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ABBREVIATIONS AND ACRONYMS

AO	Autonomous Okrug	NSE	National State Exam
DEA	Data Envelopment Analysis	OECD	Organization for Economic Co-operation and Development
EU	European Union	PHC	Primary Health Care
GDP	Gross Domestic Product	PIRLS	Progress in International Reading Literacy Study
GRP	Gross Regional Product	PISA	Program for International Student Assessment
HBS	Household Budget Survey	RosStat	Russian Statistical Agency
IMF	International Monetary Fund	SER	Social Expenditure Review
IT	Information Technology	SIF	Social Insurance Fund
MHI	Mandatory Health Insurance	TIMMS	Trends in International Mathematics and Science Study
MHIF	Mandatory Health Insurance Fund	USE	Unified State Examination
MoE	Ministry of Education		

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RUSSIAN FEDERATION
SOCIAL EXPENDITURE AND FISCAL FEDERALISM IN RUSSIA

CONTENTS	Page
Acknowledgements	
Executive Summary	i
1. Introduction.....	1
2. Fiscal and policy context for understanding social sector spending	7
3. International comparisons	16
3.1 Overall social spending.....	16
3.2 Education expenditure	17
3.3 Health expenditure.....	20
3.4 Social protection expenditure	22
4. Regional analysis of education.....	26
4.1 The system of education financing and education sector reforms	26
4.2 Regional variations in education spending, physical inputs, and education outcomes	29
4.3 Analysis of overall and system efficiency in the education sector	32
5. Regional analysis of health.....	37
5.1 The system of health care financing and health sector reforms	37
5.2 Regional variations in health spending, physical inputs, and health outcomes	40
5.3 Analysis of overall and system efficiency in the health sector	48
6. Conclusions.....	60
References	70

Annexes

Annex 1: Data and DEA Estimation of Efficiency	62
Annex 2: Regressions Explaining Regional Variation in Expenditure per Student	67
Annex 3: Results of Regressions Exploring the Correlates of Education Outcomes	68
Annex 4: Progress in Physical Inputs and Health Outcomes across Regions with Various Degrees of Efficiency Improvement	69

List of Figures

Figure 1: Healthy Life Expectancy compared to Per Capita Health Spending: Russia and Selected Countries	2
Figure 2: Regional Example of Variation in Education Inputs and Outcomes: Kirov and Ryazan.....	3
Figure 3: Fiscal Transfers from the Federal Budget, as a Share of GDP, 2006–09	9
Figure 4: The Volume and Structure of Inter-budgetary Transfers, 2009	10
Figure 5: Per Capita Fiscal Equalization Grants across Regions, 2009 (rubles)	11
Figure 6: The “equalization gap” Per Capita across Regions, Rubles, 2009	12
Figure 7: Regional Spending on Health and Education Relative to the Size of the Equalization Gap.....	13
Figure 8: Public Social Expenditures as Share of GDP across Countries	16
Figure 9: Public Social Expenditure Per Capita (in US\$ purchasing power parity) in Russia compared to OECD Countries.....	17
Figure 10: Public Educational Expenditure and GDP Per Capita.....	18
Figure 11: Russia’s Educational Test Scores in an International Perspective	19
Figure 12: Student-teacher Ratio and Average Class Size - Russia compared to other Developed Countries.....	19
Figure 13: Total Health Spending Per Capita (US dollar purchasing power parity): Russia compared to OECD Countries.....	20
Figure 14: Physical Inputs in the Health System (per 10,000 people): Russia compared to the European Union, 2006	21
Figure 15: Adult Mortality Rate compared to Total Per Capita Health Spending—Russia and Selected Countries.....	22
Figure 16: Public Social Protection Expenditures per Capita, US Dollar Purchasing Power Parity, Russia and Selected Countries	23
Figure 17: Social Assistance Expenditure in Russia by Type of Program, Percent of GDP	24
Figure 18: Share of Benefits that Goes to Poorest Quintile (20 percent) of the Population, Targeted Social Assistance Programs—Russia compared to Selected Countries	25
Figure 19: Levels and Trends in Education Expenditure per Student across Regions, 2004–07.....	30
Figure 20: Variation in Unified State Examination Scores across Regions	31
Figure 21: Efficiency and expenditure per student across regions	33
Figure 22: Overall Efficiency and Educational Outcomes	36
Figure 23: Financing of Health Care	37

Figure 24: Regional Variation in Health Expenditure Per Capita	42
Figure 25: Share of Consolidated Regional Expenditure on Various Types of Physical Inputs across Regions	43
Figure 26: Variations in Doctors and Hospital Beds per 10,000 people Across Regions	45
Figure 27: Regional Variation in Selected Health Outcomes	46
Figure 28: Overall Efficiency and Health Expenditure Per Capita Across Regions	49
Figure 29: Regional Health Outcomes compared to Overall Efficiency Levels	54
Figure 30: Trends in Efficiency compared to Trends in Physical Inputs and Health Outcomes, 2001 to 2006	55

List of Tables

Table 1: Public Expenditures in Russia as a Share of GDP during 2006–10, Functional Classification.....	8
Table 2: Structure of Social Spending in Russia compared to the OECD Country Average	17
Table 3: Sources of Financing and Provision of Education Services	26
Table 4: Expenditures on various Levels of Education by Tier of Government as a Percentage of Total Expenditures	27
Table 5: Examples of Regions with Improved Efficiency, 2001 to 2006.....	57

List of Boxes

Box 1: Methodological approach to analyzing efficiency	4
Box 2: Fiscal equalization transfers and fiscal equalization formulas.....	10
Box 3: Limitations in the existing system of inter-budgetary transfers and areas for potential improvements.....	14
Box 4: Recent Reforms in the Education System	28
Box 5: Education Reforms in the education system of Samara oblast by level of education	29
Box 6: Government-estimated Expenditure Efficiency	34
Box 7: The Challenges and Benefits of the MHI System.....	39
Box 8: Details of the National Pilot Project Aimed to Improve Quality of Health Care	41
Box 9: Influencing the social risk factors associated with poor health status in the Russian Federation.....	47
Box 10: Changing the incentives systems in the Chuvash Republic by linking payments for general practitioners to improved performance measured by achievement of programmatic targets	51
Box 11: Health System Reforms and Health Indicators in Chuvash Republic.....	56
Box 12: Improving Efficiency and Effectiveness in Health Care Organization and Delivery at the regional level in the Russian Federation	58

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The Russia Social Expenditure Review (SER) has been undertaken by the Human Development team in the Europe and Central Asia Region of the World Bank at the request of the Ministry of Finance of the Russian Federation. The SER Report presents a summary of the key findings that emerged from the analytical work undertaken within a framework of the Review. The SER complements the Public Expenditure Review (PER) work that currently the Bank is also carrying out and which focuses on roads and public employment.

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Executive Summary

This Report presents the key findings of the Russia Social Expenditure Review (SER) work. The key objectives of the SER are to: (i) benchmark Russia's social spending and some human development outcomes to those in OECD countries; (ii) present a topology of Russia's regions in terms of spending efficiency in health and education; (iii) identify options for achieving higher levels of efficiency in public spending on health and education; (iv) analyze the system of inter-budgetary transfers in the framework of delivery of social services, and suggest options for improvements in this system.

The findings presented in the Report are not intended as normative statements on what should be the “right” levels of spending or the right composition of spending in Russia or its regions. Instead, the findings are intended to enhance understanding of Russia's social sector spending in an international and regional perspective, and provide food for thought by highlighting some of the key issues related to expenditures, allocation of physical resources, and outcomes in the social sectors.

The analysis of social sector spending is undertaken keeping in mind that efficiency and equity considerations are closely linked to institutional changes in the policy environment. Indeed, in recent years significant institutional changes have been taking place in the delivery of social services in Russia. These changes are mostly related to the areas of: (i) fiscal decentralization and related inter-budgetary transfers; and (ii) efficiency reforms in health and education. There is an enhanced focus on institutional autonomy of service providers through introduction of the autonomous specialized institution model. Per capita financing in education has been promoted as a mechanism to build incentives for rationalization of education networks, and to improve efficiency. The ambitious National Projects embracing education, health and other areas (e.g., provision of housing) have been launched, and significant public funds are spent through those programs. Finally, performance measurement and performance indicators of regional administrations were introduced with a strong focus on measuring human development outcomes. Given the multitude and magnitude of the reforms, the discussion of social spending in Russia would be incomplete without discussing the context of these reforms.

The public spending efficiency reforms are indeed quite high on the policy agenda in Russia, but they are implemented unevenly across regions. The need to strive for efficiency is recognized not only at the national, but also at the regional level, and decentralization that happened in the 1990s provided more freedom (if not necessarily incentives) for regions to do better with available resources. However, due to differences in the commitment and capacity to implement reforms, the progress has been quite uneven across regions. Quite a few reform-oriented regions emerged (and those usually introduce changes across a broad spectrum of policy areas), while for other regions the progress has been quite limited. The regional disparities in fiscal capacity, social spending per capita and human development outcomes remain significant. This Report highlights those regional variations. It also investigates the key policy factors which are correlated with efficiency at the regional level.

The analysis undertaken under the framework of the SER leads to the following key messages:

- **Russia has a significant scope for spending its existing fiscal resources allocated to social services¹ more efficiently.²** The efficiency reforms could improve human development outcomes within the current resource envelope. The allocation of resources can be improved mostly through: (a) generating savings by advancing sector reforms (for example, in the health sector these would include optimization of the hospital network, a greater shift to primary care, co-payments for medicine, and performance-based payments), and (b) strengthening the system of inter-budgetary transfers to better reflect priorities for social services delivery and to support efficiency-enhancing reforms in the regions. The findings indicate that given current *physical inputs*³ into the education and health systems, better outcomes could be achieved. Indeed, the analysis suggests that even taking into account geographic vastness and population density, the student-teacher ratios and school sizes in Russia are relatively low by international comparison, while the number of hospital beds and doctors per capita are high relative to the human development outcomes achieved. The sector reforms and efficiency-enhancing incentives provided through inter-budgetary transfers are important elements in optimizing service networks and in further reducing physical (and fiscal) inputs in the provision of social services.
- **The regional analysis of social sector spending and of the related human development outcomes suggests that some regions have made significant efficiency advances while protecting or improving human development outcomes.** We find that efficiency improvements seen across many regions have not come at the expense of human development outcomes. Indeed, through the analysis of public spending and outcomes in both the health and education sectors, we find that more reform-oriented regions have been able to improve efficiency over time by reducing the amount of physical inputs into the health and education systems, while at the same time improving key outcomes in health and education. More reform-oriented regions are also found to be generally more efficient at a given point in time. Importantly, the analysis indicates that policy factors under control of the regions are more important in explaining efficiency than factors beyond the control of the regions, such as geography and population density. This evidence is encouraging and provides empirical support for further advancing the reform agenda. The efficiency of public resources utilization could also be improved with better targeting (or reallocation) of existing resources to priority areas. For instance, preventive care and promotion of healthy lifestyles should receive a stronger policy focus and respective public funding. This shift in public health policy has to some extent already begun in Russia.⁴

¹ Social services cover health, education, and social protection.

² Hauner (2007) also reaches the conclusion that there is substantial room for efficiency gains in Russia, particularly in health and social protection, and somewhat less so in education.

³ Physical resources generally refer to number of hospitals/schools, doctors/teachers, equipment, and so forth.

⁴ The Government of Russia has increased taxes on cigarettes and liquor since January 1, 2010. There is also a policy debate about the need for an outpatient essential drug benefit under the Mandatory Health Insurance Program, especially in light of escalating drug prices.

- **A quest for the *quality* of inputs in the provision of social services is of paramount importance in reducing the *quantity* of inputs while at the same time improving human development outcomes.** The quality considerations, and the related need for reforms of certain areas, have to be central in the pursuit of higher spending efficiency. For example, analysis of the education sector shows that quantitative inputs such as the student-teacher ratio, average school size, and number of schools are significantly correlated with the costs per student, but not with educational outcomes (test scores). At the same time, educational outcomes are found to be better in regions with a lower share of students in second shifts, a lower share of teachers of pension age, and a higher computer-student ratio—factors capturing the quality of inputs in the education system. Potential fiscal savings made from reducing the quantity of physical inputs in health and education could be used to enhance the quality of inputs. It is estimated that efficiency improvements across all the regions may free up about 25-30 billion Rubles in the *general* education sector, and up to 180-200 billion Rubles in the health sector. The money saved can be used to further improve outcomes in these sectors.
- **The current system of inter-budgetary transfers provides several options for changes that would position it better for the delivery of social services and the provision of budget efficiency incentives.** The current system of inter-budgetary transfers already plays a crucial role in helping the regional/local governments in providing and financing social services such as health and education, not least through smoothing (but not eliminating) the regional differences in social spending per capita. However, several proposed changes, have the potential to make the system of inter-budgetary transfers more efficient and effective.

1. Introduction

1. **Where does Russia stand on its social development outcomes? Does it get a good value for the public funds spent on social sectors such as health, education, and social protection?**

What are the options for improving the efficiency of social sector spending? Which instruments can be used to enhance efficiency and equity over space and time? These are the questions addressed in this report.

2. **Many human development indicators (and especially those related to health) in Russia are low in an international perspective and compared to countries with similar levels of development.**

For example, life expectancy at birth is 66 years, and a healthy life expectancy is only 58 years—much lower than it is in Organization for Economic Co-Operation and Development (OECD) countries or even in countries with similar levels of economic development (Figure 1). For instance, in most OECD countries healthy life expectancy exceeds 70 years, which is 12 years more than in Russia. Moreover, Russia is one of the few countries in the world where life expectancy has been stagnant or even falling over the two decades (since economic transition started in the early 1990s), although it has started to increase recently.⁵ Among men the probability of dying between ages 15 and 60 is 42 percent in Russia compared to 13.7 percent in France, 14.1 percent in the United States, 25.9 percent in Brazil, and 33.5 percent in the Kyrgyz Republic. Also, despite a slight decline since the mid-1990s, mortality rates for children under age 5 are also significantly higher in Russia than in the other G8 countries⁶ (World Bank 2005).

