in the share of the population living in cities with a population of 250,000 (or more) is associated with a 0.33 standard deviation increase in GRP per capita. This result suggests that agglomeration economies are the key driver of regional productivity in western Russia.

But can urbanization be utilized better in Russia? Economic theory suggests that the productivity benefits of agglomeration increase as cities get larger; this holds true in Russia as with most countries of the world. Recent data shows that the productivity of firms in services and manufacturing starts increasing substantially if they are located in cities with 1 million residents or more (Figure 8). However, Russia has very few cities of this size. There are only two cities larger than 1.5 million in Russia, while in Japan (a smaller country by population) there are five such cities and in Brazil (50 percent larger than Russia by population) there are eight. Russia’s second tier cities are not large enough. Cities ranked between 3rd and 10th by population only account for 6.9 percent of Russia’s population. This share is below such countries as Brazil, Japan, and Poland, where cities in the same ranks account for between 8 percent and 11 percent of population. This effect can be seen clearly in the rank-size curves. The curve representing Russia has a substantial drop after the second largest city, a drop much bigger than in any of the comparators. If cities from the other former Soviet countries are added to Russia, the curve starts looking much more like that of the comparators (Figure 9). This suggests that the system of cities in Russia has not adjusted since the breakup of the Soviet Union, when several large cities (Almaty, Kiev, Tashkent) ended up in the other newly-independent countries.

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31 UN (2013). Demographic Yearbook, World Bank – World Development Indicators.
32 The rank-size rule holds that the population of each city in a system of cities, multiplied by its population rank equals the size of the largest city. This relationship is proven to be empirically robust, even though its economic drivers are still being debated. For a detailed discussion, please see Abdel-Rahman, H., Anas, A. (2004). Theories of Systems of Cities. In Henderson, J. & Thisse J. (ed.) 2004. Handbook of Regional and Urban Economics, Elsevier, edition 1, 4 (4).
A specific challenge in Russia is that urbanization is fragmented due to historical policies. The Soviet model of industrialization was largely based on development of urban settlements around manufacturing facilities and thus, the often forced resettlement of workers. This is how many small and middle-size cities were built in remote locations, which likely would not have been able to develop such urban centers under free market conditions. After the collapse of the Soviet Union, the urban system became particularly unbalanced, with two dominant cities at the top, second tier cities not large enough to affect regional development, and a very large number of small urban settlements.

Re-balancing of the urban system is ongoing, but it is defined by the increased dominance of primary cities. Over the last 15 years, small cities (below 50,000 inhabitants) consistently lost population, while cities larger than 100,000 inhabitants gained population. Moscow and St. Petersburg saw the fastest population growth among all categories, which suggests that the imbalance between primary and second tier cities has grown larger (see Figure 10). In a way, this is unsurprising: the gap in productivity and wages between the two capitals and the second tier cities remains vast, which makes the capitals the most attractive locations for migrants looking for higher standards of living. Indeed, Moscow and Moscow Oblast attract 60 percent of all migrants.

Suburbanization and the development of agglomerations is another major urbanization trend. The largest migration gains have occurred in the commuter belts of federal cities (Moscow and St. Petersburg) and regional capitals. Between 2003 and 2009, cities that had the highest positive migration balance were not the largest cities of regions, but rather cities within a 50 km radius of the largest cities (see Figure 11). This process was particularly visible in Moscow Oblast, where 20 were cities ranked in the top 50 in the country in terms of net migration between 2003 and 2009 (while Moscow itself was ranked 33th). This trend also held in Volga Federal Okrug, Southern Federal Okrug, and even Siberian Federal Okrug.

The conditions that foster growth in secondary cities could be enhanced through better urban management and planning. The benefits of densification as a tool for sustainable urban development abounds in the literature, among which include capacity for a low-impact, accessible transportation system; large integrated labor markets; and reduced infrastructure costs. Despite the benefits of high-density urban areas, the regional capitals of Russia tend not to be very densely populated (the density of 1 million-plus cities ranges between 1,000 and 5,000 people per km², yet a lot of them are suburbanizing instead of densifying. This is partially a result of poor management of cities, which leaves them unaffordable or unappealing, thus pushing people into the suburbs in search for cheaper properties or

37 RosStat.
As a part of the push to increase housing affordability, the federal government requires regions to build a specified amount of housing every year. These targets are then often passed on to municipalities. The strong incentive to meet the targets leads to municipalities opting to issue permits for development of high-rise residential neighborhoods on greenfield sites in peripheral locations of cities — this is much faster and easier than pursuing piecemeal densification of city centers requiring detailed planning and pointed upgrades to infrastructure. In a number of cities, such decisions for peripheral development are in direct contradiction to municipal planning documents that identify the densification of city centers as one of the main priorities of spatial development (Ulyanovsk and Dimitrovgrad are two examples). Most strikingly, this happens even in cities that have been experiencing population decline. In addition, rushing to meet housing construction targets also often leads to development of neighborhoods that are underserved by social infrastructure and thus foster poor living conditions, such as the infamous "Krutie Klyuchi" neighborhood in Samara.38

Box 2
Federal housing construction targets and their impact on planning decisions

As a part of the push to increase housing affordability, the federal government requires regions to build a specified amount of housing every year. These targets are then often passed on to municipalities. The strong incentive to meet the targets leads to municipalities opting to issue permits for development of high-rise residential neighborhoods on greenfield sites in peripheral locations of cities — this is much faster and easier than pursuing piecemeal densification of city centers requiring detailed planning and pointed upgrades to infrastructure. In a number of cities, such decisions for peripheral development are in direct contradiction to municipal planning documents that identify the densification of city centers as one of the main priorities of spatial development (Ulyanovsk and Dimitrovgrad are two examples). Most strikingly, this happens even in cities that have been experiencing population decline. In addition, rushing to meet housing construction targets also often leads to development of neighborhoods that are underserved by social infrastructure and thus foster poor living conditions, such as the infamous "Krutie Klyuchi" neighborhood in Samara.38

38 Retrieved from https://goo.gl/jRQdSC.
Enhancing connectivity

Access to internal and external markets can enhance regional economic development. Proximity to large ports (measured by cargo throughput) displays a strong correlation to productivity (relative to other variables included in the EPI estimation) and is also statistically significant at alpha level 0.01, which underscores the importance of foreign trade as a driver of growth and productivity. The correlation between proximity to other highly-populated regions of the country and the level of regional productivity proves that access to a large market creates incentives for investment that pivotal for growth and productivity gains. This confirms the results of earlier research that shows that connectivity to ports and major population sectors is closely correlated with the productivity of manufacturing firms in Russia.  

Access to markets can be improved through investment in transport infrastructure and services, but the effects of such investments on the economies of individual regions are difficult to predict. The economic literature and empirical studies that focus on Russia do not offer a conclusive explanation as to how improved transport connectivity between regions impacts regional economies. The most widely accepted theory suggests that after transport links are improved knowledge-based services that benefit most from agglomeration effects tend to concentrate in a more central location, while in peripheral locations land and labor-intensive types of manufacturing become more attractive. The case for improving infrastructure connectivity to ports is also not straightforward. The benefits of improved connections might be impeded by foreign trade regimes, while negative outcomes resulting from greater competition with imported products are also possible. This suggests that while overall improvements to transport infrastructure should be a priority, specific investments should be subject to detailed analysis as to their potential impact on regional economies.

It is important to identify situations in which regions are not able to exploit the potential benefits from access to markets and try to address the causes. In some cases, connectivity between regions may be limited due to factors beyond the quality of transport infrastructure and services. One such example is the failure of most of the regions around Moscow and Moscow Oblast to benefit from proximity to the largest market in the country. Figure 12 shows that travel time to Moscow and GRP per capita of regions is negatively correlated. There are several possible explanations for this phenomenon, and further detailed analysis of each of them is required to develop a sound policy response:

- One hypothesis suggests that the poor quality of transport infrastructure and extreme level of congestion makes the Moscow market far less accessible for producers in neighboring regions than the distance might suggest.

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39Brown, et. al. (2008). Death of Distance? Economic Implications of infrastructure improvements in Russia; EIB papers, Volume 15, #2.
42There is insufficient evidence at the moment to draw a conclusion on this matter. Thus all the ideas presented here are hypotheses that require further investigation.
Another explanation points to the “brain drain” effect that Moscow has on neighboring regions. While there is no good way to ascertain the origins of migrants arriving in Moscow, data shows that Moscow and Moscow Oblast have a strong positive migration balance, while neighboring regions attract migrants at a lesser rate or are losing population. Proximity is the strongest predictor of migration in Russia, and a more than a 100 percent difference in average wages between Moscow and most of the regions in the Central Federal Okrug creates a strong incentive for the migration of the young and educated.

Another theory holds that agglomeration is more likely to stimulate growth in neighboring regions if it based on scale economies. The strong economic performance of Moscow, however, derives substantially from the factor of its administrative sector, which lessens quickly with distance. In other words, if the main reason for high productivity in Moscow were the size of the market, then businesses in neighboring regions would also benefit from that. But if attractiveness of the capital is derived mostly from proximity to the national bureaucracy, then neighboring regions will hardly benefit.

Targeted improvements in connectivity between large urban centers can also be a way to enhance the benefits of agglomerations. If creating larger secondary cities through migration is difficult, larger conurbations can be formed by linking existing large cities with high-speed rail connections. In theory this should expand the size of the labor and product markets and thus deliver most of the benefits of a bigger agglomeration. A number of such proposals have already been put forward. They include linking Chelyabinsk, Ekaterinburg, and Nizhny Tagil; Krasnodar, Rostov-on-Don, and Stavropol; and Kazan, Cheboksary, and Ulyanovsk. This idea however presents several challenges. First of all, it is again unclear how the new connections will shift the economic balance between the cities, and whether all will benefit. Secondly, development of such merged conurbations will require coordination not only between cities, but also between and within regional governments.

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RE-MAPPING OPPORTUNITY MAKING BEST USE OF THE ECONOMIC POTENTIAL OF RUSSIA’S REGION

Technologically-advanced businesses are critical for regional productivity. The share of people employed in high-tech and medium-tech industrial production is strongly correlated with higher per capita output in western Russia. On average, a standard deviation increase share of high and medium employment is associated with a 0.32 standard deviation increase in GRP per capita — this is the second strongest correlation.

In recent years, the technological sophistication of the Russian economy has been declining. The Economic Complexity Index (ECI) of the Russian economy has been gradually declining throughout the first decade of the 2000s,

*The concept of economic complexity is based on Hausman, R. and Hidalgo, C. A. (2011) The Network Structure of an Economic Unit; Journal of Economic Growth Volume 16, Issue 4, pp. 309–342. A key principle behind the concept of economic complexity is to view the exports structure as an indicator of knowledge possessed by a country (ECI). A region is considered to have a complex economy if it produces and exports many products, which can only be produced and exported by a few other regions.
In 2015, Tver, the capital of Tver region, was connected to Moscow (and St. Peterburg) with a high-speed rail link. Travel time between Moscow and Tver on passenger trains dropped from an average of just under 2 hours to 1 hour. It is possible that this was one of the key factors contributing to a strong performance of the region’s economy in subsequent years. In 2015-16, the growth of the economy of the Tver Oblast exceeded forecasts (Figure 14 and Figure 15), and the regional budget’s own income grew by 7 percent, largely due to an increase in property tax revenue. Eyewitness anecdotal evidence suggests that with the introduction of the new train, Tver started attracting commuters from towns in Moscow Oblast. It is plausible that due to the significant difference in real estate prices and wages, the improvement of the transport connection made Tver much more attractive for industries that need access to Moscow’s market but otherwise do not benefit much from other aspects of agglomeration. Verification of this observation requires deeper research, but Tver might be a proof-of-concept for the model of dispersed conurbations linked by high-speed rail.

The counterhypothesis holds that improved connectivity to Moscow may strengthen the ‘brain drain’ effect discussed above, highlighting the importance of further research into the spatial redistribution effects of such infrastructure investments.

Box 3
Did high-speed rail unlock growth opportunities in Tver region?

In 2015, Tver, the capital of Tver region, was connected to Moscow (and St. Peterburg) with a high-speed rail link. Travel time between Moscow and Tver on passenger trains dropped from an average of just under 2 hours to 1 hour. It is possible that this was one of the key factors contributing to a strong performance of the region’s economy in subsequent years. In 2015-16, the growth of the economy of the Tver Oblast exceeded forecasts (Figure 14 and Figure 15), and the regional budget’s own income grew by 7 percent, largely due to an increase in property tax revenue. Eyewitness anecdotal evidence suggests that with the introduction of the new train, Tver started attracting commuters from towns in Moscow Oblast. It is plausible that due to the significant difference in real estate prices and wages, the improvement of the transport connection made Tver much more attractive for industries that need access to Moscow’s market but otherwise do not benefit much from other aspects of agglomeration. Verification of this observation requires deeper research, but Tver might be a proof-of-concept for the model of dispersed conurbations linked by high-speed rail.

The counterhypothesis holds that improved connectivity to Moscow may strengthen the ‘brain drain’ effect discussed above, highlighting the importance of further research into the spatial redistribution effects of such infrastructure investments.

while during the same period China’s ECI has grown substantially and overtaken that of Russia (Figure 16). During this period, the contribution of manufacturing products to Russian exports has been gradually declining, as natural resource exports gained prominence.

The effort to support development of high tech businesses should be sustained and developed at both the national and regional levels. The importance of innovation and high-tech economic clusters has been recognized by the Russian government for a long time. Policy initiatives promoting the development of a high-
tech economy include creating Special Economic Zones (SEZs), the establishment of RosNano corporation and Skolkovo Innovation Center, and the opening of 94 business incubators, 85 techno parks, and 100 centers of technology transfer. However, the results of these initiatives remain unclear. At the same time, the centralization of R&D funding, the lack of private sector and university-led research, and weak collaboration between academics and business remain major policy challenges. A recent OECD study recommends that regions should adopt high-tech cluster development programs based on their current economic structure. More advanced regions with successful high-tech clusters should focus on creating favorable business conditions (access to finance, low administrative barriers, support to public-private collaborations in R&D) to improve competitiveness of established sectors. Regions where high-tech producers are present but not prominent can aim to scale up such activity through support to SMEs, export promotion, and FDI attraction, while the regions with little or no high-tech sector should focus on improvements in basic conditions such as skills as well as infrastructure to foster development of new complex products or sectors.48

Developing human capital

The EPI estimation confirms that human capital is a critical component of regional productivity, even though the effect is weaker than expected due to measurement difficulties. Human capital (measured as a share of working-age populations with tertiary qualifications plays) a positive and statistically significant role in supporting economic development of the regions. However, the limited variation in the value of this variable and the inability to account for variation in the quality of university education results in underestimation of the significance of human capital.