3. **Russia does better on some dimensions of human development than the other countries.**

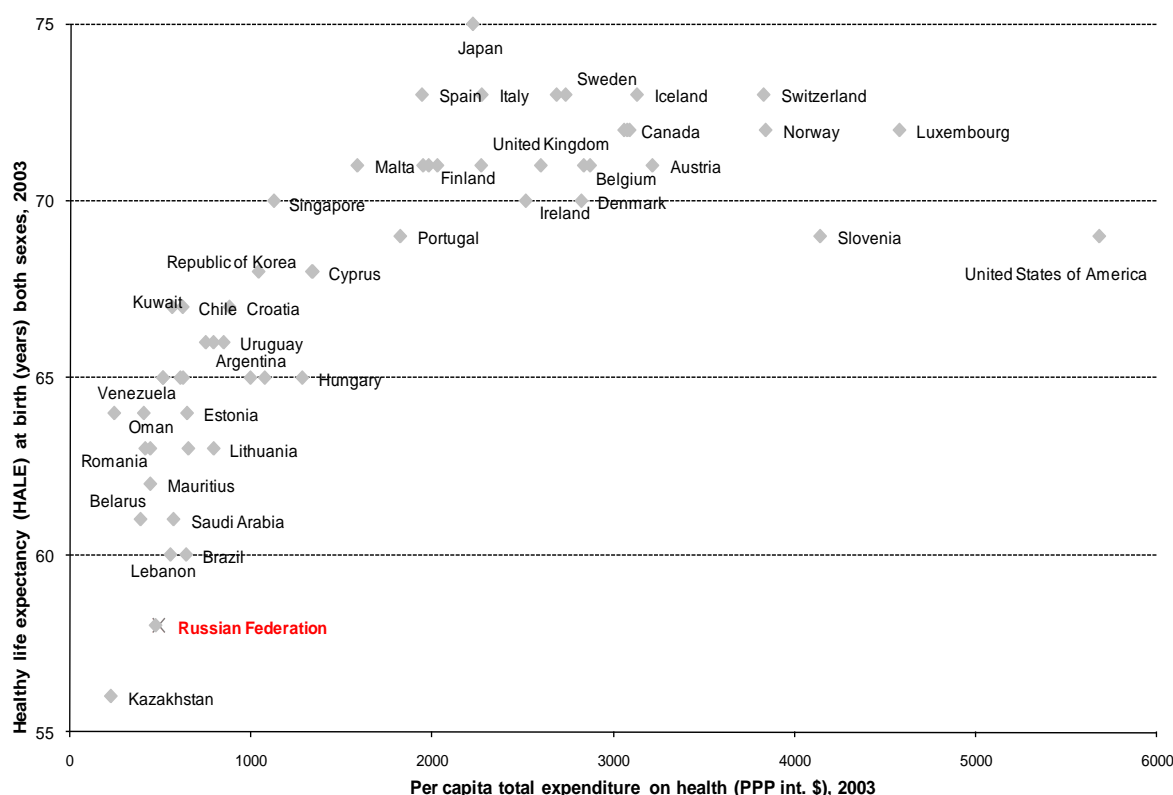
Indeed, while Russia's rates of adult mortality are poor from an international perspective, its achievements on international education tests such as the Program for International Student Assessment (PISA), Trends in International Mathematics and Science Study (TIMMS), and Progress in International Reading Literacy Study (PIRLS) are quite good. In fact, on TIMMS and PIRLS Russia does better on average than European Union (EU) countries. For instance, on the 2006 PIRLS, Russia's average score of 565 compares favorably to the average score of 528 in new EU countries and the average score of 538 in the EU-15 countries.⁷

⁵ Most countries with a falling life expectancy are Sub-Saharan Africa countries affected by the human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) epidemic.

⁶ The G8 countries are Canada, France, Germany, Italy, Japan, Russia, the United Kingdom, and the United States.

⁷ The EU-15 countries are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

Figure 1: Healthy Life Expectancy compared to Per Capita Health Spending: Russia and Selected Countries



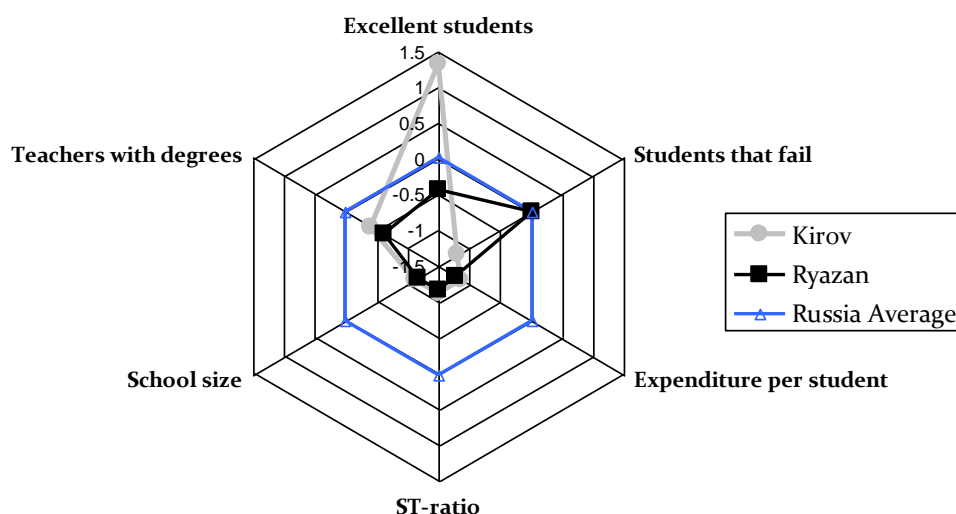
Source: WHO (2008).

4. **No matter which indicator of economic or human development is used for the analysis, one finding always holds—Russia’s average numbers mask huge regional variations.** The magnitude of those regional differences is staggering. For instance, Ingushetia Republic has a gross regional product (GRP) per capita of 17,471 rubles (US\$660)—the lowest in Russia. At the same time, the oil-rich Tyumen oblast has a GRP per capita of 782,429 rubles (US\$29,700), and Moscow city has a GRP per capita of 493,189 rubles (\$18,700). In other words, the richest regions are 30 to 40 times richer in per capita terms than the poorest regions. Mariy-El Republic’s public health spending per capita is 2,408 rubles (US\$91), while Khanty-Mansiyskiy autonomous okrug (AO) spends 22,300 rubles (US\$846) per capita. The differences in human development outcomes across regions are no less profound. For example, in the far northeast Chukotka AO, life expectancy is 58.7 years (54.1 years for men) and in Moscow city it is 72.5 years (68 years for men).

5. **There are also profound regional variations when we look at how *efficiently* various human development outcomes are produced across regions.** There are regions that spend similar amounts of public resources per student in general education, yet achieve substantially

different outcomes. For instance, Kirov and Ryazan oblasts spent 27,000 and 24,000 rubles per student in 2007, respectively; had an average student-teacher ratio of 10.4 and 10.3, respectively; an average school size of 172 and 163, respectively; and 91.2 percent and 92.5 percent of teachers with higher education, respectively. These are similar fiscal and physical inputs, while the outcomes vary substantially. In Ryazan, 4 percent of students scored more than 200 points on three subjects in the National State Exam (NSE), while in Kirov, 10.4 percent of students did. In Ryazan, 9 percent of students did not pass at least one subject on the NSE, while in Kirov, only 4 percent did not (Figure 2). Moreover, Murmansk oblast, which spent 38,000 rubles per student, or 40 percent more than Kirov oblast, achieved worse outcomes, with only 6.6 percent of students scoring more than 200 points on three subjects in the NSE. How do these differences emerge? Can they be explained?

Figure 2: Regional Example of Variation in Education Inputs and Outcomes: Kirov and Ryazan



Note: The scores/values have been standardized, meaning they have been converted into variables with a mean of 0 (Russia's average) and a standard deviation of 1.

Source: World Bank calculations based on official (RosStat) data.

6. **Given the high degree of fiscal decentralization in Russia, the equity and efficiency considerations cannot be fully understood without knowledge of the workings of the system of inter-budgetary relations.** In the decentralized fiscal environment, inter-budgetary transfers represent a core instrument for the Federal Government to influence equity and efficiency across regions. Indeed, the data indicate that the role of inter-budgetary transfers in Russia has been steadily increasing, and that transfers do help diminish regional differences in spending potential. Yet, as indicated, regional inequities are still remarkable. What is the future role of the system of inter-budgetary transfers in addressing equity and efficiency of social spending in Russia? Are there options for improving the current system of transfers?

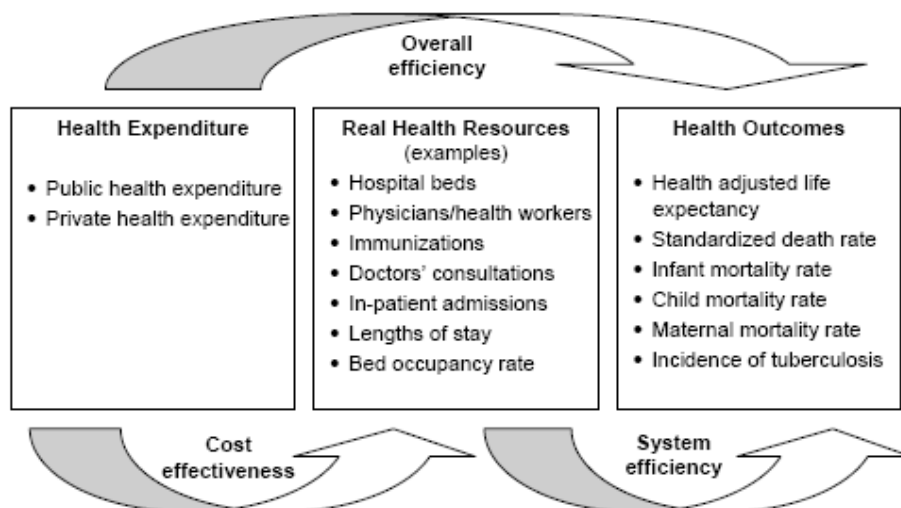
7. **In the context of inequalities in economic development, public spending levels, and efficiency, this report has the following objectives.** *First*, we look at where Russia stands in its

efficiency of spending on health, education, and social protection in the international context. *Second*, the report looks at regional variation in key health and education outcomes⁸ and analyzes the efficiency and equity of public spending on health and education. The methodological approach to analyzing efficiency is presented in the Box 1 below. Equity considerations are looked at from a geographic perspective.⁹ The analysis of health and education spending is put in the context of institutional efficiency reforms that have been taking place in both sectors. Moreover, the report tries to look at the *dynamics* in efficiency and equity over time and to link it to the observed process of reforms. *Third*, the report presents how the existing system of inter-budgetary transfers is linked to efficiency and equity of social spending at the regional level. Importantly, it also discusses the options of how the system of inter-budgetary relationships can be improved.

Box 1: Methodological approach to analyzing efficiency

To evaluate social sector efficiency we compare overall expenditures, allocated physical resources, and final outcomes. There are numerous ways of analyzing “efficiency” in social sectors. Here we use several approaches to compare Russia to other countries. Those approaches include simple figures and the framework found in Verhoeven and others (2007) to decompose efficiency into *overall and system efficiency* and cost-effectiveness. The figure below illustrates this framework with an example from the health sector. *Overall efficiency* relates the overall expenditure in the sector to the outcomes in the sector. This efficiency can then be broken down into cost-effectiveness—the volume of physical resources purchased with the expenditure, and *system efficiency*—the outcomes achieved given the allocated physical resources. In our analysis we focus on overall and system efficiency.

Figure: Framework for efficiency analysis



Source: Verhoeven, M, Gunnarsson, V. and Lugaresi, S., 2007.

⁸ Note that the report does not analyze social protection spending at the regional level due to lack of access to the data from the Russia Household Budget Survey (HBS).

⁹ The regional analysis of social expenditures can also be usefully viewed in the framework of the recent work on economic geography. The 2009 *World Development Report* “Reshaping Economic Geography” advocated the free movement of labor (population) to take advantage of the economic opportunities, but at the same time recognized a need for equity, in both availability and quality, in public service delivery across various geographic areas. This is a huge challenge for a geographically and economically diverse country like Russia.

The analysis allows for an international or regional ranking of efficiency using Data Envelopment Analysis (DEA). DEA estimates a production frontier based on observed inputs and outputs. The production frontier is an estimate of the highest production achieved given a set of allocated resources across all countries. The distance between each country/region and the production frontier is then an estimate of the relative efficiency of each country. In this setting, the estimated efficiency is based on countries that allocate a similar amount of resources but achieve different outcomes. While the DEA analysis supports some issues or findings presented here, it does not drive them. Importantly, the derived measures of efficiency are then used in the second stage of the analysis to look at the factors associated with efficiency.

While the DEA methodology provides a framework for consistent comparisons of inputs and outputs across countries/regions, there are several caveats that need to be kept in mind when interpreting DEA results. Perhaps the most important point to keep in mind is that efficiency scores and rankings across countries are dependent on the specification of inputs and outcomes that are used for the analysis. That may lead to a country being ranked as more efficient (relative to other countries) when, for example, outcome A is used, but less efficient when outcome B is used. Also, the efficiency scores (or rankings) per se do not explain the determinants (or correlates) of various levels of efficiency across countries. Some of the key pros and cons of the DEA analysis are.

Pros:

- DEA analysis provides a direct measure of *relative* efficiency based on the non-parametric approach.
- The form of the production function does not need to be specified (that is, the estimation is non-parametric).
- The analysis can handle multiple inputs and multiple outputs.
- Countries/regions can be compared in a consistent manner.

Cons:

- The lack of the production function makes DEA analysis less informative about why some countries/regions are more or less efficient.
- Estimates of efficiency are all *relative* given the sample of countries/regions used for the analysis; they are not estimates of absolute efficiency.
- Not all inputs in the production function can be accounted for.
- The results are sensitive to the selections of inputs/outputs, and to any potential outliers.

8. Greater detail on selected issues discussed in this report can be found in the four background papers prepared under the framework of the SER work.¹⁰ The background papers include:

- “Russia’s Social Expenditures and Efficiency in an International Perspective,” which compares Russia internationally by benchmarking levels of expenditure; allocated physical resources; and final outcomes in health, education, and social protection;
- “Overview of the Social Sector Financing Mechanisms in the Russian Federation,” which takes stock of and explains the system of inter-budgetary transfers (including National Projects) in Russia;
- “Efficiency of Health Delivery across Russia’s Regions,” which compares public health spending inputs and outcomes across regions and provides the topology of regions in terms of spending efficiency, and analyzes the key correlates of efficiency at the regional level; and
- “Review of Expenditures on General Education across Russia’s Regions,” which analyzes public spending on general education, physical inputs into the education system,

¹⁰ These authored working papers can be obtained upon request from: oivaschenko@worldbank.org.

and outcomes (test scores) across regions, and provides the topology of regions in terms of spending efficiency, and analyzes the key correlates of efficiency at the regional level.

9. **The important product of the SER process is also the very information-rich and user-friendly regional database on public expenditures and human development outcomes.** The database covers Russia's regions over time in terms of social sector spending, physical inputs, regional development or "control" variables, and human development outcomes. A regional analysis of social protection was not undertaken, because for a meaningful analysis of social protection programs (targeting, coverage, and benefit adequacy), full access to the Household Budget Survey (HBS) data would be required, which the Bank team did not have. However, we discuss the SP spending at the national level (and in international perspective) to provide the context for the overall social sector spending.

10. **The remainder of this Report is structured as follows.** Section 2 presents the fiscal and policy context for social sector spending in Russia, including the discussion of the inter-budgetary transfers and their link to social sector spending; Section 3 discusses the main findings that emerged from the international benchmarking of Russia's social spending, utilized resources, and outcomes; Section 4 presents regional comparisons and policy issues that emerged from the analysis of the public spending on education and health; Section 5 presents a regional analysis of health spending and outcomes; Section 6 concludes.