Human capital development should be a top priority of national development and should be done in a spatially "blind" manner. Russia prides itself on its high quality of human capital. The World Economic Forum’s Human Capital Report (2016) ranks Russia 28th in the world in human capital. Despite this strong ranking, clear gaps persist. Russia ranks 81st in life expectancy and only 54th in terms of human capital in the 0-14 age group.49 For an economy aiming to diversify away from natural resource extraction and resume high and sustained growth, human capital is a critically

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48 Farra, F. et. al. (2013). Improving regional performance in Russia: a capability-based approach, EBRD.
important factor. From a regional development angle, the main challenge of human capital investment is that people may leave the regions where they have been educated and where they have used health care services (specifically in their youth); thus, the investment in these areas may not pay off in the long-term for the region. For this reason, investment in education and health services should be the core function of the federal government, which should pursue this role in a spatially ‘blind’ manner. The core role of regions is in fostering contacts between regional educational institutions and the private sector to ensure that they prepare candidates to meet the needs of local enterprises. Another important role for the regions is providing a living environment and a quality of services that will help retain and attract talented workers.

Re-thinking monotowns

Contrary to expectations the share of the population living in monotowns in the regions of western Russia does not necessarily hinder productivity in these regions. The share of the population living in monotowns is positively correlated with regional productivity, a finding contrary to this paper’s initial hypothesis. The hypothesis that monotowns are a failed relic of Soviet-era central planning may not hold entirely in western Russia. Some monotows in western Russia may be in a position to foster productivity growth given their proximity to large markets, their ability to plug into supply chains of highly-industrialized regions, and the benefit they obtain from knowledge exchange that aids innovation and is more likely to be found in densely populated areas.

Some monotowns have economic potential, but they require an individual approach. The underutilized potential of monotowns is defined by their individual characteristics: industrial focus; the quality of their location, infrastructure, and human capital; and the ability of the city and region to reorient these assets towards new markets. Nurturing such characteristics requires an individualized policy approach. The research by the New Economic Center suggests that greater economic specialization by small towns could add almost $4 billion to the Russian economy by 2030.50 Currently, the main federal policy supporting monotowns (Territories of Accelerated Socio-Economic Development — TASED) focuses on offering tax and export/import duty discounts to business residents of the monotowns with TASED status. It is not clear whether this policy will help optimize the specific economic assets of monotowns although it is likely that this policy will lead to firms relocating to take advantage of tax discounts. Another government initiative, the Monotown Development Fund, allows regions to implement targeted investment in infrastructure and private sector development in monotowns. This approach seems to be more promising as it can potentially allow for more tailored responses to the challenges of individual towns. However, its effectiveness may be limited by a focus on only those monotowns that face the greatest social challenges, and thus probably have the lowest economic potential.

Making more of agriculture’s potential in the regions

Favorable natural conditions for agriculture do not correspond to higher productivity in regional economies. In fact, the model’s results show a statistically-significant, negative correlation between the measure of agricultural suitability (climate and soils) and GRP per capita. This result may suggest that agriculture contributes less to regional productivity than other sectors, and possibly that regions

50Dmitriev, Chistyakov (2017). Reform agenda for the forthcoming policy cycle in Russia.
specializing in agriculture based on natural endowments struggle to develop more productive forms of economic activity. This observation leads to a number of questions for further research. Are there opportunities for increasing agricultural productivity? Why do regions struggle to use favorable conditions for agriculture to lure investors in related industries, such as agro-processing and agro-equipment manufacturing?

Where is the potential among the regions, and what does it tell us about them?

The results of the model can be used to estimate the Economic Potential Index (EPI), and the comparison of the EPI value with the observed level of productivity reveals how close regions are to fulfilling their potential. The Economic Potential Index calculates a predicted level of GRP per capita using the observed levels of the structural independent variables in the model. We can distinguish between regions that exceed, meet, or are yet to meet their predicted level of GRP per capita (potential) by comparing predicted levels of productivity to observed levels of productivity.\footnote{The limitations of this methodology are discussed in detail in Annex 2.}

EPI estimates for the regions show that the conditions associated with achieving high levels of productivity are not confined to Moscow and St. Petersburg.\footnote{The Economic Potential Index (EPI) value is calculated using the results of the regression model. Comparison of the EPI value with the observed level of productivity reveals how close regions are to fulfilling their potential. This can be used to distinguish between regions that exceed, meet, or are yet to meet their predicted level of GRP per capita (potential) by comparing predicted levels of productivity to observed levels of productivity. The limitations of this methodology are discussed in detail in Annex 2.}

Three corridors of high potential can be identified:

- One band of medium-high and high potential radiates from Moscow and spreads slightly north and south to include such high potential regions as Yaroslavl, Kaluga, Ryazan, and Lipetsk oblasts among a number of other medium-high potential regions. It appears that these regions benefit from proximity to major population centers as well as from high rates of urbanization.

- The second group of high potential regions stretches from Rostov Oblast in the south along the Volga River to Tatarstan in the north and includes Volgograd, Samara, Ulyanovsk Oblast, and Chuvash Republic. All of these regions are densely populated and have large urban centers, a highly-educated population, and established industrial bases that include technologically-advanced companies.

- The third grouping of high potential regions is concentrated in the southern Urals. It includes Sverdlovsk Oblast and Chelyabinsk Oblast. These regions are highly urbanized and are well-known for being the industrial heartland of Russia.

- The most surprising region identified as having high potential is Murmansk Oblast. Its high potential status is driven primarily by its access to external markets given the number of ports located in the Oblast and the volume of cargo transiting its ports. The potential is also driven by its highly-educated population and, finally, by its high urbanization levels that are typical of the sparsely populated territories in the north.

The EPI finds that low potential regions are concentrated in southern Russia.

This is largely due to the regions’ remote locations, their low level of urbanization, and the small size of their major cities. Additionally, these areas are ‘penalized’ for having a highly favorable climate for agriculture. It is worth focusing on the special case of Krasnodar Krai — one of the rapidly developing Russian regions.
Despite fast economic growth in recent years, and favorable rankings for business environment and investment attractiveness, the region has a low EPI ranking. This reflects the results of the EPI model, which assigns high importance to presence of high-tech industries, level of urbanization, which are typical for highly productive regions but are lacking in Krasnodar. But Krasnodar’s conditions are hardly typical for the European part of Russia. They support development of highly productive and competitive tourism and agricultural sectors (fertility of soils in the region are double of Russian average, see Annex 1). In other words partially the low EPI estimate reflects that structural endowments of Krasnodar Krai are unique for the European part of Russia. In this regard, the focus of regional policy should be on maximizing the benefits of regions competitive advantages (e. g. recreational resources and agriculture), in combination with addressing the structural conditions that may constrain economic development: access to markets of other Russian regions, human capital, innovation and presence of high-tech businesses. The strong performance of the region’s ports — ranking 9th of 56 and for agriculture suitability — ranking 5th out of 56, should be seen as advantages that the region needs to utilize.

Figure 18 shows that the map of actual level of economic development in the regions of western Russia doesn’t perfectly match the map of economic potential:— A large share of regions that are estimated to have high potential fail to reach predicted levels of productivity. Out of 21 regions with high and medium-high potential, eight have yet to fulfill this potential.

— Some low potential regions manage to reach GRP per capita levels that exceed projections based on their structural endowments. Of 22 regions that perform above their predicted level, 12 are categorized as low or low-medium potential. Like high potential regions, over-performing regions also tend to concentrate spatially. Clusters of over-performing regions are found in the north, on the border of Volga Okrug and the Southern Urals, and in the southwest along the Ukrainian border.

The difference between the potential and performance of regions can be partially explained by institutional and policy factors. The quantitative analysis didn’t produce conclusive results about the role of regional institutions and governance; however, Chapter 3 presents evidence that addresses this analytical gap and shows the importance of these factors for regional economic development. Annex 1 also shows how the condition of institutions for the regional economy and economic development policy help or impede utilization of economic potential of the region. Additionally, Box 4 explains why economic growth dynamics in the regions are not necessarily correlated with their economic potential.

53 Krasnodar Krai is ranked 7th in the country for investment attractiveness by Agency of Strategic Initiatives (ASI). See: https://goo.gl/6UMGnb
54 Part of the difference between performance and potential estimates can be explained by limitations of the model and under accounting for some factors due to lack of data (quality of institutions and quality of education) or deliberate exclusion of such conditions form the model (natural resources). However, part of the difference can be explained by policies implemented by the regions.
### Economic Potential Index for the Regions of Western Russia

**Source:** Research elaborated by the authors.

### Regions of Western Russia That Meet Their Economic Potential, Exceed It, or Are Still to Reach It

**Source:** Research elaborated by the authors.
Many of the regions that have achieved high rates of economic growth were not estimated to be regions of high potential. The factors that make up economic potential define the development patterns over a long period, while over shorter stretches (3-5 years) growth dynamics can be driven by temporary external effects (market or geopolitical shocks) that benefit (or adversely affect) certain industries or certain geographic areas. Examples from Russia’s recent history include oil price fluctuation and the EU embargo on imports of foodstuffs that had particular effect on oil-producing and agricultural regions, respectively.

Figure 19 shows that, in recent years, most of the high growth regions in Russia were concentrated in the southern part of the Central Federal Okrug and the southern part of the Volga Okrug. Additional analysis is required to identify the factors that contributed most to growth there in this period. One hypothesis is that agriculture was a significant contributor to growth between 2010 and 2014, as seven of the high growth regions were also in the top 10 in terms of growth in agricultural output from 2009-2014. While it is difficult to assert that agriculture was growing extremely rapidly in Russia in recent years, it was one of the more stable sectors while many others stagnated, thus, explaining these results.

**Box 4**

Economic potential is not the only factor that determines the economic growth of regions in the short run.

**Figure 19**

**ECONOMIC PERFORMANCE OF REGIONAL ECONOMIES, 2010-2014**

Based on average annual growth rate of real GRP in equalized prices as of 2010.

Source: Research elaborated by the authors using RosStat data.

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RosStat.
CHAPTER 3

What is the role of regional institutions, governance, and policy in a region achieving its economic potential?

This chapter shows that policies and institutional conditions have an important effect on the economic development outcomes of regions. Despite the fact that the data analysis presented above failed to establish a clear link between the institutional conditions and quality of governance in individual regions in Russia and their economic performance, qualitative evidence presented in this chapter demonstrates that the role of governance and institutions is important for advancing regional economic development. Given the high level of centralization of power in Russia, the analysis first covers the role of the federal government’s regional development policies and then shifts to policy at the level of individual regions.

The evolution of national policies for regional development

Over the last 25 years, the federal government’s approach to regional development changed several times. Thus, the circumstances under which regional governments operate have also changed. The evolution of policy thinking can best be tracked through two main streams: inter-governmental budgetary policy and targeted regional development initiatives (key events in both of these policy areas are presented in Figure 20).

The trend towards decentralization of power and resources in the early 1990s was reversed in the 2000s. In the early days of the new Russian state, the government allowed regions to claim greater authorities through a process known as the “parade of sovereignties.” This process was restricted by the adoption of the Russian constitution in 1993, which prohibited the sovereignty of regions, and federal laws took precedence over regional ones. The foundation of regional development policy was laid in 1996 with the introduction of the presidential decree “The basic principles of regional policy in the Russian Federation.” Overall, the document aimed to support the development of a federal system through the gradual delegation of powers; however, it was never implemented, and throughout the 1990s there was no systematic regional development policy. Further developments in this area occurred only in 2004 with the initiation of the Ministry for Regional Development. The ministry de-facto contributed to re-centralization of regional economic development powers. It got involved in strategic planning for regions and introduced such instruments as Targeted Federal Programs (TFPs) and State Programs (SPs) that offered regions financing for critical projects but which increased their dependence on the center. The spatially-targeted programs focusing on peripheral macro regions (designed for development of the Far East, Baikal region, and Kaliningrad region) were the next major policy trend. Eventually, this trend led to the establishment of the Ministry for Development of the Far East (in 2012), and later the Ministry for Development of the Federal North and the Far East.

for Development of the Northern Caucasus. However, the Ministry for Regional Development was abolished in 2014.

Spatially-targeted programs for lagging territories are important for ensuring territorial integration, but they should not be expected to create new drivers of economic growth for the national economy. Today, spatially targeted programs account for 7.7 percent of the total budget of all State Programs (excluding programs focused on defense). The three territorially-focused national programs existing today differ substantially in objectives, motivations, and the range of instruments involved (Annex 3 offers an overview of current programs). One objective of these programs is spatial equalization of economic development, but national security concerns are also a critical consideration, which means that the programs can’t be evaluated purely on their economic development merits. The programs are justified by the unique needs of the targeted territories and their limited integration into the national economy. They, however, are not likely to lead to a substantial boost in national growth. The North Caucasus and the Far East combined contributed 6.6 percent to national GDP and 6.4 percent to growth in the period 2009-2015, most of it through natural resource exploitation.
exports. The low economic potential of most of the North Caucasus is confirmed by the EPI results. The Far East has been struggling to retain population and has been reliant on natural resource exports to deliver growth. However, the region’s proximity to the large Chinese market has yet to be utilized as a driver of growth. The Arctic regions can contribute to the economy through better utilization of natural resources, but are unlikely to be key drivers of productivity growth due to harsh living conditions and the difficulty of sustaining large agglomerations. It is much more likely that new drivers of economic growth could emerge in the high potential regions of western Russia, as suggested by the results of the EPI.