2. Fiscal and policy context for understanding social sector spending

11. **Since the early 1990s, Russia has been carrying out a series of comprehensive reforms toward decentralization.**¹¹ The overhaul of the system of intergovernmental fiscal relations happened against the backdrop of fundamental reforms of political and economic structures. Around the same time, many regions embarked on institutional reforms in health, education, and social protection. However, many of those reforms remain incomplete, largely as a result of the 1998/99 financial crisis that led to insolvency of a large number of regions, and the period of inactivity that followed for some time afterward. It seems to be generally acknowledged that the fiscal decentralization process in Russia has been, at least in its early stages, “rapid, haphazard, and often non-transparent” (Dabla-Norris, Martinez-Vasquez, and Norregaard 2000).

12. **Indeed, in the early stages, decentralization efforts suffered from several limitations.** These include: (a) bilateral arrangements between the center and regions rather than consistently applied rules and principles; (b) an absence of the formal assignment of expenditure responsibilities and unfunded expenditure mandates; (c) substantial political manipulation and pressure with respect to the system of equalization transfers; (d) a soft budget constraint and perverse incentives for revenue mobilization related to fiscal balancing transfers to the regions, and (e) very few constraints for sub-national borrowing.

13. **However, it appears that the past deficiencies in the system of intergovernmental transfers have been gradually ironed out.** The system of inter-budgetary relationships improved, in particular as a result of the 2005 Budget Law, which led to a more clear assignment of fiscal spending and service provision responsibilities across levels of government.

14. **How important is social sector spending in the total budget envelope in Russia? The country currently spends about 50 percent of its total fiscal envelope on social services (health, education, and social protection).** Total government spending during 2007–08 was around 34 percent of GDP, while spending on social services accounted for about 17 percent of the GDP, or half of total spending. The health and education sectors accounted for roughly 4 percent of GDP each, while social protection accounted for about 9 percent of GDP (Table 1). The recent increase in pensions has further pushed the size of the social protection envelope to about 12 percent of GDP. Combined with support of the anti-crisis policy measures, this increase in pensions pushed the whole budget spending envelope to about 40 percent during 2009–10 (Table 1).

¹¹ A detailed account of the history of intergovernmental relations in Russia can be found in De Silva and others (2009, Chapter 3).

Table 1: Public Expenditures in Russia as a Share of GDP during 2006–10, Functional Classification

	Consolidated budget					..o/w federal budget				
	2006	2007	2008	2009*	2010*	2006	2007	2008	2009*	2010*
Total	31.15%	34.49%	33.91%	41.29%	39.24%	15.94%	18.15%	18.34%	25.47%	22.89%
General Public Services	3.08%	3.55%	3.12%	3.67%	3.81%	1.98%	2.47%	2.02%	2.46%	2.75%
Defense and public order	5.20%	5.15%	5.18%	6.35%	5.97%	4.58%	4.54%	4.55%	5.69%	5.97%
Economic Affairs	3.53%	4.72%	5.46%	7.38%	5.29%	1.28%	2.10%	2.48%	4.73%	3.12%
Housing & community amenities	2.35%	3.34%	2.79%	2.53%	2.07%	0.20%	0.89%	0.31%	0.37%	0.32%
Education	3.85%	4.07%	4.04%	4.34%	3.85%	0.79%	0.89%	0.86%	1.06%	0.92%
Health	3.58%	4.19%	3.75%	3.93%	3.50%	0.55%	0.60%	0.67%	0.89%	0.77%
Social Protection	8.77%	8.64%	8.75%	10.05%	12.23%	0.75%	0.65%	0.71%	0.85%	0.76%
Other	0.79%	0.83%	0.83%	3.06%	2.52%	0.23%	0.24%	0.24%	0.33%	-0.33%
Fiscal transfers						5.57%	5.76%	6.48%	9.09%	8.61%

Note: Numbers for 2010 are the budget forecast (based on the approved budget).

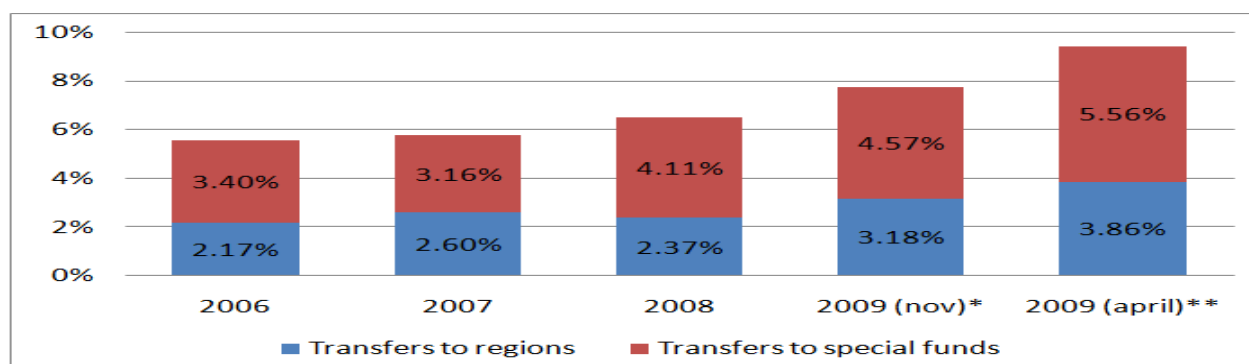
Source: Ministry of Finance, World Bank staff estimates.

15. How did the financial crisis affect social spending in Russia? Although Russia has maintained a prudent fiscal policy stance in recent years, a significant fiscal loosening took place in 2009 due to anti-crisis expenditures and prior commitments to increase social expenditures. Yet, despite the crisis, the volumes of spending on health and education have been largely maintained at pre-crisis levels, and social protection spending increased. Federal budget amendments for 2009 include provisions for additional crisis-related expenditures of slightly less than 2 percent of GDP.¹² Furthermore, the changes in the pension system legislation alone have resulted in additional expenditures of around 1.5 to 1.7 percent of GDP per year between 2010 and 2012. The total amount of additional (without taking into account the indexation of existing benefits) social expenditures (for example, new active labor market programs, the housing allowance) is estimated to be around 3.3 percent of GDP per year between 2010 and 2012. These increased fiscal pressures would mean that there will be an even greater need to find ways to spend the existing resources on health and education in a more efficient fashion.

16. Fiscal transfers play an important role in the delivery of social services, and their role has increased considerably in recent years. Approximately one-third of federal budget expenditures are allocated to transfers. In general, the transfers from the federal budget can be classified into two broad groups: transfers to regions (with the aim of equalizing regional differences) and transfers to special funds, including compensation for the shortfall in the Pension Fund (Figure 3).

¹² The government anti-crisis measures included provisions that increased transfers to regions to cope with the social and labor market impacts of the crisis at the regional level.

Figure 3: Fiscal Transfers from the Federal Budget, as a Share of GDP, 2006–09



*According to the Law on the Budget for 2009 adopted in November 2008.

**According to the revised Law on the Budget for 2009 adopted in April 2009.

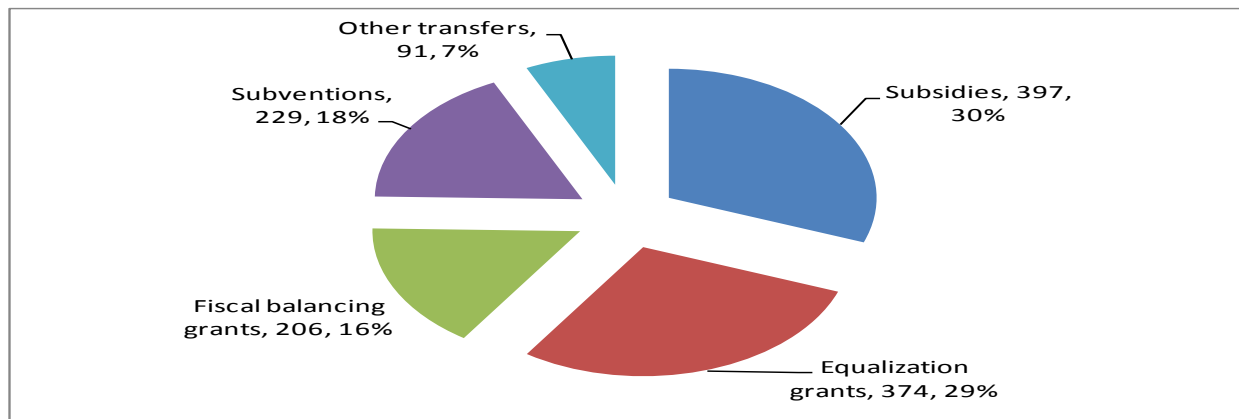
Source: Ministry of Finance, Economic Expert Group, and World Bank staff estimates.

17. The system of inter-budgetary transfers is complex. All transfers (from federal to regional governments) can be divided into unconditional, or “block” transfers called *grants*, and conditional (that is, the funds can be used only for specific programs agreed in advance) transfers, that are further differentiated into *subventions* and *subsidies* (Figure 4).¹³ The difference between the two is that subventions assume co-financing from regional budgets, while subsidies do not. Subventions are used to finance the functions delegated by the Federal Government to the regional governments. Subsidies are used to finance the regional authorities’ own functions or functions related to the implementation of the National Projects. Regional governments also provide subventions to municipal governments to finance the respective delegated functions.

18. Equalization grants and subsidies dominate the structure of inter-budgetary funds. Combined, they account for 60 percent (about 30 percent each) of total inter-budgetary transfers. Subventions and fiscal balancing grants account for 18 percent and 16 percent of the total, respectively (Figure 4). Other transfers account for the remaining 7 percent of the total. It is important to keep in mind that equalization grants are *not* earmarked for specific social sectors, such as health and education. From the year 2005 on-wards federal equalization formulae does not take into account regional consolidated budget expenditure needs for education and health in the explicit form. However, implicitly some of those needs are taken into account. The Box 2 below presents more details on how the equalization formulas work.

¹³ A detailed description is available in Center for Fiscal Policy (2009).

Figure 4: The Volume and Structure of Inter-budgetary Transfers, 2009



Note: The first number indicates the volume of the transfer in billion rubles.

Box 2: Fiscal equalization transfers and fiscal equalization formulas

Federal equalization transfers to the regions of the Russian Federation depend on tax capacity and expenditure needs of a particular region and some benchmarks, which are based on a combination of these two key factors and are used for assessing of equalization effects as well as for calculation of transfers.

The modern federal equalization formulae, which is based on an objective and reliable official database was first developed and applied to the 2001-2004 budgets, and then several crucial transformations were adopted for 2005 budget and applied to subsequent budgets with some minor corrections.

The Federal equalization formulae for 2001-2004 – through assessment of the index of expenditure needs (calculated on per capita basis) - took expenditure needs of the regions in education and health in an explicit form. So called normative expenditures on education for the Russian regions were developed by the Ministry of Education and were subdivided into normative expenditures on pre-school education, primary and secondary education, vocational education, and for boarding schools. For the health sector normative expenditures without any sub-division were prepared by the Ministry of Health.

In addition to such normative expenditures, expenditures for both education and health were adjusted for the share of population living in the localities with less than 500 inhabitants (factor of dispersion of the population which leads to higher costs of provision of services). Health expenditures were adjusted for the age structure of the population (share of persons less than 18 years old (later 17 years old) and the share of pensioners in total population of the region).

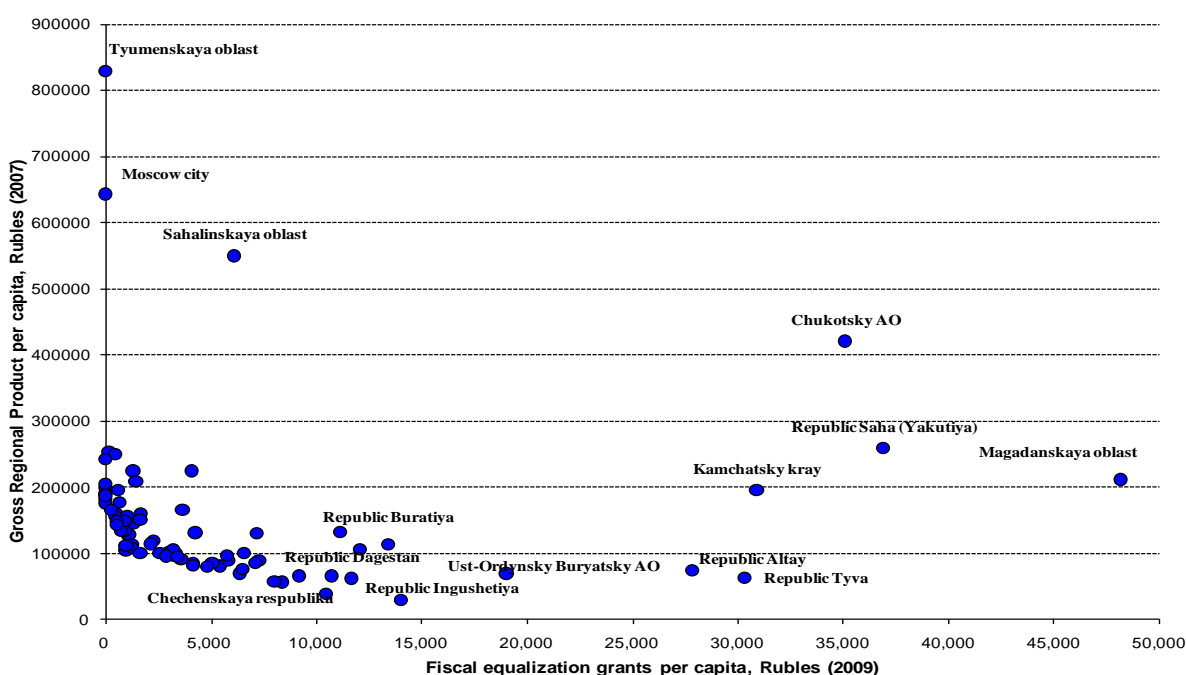
Almost all normative expenditures (excluding housing and utilities, where a special formulae was applied) were also adjusted for differences in wages and food prices, prices for fuel & energy and communal services, and for transportation density and seasonality factors in transportation (so called delivery of goods to Northern territories).

From the year 2005 on-wards, federal equalization formulae has not taken into account regional consolidated budget expenditure needs for education and health in explicit form. Implicitly, they are still taken into consideration as they constitute significant amount of budget expenditures and as regional expenditure needs are adjusted through the system of coefficients for wage differences (as average wages in the budget sector in the regions depend mostly on wages in health and education), utility prices, the share of population living in the localities with less than 500 inhabitants, share of people living in mountainous areas and Northern territories, access to transportation, transportation density, seasonality factors in transportation, prices for goods and services, share of persons less than 17 years old and of pensioners in total population of the region. These factors could be incorporated into different adjustment coefficients twice or even three times, so that population living in such disadvantageous areas could get higher equalization transfers.

In general, both equalization formulas do capture regional differences in expenditure needs for education and health as they are mostly based on objective criteria and statistical data.

19. **Equalization grants help reduce the gap in fiscal capacity across regions.** In 2009, the fiscal capacity gap between the richest and the poorest regions before equalization was 48 times, while after equalization narrowed to 7 times. In 2009, the guaranteed minimal fiscal capacity after equalization was 58 percent of the average for Russia.¹⁴ All regions with fiscal capacity below the national average are recipients of grants. Equalization grants are generally pro-poor, which means that poorer regions generally get a higher per capita volume of grants (Figure 5). Equalization grants in the poorest regions serve as the key source of ensuring basic social guarantees. In 11 regions equalization grants exceed 50 percent of their budgets. Among such regions are all republics of the North Caucasus and some regions in Siberia and the Far East.