Spatially-targeted programs can be strengthened by learning from existing local experience as well as global experience. The results of the programs so far suggest that they are more effective at equalizing social outcomes through improvements to basic infrastructure and access to healthcare and education, than at equalizing economic outcomes through spatially-focused incentives to investors. This can be seen in the contrast between the North Caucasus program, which in its first phase mostly targeted social outcomes and was considered rather successful, and the Far East development program, which focused on spatially-bounded incentives to investors and was less effective (see Annex 3). This finding is consistent with findings globally. It suggests that investment in services and basic infrastructure in lagging areas can be effective tools for integration (partially through giving people opportunity to relocate to more productive places, partially through reducing disparities in the quality of life). On the other hand, incentives aimed at fostering economic growth in lagging areas are often ineffective; indeed, there have been multiple failed attempts to lure investors to lagging areas in order to help them catch up. Among countries attempting such programs, little substantial progress has been made in southern Italy, France, northern England, northwest Brazil, the peripheral areas of Mexico, and rural India.

Do regional institutions and governance matter — and how much?

Evidence from around the globe supports the argument that institutions and governance matter for economic development. While academic debate about the nature of the causal relationship between the quality of governance and institutions and economic growth continues, there is a broad consensus that these factors are correlated; in fact, on a global scale the quality of institutions might be the strongest predictor of the level of development. Empirical enquiries have identified strong relationships between specific aspects of governance and institutions and economic growth, including the enforceability of contracts, corruption, and others. A close correlation between the quality of regional

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CHAPTER 3

WHAT IS THE ROLE OF REGIONAL INSTITUTIONS, GOVERNANCE, AND POLICY IN A REGION ACHIEVING ITS ECONOMIC POTENTIAL?

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governance and the level of economic development has been found globally, and in particular, in the countries of the European Union. Empirical studies have proven that reforms of business regulations and transparency of regional governance have a positive effect on the diversification of regional economies in Russia and that corruption is a significant deterrent for regional development in Russia. However, it is also widely acknowledged that regional governments in Russia are rather restricted in what they can do due to the high degree of centralization of power and resources.

This report uses a narrow definition of institutions and governance to understand their impact on the observed level of regional productivity. In this way, institutions are mostly understood relative to the business climate as measured

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Box 5
Case study methodology

A case study is an empirical inquiry into a phenomenon from a real-world context and applies a mixture of quantitative and qualitative techniques for data collection and analysis. Among the benefits of the case study approach are that it allows examination of causal effects as well as causal mechanisms in order to understand specifically how one event leads to the other and why certain outcomes are observed.

In this paper, the case studies were used to establish to what extent conditions for regional institutions and governance influence economic outcomes of the regions relative to other factors, and more importantly, to explain why and how those effects occur. The emphasis is thus on understanding the mechanisms that shape the climate influencing regional governance and institutions and translating them into economic outcomes.

The case studies relied on a combination of analysis of secondary literature, statistical data, and qualitative data collection that included interviews with key public officials, private sector associations, businesses, and academics in each of the regions. Field data collection was conducted during March-April 2017. Case study teams spent a week in each of the case study regions.

The selection of case studies was informed by preliminary results from the EPI analysis, even though the results couldn’t be factored into the selection process due to a tight timeline. The aim was to select regions with different characteristics and different outcomes to allow for cross-case comparison. The regional governments’ willingness to collaborate and provide assistance in the preparation of the case studies was also a significant factor that influenced case selection. The final selection yielded a rather diverse group of regions in terms of their structural characteristics and endowments, approaches to governance, and observed economic outcomes.

The three selected regions were: The Republic of Bashkortostan, Krasnodar Krai, and Ulyanovsk Oblast.

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through the characteristics of the regulatory environment and through perceptions of the public and private sectors. Quality of governance is primarily understood as effectiveness in identification of policy priorities and in their implementation. This approach is mostly defined by methodological limitations and the availability of data. The analysis in this chapter is based on the results of qualitative case studies (the case study methodology is described in Box 5; the results of individual case studies are summarized in Annex 1).

Regional governments have the tools to support economic development

**In-depth case studies of selected Russian regions show that the quality of governance and institutions at the regional level can make a difference for economic development.** Ulyanovsk Oblast offers a good example of how a change in government priorities and operating principles can lead to improved economic outcomes (see Ulyanovsk case description in Annex 1). After the 2005 change of government, the region went from lagging behind the national economy to gradually catching up. The shift of government priorities in Ulyanovsk was drastic: the region went from one of the most conservative and protectionist regimes in the late 1990s to one of the most economically liberal and pro-business since 2005. In the other two case studies — Republic of Bashkortostan and Krasnodar Krai — a similar, but more gradual shift in government priorities towards improvement of the business climate occurred more recently. For now, the effect of this priority shift in these two regions can only be registered in terms of improvements in the business sector’s perception of the investment climate as it is not yet reflected in macro statistics.

**Investment promotion is the most direct way for regions to enhance their economic outcomes.** Krasnodar Krai is a region that has benefited from attracting international investors since the late 1990s. The investors were drawn to the region by its seaside resorts, ports, and large local market, rather than by proactive government policy. Ulyanovsk Oblast on the other hand achieved success in attracting investors only after the regional government put investment promotion at the center of its development strategy in 2005. Ulyanovsk was not the first region to do this; Kaluga and Belgorod oblasts were the early adopters of an FDI-led economic development strategy in Russia in the early 2000s. The experience of these regions proves that openness to investors, and eagerness to provide favorable conditions (investment-ready land, support with bureaucratic procedures, and assistance in accessing federal subsidies) can lead to quick wins for regions. As other sources of growth (most notably natural resource exports) dried up after the 2008 crisis, many regions started paying closer attention to external investment. Bashkortostan brought investment attraction to the top of the agenda after the 2010 change of government, and has since established an investment promotion office and a system for supporting investors. It is likely that in the upcoming period many more regions will be competing for a pool of investors that, however, has been shrinking since the EU and US introduced economic sanctions against Russia. As the competition for investors becomes more intense, it is likely to lead to tax discount wars between regions, which will not be beneficial for already-squeezed regional budgets (Box 6).

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What is the role of regional institutions, governance, and policy in a region achieving its economic potential?

Tax discounts are one of the easiest and most effective ways for regions to increase their attractiveness to investors. Regions covered in the case studies offered rather contrasting approaches to tax discounts.

Ulyanovsk Oblast eagerly offers all investors that bring over $10 million into the region a 15.5 percent discount on taxes of corporate profit for 15 years; a 0 percent rate for corporate property tax and transport tax for 10 years; and 0 percent rate for land tax for 8 years. Large investors are therefore basically exempt from all regional taxes. Regional government representatives defend this approach by explaining that the arrival of new investors nonetheless creates some revenue for the region through taxes on personal income from the jobs that are created and that without investors even that extra revenue would not occur.

Bashkortostan is less generous with tax discounts. Discounts are offered only to investment initiatives that are identified as priority projects, a status conferred by the investment board chaired by the Governor. Investment board meetings are open to the public. The strategic projects receive a 15.5 percent discount on taxes on corporate profit and 0 percent corporate property tax rate for 10 years. The region also offers subsidies to cover interest payments on loans from private banks.

Krasnodar Krai is much more cautious about offering tax incentives. While some tax discounts are available, they are less generous and are offered for shorter periods of time. The government’s position is that the region offers investors a favorable environment for doing business, and thus no further incentives are necessary.

Overall, 50 Russian regions examined offer some form of tax discounts to investors. Further proliferation of this practice might prove costly for the regions that already find themselves extremely restricted in terms of available revenue.71

The USA offers a negative example of the unintended consequences of tax discount wars between jurisdictions. In the USA, the tax discount competition between the states has given large corporations a lot of bargaining power and helped them gain huge tax discounts by threatening regional governments with the relocation of their operations and resulting loss of local jobs and revenue. Boeing, the aircraft maker, negotiated $9 billion in tax discounts from Washington state, and Nike, the sportswear manufacturer, got a $2 billion discount from Oregon. The paradox is that both companies were founded and grew into global corporations in these states.72

Russian regions should try to avoid such bidding wars and priority should be given to competing over the quality of the business environment and investor services. Of course, tax discounts shouldn’t be disregarded as a tool for investment promotion, particularly because they can help regions compensate for other factors that put them at a disadvantage with other regions. However, each tax discount offer should be seen as an investment (as it constitutes a loss of potential income to the regional budget), and should be put through rigorous economic analysis to ensure that its contribution to the regional budget and regional economy is positive.

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A number of Russian regions have used the "institutions for development" model to effectively implement investment promotion strategies. "Institutions for development" initiatives were first introduced in the Kaluga region and have now been adopted by more than 40 regions across Russia, including the three regions covered in the case studies of this report. These institutions are usually set up as government-owned commercial enterprises. Their functions may vary, but they typically use government funding to prepare public land for investors, provide investor support services, and help investors resolve problems by facilitating direct access to senior officials of the region. Their main benefit is the ability to adopt a more agile, goal-oriented, and client-facing management approach — typically found in the private sector, but rare in highly-bureaucratized regional government ministries. However, not all "institutions for development" are equally successful. A lot of them struggle to establish effective systems and protocols necessary for analyzing market trends and opportunities, identifying potential investors, providing investor services of consistently high quality, and mobilizing and retaining qualified staff. Box 7 discusses the models of development institutions used in Ulyanovsk Oblast and Bashkortostan Republic.

Business environment reforms are another area where regional governments can make a difference. For a number of years, Russia received very low scores from the IFC/World Bank Doing Business survey of the quality of the business environment. These rankings attracted a lot of attention in Russia, such that improvements in the regulatory environment became a top priority of the federal government. Today targets for regulatory simplification are passed on from the federal government to the regions. Regulatory environment indicators make up the core of the rating of a region's investment climate assessed by the Agency for Strategic Initiatives (ASI), government-affiliated think tank. The rating is now one of the key measures used by federal authorities to evaluate a regional government's performance. It is also often used as a Key Performance Indicator (KPI) for regional ministers, as is the case in Bashkortostan. Ulyanovsk Oblast provides an example of best practice in regulatory reforms (Box 8).

Small and medium-sized enterprise (SME) support is a new area of policy focus for the regional governments. This trend has emerged largely out of the recognition that other avenues for economic growth (external investment and further growth of established large enterprises) have been hurt by recent recessions and geo-political events. The focus on SMEs forces regions to adopt a holistic approach to regulatory and other business reforms instead of providing special treatment to selected investors. It has also produced interesting policy innovations:

- The Entrepreneurship Development Corporation of Ulyanovsk region provides a comprehensive array of services to SMEs and start-ups. It consolidates all concessionary financing options that SMEs can access through federal support programs, and helps entrepreneurs navigate the complex system. The Corporation also provides a ‘one-stop shop’ for all the regulatory needs of entrepreneurs, and even works on improving the image of entrepreneurs by running campaigns that aim to engage more people in entrepreneurship.

- Bashkortostan’s entrepreneurship development department in the Ministry of Economic Development runs several innovative initiatives including a “start-up bus” — a mobile entrepreneurship support office that travels to remote areas of the region.

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73 http://www.doingbusiness.org/
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Another interesting initiative pioneered in Bashkortostan is the trade house “Product of Bashkortostan” — an organization that, in addition to helping develop a regional brand, helps local small-scale farmers and food processors ensure quality and bring products to the shelves of large chain retailers, which is notoriously difficult in Russia.

In addition to regional policies and institutional conditions, the case studies for this report found that region-specific structural characteristics help determine the difference between economic potential and performance. This was observed to some extent in each of the regions selected for case studies:

- Despite being recognized for its effective governance and good investment climate, Ulyanovsk Oblast’s GRP per capita is still below the national average, and it is

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Box 7

Development Corporations of Ulyanovsk Oblast and Bashkortostan

The Ulyanovsk Region Development Corporation (URDC) and the Corporation for the Development of Bashkortostan (DCB) fulfill similar functions, but the differences in the way they are organized highlight the range of variations for the model of “institutions for development”.

The URDC was set up in 2008 and its structure was designed based on a thorough review of best practices from other regions. Over the course of its existence, the URDC has attracted the likes of Bridgestone, DM Mori, and Mars to the region. It was also pivotal in attracting several large-scale federal government investments, including the Port Free Trade Zone. In addition, other successful development institutions were spun out of the URDC itself over the years.

The URDC’s success can be attributed to three aspects of its organization and governance:

- From the start, it used private sector principles for hiring and motivating staff.
- It used rigorous analysis to identify investment attraction priorities, and it always had a strategy that was carefully followed. If some targets were not met (e.g., the target to attract aircraft builders to the region), it was re-evaluated and priorities were changed.
- It enjoyed the support of the Governor. While the URDC has no direct mandate to request support from different ministries and government agencies, it does so de facto by placing a direct request to the governor whenever an issue needs to be resolved.

The URDC also actively promotes the localization of the supply chain of investors. It seeks out local companies that can produce the inputs required, and gives them all necessary support in meeting the standards of the foreign investor.

By contrast, the DCB is far less integrated with the government of the region, although the corporation is owned by the region. In the past, it received financial support from the region to develop the infrastructure for industrial zones, but today the organization is self-funded by offering paid services alongside the basic package to all investors. The focus of the DCB is much narrower than that of the URDC, and it can hardly claim to have as significant of an impact on the region as the URDC.

However, it has a good record in developing infrastructure and in attracting investors, and its experience offers an example of a much leaner approach to regional investment promotion.

Source: Interviews with the officials of the Ulyanovsk Oblast Administration.

Another interesting initiative pioneered in Bashkortostan is the trade house “Product of Bashkortostan” — an organization that, in addition to helping develop a regional brand, helps local small-scale farmers and food processors ensure quality and bring products to the shelves of large chain retailers, which is notoriously difficult in Russia.

Large chain retailers’ monopoly on retail markets results in small businesses struggling to meet the tough requirements of these large chains, and thus, finds them cut out of a large segment of local markets.
Box 8
Regulatory Environment Reforms in Ulyanovsk

The reform of business regulations in Ulyanovsk Oblast has been an important factor contributing to the change in the region’s fortunes over the last decade. The reforms are widely recognized as best practices in Russia. Three core aspects of the reforms can be highlighted:

1. Ulyanovsk region was the first region to mandate evaluations of the regulatory impact of any legislative act before it is passed by the regional parliament.