Figure 5: Per Capita Fiscal Equalization Grants across Regions, 2009 (rubles)



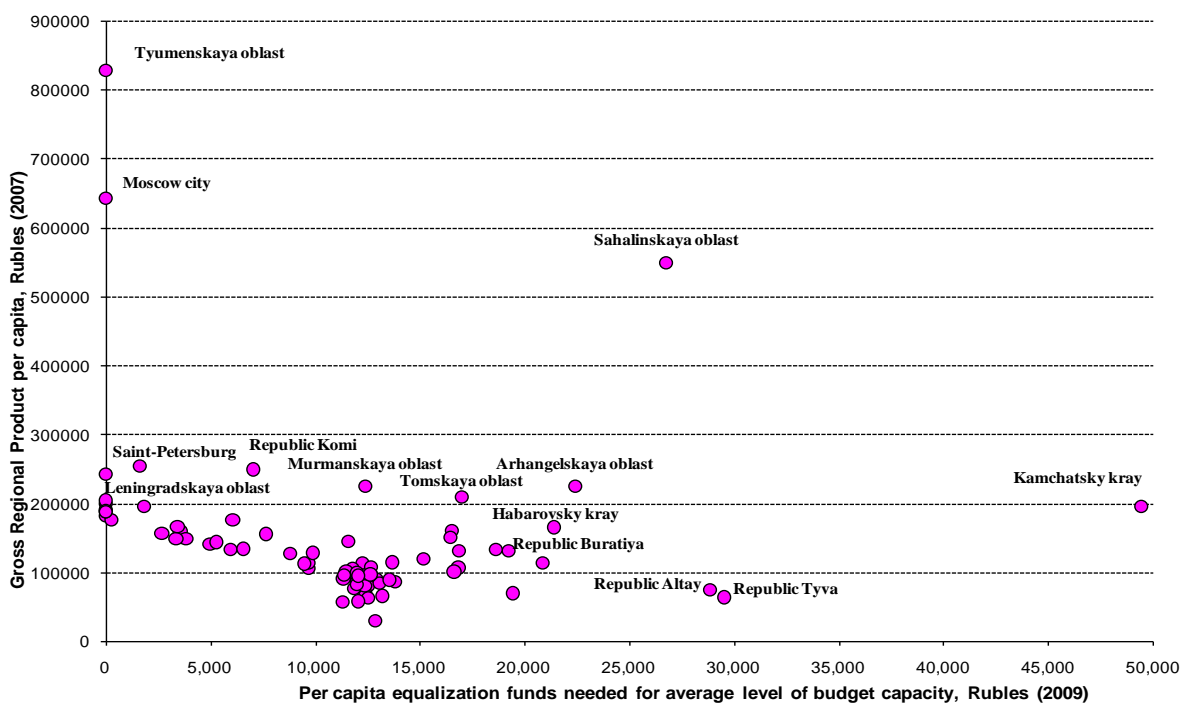
Source: World Bank based on Ministry of Finance data.

20. **There are still significant differences in fiscal capacity across regions after equalization transfers.** The “equalization gap” per capita across regions is presented in Figure 6. The data also indicate that regions with larger equalization gaps per capita end up spending less on health and education relative to the size of the equalization gap. In many regions, the size of the equalization gap per capita exceeds total health and education spending per capita (Figure 7). However, trying to make all regions equal in their fiscal capacity would create disincentives for regions to improve their revenues and to be fiscally prudent. Of importance, however, is that in Russia the transfers are equitable, that is, fiscal entitlements vary inversely with regional fiscal capacity and directly with fiscal needs. The allocations are also formula based, which makes transfers more stable, predictable, and objective. While regions continue to resort to different ways of equalizing per capita budget revenues across *municipalities*, they have to follow the

¹⁴ This is calculated excluding the 10 Russian regions with the highest fiscal capacity and the 10 Russian regions with the lowest fiscal capacity.

general principles of equalization stipulated in the Budget Law. The Federal Government does not influence the volume of transfers between regions and municipalities (De Silva and others 2009).¹⁵

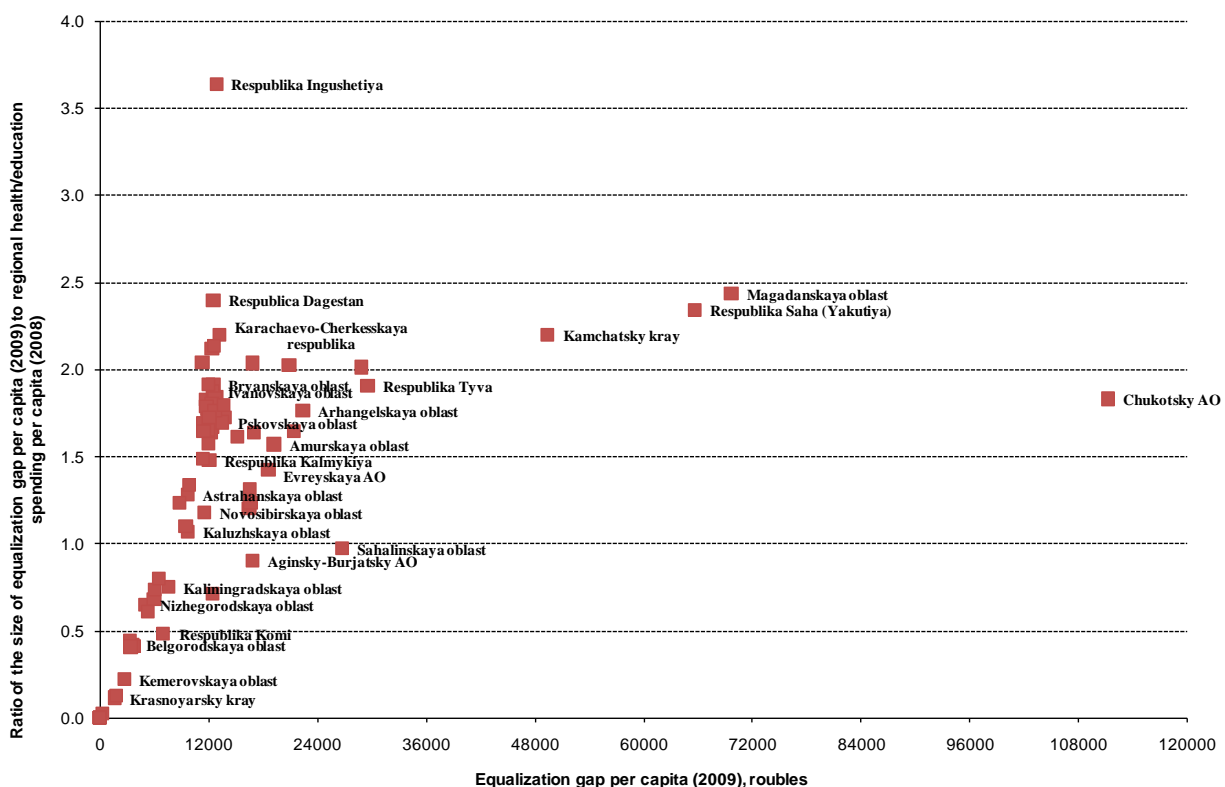
Figure 6: The “equalization gap” Per Capita across Regions, Rubles, 2009



Source: World Bank based on Ministry of Finance data.

¹⁵ Disparities across localities are sometimes no less striking than those across regions. Typically, an extremely rich municipality is one that has a large enterprise generating big profits.

Figure 7: Regional Spending on Health and Education Relative to the Size of the Equalization Gap



Source: World Bank, Ministry of Finance data.

21. Fiscal balancing grants are effectively transfers aimed at covering the budget deficits of regional governments. As such, they work against incentives for regions to spend money more prudently and to enhance the efficiency of budget spending, and are subject to regions lobbying for better “treatment” from the center. At the same time, this financing mechanism may be much needed and can work quite well in times of economic crisis, when the regions’ fiscal capacity is affected and is difficult to predict.

22. The existing system of inter-budgetary transfers has several limitations. These limitations are present across all types of transfers, and are highlighted in the Box 3 below.

Box 3: Limitations in the existing system of inter-budgetary transfers and areas for potential improvements

- **The system of subsidies and subventions is highly fragmented and results in high administrative costs.** There are currently about 87 subsidies/subventions that are managed by 22 key spending units (such as ministries and special government agencies), which makes the system costly to administer. The multiplicity of the spending units (and induced competition) and of the programs to be financed also complicates the formulation of the key spending priorities at the federal level. Further, the lack of consolidation makes the budget allocation non-transparent and hence open for different actors to attempt to game the system.
- **The window of opportunity for the regions to use the received subsidies is very short.** This is due to two key reasons. First, there are delays in transferring subsidies to the regions. The agreements between key spending units and regional governments are often not concluded before midyear, while there are also requirements for prefunding, and the allocated resources need to be used by the end of each year. Second, all balances unused by the end of the year have to be returned, which results in a “use it or lose it” situation.
- **The existing system of *subsidies* contributes to regional inequalities.** Subsidies by definition assume the co-financing of selected programs from the regions. That means two things. First, the rich regions receive more resources. Second, the imposition of co-financing obligations on regions takes the freedom away from regions to choose spending priorities.

The existing system of inter-budgetary transfers could benefit from the following: (i) Conducting a critical review of the existing list of subsidies/subventions and eliminating those that do not match national priorities; (ii) Reducing the number of Federal agencies that implement subsidies; (iii) Allowing regions to keep and accumulate balances of subsidies not used in a given fiscal year in some sort of a “savings” account, with accumulated funds being available for use at any time; (iv) Introducing a system of incentive-based federal grants that rewards regions with good implementation performance; (v) Introducing a description of transfer mechanisms for same-level governments into the Budget Code.¹⁶

23. In analyzing social sector spending, it is also important to keep in mind that there are still significant inefficiencies inherited from the Soviet legacy of provision of social services. This legacy is evident first of all in the health and education systems being very intensive in physical inputs (for example, number of hospitals, doctors, and teachers) that are used to achieve outcomes. For instance, Russia has on average 97 hospital beds and 43 physicians per 10,000 people compared to 54 hospital beds and 35 physicians per 10,000 people in EU-15 countries, and 34 hospital beds and 19 physicians per 10,000 people in countries with a similar GDP level. The average student-teacher ratio is 9.9 and class size is 16.9 in Russia compared to 13.2 and 23.1, respectively, in OECD countries. Empirical evidence indicates that even controlling for population density and other factors, there is still a huge space for rationalizing physical resources. The decline in population has further enhanced the need for consolidation in both the health and education sectors, and the policymakers in Russia seem to recognize that.¹⁷

¹⁶ The suggested areas for improvement emanate from a detailed analysis of inter-budgetary transfers undertaken within the framework of the Russia SER. This analysis is presented in the background paper.

¹⁷ There are also many other key challenges in the health and education sectors related to efficiency improvements. In the health sector, those are the complicated multilayer system of financing and a lack of clear incentives to regions for efficient delivery of health services.

24. Some efficiency-enhancing reforms are underway across many regions, but they are implemented unevenly across regions. In the education sector most of the regions adopted various models of per student financing. In the health sector, many regions have been undertaking efforts to rationalize the networks of hospital care and to increase the role of primary care. There is also work in progress now at the Federal Government level in designing the system of health insurance and altering the functioning of the health insurance funds. However, the reform agenda in the health sector is incomplete across many dimensions, including: (a) rationalization of the hospital network, (b) a shift to primary care, and (c) health insurance and co-payments. In the area of social protection, improved targeting of social assistance remains an important area for further reforms. Further, there is a huge heterogeneity across regions in the pace and scope of reforms.

25. Measures have been introduced to gauge the performance of the regional governments based on a set of agreed indicators. The evidence-based performance evaluation is a generally positive development. There is, however, a danger that certain indicators could be used as the *immediate* and *absolute* measures of regional/local government performance. For example, the results of the Unified State Examination (USE) are very useful in understanding the variation in quality of general education across regions and in measuring progress over time. However, the *levels* of this indicator should not be used as a direct measure of local government performance, not least because regions have very different starting positions. Instead, it is important to monitor the *progress* of indicators over time.

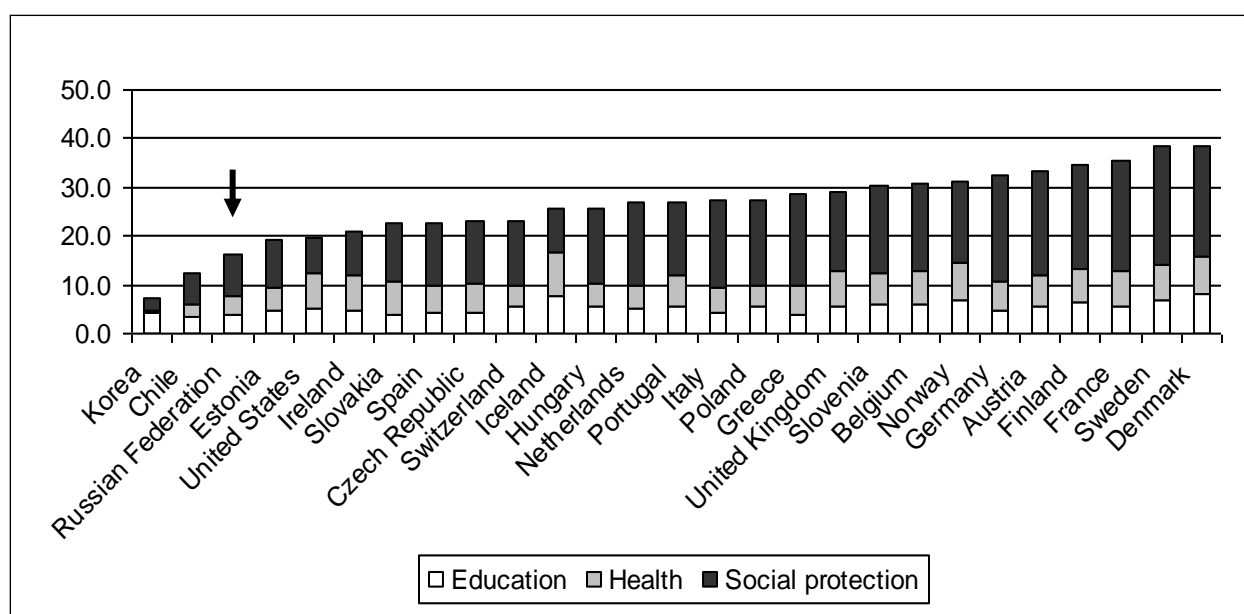
26. Before discussing the regional picture of public sector spending and its efficiency, the next section puts Russia's social sector spending in an international perspective.

3. International comparisons

3.1 Overall social spending

27. **The social sectors—health, education, and social protection—in Russia receive less funding as a share of GDP than in OECD countries.** Russia spends about 17.6 percent of its GDP on the social sectors, while the United States spends 20 percent; Japan spends 22 percent; and the Scandinavian countries, with their strong emphasis on social welfare, spend over 30 percent (Figure 8). Most OECD countries and OECD partner countries, such as Brazil, allocate more than 60 percent of their total government spending to the social sectors compared to Russia, which allocates 50 percent.

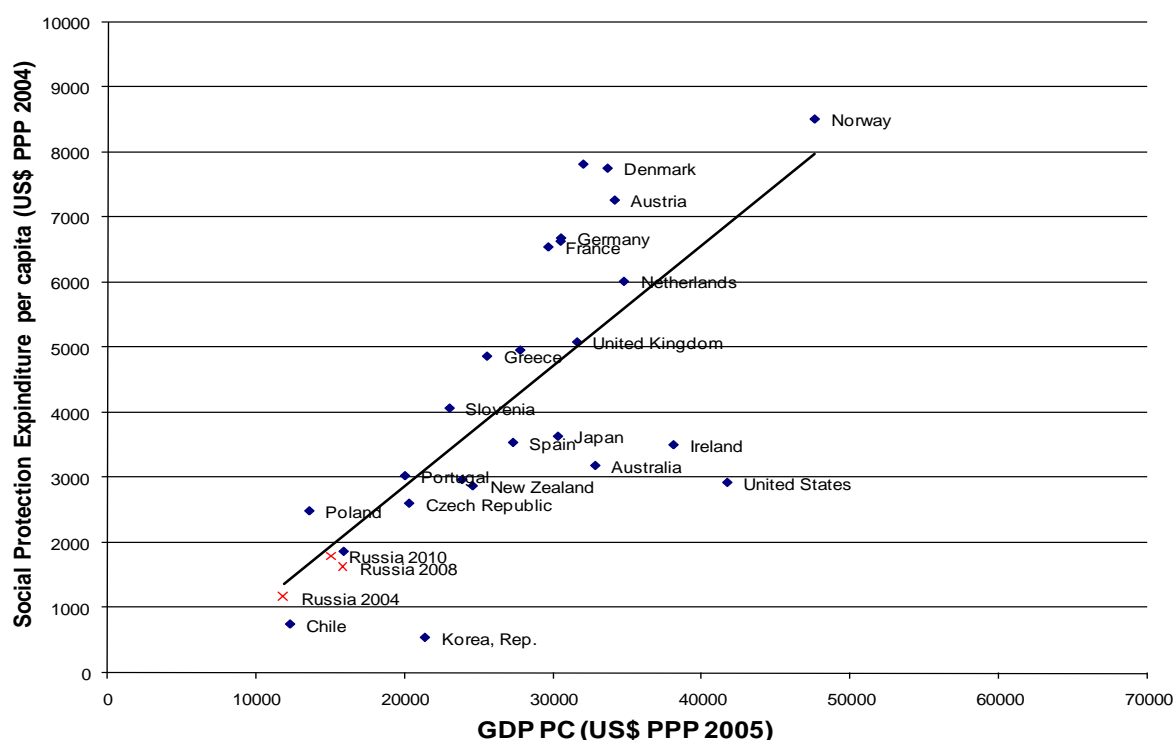
Figure 8: Public Social Expenditures as Share of GDP across Countries



Source: IMF, OECD (2005).

28. **In an international perspective, Russia's total social sector spending per capita in US dollar purchasing power parity terms as of 2010 was in line with its level of development.** A substantial real increase in social spending happened during 2004–08. Yet, in 2008 Russia's social spending per capita in US dollar purchasing power parity was somewhat lower than what would have been expected given its GDP. However, the recent (2009/10) increase in pensions has put Russia pretty much where it would be expected to be in terms of total social spending per capita for its level of development (Figure 9).

Figure 9: Public Social Expenditure Per Capita (in US\$ purchasing power parity) in Russia compared to OECD Countries



Note: Social expenditure covers health, education, and social protection spending.

Source: OECD and the World Bank calculations.

29. Russia's social spending is similar to OECD country social spending in terms of its structure. As a share of the total social spending envelope, social expenditures across sectors are 22 percent, 24 percent, and 54 percent for education, health, and social protection, respectively. This is very similar to the structure observed on average in OECD countries (Table 2).

Table 2: Structure of Social Spending in Russia compared to the OECD Country Average

Share of Total Expenditures on:	Russia (%)	Average for OECD Countries (%)
Education	22	24
Health	24	21
Social protection	54	55

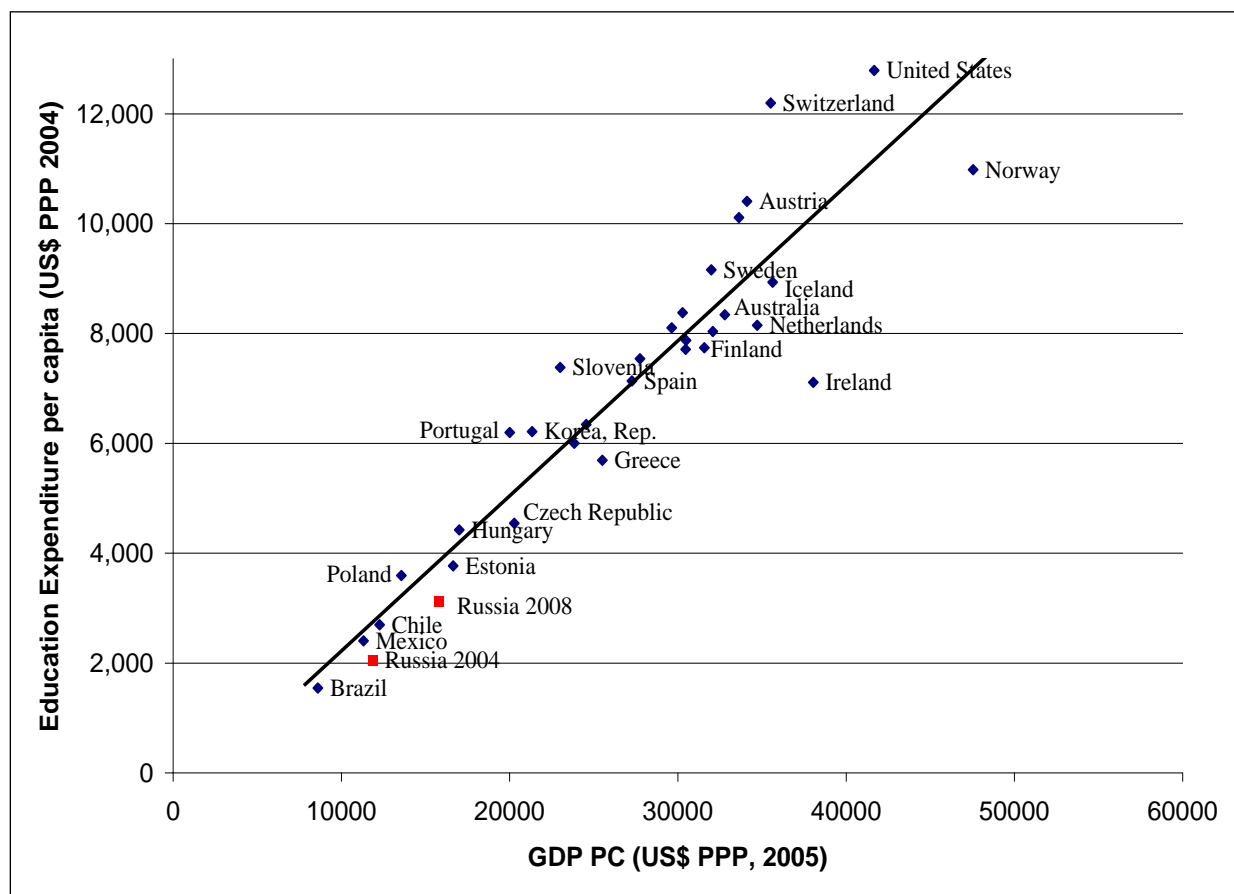
Source: World Bank estimates.

3.2 Education expenditure

30. With a public expenditure of about 4 percent of GDP in education, Russia invests less in education than the OECD average of 5.4 percent. Russia also allocates a somewhat smaller share of the overall government budget to education compared to the OECD country average (11.9 percent compared to 13.2 percent, respectively). OECD partner countries such as Brazil, Chile, and Estonia allocate even more to education than the OECD average. Despite a substantial

increase in real spending during 2005–08, the country spends less on education per student (in US dollar purchasing power parity) than would have been expected given its GDP per capita (Figure 10).

Figure 10: Public Educational Expenditure and GDP Per Capita

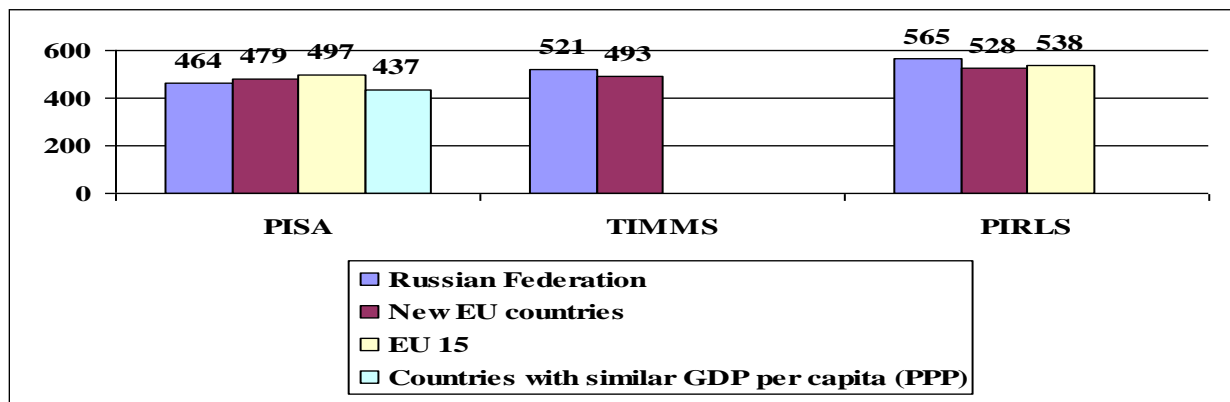


Source: World Bank; OECD.

31. Compared internationally, the structure of education spending in Russia is geared more toward tertiary education. Non-tertiary education receives relatively low public funding compared to tertiary education—only 5.9 percent of the government budget (or under 50 percent of the total public education expenditure) in Russia is allocated to non-tertiary education compared to 9 percent in OECD countries (or about 70 percent of the total education expenditure).

32. Despite relatively low spending, Russia achieves quite good outcomes in general education compared to OECD countries. In other words, it is quite efficient in turning expenditure into outcomes (that is, high *overall* efficiency). Russia's on average good education outcomes in general education are evident from its scores on international tests such as the PISA, TIMMS, and PIRLS (Figure 11).

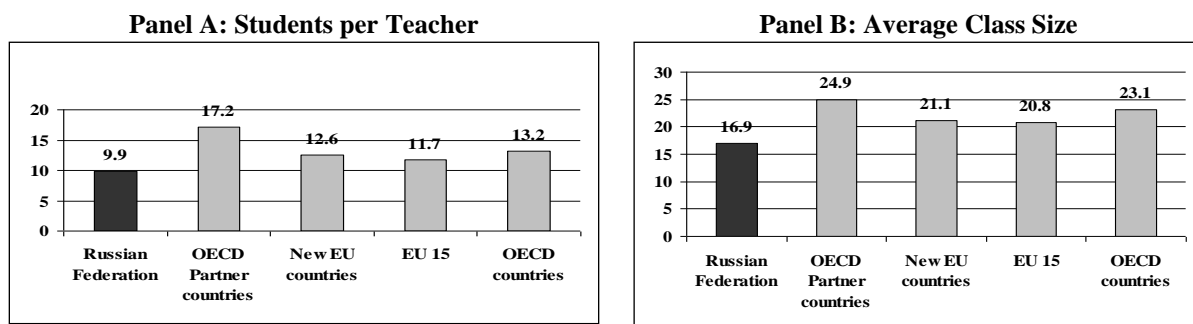
Figure 11: Russia's Educational Test Scores in an International Perspective



Note: PISA is the average for math, science, and reading from 2006. TIMMS is the average for math and science for eighth graders in 2007. PIRLS is reading for 2006.

33. **However, in terms of the quantity of human resources, Russia's education system is still quite resource-consuming in an international perspective.** This is evident in the relatively low student-teacher ratio and small class size. The average student-teacher ratio in Russia is 9.9 for primary and secondary education compared to 12.6 and 11.7 in old and new EU countries. In Russia, the average class size at the primary/secondary levels of education is 16.9 compared to about 21 in the EU states (Figure 12). The analysis indicates that after controlling for population density, the expected student-teacher ratio in Russia would be expected to be around 12.5. This ratio combined with 2 teachers per class would result in an average class size of 25. However, regional differences in urban/rural population, population density, and so forth, would be expected to lead to substantial deviations from these "optimal" numbers.

Figure 12: Student-teacher Ratio and Average Class Size - Russia compared to other Developed Countries



Source: OECD (2008).

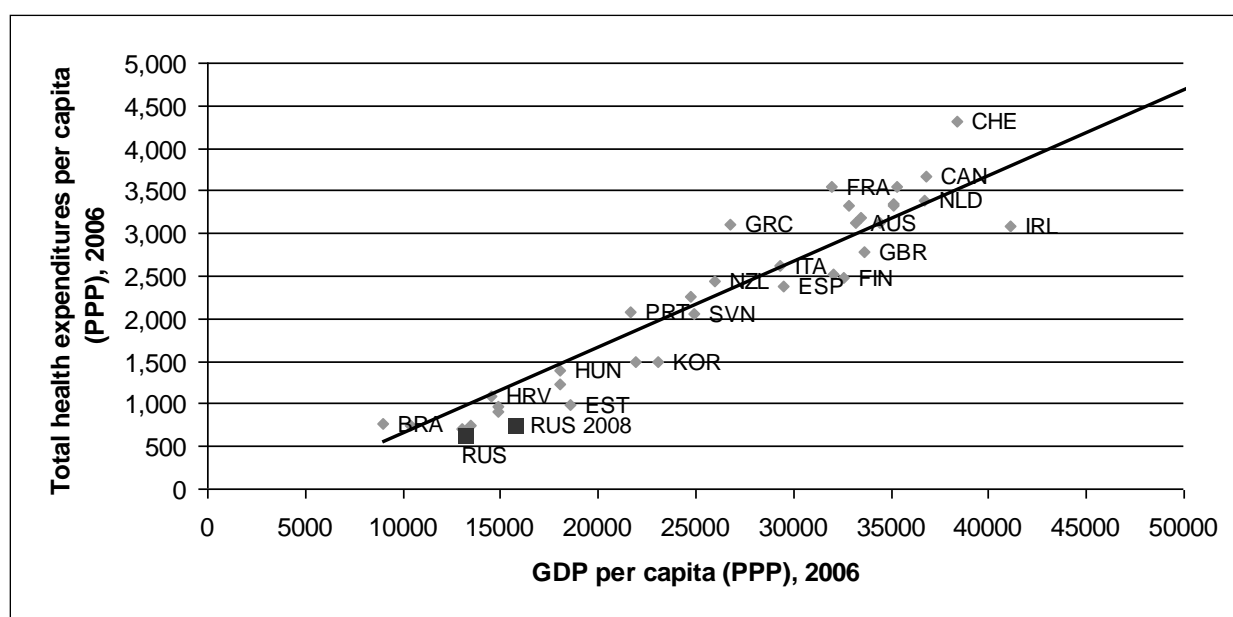
34. **It appears that Russia has an abundance of physical inputs relative to the education outcomes it achieves.** While international comparisons regarding the relation of inputs to outcomes have to be handled with much care, the analysis indicates that the efficiency of transforming physical inputs into outcomes (that is, system efficiency) in Russia has a significant scope for improvement, through further rationalization of the system of physical inputs. This is especially so given that the number of school-age children keeps declining.