2. Over the last several years, a designated department within the regional government has undertaken a comprehensive review of all regulatory inspections that businesses face. The review has produced a finite list of requirements that each regulatory inspection is allowed to impose upon a firm. It has introduced ‘one-stop shop’ services for businesses and is now working to introduce a risk-based approach to business inspections. Overall, this effort has substantially simplified the process of passing a business inspection, and has reduced the potential scope for corruption in inspections.

3. The performance of regional regulatory inspections is closely monitored. Government representatives periodically conduct “secret shopper” tests. The Entrepreneurship Development Corporation of Ulyanovsk region regularly surveys businesses about their perceptions of different regulatory inspections and the quality of their services, and publishes rankings of regulatory organizations. Business interviews have confirmed that this has led to an improvement in the quality of services.

Source: Interviews of public officials of Ulyanovsk Oblast.

yet to meet its full economic potential per the EPI results. Productivity growth in Ulyanovsk Oblast is constrained by a reliance on large Soviet-era enterprises (aircraft and car manufacturing) and by particularly challenging demographic trends leading to a loss of 12 percent of the labor force from 2002-2013 (see Annex 1.1).

- Krasnodar Krai, where institutional reforms lagged until very recently, remains a fast-growing region thanks to a large volume of support from the national government and some additional local endowments, such as the potential for development of the tourism industry (see Annex 1.2).

- Bashkortostan remains among the nation’s productivity leaders largely due to its oil extraction and petrochemical refinement industries, all of which were inherited from the Soviet period and adapted more easily to market conditions than many other manufacturing sectors (e.g., aircraft manufacturing in Ulyanovsk). According to the EPI model, the region is exceeding its medium potential, but this result can only be credited to a small extent to local institutions and government policies (see Annex 1.3).

Federal policy limits the role of regions in supporting economic development

The influence of regional governments over economic outcomes is limited due to constraints on their powers and resources. As a result, it is difficult for regions to engage in large-scale and long-term projects promoting economic development.
Federal government policies also limit what regions can do to improve their attractiveness to investors.

The effectiveness of reforms of the regional regulatory environment is substantially constrained by the role of federal regulatory inspections. Regional branches of federal agencies that report directly to their Moscow headquarters conduct some of the regional regulatory inspections yet bypass regional authorities. This list includes the Agricultural Control Agency, Consumer Safety Control, Labor Protection, and Disaster Risk Inspection, among others. No matter how much regions try to limit the regulatory impact on businesses, they can’t fully regulate the practices and policies of these inspections. While in some instances coordination between the regional government and federal inspections happens, it is on a goodwill basis rather than on direct subordination. The inspections appear to have a tendency to sustain and increase the regional regulatory burden despite the best efforts of other government institutions. For instance, although the number of planned inspections was restricted at the national level in 2015, the total number of inspections undertaken increased in 65 out of 81 regions. This was due to an increase in the number of unscheduled inspections, which regulatory inspection agencies can conduct without a court order in many cases. Several regional governments have proposed that they take control over all regulatory inspections (but not the rulemaking), but they have been unsuccessful.

Regulatory measures introduced at the federal level often fail to account for circumstances in individual regions, and can have substantial adverse impact. Whether such regulations are a result of lack of consultations, poor capacity of federal agencies, or corruption, they limit the ability of regions to improve the business climate. Examples are plentiful:

– In 2014, new sanitary regulations for butchering were passed without validating whether there were sufficient numbers of facilities in the regions to meet the new requirements. In many regions, including Bashkortostan, the added cost of butchering put thousands of smallholder farmers at risk of bankruptcy.

– A regulation passed in 2016 by the federal customs agency introduced new ways of calculating the guarantee payments for imported goods; however, the rule led to substantial overestimation of the cost of imported goods and thus substantially increased costs for importers of final products or inputs.

– In 2016, a federal law introduced a new requirement for cashier equipment. The new rule required the addition of a device that digitally records all of the transactions. However, it was only after the law came into effect that it became obvious that there were only two companies that could produce equipment to fit the specifications. As the deadline approached, the cost of the equipment skyrocketed and put many small traders on the verge of closing shop.

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Regional budgets are squeezed. In 2015, 69 regions reported budget deficits; for eight of them, the deficit exceeded 10 percent, and two regions had deficits of over 20 percent.\textsuperscript{79} This is a result of the limited ability of regions to raise revenues as well as their high expenditure burden.

- Regions are heavily reliant on inter-budgetary transfers and shared federal taxes. Direct transfers constitute on average 17 percent of the revenue for regional budgets.\textsuperscript{80} Fifty-three percent of regional revenues come from their share of personal income tax and corporate profit tax, both of which have declined in the years of recession and stagnation. Because of the share structure of taxes, the regions’ ability to increase tax revenues is limited.

- Regions have a statutory requirement to fulfill social obligations of the federal government, but the federal transfers do not fully cover them. For example, regions are responsible for implementing the 2012 Presidential Orders that set targets for improving social standards, specifically pension and salaries of public sector employees (e.g., teachers and doctors). Federal transfers do not cover the cost of meeting these targets, and available funding is redistributed across regions on an equalization formula basis. The volume of transfers can vary year-to-year, yet the targets are fixed, which means that regions are expected to contribute varying (and always increasing) amounts of their revenue.

Most regions have significant short-term debt and can’t raise funding for long-term investments. On average, 10 percent of regional revenue goes towards servicing existing debt. By 2018, the debt burden will exceed 60 percent of budget revenue in 60 regions, while in seven regions it already exceeds 100 percent of annual revenue. By international standards these debt levels are rather low; in developed countries, they are often several times higher. But compared to countries in the West, the debt of Russian regions has very short maturity. This means that even with a low debt burden a large part of the budget is committed to servicing interest and repaying loans. The tools for debt financing are also limited, including federal government loans, commercial bank loans, and issuance of bonds. Today, regions almost exclusively borrow to plug holes in the budget or refinance old debt, rather than to fund development initiatives. Most regions lack capacity to organize a bond issuance, while many others are excluded from the market due to low ratings or prohibitively high interest requests by potential investors.\textsuperscript{81}

Short-term debt and an inability to raise revenue means that regions rely on federal support when attempting large-scale initiatives. As revealed by the case studies, most of the Industrial Parks, large-scale transport infrastructure upgrades, business incubators and technology transfer centers, and other forms of long-term investments in the regions are supported by federal government programs. Examples include the Port Free Trade Zone, NanoTechnology center, and Radiation Medical Institute in Ulyanovsk Oblast; Novorossiysk Port development in Krasnodar Krai; and monotowns development initiatives in Bashkortostan. It is rather telling that the Ulyanovsk government has decided that the only way it can upgrade one of the major roads crossing the region is by transferring it to the federal government.

In some instances, the heavily regulated nature of federal programs hinders the effectiveness of their implementation. Federal programs often come with complicated bureaucratic protocols. The best illustration of this is the Port Free Trade Zone in Ulyanovsk Oblast. On paper the zone offers fantastic opportunities for businesses — with comprehensive tax discounts and relief from customs duties. Yet three years after its initiation and the construction of basic infrastructure, the zone is still mostly empty. However, next door the “Zavolzhe” industrial park, which is managed by the region, has attracted six large foreign investors over the last five years. Among the differences between the two zones: federal legislation restricts the types of activities that can take place in the federal zone, the manner in which the zone management company operates, and the process of granting investors the right to operate in the zone.82

Regions can still do more

Regions have some leverage to generate extra revenue. The Russian tax code offers regional governments several opportunities to increase revenues, but not all regions utilize them. For example, valuation-based property taxation is an underutilized tool for revenue generation. Regions also have an option to set higher fees for migrant patents and increase transport tax rates for cars with powerful engines. Bashkortostan, for example, has made use of all of these revenue generation methods (as have regions like Moscow, Tatarstan, and St. Petersburg). Ulyanovsk alongside 17 other regions does not use any of these revenue-raising tools.83

To increase their leverage over economic development, regions should aim to build coalitions with the private sector. Public-private coalitions are widely recognized as an important tool for economic development.84 A World Bank study of competitive cities has revealed that most successful cities have some formal or informal mechanisms for public-private coordination.85 Similarly, many cities and regions that have rebounded after periods of decline have done so largely due to a high level of coordination between local actors joined by shared priorities.86 Such coalitions, particularly when they are broad-based, provide the means to attract private resources to priority projects, improve policy design and implementation, gain broad support for government initiatives, and increase a region’s leverage in negotiations with the federal government. In cities like Gaziantep, Turkey, such an approach was key to implementing a comprehensive private sector development strategy and attracting major federal government investments.87 The practice of building public-private coalitions exists in Russia: a recent study of three successful regions (Kaluga Oblast, Belgorod Oblast, and Tyumen Oblast) found that all three featured an elite coalition of representatives of all branches of governments and business leaders which defines and shares the core development objectives of the region.88 While this model of coalition-building is suboptimal due to its limited inclusiveness, it can provide impetus for more regions to build systematic partnerships with the private sector.

82Detailed description of the contrast between the two zones is provided in Sivaev, D. (2017, forthcoming). What can regions do to promote economic development: the case of Ulyanovsk Oblast? (Background paper to this report).
Suggested policy priorities

Policy priorities for the federal government

1. **The federal government can enhance the structural conditions associated with high levels of productivity for regional economies.**

   - The federal government can do more to manage urbanization. It can support re-balancing of the urban system by supporting growth of second-tier cities and encouraging urban planning and municipal service provision practices that are consistent with development of economically-dense environments that promote economic growth.

   - Most specifically, the federal government can identify and revisit regulations that distort incentives of local governments, such as the housing construction targets that lead to urban expansion into undeveloped lands even in places with declining population.

   - The federal government can consider creating incentives for cross-municipal coordination and planning on infrastructure, transport, education, and healthcare services. Federal funding for projects that are planned and financed by several municipalities across an agglomeration can be one mechanism to consider. Similarly, the UK City Deals model, which offers cities more power and resources if they demonstrate an ability to collaborate and govern effectively, may be applicable in Russia.89

   - Transport infrastructure investment should aim to enhance inter-regional connectivity and better access to major ports (at least in the European part of Russia), and prioritize regions where connectivity improvements will have the greatest impact on economic potential. Steps towards achieving this objective can be made by further development of public private partnership (PPP) models for infrastructure finance, for example the “infrastructure mortgage” scheme that will provide government guarantees to private investors.

   - The federal government can also consider plans for connecting large, second-tier cities with high-speed rail links to develop network conurbations. This policy may help in re-balancing the urban structure and may strengthen the productivity benefits of agglomeration. This, however, will require a series of preparatory steps:

     - Conduct thorough analyses of the potential economic impact of proposed high-speed rail links between second-tier urban areas in order to evaluate productivity gains against potential re-allocation effects of such transport investments.

     - Initiate consultations with regions to rally the support of regional elites.

     - Launch policy dialogues on mechanisms for inter-regional management of conurbations with a focus on mechanisms for budget pooling, management of regional funds, urban planning, investment promotion, and private sector development.

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2. Federal policies can bolster regional governments so that they can do more to promote economic development.

- To gain greater ability to implement economic policy, regional governments should be more financially stable. This will require re-balancing of the regions’ fiscal responsibilities and revenue streams. To achieve this, the federal government can shift more functional responsibilities to the federal level, for example, by paying teachers’ salaries from the federal budget rather than the regional budget, or by freeing regions from the responsibility of meeting public servant salary increase targets. The federal government can also build up the revenue of the regions by increasing the regional portion of shared national taxes or by increasing non-earmarked grants. The federal government can also explore combining the delegation of taxation powers with incentives for good financial management by regional governments. For example, the right to raise tax rates may be granted only to a region with a good bookkeeping record.

- To increase the effectiveness of regional business environment reforms, the federal government can engage regional governments in designing business regulations and in the management of regional branches of regulatory inspections.

  - Regions will benefit from having a mechanism for challenging newly-introduced regulations (e.g., by establishing a clear formula with regard to the number of regions and businesses that need to file a complaint in order for a regulation to be reconsidered or overturned).
  
  - Regions can have a greater say in the management of regional branches of inspections. The regional governments should be given authority to assess the impact of the federal inspections on the investment climate of the region, and report on the findings to the Government of the Russian Federation. A more advanced measure would give regions the right to approve checklists of requirements or the right to set the maximum number of times businesses can be inspected.

  An alternative approach, proposed by some regions, could be that inspections management be fully delegated to the regional level. It could start with pilot projects in regions that show results in implementing regulatory reforms. The danger is that this approach might lead to the abuse of power that regional governments would then have over the private sector. On the other hand, it would give regions a lot of flexibility for ensuring coordination between inspections, for reduction of duplication, and for increasing efficiency.

  - Instituting a risk-based approach to inspections could be a more complicated (in terms of implementation) alternative to the proposed reforms of business regulations practices.

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3. Spatially-targeted federal programs are effective as tools for integration of peripheral territories, and may be more effective when focusing on equalization of social rather than economic outcomes across regions. Spatially-targeted federal programs for development of the Far East, North Caucasus, and Arctic regions are important as tools for overcoming geographic and cultural divisions between these territories and the rest of the country, and their purpose spans far beyond economic development. Both global experience and the track record of these programs suggest that similar interventions are most effective at achieving spatial equalization of social outcomes through improvements in basic infrastructure and access to health and education services. On the other hand, attempts to help such regions catch up in terms of their productivity, e.g., by offering incentives to investors, are often less effective.

Policy priorities for the regional governments

- To boost private sector performance, regions need to attract investors and support entrepreneurs. To achieve this, they can incorporate best practices in investment promotion, business environment reforms, and SME support policies from other Russian regions. Initiatives may include developing investment promotion strategies based on a thorough analysis of a region’s competitive advantages and the prospects for its targeted industries, or systematically reducing the regulatory burden on businesses. Regions, however, should use tax discounts and incentives for investors with caution, first conducting thorough cost-benefit assessments.

- To boost their economic potential, regions can focus on developing, retaining and attracting human capital. Part of this effort should be about increasing the quality of pre-school, secondary school, and technical professional education while ensuring that curriculums are designed with the engagement of the private sector and that training courses address demands of key regional industries. The other focus should be on improving the overall quality of life. To achieve this, regions can work more closely with the municipal governments of larger cities to support them in improving overall quality of urban infrastructure and services and improving the quality of housing.

- Regional leaders can also improve governance practices by establishing development institutions that follow the best practices of Kaluga, Belgorod,92 and Ulyanovsk oblasts. However, regions need to shift greater attention to improving the effectiveness of government agencies themselves by introducing innovative governance practices such as performance-based budgeting and a project management approach.

- To achieve better economic outcomes and increase the level of public sector investment in the regional economy in the short-term, it is important for regional governments to utilize federal government programs which focus on infrastructure and service challenges. Regional authorities can play an active role in helping businesses access benefits provided by federal programs through direct facilitation (in the case of large enterprises eligible for support through sectoral programs, e.g., programs for development of manufacturing)93 or by establishing ‘one-stop

shops’ where small firms can get advice on accessing forms of federal and regional support. For example, the Corporation for Development of Entrepreneurship of Ulyanovsk region aggregates various forms of subsidized, small business loans from federal and regional programs into easy-to-navigate products.94 Regions can also make better use of the federal export promotion programs offered by the Federal corporation for SME and entrepreneurship development.95

To boost their capacity and political leverage over the long-term, regions need to focus on building broad-based, public-private coalitions. This will require more engaged and transparent involvement of business leaders, associations, and community groups in identifying a region’s development priorities. Such efforts will enhance a region’s implementation capacity by attracting private sector resources and will improve a region’s negotiating position with national authorities. Examples can be drawn from the experiences of Gaziantep in Turkey, the Santander region in Colombia, and many others.96
**ANNEX 1**

**Summaries of the Case Studies of the Regions**

**ULYANOVSK OBLAST — working hard to catch-up**

Ulyanovsk Oblast is a small region in the Volga Federal Okrug. Its population is 1.7 million people; it is not rich with mineral resources; and its economy is small compared to the economies of neighboring Tatarstan and Samara Oblast. However, Ulyanovsk Oblast is a region with high economic potential due to its high level of urbanization, proximity to the large markets of its neighbors, and presence of advanced industries. Yet for a long time the region has fallen short of its potential due to region-specific, structural challenges and due to policy choices taken by previous regional governments. Since the regional government changeover, a decade ago, the region has aggressively implemented pro-business reforms and achieved substantial results; however, substantial structural constraints still hold it back from realizing its full potential (Figure 21).

The experience of Ulyanovsk Oblast over the last 20 years confirms that improvements in a region’s institutional environment and governance can have an impact on economic outcomes, while conversely poor governance and policy choices can hold a region’s economic development back. Throughout the 1990s, the region was governed by a very conservative elite coalition that had continued from the Soviet period. The regional government used the profits of major industrial...
enterprises to subsidize food prices, imposed price controls, and controlled the flow of goods across regional borders to avoid arbitrage trade. This approach prevented a complete collapse of the economy in the 1990s, but the region paid for it later. In 2000, the incumbent governor lost the election, leading to the replacement of government and business elites that had controlled the region since the Soviet era; however, this also brought the collapse of a system of manual control that had kept the key regional enterprises afloat. As protectionist and isolationist measures were dropped, external competition revealed the lack of competitiveness of key industries in the region leading to a series of bankruptcies and hostile takeovers. Consequently, during the years of rapid national economic recovery (1998-2004), the region fell behind the national growth trend. The situation visibly changed after another change of government in 2005. The new leadership declared a turn towards private investors as the main drivers of economic development and focused on simplifying regulations. The region became one of the leaders in FDI attraction; international giants like Mars, DMG Mori, and Bridgestone built new factories in the region. Largely because of this, the region has grown slightly faster than the national economy since 2006 (Figure 22).

**Figure 22**

**Two Historical Phases in the Development of the Ulyanovsk Region’s Economy**

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>Volga regions</td>
</tr>
</tbody>
</table>

Source: RosStat

Russia’s other regions can learn from Ulyanovsk Oblast. Over the last 10 years, it offers examples of best practice in investment promotion; in introducing goal-oriented private sector principles into governance; in streamlining and simplifying the regulatory environment (Ulyanovsk, the region’s capital city, was ranked #1 among 30 Russian cities in ease of doing business in 2012); and in leveraging support programs of the federal government.

However, further development of the region is heavily constrained by specific structural conditions. Rapid population decline will likely limit its capacity for growth. Between 2002 and 2013, Ulyanovsk Oblast lost 8 percent of its population including 12 percent of its working age population. Even though the region has lost almost 20,000 jobs since 2012, the unemployment rate keeps declining and is now below 5 percent. Thus, scarcity of labor resources jeopardizes further FDI-driven growth. The other challenge is its continued reliance on Soviet-era enterprises: UMZ, a producer of air defense systems, UAZ, the maker of legendary Soviet-era 4x4 vehicles, and Aviastar, the aircraft maker. With more than 20,000 employees between them, these enterprises are still the backbone of the economy. However, all of them today operate in a much more competitive environment than when they were established and to varying degrees face challenges and volatility.

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(for instance, dependence on government contracts). Due to their large scale, this affects the overall performance of the regional economy.

The regional government continues to be constrained by the scope of powers and resources available to it. With little authority or budget, the authorities can’t do much beyond what has already been done. Major infrastructure investments are only possible with federal support, and comprehensive reforms (like the reform of the regulatory system) are limited by federal legislation. The regional government can be described as rather centralized, while interviews show that many initiatives and programs are driven by the personal engagement of the Governor (e.g., he personally supervises large private investment initiatives as well as the quality of services they receive from government agencies). Private sector representatives have indicated that while regional authorities are very responsive to complaints from entrepreneurs, business associations and civil society groups would like to have more influence on the policy priorities of the regional government. Establishing a broad, public-private coalition to identify development priorities for the region and engaging non-governmental actors in policy implementation can be the next step towards strengthening regional institutions and the regional economy.

**KRASNODAR KRAI: learning how to leverage its assets**

*Krasnodar Krai is located on the Black Sea coast in southern Russia. It is one of the most densely-populated regions in Russia and is well endowed with a favorable climate, fertile soils, ports, oil reserves, and recreational assets both on the coast and in the mountains. Additionally, its population is growing unlike that in other regions of Russia. However, the results of EPI suggest low potential of the region. This result reveals that the region has substantial structural weaknesses. On the other hand, the EPI also reveals that the observed level of productivity in the region exceeds the estimate of potential, which partially points at underestimation of the factors that shape Krasnodar Krai potential, because some of them are unique for the European part of Russia. A review of current economic development in the region suggests that the relative over-performance of the regional economy is likely due to the direct analysis of recent development trends of the region, suggest that it has benefited from the support of the federal programs (including the Olympics in Sochi) and potentially indirectly from geopolitical events. However, the example of Krasnodar Krai shows that regions can reach high levels of productivity through using.*

EPI estimates suggest that Krasnodar Krai has low economic potential. The structural characteristics of the region are not in line with those most closely associated with a high level of economic development, while some of the key determinants of a higher level of productivity are lacking. Most of the population of the region lives in rural areas or small towns (54 percent in 2014, while conversely, the national level of urbanization exceeded 70 percent); its access to the markets of densely-populated regions of western Russia is limited due to its peripheral location; the share of the high tech sector in the economy is low; and EPI modeling suggests that the suitability of the region’s natural conditions for agriculture reduces the estimate of its economic potential. While the location of the region’s ports makes a positive contribution to the potential, it doesn’t outweigh other factors, partially because the cargo throughput of Krasnodar ports is relatively small. The EPI results also show that Krasnodar Krai’s economy has achieved a level of productivity that exceeds its predicted potential (Figure 23).

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There are several possible reasons why the region is over-performing per our results. First of all, our model doesn’t account for the region’s recreational resources, and thus its potential in the tourism sector; tourism accounts for 14.2 percent of regional GDP compared to 1.4 percent in Russia overall. In part, the over-performance reflects an underestimation of regional potential. The second reason is the fact that the model can’t account for the fact that agricultural sector of Krasnodar Krai is the most productive in Russia (the average harvest of wheat from 1 ha of land in Krasnodar Krai is at 5.85 tons, while the average for Russia as a whole is 2.68 tons). Overall the EPI model penalizes regions for agriculture suitability, however Krasnodar’s highly productive agriculture may make it an exception from this rule, which will suggest further underestimating of potential. The other major reason for over-performance is the support that the region has enjoyed from the national government. Over the last decade, the region received considerable federal investment, most notably through the preparation for the 2014 Sochi Olympics, but also through the development of the resorts of North Caucasus. These conditions enabled the region to keep up with national economic growth trends throughout the 2000s, and to even be a leader in growth among the large and most densely-populated regions of western Russia since 2011 (Figure 24). Further, in recent years, the regional economy could have benefited from geopolitical developments, as the agricultural sector benefited from sanctions on imports of foodstuffs imposed by the Russian government and the region received new inflows of public capital investment for the construction of the bridge across the Kerch to Crimea.

The review of institutional and policy developments in the region suggests that it is hard to relate the performance of the Krasnodar Krai economy to policies and institutional reforms implemented by the regional leadership. The focus of the region’s economic policy over the last decade was the

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101 Expertise and Analysis Center for Agribusiness “AB-Center” www.ab-centre.ru.
provision of targeted support to large investors, yet it was not organized as systematically and strategically as was done by the leaders of Kaluga, Bryansk, and Ulyanovsk oblasts. Until 2016 there was no evidence of significant institutional reforms implemented in the region in the areas of business environment, skills, or governance until the last two years. No large regional economic development initiatives could be identified.

Finally, a change in external conditions in recent years might be pushing Krasnodar’s government to be more proactive and innovative. Increased competition for FDI among Russian regions has altered the favorable environment that helped the regional economy grow in the past, and thus, the regional government needs to do more to make the most of the region’s unique endowments. The newly-elected Governor and his administration have started several initiatives to strengthen governance institutions, level the playing field for businesses in the region, and focus on improving the business environment for entrepreneurs and SMEs. It is, however, too early to ascertain the effect of these actions.

Krasnodar’s case, however, illustrates that region-specific endowments, such as the tourism sector or highly productive agriculture, may be leveraged to achieve higher levels of productivity. Tourism is not an industry of great significance on a macro scale in Russia, but it is important for the region and has made an important contribution to economic development, and the case for agriculture is similar. Dynamic development of these industries has allowed the region to reach high levels of productivity even though it might be lacking some of the characteristics that are typically associated with most economically advanced regions.
BASHKORTOSTAN REPUBLIC — seeking growth beyond oil

After 20 years of reliance on its oil, gas, and petrochemical industries, Bashkortostan is making steps towards building a more diverse and innovative economy. Unlike many other regions, Bashkortostan got rather lucky with its Soviet inheritance, specifically a well-developed and fully integrated oil and gas extraction, refining, and petrochemical infrastructure. These industries were among those that found it easy to adjust to market conditions, which helped the region consistently export high value-added products and enjoy relative prosperity. Coincidentally, however, the region developed an overreliance on this sector, and the oil and petrochemical industrial complex still contributes 59 percent of the industrial output of the region. This dependence was exacerbated by the strategy of the previous regional government to keep key industrial assets under the control of local actors (often affiliated with the government), thus shielding them from takeover attempts as well as limiting competition, investment, and innovation in the industry. The strategy changed with the arrival of a new administration in 2010. The pro-business approach of the new government seems to have delivered a spike in investment, but it is not clear this is a sustainable trend that will be reflected in economic outcomes and that will lead to the development of a more balanced economy.

Bashkortostan's recent history highlights the restrictive effect of natural resource endowments on the development of regional institutions. As long as the oil and petrochemical industries delivered reasonable growth and prosperity, there was little impetus for institutional reforms in the region. The shift in the regional government’s approach to investment attraction and the overall business climate occurred after the change of regional leadership in 2010 when the oil and gas industry was hit by the downturn on global markets.

Over the last seven years, the region has implemented several innovative initiatives, including:

- The region has a very structured and transparent system for investor support. It includes a public-private committee that discusses proposed private investments and recommends whether they should be considered strategically important, and thus receive tax discounts and other incentives.

- “Product of Bashkortostan” — is a self-sustaining trade house originally founded by the state government that helps local, small-scale agricultural producers and food processors access major retail chains (generally a major issue for small agro-producers in Russia). For a relatively small fee, it offers participation in a regional branding scheme, quality control, and capacity-building services. The scheme’s growing membership and financial viability are testament to its success.

- “The start-up bus” is a mobile start-up and SME support service office that visits small towns and rural areas of the region, where establishing a permanent support office is unfeasible.

However, institutional challenges remain a critical constraint for the diversification of the economy, which remains dominated by the oil, gas, and petrochemicals industries. Entrepreneurship and innovation remain weak, and while there have been several new manufacturing investments, the results are much more modest than in Ulyanovsk Oblast. Peripheral parts of the region remain underdeveloped, and several monotowns persist as areas of substantial financial distress. The region’s government is working to address some of these challenges mostly through active use of federal support programs. For instance, it has recently secured the status of “Territories of Accelerated Socio-Economic Development — TASED” for two monotowns. It is also working to improve the business environment (the region recently reached 20th place in the ASI ranking of investment attractiveness). These steps are important, and their results should be visible in the foreseeable future.