35. **Education policies in Russia recognize that there is scope for optimizing the quantity of inputs in the education system.** Federal Government guidelines stipulate the increase in the student-teacher ratio and average class size, with the respective targets set at 15 for the student-teacher ratio and 30 for class size. The implementation of per student financing in many regions also works to reduce existing human resources in education. Yet, optimization in quantity should come with measures to improve the quality of teaching through the reforms of teacher qualifications and curriculum.

3.3 Health expenditure

36. **In Russia, public expenditures on health as a share of GDP are lower than in OECD countries.** Public sector expenditures on health in Russia are around 3.7 percent of GDP, which is significantly less than in industrialized countries (OECD and OECD partner countries spend an average of 7.7 percent). Russia spends around 11 percent of total government outlays on health. This is comparable to the share spent by countries with a similar level of development. However, it is less than the average 12 to 15 percent of total government expenditure in EU countries. Russia's health spending per capita (in US dollar purchasing power parity) is also lower than would be expected for a country with a similar GDP level, even after the 2005–08 increase in real expenditures (Figure 13).

Figure 13: Total Health Spending Per Capita (US dollar purchasing power parity): Russia compared to OECD Countries

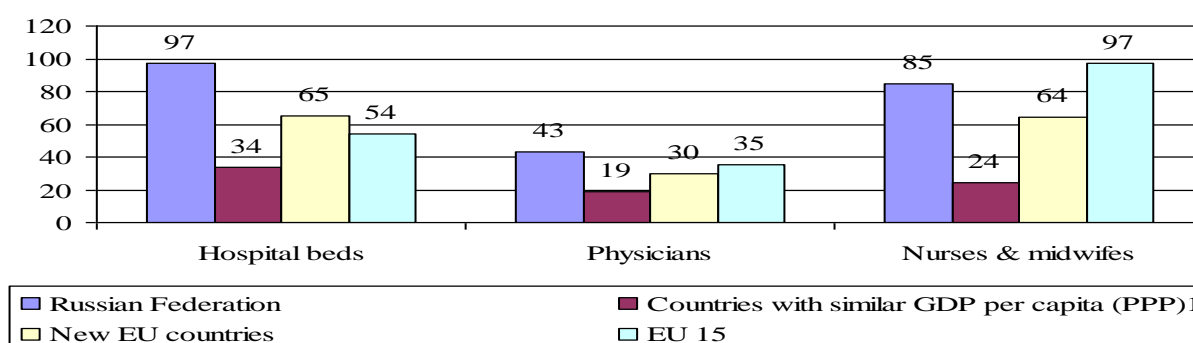


Source: WHO (2009); World Bank (2009).

37. **In an international perspective, Russia spends a relatively higher share of financial resources on inpatient treatments compared to primary care and outpatient treatments.** While in most EU and G8 countries the share of public health funds spent on inpatient care is between 30 and 40 percent, in Russia inpatient care consumes almost 60 percent of total public expenditures.

38. **Largely as a reflection of the orientation of Russia's health system toward inpatient care, it uses far more physical resources per patient than other countries.** The numbers of hospital beds and medical staff per patient in Russia far exceed the levels observed in EU countries (Figure 14). This provides substantial scope for improving the allocation and use of available resources by restructuring the organization of health facilities networks. As a reflection of this, around 6 percent of Russian physicians work as general practitioners compared to 30 percent among EU 15 countries (WHO). Further, the share of auxiliary personal in health facilities is around 40 percent, which is higher than international standards. Overall, the Russian health sector has a high number of employees per capita.

Figure 14: Physical Inputs in the Health System (per 10,000 people): Russia compared to the European Union, 2006



Source: WHO (2006).

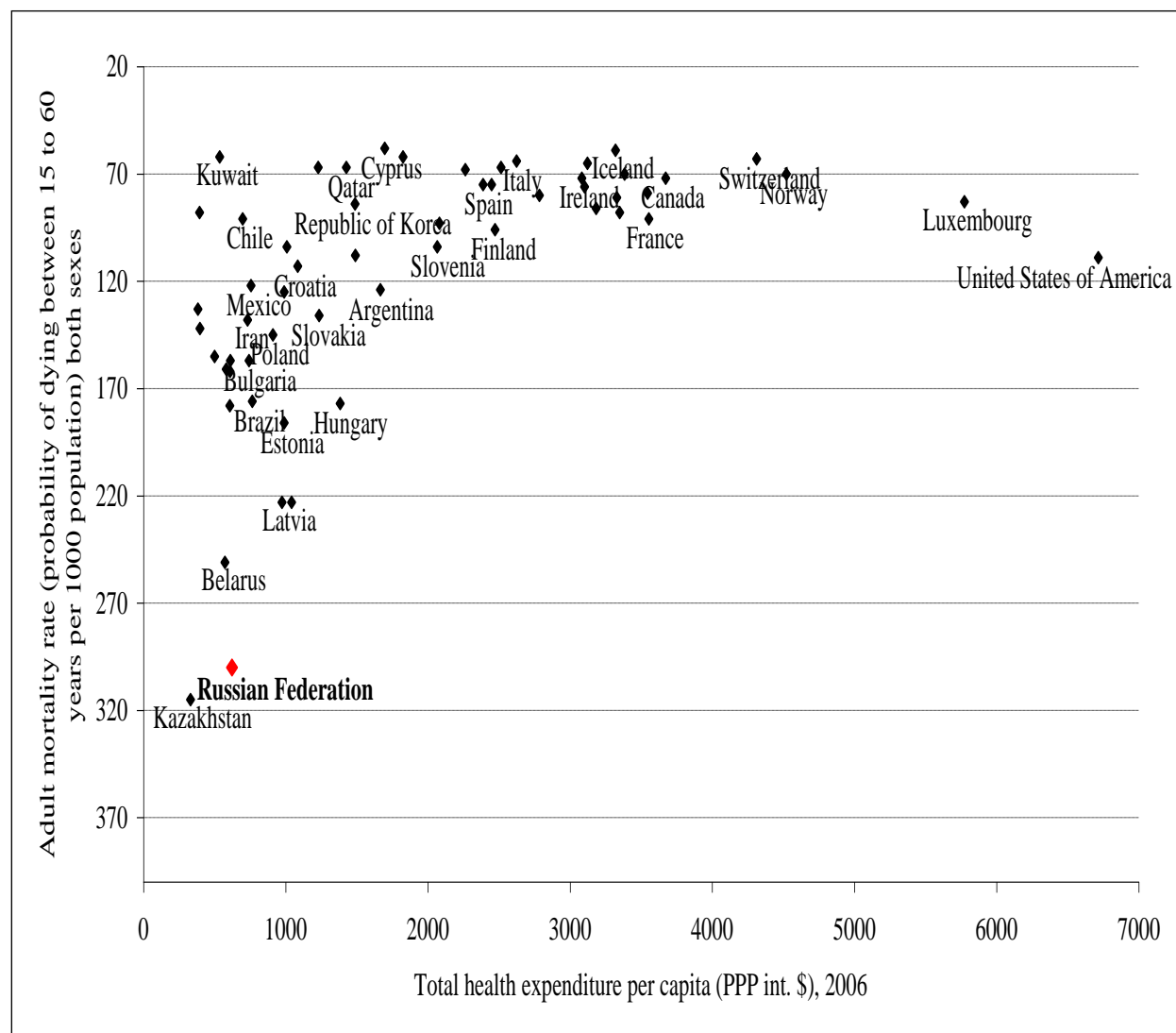
39. **Infant and maternal mortality rates in Russia fare well relative to other countries with a similar level of development and per capita spending on health.** However, the indicators in Russia compare poorly with those observed in most EU countries, Japan, Canada, and the United States—they tend to be two or three times higher.

40. **Adult mortality, particularly among males, is at the core of the demographic crisis in Russia.** Mortality rates for adults are extremely high in Russia relative to other countries at similar development levels (Figure 15). It is caused by non communicable diseases, particularly cardiovascular diseases (CVD), and injuries that are associated with unhealthy lifestyle factors and other risky behaviors. Alcohol occupies a prominent place in many explanations of Russia's health crisis and it can explain part of the huge difference in male and female life expectancy.¹⁸ Standardized deaths per 100,000 of population for major causes of death in the Russian Federation in 2009 far exceeded the corresponding rates in the EU countries—the mortality rates from CVD for Russian men are four times higher than those observed in the EU. At 21.1 road traffic fatality rates per 100,000 populations the Russian Federation also has one of the second highest road traffic fatality rate in Europe.¹⁹

¹⁸ Marquez, P. and others. 2005. *Dying Too Young. Addressing Premature Mortality and Ill Health Due to Non-Communicable Diseases and Injuries in the Russian Federation.* Washington, D.C.: The World Bank.

¹⁹ Marquez, P., Banjo, G., Chesheva, E., and Muzira, S. 2009. *Confronting "Death on Wheels". Making Roads Safe in Europe and Central Asia.* Washington, D.C.: The World Bank.

Figure 15: Adult Mortality Rate compared to Total Per Capita Health Spending—Russia and Selected Countries



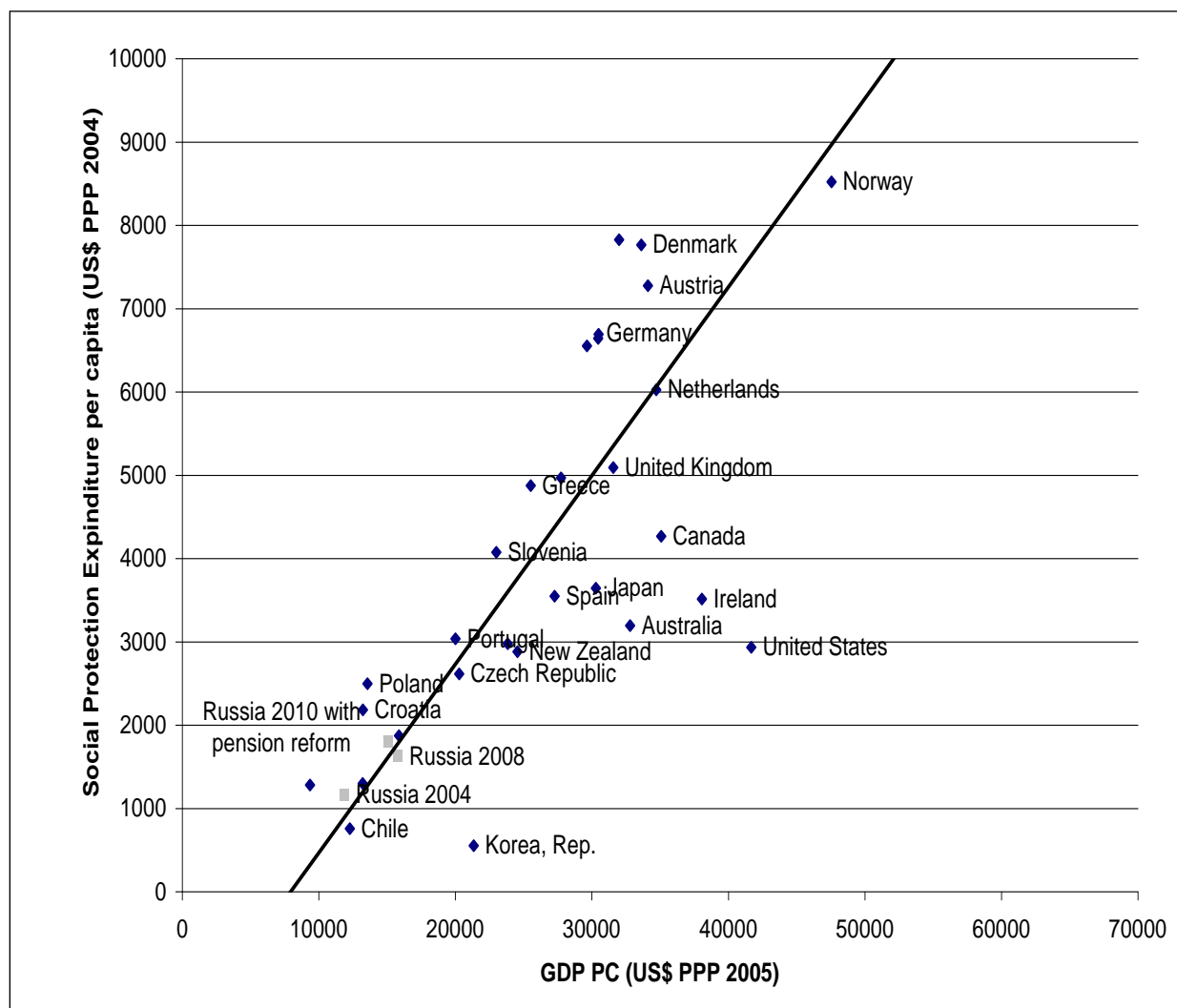
Source: WHO (2008).

3.4 Social protection expenditure

41. **Russia's public spending on social protection as a percentage of GDP is lower than social protection spending in OECD countries.** As of 2008, Russia has spent around 9.8 percent of GDP on social protection, which is lower than what is spent in new and old EU countries—an average of 12.7 percent and 18.5 percent, respectively. However, after the recent (2009 and 2010) increases in pensions, Russia's total social protection spending increased to about 11.5 percent of GDP. This brings Russia's social protection spending as a percent of GDP closer to the average observed in the new EU states. Social protection expenditure per capita (in

US dollar purchasing power parity) in Russia is also in line with that in countries with similar development (per capita GDP) levels (Figure 16).