102 Steshenko, A. (2017, forthcoming). What can regions do to promote economic development? The case of Bashkortostan Republic. (Background paper to this report).
Figure 25
EPI Estimates for Bashkortostan

- Bashkortostan Republic
- GRP per capita growth rank: average
- EPI rank low medium potential
- Performance rank: exceed
## ANNEX 2

### Quantitative analysis methodology.

Full table of variables used in the EPI model

<table>
<thead>
<tr>
<th>Variables (sources)</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Productivity</td>
<td>Real GRP per capita is the dependent variable and is an indicator of a region's level of productivity. The model uses GRP in constant prices, equalized across regions. It is calculated using the index of the physical volume of GRP, which controls for regional differences in inflation. The price of the fixed basket of goods is used to correct for the price difference between regions in the base year.</td>
</tr>
<tr>
<td>Population Density</td>
<td>An increase in the share of population living in urban areas and in economic density confers benefits on firms and workers. This increase in urbanization and density gives rise to agglomeration economies and raises productivity and real wages. Additionally, proximity allows for knowledge spillovers, dense labor markets can facilitate matching between firms and works, and firms benefit from sharing indivisible costs. Empirical evidence suggests that the forces of urbanization and agglomeration in Russia are not utilized in full.</td>
</tr>
<tr>
<td>Level of Urbanization</td>
<td>A substantial body of literature confirms that the quality of human capital is closely associated with increases in firm productivity. Some mechanisms that foster this relationship include knowledge spillovers or the growth of consumption amenities in the places where the highly-educated concentrate. Traditionally, this indicator is measured through the workforce’s educational attainment outcomes; however, in Russia the share of the working age population with a university degree fails to capture differences in the quality of education, and as a result is not a good measure of human capital. Life expectancy is used as an alternative proxy, as it is widely recognized as a measure of the quality of human capital and is associated with better educational attainment and broader socio-economic outcomes of the regions.</td>
</tr>
<tr>
<td>Human Capital</td>
<td>Firms can trade and communicate with distant markets, which means that there is a spatial extent component to knowledge spillovers that occurs when markets (i.e., cities) are located in proximity. Following Harris’ 1954 model we compute an &quot;external&quot; market potential whose impact is separate from the effect of the location’s size. Previous studies have shown that market access contributes to productivity at a regional level and at a business level.</td>
</tr>
<tr>
<td>Market Access</td>
<td>Higher density of local roads increases the size of the labor markets, thus increasing chances for better job matching leading to higher productivity. Additionally, at a regional scale, road networks create opportunities for the creation of local supply chains and the development of a productive rural-urban system with a diverse set of sectoral specializations. Density of road networks can also be seen as a proxy for the quality of infrastructure in the region, which is closely associated with economic development.</td>
</tr>
<tr>
<td>Local Transport Infrastructure</td>
<td>Density of public hard surface roads (km/km²)</td>
</tr>
</tbody>
</table>
Extractive Industries

<table>
<thead>
<tr>
<th>Share of employment in natural resource extraction (RosStat)</th>
<th>Natural resource extraction is a major force that drives regional economic development in Russia. The EPI model developed in this analysis uses several methods to control for the effect of regions whose economies rely on the extractive industries.</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRP per capita net of contribution of extractive industries (RosStat)</td>
<td>Inefficient allocation of labor and capital in Russia slows down structural transformation of the economy and locks resources in unproductive forms of economic activity. Monotowns are widely recognized as a major social issue in Russia, but their presence also points to the significance of the Soviet industrial legacy in a given region.</td>
</tr>
</tbody>
</table>

Effect of Central Planning

| Share of population living in monotowns | Natural endowments (like proximity to coastlines and temperatures favorable for agriculture) may confer advantages on cities as they develop. Given theories on path dependence and the variegated nature of Russia’s geography, it is important to measure the role of geography and climate in shaping the fortunes of Russian cities. |

Geography and Climate

| Land suitability for agriculture | Natural endowments (like proximity to coastlines and temperatures favorable for agriculture) may confer advantages on cities as they develop. Given theories on path dependence and the variegated nature of Russia’s geography, it is important to measure the role of geography and climate in shaping the fortunes of Russian cities. |
| Mean temperature in the coldest quarter | Natural endowments (like proximity to coastlines and temperatures favorable for agriculture) may confer advantages on cities as they develop. Given theories on path dependence and the variegated nature of Russia’s geography, it is important to measure the role of geography and climate in shaping the fortunes of Russian cities. |

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104 Datasets for most variables used cover the period from 1998 to 2016; however, complete datasets are available for the period 2010-2014.


Quality of Governance

| RA expert rating of governance risk | The quality of governance is closely associated with regional development and productivity according to international empirical evidence. \(^{120}\) Studies in Russia have also found a significant role for the quality and proactivity of regional governments as drivers of growth. \(^{121}\) Inter-budgetary transfers variables are used to estimate the level of independence of regional authorities, as well as the extent to which they are incentivized to raise their own revenue by supporting private sector development. \(^{122}\) Grants were excluded from total inter-budgetary transfers in an attempt to exclude the equalization factor. |

| Total inter-budgetary transfers/ budgetary transfers without equalizing grants (RosStat) | There are no surveys of business environments covering all of Russia’s regions. For that reason, proxy indicators are used. The number of small businesses \(^{123}\) is considered and variables for the level of economic crimes \(^{124}\) were used as a proxy for the strength of regional institutions; high values indicate either the degree of extraction by institutions or the weakness of property rights protections that leads to criminal activity. \(^{125}\) |

Institutional Factor

| Total number of SMEs (RosStat) | There are no surveys of business environments covering all of Russia’s regions. For that reason, proxy indicators are used. The number of small businesses \(^{123}\) is considered and variables for the level of economic crimes \(^{124}\) were used as a proxy for the strength of regional institutions; high values indicate either the degree of extraction by institutions or the weakness of property rights protections that leads to criminal activity. \(^{125}\) |

| Number of economic crimes (RosStat) |

### EPI: Selection of regions

When an EPI model is constructed for all regions in Russia, resource extraction emerges, above all other indicators, as the key driver of productivity. Constructing an EPI model that draws on all of Russia’s regions yields results that defy the basic relationships established in economic development literature (see Table 6 and Figure 25). Regions dependent on the extractive industries and those that are inaccessible to western Russia (remote regions) drive these atypical results. For example, market access displays a negative relationship to GRP per capita. Since most of the extractive regions are located in the northern and eastern part of Russia they tend to have low to non-existent market access; however, GRP per capita is magnified there due to the high value added via natural resource extraction. These effects are diametric to such an extent that they distort the conventional relationship between market access and GRP per capita. \(^{126}\) In fact, the economies of regions like Sakhalin, Magadan, Yakutia, and Khanty-Mansiysk Autonomous Okrug do not benefit from access to other Russian regions, as the majority of their tradable outputs (oil, gas, and diamonds) are exported to foreign markets.

Russia’s resource-rich regions distort the relationship between structural characteristics and level of economic development: they are usually low density, but highly urbanized (few people live in northern rural areas), and they tend to have a highly-educated population since engineers, geologists, and managers relocate (temporarily) to these remote regions to work in resource extraction. Although the high productivity of these regions is associated with natural endowments, their idiosyncratic and unsustainable nature distorts our attempt to capture structural drivers of productivity that can be used to influence regional development across Russia. In addition to

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\(^{124}\) Economic crime is understood as crimes related to entrepreneurial and business activities.


the extractive regions, the remoteness of populated areas in the Far Eastern and Siberian Federal okrugs displays similar structural characteristics such as low population density and low market access. These remote regions also display distorted relationships to GRP per capita since their productivity is derived from other structural factors, such as reliance on government support programs or access to foreign markets through land borders — both of which are not fully captured in this model. For example, Vladivostok is a major city with over 600,000 inhabitants in Primorsky Krai whose primary markets are outside of Russia (only 1.1 percent of GRP comes from natural resources extraction). The distance between Vladivostok and Moscow is over 4,000 miles; by contrast, Vladivostok is approximately 1,000 miles to both Tokyo and Shanghai.

The full model is distorted by the high level of productivity displayed by resource-rich regions. The full model suggests a statistically insignificant relationship between market access (internal) and GRP per capita and a statistically significant and negative relationship between access to ports and GRP per capita (see Table 4). Both these results violate the laws of economic geography and are a result of the resource-rich regions. Figure 27 also shows that high EPI is concentrated in the central, Siberian, and Far Eastern regions. According to this estimation, Chukotka has the highest EPI score of 100 while Moscow and St. Petersburg fall slightly above the average with scores of 66 and 61, respectively.
SIBERIAN FEDERAL OKRUG
63 Buryatia Republic
64 Tyva Republic
65 Altai Krai
66 Krasnoyarsk Krai
67 Irkutsk Oblast
68 Kemerovo Oblast
69 Novosibirsk Oblast
70 Omsk Oblast
71 Tomsk Oblast
72 Altai Republic
73 Khakassia Republic
74 Zabaykalskiy Krai

FAR EASTERN FEDERAL OKRUG
75 Sakha (Yakutia) Republic
76 Primorskiy Krai
77 Khabarovskiy Krai
78 Amur Oblast
79 Kamchatka Krai
80 Magadan Oblast
81 Sakhalin Oblast
82 Jewish Autonomous Oblast
83 Chukotka Autonomous Okrug

Source: Research elaborated by the authors.
MAKING BEST USE OF THE ECONOMIC POTENTIAL OF RUSSIA’S REGION

RE-MAPPING OPPORTUNITY

CONTROLLING FOR RESOURCE-RICH REGIONS — DOESN’T RESULT IN SIGNIFICANT CHANGES IN THE EPI SCORES
47 Udmurt Republic
48 Chuvash Republic
49 Nizhni Novgorod Oblast
50 Kirov Oblast
51 Samara Oblast
52 Orenburg Oblast
53 Penza Oblast
54 Perm Krai
55 Saratov Oblast
56 Ulyanovsk Oblast

**URALS FEDERAL OKRUG**
57 Kurgan Oblast
58 Sverdlovsk Oblast
59 Tyumen Oblast
60 Chelyabinsk Oblast
61 Khanty-Mansiysk Autonomous Okrug
62 Yamalo-Nenets Autonomous Okrug

**SIBERIAN FEDERAL OKRUG**
63 Buryatia Republic
64 Tyva Republic
65 Altai Krai
66 Krasnoyarsk Krai
67 Irkutsk Oblast
68 Kemerovo Oblast
69 Novosibirsk Oblast
70 Omsk Oblast
71 Tomsk Oblast
72 Altai Republic
73 Khakassia Republic
74 Zabaykalskiy Krai

**FAR EASTERN FEDERAL OKRUG**
75 Sakha (Yakutia) Republic
76 Primorskiy Krai
77 Khabarovskiy Krai
78 Amur Oblast
79 Kamchatka Krai
80 Magadan Oblast
81 Sakhalin Oblast
82 Jewish Autonomous Oblast
83 Chukotka Autonomous Okrug

*Source: Research elaborated by the authors.*
Table 4
EPI ESTIMATION FOR ALL REGIONS

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>t-statistic</th>
<th>Coefficient</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Access</td>
<td>-0.0043</td>
<td>-0.6181</td>
<td>-0.0289</td>
<td></td>
</tr>
<tr>
<td>Port Access</td>
<td>-0.0381***</td>
<td>-3.2856</td>
<td>-0.1039</td>
<td></td>
</tr>
<tr>
<td>Land Suitability</td>
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<td>-0.3605</td>
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<tr>
<td>% University-Level Education</td>
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<td>High-Tech Employment</td>
<td>0.0210</td>
<td>0.1746</td>
<td>0.0084</td>
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<tr>
<td>% Population in Monotowns</td>
<td>0.2285</td>
<td>1.683</td>
<td>0.0438</td>
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<tr>
<td>Economic Crimes per 1000 Pop</td>
<td>0.0849*</td>
<td>1.7834</td>
<td>0.0797</td>
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<tr>
<td>% Population in City &gt; 250k</td>
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<td>Constant</td>
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<td>13.5537</td>
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<tr>
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<tr>
<td>Adjusted R-squared</td>
<td>0.1488</td>
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</table>

Note: Dependent variable is gross regional product per capita. Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1. Robust SE. Standardized coefficient (beta) reported in third row. Market access is calculated as the ratio between the sum of the population of the major city in each region relative to the sum of travel time to those cities from the reference city.

Fostering sustainable growth in Russia requires looking beyond the lure of the extractive industries and natural resource endowments, as well as the challenge of remoteness.

Given the role of the extractive industries and Russia’s vast geography in distorting development outcomes in Russia’s regions, it is important to design an EPI model that effectively controls for the niche role that these factors play in economic development. A number of approaches were implemented to control for the impact of these regions in the EPI regression. The outcome indicator, GRP per capita, was netted of income from the extractive industries; additionally, a variable that measured the share of population employed in the extractive industries was included. These measures, however, were not sufficiently strong to alter the negative relationship found between GRP per capita and market access, which is hard to explain or reconcile with the results of multiple empirical studies conducted in different countries. This is in part reflective of the fact that an inflow of revenue into an extractive sector boosts prices and wages across the economy and thus makes the entire economy, rather than the sector itself, appear more productive. The negative relationship between ports and GRP per capita remains, although it is statistically insignificant in this iteration. Figure 28 shows that using this version of the EPI estimation that controls for resource-rich regions, there is a slight shift in those regions that have high economic potential: some regions emerge in western Russia, while others in Siberia and in the Far East lose their high potential status. For example, in this iteration, Moscow and St. Petersburg have EPI scores of 100 and 98 respectively; however, regions like Chukotka and Buryat continue to have EPI scores well above the average and 9 out of 20 regions ranked as High EPI are in the Siberian or Far Eastern Federal okrugs. These results continue to suggest that resource richness and remoteness are important factors in their high productivity, which in the framework of this analysis is uninformative and does not proffer sustainable or actionable policy options.
Based on the distortions introduced into the model by the inclusion of remote regions in Russia, we made the important decision to drop the Far Eastern and Siberian Federal okrugs from the analysis. Excluding the two Federal okrugs removed the following 21 regions:

<table>
<thead>
<tr>
<th>Region</th>
<th>Federal Okrug</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Buryatia Republic</td>
</tr>
<tr>
<td>2</td>
<td>Altai Krai</td>
</tr>
<tr>
<td>3</td>
<td>Buryatia Republic</td>
</tr>
<tr>
<td>4</td>
<td>Altai Republic</td>
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<td>Khakasia Republic</td>
</tr>
<tr>
<td>6</td>
<td>Krasnoyarski Krai</td>
</tr>
<tr>
<td>7</td>
<td>Irkutsk Oblast</td>
</tr>
<tr>
<td>8</td>
<td>Kemerov Oblast</td>
</tr>
<tr>
<td>9</td>
<td>Novosibirsk</td>
</tr>
<tr>
<td>10</td>
<td>Omsk Oblast</td>
</tr>
<tr>
<td>11</td>
<td>Tomsk Oblast</td>
</tr>
<tr>
<td>12</td>
<td>Zabaykalsky Krai</td>
</tr>
<tr>
<td>13</td>
<td>Sakha (Yakutia) Republic</td>
</tr>
<tr>
<td>14</td>
<td>Primorsky Krai</td>
</tr>
<tr>
<td>15</td>
<td>Khabarovsk Krai</td>
</tr>
<tr>
<td>16</td>
<td>Amur Oblast</td>
</tr>
<tr>
<td>17</td>
<td>Kamchatka Krai</td>
</tr>
<tr>
<td>18</td>
<td>Magadan Oblast</td>
</tr>
<tr>
<td>19</td>
<td>Sakhalin Oblast</td>
</tr>
<tr>
<td>20</td>
<td>Jewish Autonomous Oblast</td>
</tr>
<tr>
<td>21</td>
<td>Chukotka Autonomous Oblast</td>
</tr>
</tbody>
</table>

Figure 29: Analysis with 20 regions removed from Far Eastern and Siberian Federal okrugs
Removing the 21 regions in the Far Eastern and Siberian Federal okrugs resolved the remoteness issue that distorted our analysis. However, this removal did not capture all of the regions reliant on the extractive industries. Table 7 shows the share of natural resource extraction in the structure of GRP by region from 2010-2014. The table only displays those regions where, on average, more than 9.9 percent of GRP between 2000 and 2014 was from natural resource extraction. Although many of the 21 regions are included in Table 7, there are several regions whose share of natural resource extraction is immense — including the top two regions Nenets Autonomous Okrug and Khanty-Mansi Autonomous Okrug — but that are not captured by this fix. The next approach was to remove a subset of regions reliant on natural resource extraction.

An average contribution of more than 30 percent to GRP was selected as the boundary for excluding the final set of regions that distorted our EPI model after analyzing (1) the distribution of average contribution of natural resource extraction to GRP across the regions and (2) the number of regions already accounted for by dropping the Siberian and Far Eastern Federal okrugs. In order to test 30 percent contribution as a reasonable threshold (reasonable is defined as a threshold that would allow enough variability in the sample while controlling for the influence of the extractive regions), we employed a sensitivity analysis. The purpose of the sensitivity analysis is to determine how preliminary EPI estimations would be influenced by two alternative thresholds: (a) a smaller sample excluding regions with contributions greater than 37.5 percent — where the total number of excluded regions would increase by four to 24 regions (b) a wider sample excluding regions with contributions greater than 27.5 percent — where the total number of excluded regions would increase by six to 26.

<table>
<thead>
<tr>
<th>Table 5</th>
<th>EPI Results Controlling for Extractive Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Access</td>
<td>-0.0072* (-1.7413)</td>
</tr>
<tr>
<td>Port Access</td>
<td>-0.0113 (-1.4759)</td>
</tr>
<tr>
<td>Land Suitability</td>
<td>-0.4353*** (-6.0283)</td>
</tr>
<tr>
<td>% University-Level Education</td>
<td>0.1929 (1.1589)</td>
</tr>
<tr>
<td>High-Tech Employment</td>
<td>0.3064*** (3.3870)</td>
</tr>
<tr>
<td>% Population in Monotowns</td>
<td>0.1202 (0.8504)</td>
</tr>
<tr>
<td>Economic Crimes per 1000 Pop</td>
<td>0.0650* (1.8171)</td>
</tr>
<tr>
<td>% Employment in Extractive Industries</td>
<td>0.0018 (0.8344)</td>
</tr>
<tr>
<td>% Population in City &gt; 250k</td>
<td>0.0040*** (3.5664)</td>
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<tr>
<td>Constant</td>
<td>11.4549*** (20.4307)</td>
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<tr>
<td>Observations</td>
<td>415</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.1729</td>
</tr>
</tbody>
</table>

Note: Dependent variable is gross regional product per capita. Robust t-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Robust SE. Standardized coefficient (beta) reported in third row. Market access is calculated as the ratio between the sum of the population of the major city in each region relative to the sum of travel time to those cities from the reference city. Port access is calculated as the ratio between the sum of cargo throughput in each port relative to the sum of travel distance to those ports from the reference city.

Source: Elaborated by the team.
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Nenets AO</td>
<td>Northwestern</td>
<td>74.9</td>
<td>74.3</td>
<td>65.4</td>
<td>59.6</td>
<td>66.4</td>
<td>77.3</td>
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<td>75.4</td>
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<td>74.3</td>
<td>72.3</td>
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<tr>
<td>Khanty-Mansiysk AO</td>
<td>Urals</td>
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<td>74.9</td>
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<td>65.4</td>
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<td>66.8</td>
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<td>67.76</td>
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<td>61.4</td>
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<td>50.3</td>
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<td>37.0</td>
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<td>12.0</td>
<td>12.39</td>
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<td>15.4</td>
<td>17.2</td>
<td>16.9</td>
<td>9.9</td>
</tr>
</tbody>
</table>

*Arkhangelsk oblast without Nenets AO.
Sensitivity Analysis Results: 37.5 percent threshold.

The 37.5 percent threshold corrected for distortions in market access.

**Figure 30**
SCATTER MARKET ACCESS VS. LOG GRP PER CAPITA 2014

**Table 7**
SENSITIVITY ANALYSIS REGRESSION 37.5 PERCENT THRESHOLD

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>t-statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Access</td>
<td>0.1342*</td>
<td>(1.9008)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td></td>
<td>0.1116</td>
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<td></td>
</tr>
<tr>
<td>Port Access</td>
<td>0.0734**</td>
<td>(2.4328)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td></td>
<td>0.1503</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land Suitability</td>
<td>-0.3486***</td>
<td>(-4.0946)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td></td>
<td>-0.2358</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% University-Level Education</td>
<td>0.2956**</td>
<td>(2.2249)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td></td>
<td>0.1320</td>
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<td></td>
</tr>
<tr>
<td>High-Tech Employment</td>
<td>0.3948***</td>
<td>(3.3623)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td></td>
<td>0.2238</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Population in Monotowns</td>
<td>1.0982***</td>
<td>(7.1824)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td></td>
<td>0.2656</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Dependent variable is gross regional product per capita. Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1. Robust SE. Standardized coefficient (beta) reported in third row. Market access is calculated as the ratio between the sum of the population of the major city in each region relative to the sum of travel time to those cities from the reference city. Port access is calculated as the ratio between the sum of cargo throughput in each port relative to the sum of travel distance to those ports from the reference city.

**Source:** Research elaborated by the team.
Sensitivity Analysis: 27.5 percent threshold.

The 27.5 percent threshold also corrected distortions in market access.

Table 8

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Access</td>
<td>0.2377***</td>
<td>(3.6562)</td>
<td>0.0001</td>
</tr>
<tr>
<td>Port Access</td>
<td>0.1462***</td>
<td>(5.7243)</td>
<td>0.0001</td>
</tr>
<tr>
<td>Land Suitability</td>
<td>-0.1986***</td>
<td>(-2.6235)</td>
<td>0.005</td>
</tr>
<tr>
<td>% University-Level Education</td>
<td>0.3181***</td>
<td>(2.8527)</td>
<td>0.005</td>
</tr>
<tr>
<td>High-Tech Employment</td>
<td>0.5921***</td>
<td>(5.4045)</td>
<td>0.0001</td>
</tr>
<tr>
<td>% Population in Monotowns</td>
<td>0.8378***</td>
<td>(5.5868)</td>
<td>0.0001</td>
</tr>
<tr>
<td>Economic Crimes per 1000 Pop</td>
<td>0.0253</td>
<td>(0.7539)</td>
<td>0.459</td>
</tr>
<tr>
<td>% Population in City &gt; 250k</td>
<td>0.0063***</td>
<td>(6.5941)</td>
<td>0.0001</td>
</tr>
<tr>
<td>Constant</td>
<td>8.8062***</td>
<td>(14.2739)</td>
<td>0.0001</td>
</tr>
<tr>
<td>Observations</td>
<td>275</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.4652</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Dependent variable is gross regional product per capita. Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1. Robust SE. Standardized coefficient (beta) reported in third row. Market access is calculated as the ratio between the sum of the population of the major city in each region relative to the sum of travel time to those cities from the reference city. Port access is calculated as the ratio between the sum of cargo throughput in each port relative to the sum of travel distance to those ports from the reference city.

Source: Research elaborated by the team.
In sum, the 37.5 percent threshold corrected the distortions introduced by regions reliant on natural resource extraction, and the 27.5 percent threshold is also able to correct these same distortions. Based on these results, we conjecture that the 30 percent threshold is sufficient to limit the effect of the extractive industries in our analysis while preserving any variation contributed to the model by the additional regions that would otherwise be removed using the 27.5 threshold. By employing the 30 percent threshold, the following additional regions were removed from the analysis:

<table>
<thead>
<tr>
<th>Region</th>
<th>Federal Okrug</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nenets AO</td>
<td>Northwestern</td>
</tr>
<tr>
<td>Komi</td>
<td>Volga</td>
</tr>
<tr>
<td>Orenburg</td>
<td></td>
</tr>
</tbody>
</table>

Therefore, the total number of regions evaluated in the EPI was 56.

**Variable Selection**

After narrowing down the sample of regions, the next step was to narrow down the set of variables that would (1) follow appropriate statistical conventions (i.e., not violate collinearity) and (2) precisely model the variance between structural conditions and observed levels of GRP per capita in Russia. We collected over 147 indicators that ranged in years and representativeness across the regions. We tested a range of indicators including raster-based market access measures, minimum temperature and other climatic measures, agricultural land, the Engle Road Index, and...
more. However, after over 20 iterations of modeling the EPI, we narrowed the list of variables to the following (all of the indicators had data for our regions between 2010 and 2014):

When selecting the final set of variables, we ensured that our variables did not show high levels of collinearity.

<table>
<thead>
<tr>
<th>Market Access (travel time)</th>
<th>Human Capital (university degree)</th>
<th>Economic Crimes</th>
<th>Road Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Access</td>
<td>Life Expectancy</td>
<td>Employment in Natural Resources</td>
<td>City Population</td>
</tr>
<tr>
<td>Land Suitability for Agriculture</td>
<td>Employed in High- and Medium-tech Industries</td>
<td>Budgetary Transfers</td>
<td>Population Living in a City with &gt; 250,000 Inhabitants</td>
</tr>
<tr>
<td>Calories Produced by Land</td>
<td>Monotowns</td>
<td>Urbanization Level</td>
<td>Population Density</td>
</tr>
</tbody>
</table>

Table 10
Correlation Matrix for All Variables Included in the Analysis

<table>
<thead>
<tr>
<th></th>
<th>Market Access</th>
<th>Port Access</th>
<th>Land Suitability</th>
<th>Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Access</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Port Access</td>
<td>-0.4232*</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land Suitability</td>
<td>0.2332*</td>
<td>-0.2446*</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Calories</td>
<td>0.5034*</td>
<td>-0.2375*</td>
<td>0.6696*</td>
<td>1</td>
</tr>
<tr>
<td>Human Capital</td>
<td>0.0966</td>
<td>0.2350*</td>
<td>0.1106</td>
<td>0.1849*</td>
</tr>
<tr>
<td>Life Expectancy</td>
<td>-0.0643</td>
<td>0.1753*</td>
<td>0.2127*</td>
<td>0.2732*</td>
</tr>
<tr>
<td>Employed in High- and Medium-tech</td>
<td>0.3593*</td>
<td>-0.4135*</td>
<td>0.1062</td>
<td>0.0972</td>
</tr>
<tr>
<td>Monotowns</td>
<td>-0.1292*</td>
<td>-0.2155*</td>
<td>0.0417</td>
<td>-0.2399*</td>
</tr>
<tr>
<td>Employment in Natural Resources</td>
<td>-0.1900*</td>
<td>0.011</td>
<td>-0.1890*</td>
<td>-0.2081*</td>
</tr>
<tr>
<td>Economic Crime</td>
<td>0.1680*</td>
<td>-0.1444*</td>
<td>-0.0856</td>
<td>-0.0576</td>
</tr>
<tr>
<td>Budgetary Transfers</td>
<td>0.1161</td>
<td>-0.014</td>
<td>0.1993*</td>
<td>0.2295*</td>
</tr>
<tr>
<td>Urbanization Level</td>
<td>0.1622*</td>
<td>0.0683</td>
<td>-0.3503*</td>
<td>-0.2986*</td>
</tr>
<tr>
<td>Road Density</td>
<td>0.4306*</td>
<td>-0.0546</td>
<td>0.3536*</td>
<td>-0.7737*</td>
</tr>
<tr>
<td>Primary City Population</td>
<td>0.1187*</td>
<td>0.0624</td>
<td>0.0807</td>
<td>0.1087</td>
</tr>
<tr>
<td>% Population Living in City with &gt;250k Inhabitants</td>
<td>0.0153</td>
<td>-0.0178</td>
<td>-0.0222</td>
<td>-0.1265*</td>
</tr>
<tr>
<td>Population Density</td>
<td>0.2142*</td>
<td>0.1</td>
<td>-0.1319*</td>
<td>0.0571</td>
</tr>
</tbody>
</table>

*Significant at 5%.
Model Specification

Our model is a Pooled OLS for the years between 2010 and 2014. Although doing a cross-sectional regression was an option, a Pooled OLS (as the primary consideration) gave us more degrees of freedom. Even though we use a Pooled OLS, we do not control for year in our estimation because the intention is to model aggregate trends since we do not expect much variation in the EPI scores (based on long-term structural factors) over five years. Additionally, the time invariant variables in our model, such as market access, support the use of an aggregate (Pooled OLS) model. The market access variable (according to our hypothesis), although extremely important, is static and would severely limit the ability to see yearly variations. Random or fixed effect models were also considered and tested; however, a Chow Poolability test confirmed (as did a Hausman test of the random and fixed effects model) that the Pooled OLS model would provide estimates that are BLUE (best linear unbiased estimates).
**The final model specification is:**

\[
Y_{ln \{(grp \text{ cap constant)}\}} = B_0 + B_1 \ln \text{market} + B_2 \ln \text{portaccess} \\
+ B_3 \text{landsuitability} + B_4 \ln \text{humancap} + B_5 \ln \text{hightech} + B_6 \ln \text{monotown} \\
+ B_7 \ln \text{primacy}_250 + B_5 \ln \text{crime} + \mu, \text{vce(robust)}
\]

**EPI Scores**

In order to derive the EPI scores, once the regression was completed the predicted values of the fitted line were generated (\(y_{hat}\)). From here, \(z\)-scores for each region were generated within each year. Finally, the \(z\)-scores for each year were re-scaled into the final EPI score using the following equation:

\[
EPI_t = 50 + \left( \frac{50}{\max(Z_i)} \right) \cdot Z_i
\]
Performance Rankings

In order to generate the performance statistics, the standard errors of the predicted mean were generated from the base model. Then the t-multiplier for the 99 percent confidence interval and n-(k+1) degrees of freedom was determined using the t-table (2.340). Confidence intervals were generated for the predicted values using the standard errors of the predicted mean and the t-multiplier using the following formulas:

\[
\text{lower confidence interval boundary} = \hat{y} - 2.340 \times \text{std_error} \\
\text{upper confidence interval boundary} = \hat{y} + 2.340 \times \text{std_error}
\]

Values that fell within the confidence interval are labeled "performance fulfills potential", values above the confidence interval labeled "performance exceeds potential", and values below the confidence interval labeled "performance yet to fulfill potential".