Figure 16: Public Social Protection Expenditures per Capita, US Dollar Purchasing Power Parity, Russia and Selected Countries

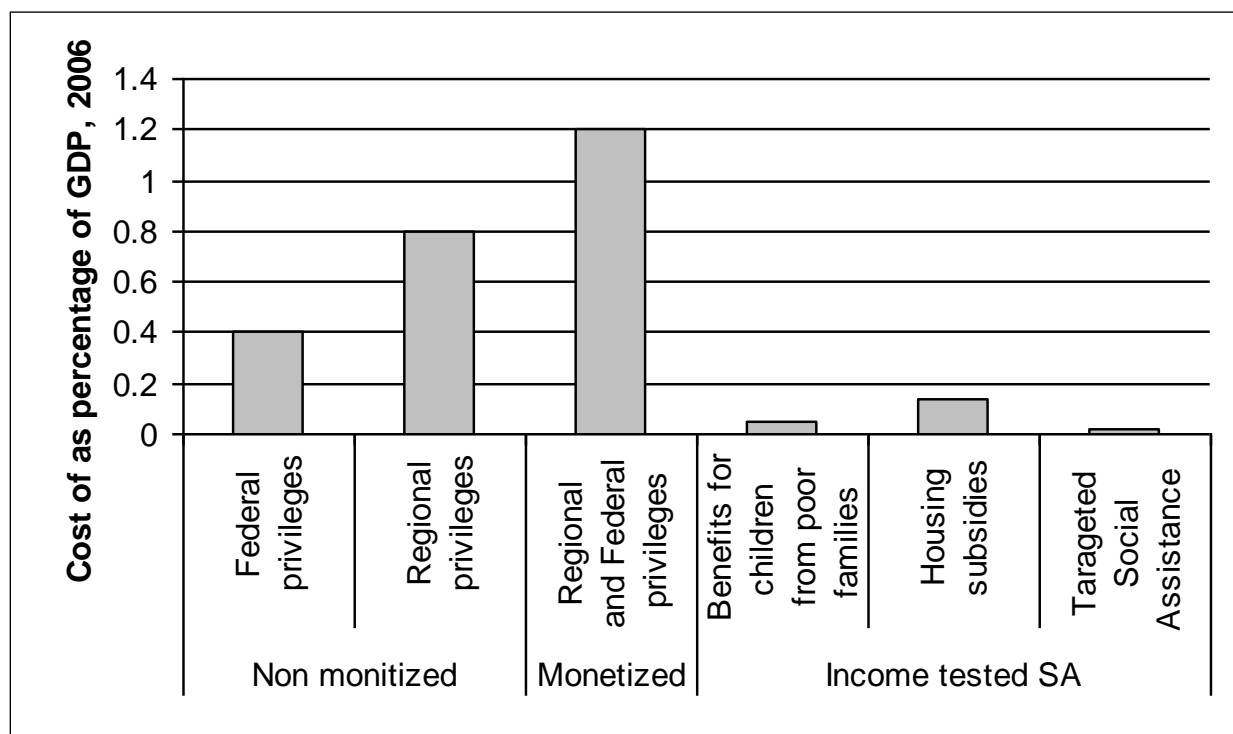


Source: IMF and World Bank estimates.

42. Social insurance (mostly pensions) expenditure makes up 73 percent of the total social protection expenditure in Russia. The orientation of Russia's social protection system toward pensions (which account for about two-thirds of total social protection spending) can be understood given that the elderly and pensioners were severely affected during the transition of the 1990s, and the Government aiming to improve the social security of this sector of the population. At the same time, the recent increase in the size of pensions, especially in times of economic crisis, raises a number of equity and other concerns, especially bearing in mind its significant fiscal cost of 1.7 percent of GDP (compared to, for example, 1 percent of GDP spent on roads annually).

43. **A substantial part of social assistance is spent on privileges, while very little is spent on targeted programs.** The spending on privileges (payments to specific categories of the population) accounts for 2.3 percent of GDP, or 90 percent of total social assistance. At the same time, privileges generally do not reach the poor well, and hence achieve little in terms of poverty reduction. Targeted social assistance accounts for only 0.2 percent of GDP, while monetized benefits account for 1.2 percent, and non-monetized federal and regional benefits combined are estimated to account for another 1.2 percent (Figure 17).

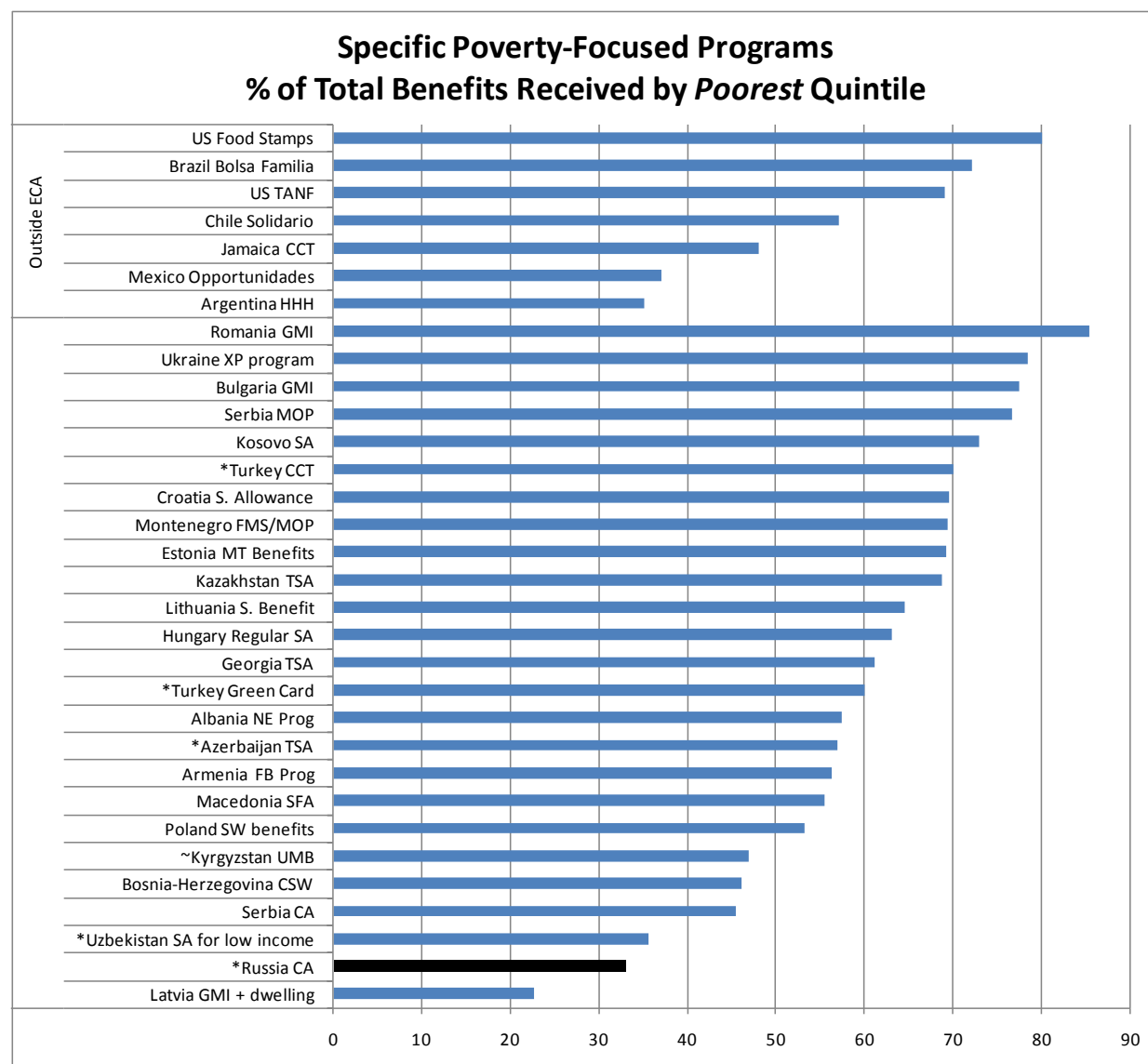
Figure 17: Social Assistance Expenditure in Russia by Type of Program, Percent of GDP



Source: World Bank estimates.

44. **The few existing last resort social assistance programs in Russia show a weak targeting performance when compared internationally** (Figure 18). There is a significant scope in Russia for expanding the means-tested component of social assistance and improving the targeting of programs, and hence for allocating social protection funds with fewer leakages and a higher poverty-reduction impact. The recent financial crisis has presented an opportunity to rethink the social assistance system in Russia in the context of the more efficient use of the social assistance funds through better targeting and a gradual substitution of privileges with targeted programs. However, this agenda has not gained momentum.

Figure 18: Share of Benefits that Goes to Poorest Quintile (20 percent) of the Population, Targeted Social Assistance Programs—Russia compared to Selected Countries



Source: World Bank (selected years based on the most recent data available for a country).

45. Yet, Russia is highly heterogeneous, with substantial regional differences in social sector spending and outcomes. In what follows we explore this regional differentiation in the education and health sectors.²⁰

²⁰ In the regional analysis we have only analyzed the education and health sectors. The regional analysis of the social protection programs (their targeting, coverage, and welfare impact) is not possible due to the lack of access to Household Budget Survey (HBS) data in Russia.

4. Regional analysis of education²¹

4.1 The system of education financing and education sector reforms

46. **Responsibilities for financing and provision of education services rest with various levels of government.** For instance, financing and provision of general education largely falls under the responsibility of regional and local governments (Table 3), while the Federal Government provides overall guidelines and supervision of education standards.²² Regional governments have freedom to implement laws in most aspects of education as long as they stay within the federal framework. The control over finance at the local level has in some places permitted desirable democratic involvement in the selection of priorities, and, at the school level, has reduced bureaucracy and allowed teachers and parents to participate in educational decision-making and to advance some restructuring of schools in rural areas (Freinkman and Plekhanov 2009).

Table 3: Sources of Financing and Provision of Education Services

Education Level	Financing	Provision
Preschool	R (subvention) (in some regions), MD, CD	MD, CD
General (schools)	R (subvention) MD, CD	MD, CD
General (boarding schools, orphanages)	R	R
Supplementary	R (subvention) MD, CD	MD, CD
Primary and secondary vocational education	R	R
Primary and secondary vocational (under federal list)	F	F
Higher (university)	F	F

F = Federation; R = Regions; MD = Municipal District; CD = City District.

47. **The degree of regional inequalities in education spending thus also depends on whether a particular level of education is financed mostly through the federal, regional, or local (municipal) budget.** For example, an average of 22 percent of the education sector is financed by the federal budget, 26 percent by regional budgets, and 52 percent by local (municipal) budgets (Table 4). However, 82 percent of preschool education is financed through local budgets. Hence, poorer regions will be more disadvantaged in their capacity to finance

²¹ Most of the analysis of education sector efficiency presented here is related to the system of general education since this is also where we have measurable outcomes.

²² The assignment of responsibilities adheres to the guiding principle of regions/states being responsible for provision (and financing) of services for which benefits accrue mostly within the borders of regions/states.

preschool education than richer regions.²³ At the same time, 95 percent of higher education is financed from the federal budget.

Table 4: Expenditures on various Levels of Education by Tier of Government as a Percentage of Total Expenditures

Government Function	Federal Budget (%)	Regional Budgets (%)	Local Budgets (%)
Education (total)	22	26	52
<i>Preschool</i>	1	16	82
<i>Primary and secondary</i>	1	21	78
<i>Vocational</i>	28	69	2
<i>Retraining and continuous</i>	53	44	3
<i>Higher</i>	95	5	0

Note: Extra-budgetary funds are included.

Source: De Silva and others (2009).

48. Demographic trends and reforms in education present opportunities for improving efficiency in education. The key demographic trend, which is a declining school-age population, already has led the regions to reduce the number of teaching staff. The regions have also been implementing the transition to per capita financing, and there are federal guidelines for increasing the average student-teacher ratios and class sizes. This demographic and policy environment creates conditions for improving the efficiency of public spending on education.

49. In recent years new reforms have been implemented in the education sector. These reforms aim at improving the quality of education and enhancing the efficiency of public spending on education through introduction of new fiscal incentive structures, measurement of results, changes in curriculums, and performance-based payments to teachers. The main recent reforms are summarized in Box 4.

²³ That is perhaps one of the reasons for ongoing policy discussions of the possibilities for the Federal Government to finance at least some of the preschool education provision.

Box 4: Recent Reforms in the Education System

- **Per capita financing.** Since 2008 general education has been financed on a per capita (student) basis in all regions. The per capita financing scheme is aimed at the more efficient use of budget funds and improved education quality. The rules and formulas (norms) for per capita funding allocations from the regional level to municipalities are set by each region. The federal government has issued a set of guidelines, but they are not binding. Hence, each region's method of per capita funding can differ. In general, three major approaches to per capita financing emerged, with setting the cost based on: (a) minimum education standard (for example, in Penza and Irkutsk), (b) average unit cost (for example, in Tyumen), and (c) type/category of education service (for example, in Perm). The second approach became most common across regions. Challenges to full-scale implementation of per capita financing still exist since municipalities often face restrictions, and schools have limited autonomy in how to spend allocated resources. Formally, municipalities are free to set any policy for allocating the local budget (including the funds received from the region) through the per capita allocation across schools. However, the budget legislation severely constrains such autonomy. Further reforms aimed at providing more autonomy to schools are being considered.
- **Unified State Examination (USE).** Since 2001 the USE—an exam at the end of general education that also serves as an entry exam for university studies—has been gradually implemented across regions and schools. By 2009 the examination was given in all regions and became mandatory. The USE is designed to protect common standards, decrease corruption and informal payments to obtain access to post-secondary education, and increase access for students from rural areas and low-income families to university-level education. The USE also provides an opportunity to evaluate the quality of education across schools and regions.
- **National Project “Education.”** Since 2006, the Federal Government has allocated funds for special purposes. Some is spent for direct subsidies for special purposes for all regions, such as for the establishment of an Internet connection for all schools in 2009. Other funds are competitive, for example, for remuneration of best teachers and innovative schools. Finally, some funds are matching grants, such as for procurement of buses for rural areas.
- **Changes in curriculums.** In 2009 new standards for general education were introduced that allow schools greater autonomy in designing curriculums. The reform is still not fully implemented.
- **Performance-based salaries.** In 2008, performance-based salaries were introduced. The reform is aimed at increasing teachers' wages and enhancing incentives. In general, teachers' wages are paid according to a scale based on seniority, where each region can adjust the general level and coefficients determining the increases in each level.

50. **Implementation of the education per capita financing reforms has faced several challenges. Yet, some regions were able to successfully introduce a broad spectrum of reforms.** There were numerous barriers inhibiting the introduction of per capita funding principles in general secondary education. The barriers were found at the federal, regional, and municipal (local) levels. For instance, at the regional level such barriers included: (i) lack of understanding of the strategic importance of the changes by the regional Ministries and Departments of Education; (ii) insufficient attention to the per capita funding methodologies or to a cost-benefit analysis, which also made the results of the transition process difficult to assess; (iii) low capacity and experience with transition to per capita-based budgeting (Babko and Klimanov, 2007). However, some regions were very successful in implementing the reforms, as an example of Samara region indicates (Box 5).

Box 5: Education Reforms in the education system of Samara oblast by level of education

Common reforms: improvement and integration of new system of teacher remuneration; integration of per capita financing (implementation period – since 1998); integration of system of teaching staff quality improvement; improvement of regional system of education quality evaluation; implementation of distance learning for children with disabilities.

Pre-school: development of system of early care and special support to children with disabilities and their families; expansion of pre-school private sector by furthering opening of non-state preschool educational institutions.

Primary and secondary: provision of Internet connection to all schools in the region; construction of new schools and capital repair of educational institutions; restructuring (optimization) and development of school network; integration of new educational standards; grants to support gifted youth; new norms to increase school autonomy – granting of status of autonomous educational institutions; monthly grants to stimulate activity of form masters; integration of innovative pedagogic methods and techniques in educational process; provision of access to modern ICTs for students and teachers; incentives to support teachers using modern ICTs in educational process; provision of transport utilities to schools; implementation of profile education in upper-secondary school; increase of the share of students studying in modern conditions; update of school infrastructure, school equipment.