Economic Indicators

Exceeds 22% 28.57% 32.14%
Freq. 39.29% 22 16 18

Explaining Potential

In order to determine which variables contributed to each region's EPI ranking, the EPI score was split into tertiles by year. Each of the regions could subsequently be ranked relative to their peers across the six variables. This method allows us to see which variables had higher scores for high potential regions and which variables had higher scores among the low potential regions.

<table>
<thead>
<tr>
<th>Region</th>
<th>EPI Score</th>
<th>Port Rank</th>
<th>Land Rank</th>
<th>Monotown Rank</th>
<th>Market Access Rank</th>
<th>Human Capital Rank</th>
<th>Tech Rank</th>
<th>Cities Rank</th>
<th>Crime Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mari El Republic</td>
<td>34.15</td>
<td>45</td>
<td>36</td>
<td>9</td>
<td>17</td>
<td>40</td>
<td>11</td>
<td>46</td>
<td>48</td>
</tr>
<tr>
<td>Krasnodar Krai</td>
<td>26.22</td>
<td>9</td>
<td>5</td>
<td>10</td>
<td>36</td>
<td>34</td>
<td>46</td>
<td>43</td>
<td>24</td>
</tr>
<tr>
<td>Chechen Republic</td>
<td>2.65</td>
<td>35</td>
<td>21</td>
<td>5</td>
<td>48</td>
<td>55</td>
<td>53</td>
<td>42</td>
<td>55</td>
</tr>
<tr>
<td>Belgorod Oblast</td>
<td>28.81</td>
<td>38</td>
<td>8</td>
<td>33</td>
<td>29</td>
<td>24</td>
<td>42</td>
<td>41</td>
<td>40</td>
</tr>
<tr>
<td>Pskov Oblast</td>
<td>35.37</td>
<td>11</td>
<td>42</td>
<td>6</td>
<td>41</td>
<td>35</td>
<td>29</td>
<td>51</td>
<td>25</td>
</tr>
</tbody>
</table>

Table II
Regional Ratings by Individual Components of EPI
<table>
<thead>
<tr>
<th>Region</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bashkortostan Republic</td>
<td>37.00</td>
<td>51</td>
<td>19</td>
<td>39</td>
<td>44</td>
<td>47</td>
<td>16</td>
<td>39</td>
<td>46</td>
</tr>
<tr>
<td>Tambov Oblast</td>
<td>43.16</td>
<td>31</td>
<td>3</td>
<td>20</td>
<td>12</td>
<td>45</td>
<td>14</td>
<td>38</td>
<td>42</td>
</tr>
<tr>
<td>Kabardino Balkar Republic</td>
<td>16.28</td>
<td>20</td>
<td>30</td>
<td>1</td>
<td>43</td>
<td>22</td>
<td>45</td>
<td>50</td>
<td>31</td>
</tr>
<tr>
<td>Karachay Cherkess Republic</td>
<td>32.85</td>
<td>13</td>
<td>49</td>
<td>3</td>
<td>31</td>
<td>6</td>
<td>41</td>
<td>52</td>
<td>4</td>
</tr>
<tr>
<td>Kurgan Oblast</td>
<td>33.87</td>
<td>55</td>
<td>23</td>
<td>26</td>
<td>51</td>
<td>41</td>
<td>23</td>
<td>24</td>
<td>45</td>
</tr>
<tr>
<td>Adygea Republic</td>
<td>17.36</td>
<td>10</td>
<td>1</td>
<td>17</td>
<td>30</td>
<td>16</td>
<td>49</td>
<td>47</td>
<td>18</td>
</tr>
<tr>
<td>Kalmykia Republic</td>
<td>17.76</td>
<td>17</td>
<td>29</td>
<td>2</td>
<td>32</td>
<td>5</td>
<td>54</td>
<td>48</td>
<td>17</td>
</tr>
<tr>
<td>Stavropol Krai</td>
<td>32.80</td>
<td>12</td>
<td>17</td>
<td>25</td>
<td>38</td>
<td>9</td>
<td>40</td>
<td>45</td>
<td>14</td>
</tr>
<tr>
<td>Astrakhan Oblast</td>
<td>44.76</td>
<td>8</td>
<td>25</td>
<td>13</td>
<td>50</td>
<td>11</td>
<td>47</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Kursk Oblast</td>
<td>44.53</td>
<td>37</td>
<td>4</td>
<td>35</td>
<td>22</td>
<td>20</td>
<td>35</td>
<td>27</td>
<td>36</td>
</tr>
<tr>
<td>Dagestan Republic</td>
<td>33.75</td>
<td>6</td>
<td>28</td>
<td>28</td>
<td>53</td>
<td>27</td>
<td>50</td>
<td>44</td>
<td>52</td>
</tr>
<tr>
<td>Ingushetia Republic</td>
<td>9.244</td>
<td>28</td>
<td>26</td>
<td>12</td>
<td>37</td>
<td>19</td>
<td>55</td>
<td>53</td>
<td>19</td>
</tr>
<tr>
<td>Saratov Oblast</td>
<td>44.81</td>
<td>42</td>
<td>20</td>
<td>24</td>
<td>27</td>
<td>23</td>
<td>22</td>
<td>32</td>
<td>47</td>
</tr>
<tr>
<td>Severnaya Osetiya-Alaniya Republic</td>
<td>40.82</td>
<td>29</td>
<td>24</td>
<td>11</td>
<td>42</td>
<td>2</td>
<td>48</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>Volgograd Oblast</td>
<td>58.22</td>
<td>26</td>
<td>22</td>
<td>47</td>
<td>35</td>
<td>18</td>
<td>36</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>St. Petersburg</td>
<td>99.78</td>
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<td>43</td>
<td>14</td>
<td>49</td>
<td>4</td>
<td>27</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>Mordovia Republic</td>
<td>59.86</td>
<td>43</td>
<td>13</td>
<td>32</td>
<td>15</td>
<td>8</td>
<td>9</td>
<td>28</td>
<td>1</td>
</tr>
<tr>
<td>Nizhni Novgorod Oblast</td>
<td>59.11</td>
<td>40</td>
<td>31</td>
<td>38</td>
<td>18</td>
<td>25</td>
<td>15</td>
<td>23</td>
<td>30</td>
</tr>
<tr>
<td>Yaroslavl Oblast</td>
<td>71.07</td>
<td>27</td>
<td>45</td>
<td>34</td>
<td>8</td>
<td>49</td>
<td>6</td>
<td>8</td>
<td>54</td>
</tr>
<tr>
<td>Tatarstan Republic</td>
<td>71.43</td>
<td>47</td>
<td>9</td>
<td>53</td>
<td>25</td>
<td>10</td>
<td>5</td>
<td>14</td>
<td>38</td>
</tr>
<tr>
<td>Kaluga Oblast</td>
<td>72.37</td>
<td>23</td>
<td>33</td>
<td>19</td>
<td>6</td>
<td>31</td>
<td>2</td>
<td>35</td>
<td>5</td>
</tr>
<tr>
<td>Moscow</td>
<td>89.71</td>
<td>18</td>
<td>40</td>
<td>8</td>
<td>2</td>
<td>1</td>
<td>44</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>Rostov Oblast</td>
<td>60.99</td>
<td>4</td>
<td>14</td>
<td>21</td>
<td>28</td>
<td>15</td>
<td>33</td>
<td>36</td>
<td>27</td>
</tr>
<tr>
<td>Vladimir Oblast</td>
<td>58.16</td>
<td>33</td>
<td>35</td>
<td>40</td>
<td>4</td>
<td>48</td>
<td>12</td>
<td>40</td>
<td>32</td>
</tr>
<tr>
<td>Ulyanovsk Oblast</td>
<td>67.69</td>
<td>46</td>
<td>11</td>
<td>43</td>
<td>21</td>
<td>37</td>
<td>3</td>
<td>7</td>
<td>49</td>
</tr>
<tr>
<td>Samara Oblast</td>
<td>90.80</td>
<td>48</td>
<td>12</td>
<td>52</td>
<td>34</td>
<td>7</td>
<td>1</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>Chuvash Republic</td>
<td>63.90</td>
<td>44</td>
<td>18</td>
<td>49</td>
<td>14</td>
<td>32</td>
<td>8</td>
<td>29</td>
<td>8</td>
</tr>
<tr>
<td>Ryazan Oblast</td>
<td>65.60</td>
<td>25</td>
<td>15</td>
<td>15</td>
<td>5</td>
<td>21</td>
<td>7</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Lipetsk Oblast</td>
<td>66.87</td>
<td>30</td>
<td>2</td>
<td>55</td>
<td>10</td>
<td>28</td>
<td>38</td>
<td>13</td>
<td>51</td>
</tr>
<tr>
<td>Chelyabinsk Oblast</td>
<td>66.47</td>
<td>54</td>
<td>32</td>
<td>54</td>
<td>46</td>
<td>12</td>
<td>10</td>
<td>12</td>
<td>35</td>
</tr>
<tr>
<td>Tula Oblast</td>
<td>58.93</td>
<td>22</td>
<td>10</td>
<td>36</td>
<td>3</td>
<td>38</td>
<td>13</td>
<td>34</td>
<td>21</td>
</tr>
<tr>
<td>Murmansk Oblast</td>
<td>67.11</td>
<td>1</td>
<td>55</td>
<td>46</td>
<td>55</td>
<td>26</td>
<td>52</td>
<td>19</td>
<td>44</td>
</tr>
</tbody>
</table>
ANNEX 3

A brief overview of spatially-targeted federal programs for the development of lagging macro-regions

Federal program for the development of the Far East and Baikal region:

*Main objectives:* Achievement of accelerated development and retention of population in the regions of the Far East Federal Okrug.

*Key target indicators:* Jobs created, high-value jobs created, total private sector investment attracted, permanent population of the Far East Federal Okrug retained, total taxes collected.

*Instruments:* Delegation of territories for accelerated socio-economic development (that benefit from federal tax discounts), support for strategically important private investment projects, support for the institutions for development, infrastructure investment, granting of land parcels (1 ha large) to stimulate entrepreneurial activity.127

*Motivation:* Avoiding the natural resources-dependent path of economic development that underutilizes the potential of the regions and Russia as a whole as an economic link between Europe and Asia. Utilizing this potential will require greater economic integration of the Far East into the economic landscape of Russia. The program also responds to national security challenges.128

*Assessment of results and effectiveness:* The program is widely recognized as ineffective, and it has recently been defunded. According to the state Duma committee for regional development and issues of Far East and the North, in 2015 only 45 percent of the program’s planned objectives were met, while the program still used 95 percent of allocated funding.129

Federal program for the development of the North Caucasus Federal Okrug:

*Main objectives:* Development of manufacturing and agricultural sectors to support growth of the economy of the regions and improvement of the incomes of the population, improvement of quality of life of the population through better access to high quality education and healthcare, attraction of private investment, decrease in dependence on federal transfers, decrease in the level of unemployment, and the development of innovation activity in healthcare.

*Key target indicators:* Output of industrial and agricultural products, total volume of private investment, total tax collection, level of unemployment, share of students studying in morning shifts, income levels, number of high value-added jobs, number of tourists visiting the region.

*Instruments:* The first phase of the program that ended in 2016 prioritized investment in municipal and connective infrastructure and services; the subsequent two phases running until 2025 are supposed to focus on economic development and infrastructure that supports industry, agriculture, and tourism. Infrastructure investment priorities include water and sanitation, healthcare infrastructure, urban space and parks, industrial parks, and storage facilities for agricultural produce. Economic development measures focus on support and co-financing for private sector investment projects, investment promotion, and services. The program also includes budget

transfers to the region from the federal government.

**Motivation:** Equalization of the levels of socio-economic development of the regions is seen as a necessary condition for the transition to an innovative, socially-oriented model of development for the country. Securing the political stability of the region is stated as one of the secondary objectives. The policy paper also identifies disparities in the level of economic development as a threat to national security.

**Assessment of results and effectiveness:** The program has been highly successful and impactful in terms of its contribution to the quality of infrastructure and the accessibility of social services. In 2016, out of 50 investments supported by the program, 48 were implemented for different forms of social infrastructure. However, despite the region’s improved economic performance, it is acknowledged that the challenges of unemployment and lack of private investment in the region persist. In 2016, the program supported 17 private sector investment projects that together generated 3,000 jobs (a rather small amount for a total population of 10 million people).130

**Federal program for the development of the Arctic region until 2020:**

**Main objectives:** Improving the level of socio-economic development of the Arctic territories through better coordination of federal and regional governments, implementing state programs in the Arctic territories, and improving the monitoring and evaluation system of socio-economic development of the Arctic territories.

**Key target indicators:** The program is primarily a coordination framework for other federal interventions; thus, it uses indicators from sectoral programs that make up its components.

**Instruments:** The program has an analytical and organizational focus. It includes measures for improvement of the coordination between federal government agencies and regional governments, as well as the establishment of a monitoring and evaluation system.

**Motivation:** Achieving balanced development of the Arctic region through targeted and prioritized development of selected areas, utilization of a selective approach to investment, and targeting high potential economic clusters while ensuring the territorial unity and national security of Russia.

**Assessment of results and effectiveness:** No assessments available at this stage.

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