Extracurricular education for school age children: optimization of network of extracurricular educational institutions; integration of new standards of funding for educational institutions; update of infrastructure/purchase of new equipment.

Vocational: development of system for monitoring of vocational school graduates' employment status; integration of mechanisms of employment assistance for vocational school graduates; integration of new educational standards in VET; attraction of industry representatives – potential employers in the management process of educational institutions; improvement of material and technical base.

Higher: grants to support creative initiatives of HEI's staff; social benefits to scientists and specialists having certain achievement in the spheres important for socio-economical development of the region; grants to support students showing good academic performance, achievements in social and scientific activities.

Life-long learning: creation of network of resource centers (RCs) of professional education; qualification improvement and retraining of workers on the basis of RCs.

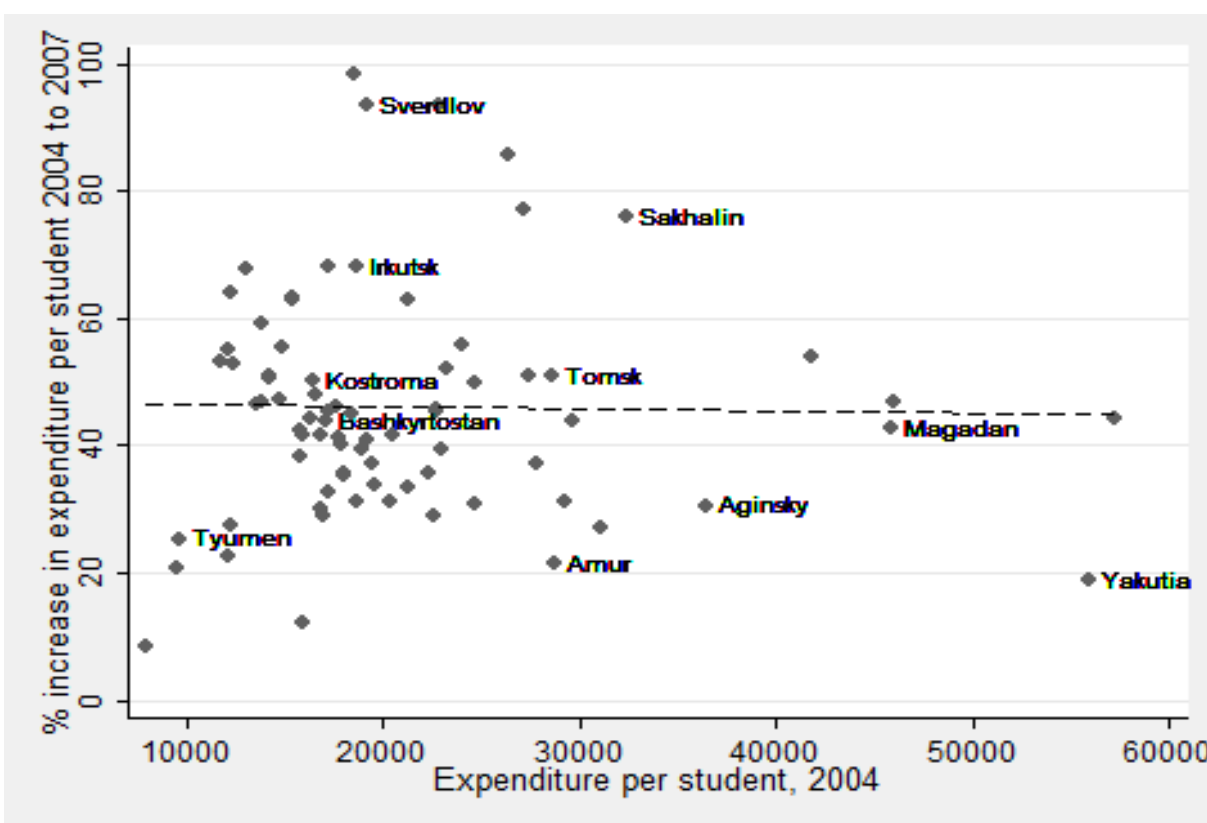
Source: Ministry of Education and Science of Samara oblast

4.2 Regional variations in education spending, physical inputs, and education outcomes

51. Substantial regional differences in per student spending persist, and poorer regions are not catching up. The difference between the highest and the lowest spending regions is still a factor of 10 in per capita terms, even after controlling for regional price differences²⁴. Moreover, the substantial increase from 2004 to 2007 in real expenditure per student was unrelated to previous (that is, 2004) levels of spending (Figure 19), and did not reduce regional inequality in expenditure per student. Moreover, even regions with similar GRP per capita levels can have substantial differences in how much they spend on education per student—often by a factor of 2, as Annex 3 suggests.

²⁴ Based on the cost of the basket used for CPI calculation by Rosstat a spatial price index was calculated for each year. This is index used to correct for price differences between regions.

Figure 19: Levels and Trends in Education Expenditure per Student across Regions, 2004–07



Source: World Bank estimates.

Note: Expenditure levels are in constant 2007 rubles.

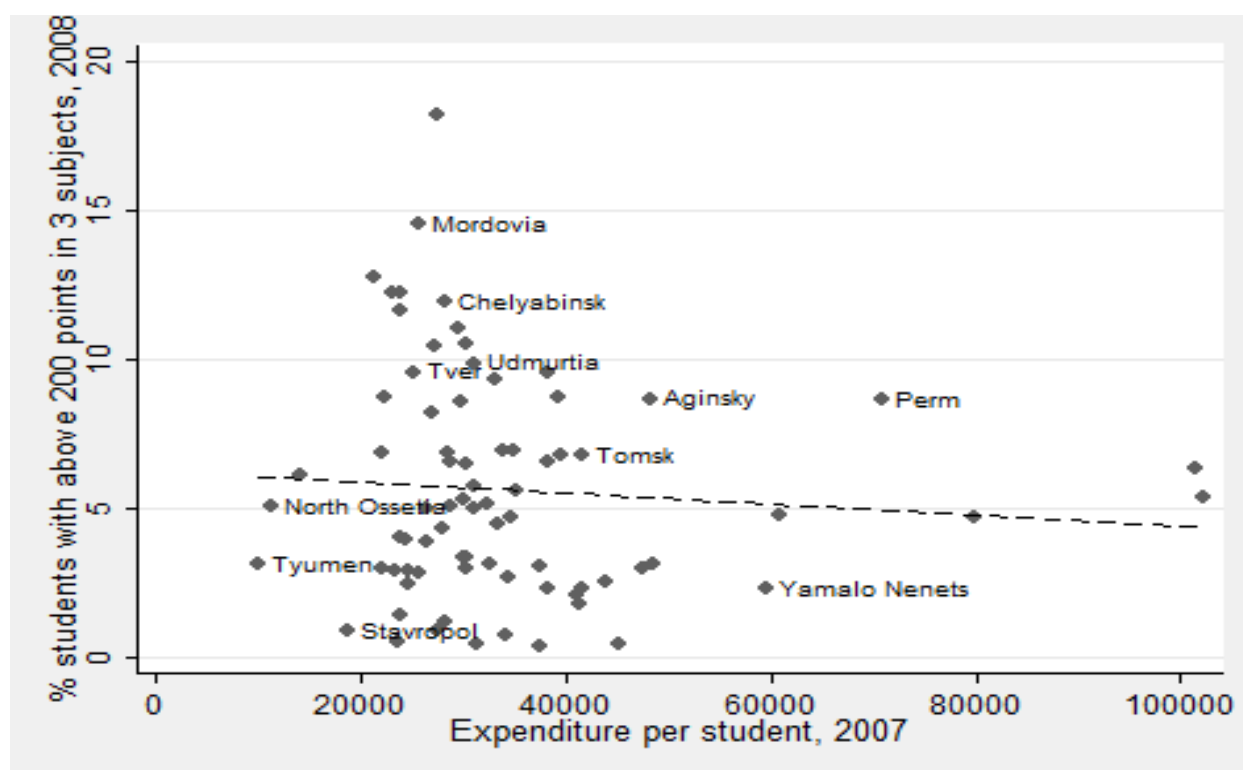
52. The level of expenditure per student is significantly correlated with the volume of inputs into the education system. We find that regions that have larger average school sizes (number of students) and higher student-teacher ratios also have lower cost per student than other regions. The estimated elasticity across regions indicates that by reducing a student-teacher ratio from 10 to 12 a region can expect to lower the cost per student by 15 percent. There seems to be economy of scale at the regional level since regions with fewer schools have higher expenditure per student. The average wage in the education sector explains around 40 percent of all variation in expenditure per student.²⁵ Teacher wages are strongly correlated with the average wage of the economy. With a correlation coefficient of 91 percent between the average wage of the economy and the education sector wage, it is obvious that regions have to pay education sector wages that reflect local labor market conditions. Regressions explaining regional variation in expenditure per student are presented in Annex 4.

53. Substantial regional differences are also apparent in the quality of education, as measured by education outcomes. In the regional analysis of education we use two indicators of educational outcomes based on the results of the 2008/09 Unified State Examination: (a) the share of students that did not pass a single subject, and (b) the share of students scoring more

²⁵ Note that for analysis across regions both expenditure per student and average wage have been corrected for spatial price differences.

than 200 points in three subjects. With respect to the first indicator, in the worst-performing region 29 percent of students did not pass a single subject, while in the best-performing region only 3 percent of students had the same outcome. With respect to the second indicator, in the best-performing region more than 18 percent of students scored more than 200 points in three subjects, while in the worst-performing region less than 0.4 percent of students did (Figure 20). These results once again confirm the importance of regional diversity in Russia.

Figure 20: Variation in Unified State Examination Scores across Regions



Source: World Bank regional database.

54. **Higher spending per se does not lead to better educational outcomes. It is mostly factors that capture the quality of education that explain the differences in education outcomes across regions.** These factors include the *share of students in second shifts*, the *share of students with preprimary education*, the *share of teachers in pension age*, and *parents' education*. The share of schools with second shifts is negatively correlated with educational outcomes. On average, across regions 14 percent of schools have second shifts, but across regions this varies from none in Saint Petersburg to 47 percent in Chechnya. The analysis shows that regions that had higher preschool enrollment rates in the past achieve better general education outcomes in the present. In regions with a high share of teachers in pension age the educational outcomes are also worse on average. This indicates the importance of attracting more of the younger cohort to the teaching profession and of improving the quality of teaching. Parents' educational background, which is captured at the regional level by the share of the workforce with a university degree, is significantly positively correlated with educational outcomes. The regressions on which these results are based are presented in Annex 5.

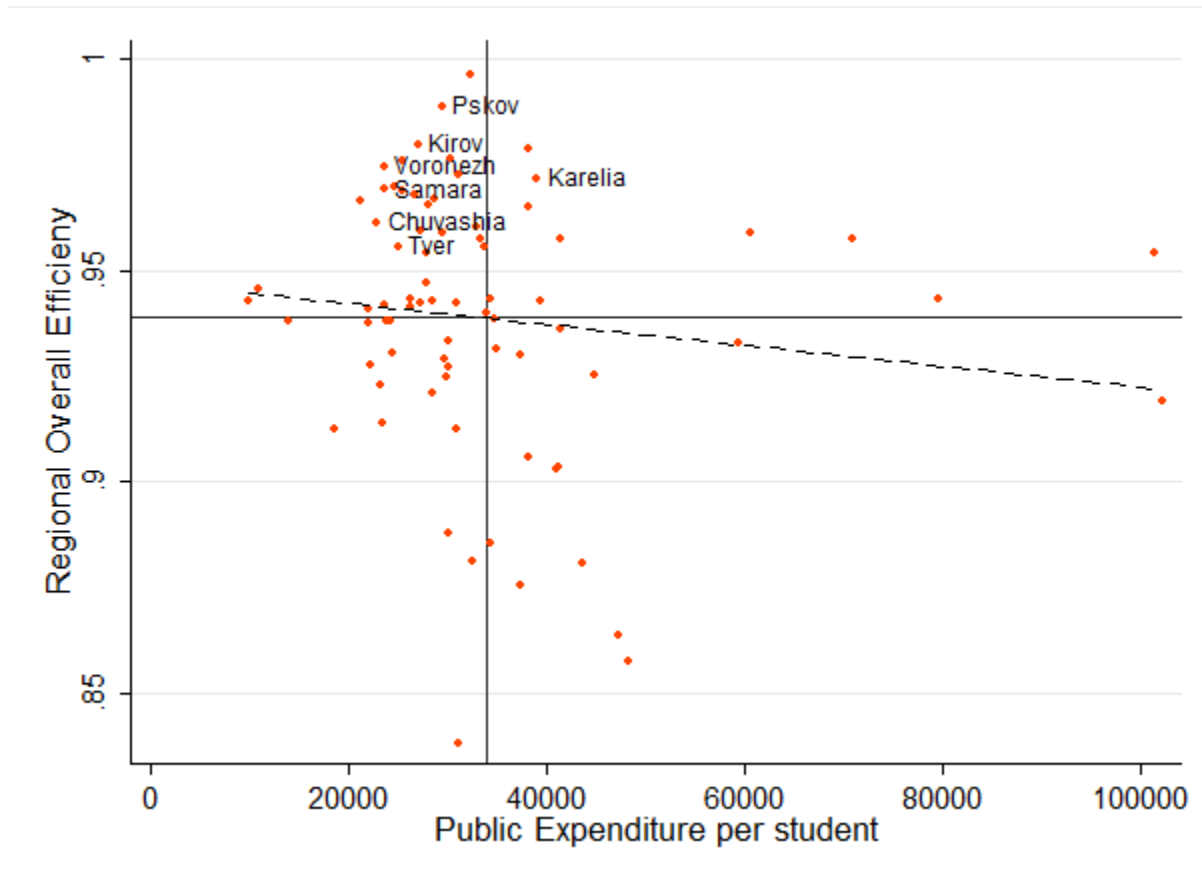
4.3 Analysis of overall and system efficiency in the education sector

55. **Significant regional differences also emerge with regard to the estimated *efficiency of education spending*.** Efficiency is estimated across regions by relating the USE indicators across regions to their allocated resources. We measure educational outcome by the first principal factor of the two USE indicators mentioned above. The relative ability of regions to turn expenditure into education outcomes is *overall efficiency*, and their ability to turn allocated physical resources (student-teacher ratio, average school size, and share of teachers with higher education) into educational outcomes is *system efficiency*.²⁶ The analysis produces a relationship between public expenditures per student and the overall regional efficiency score (Figure 21). The analysis shows that regions on average have a score of 0.94 in overall efficiency; i.e. on average regions could reduce inputs into to the education sector by 6 percent and still produce the same outcomes if they were as efficient as the most efficient similar region²⁴. If all the 76 regions included in the analysis became as efficient as their best performing peer this would result in 25 to 30 billion rubles that could be allocated to alternative uses within the sector.²⁷

²⁶ The efficiency is estimated using DEA methodology.

²⁷ The estimated saving is calculated as one minus the efficiency score multiplied by regional education expenditures in 2007 (the year the analysis for undertaken for).

Figure 21: Efficiency and expenditure per student across regions



Note: Expenditure per student is corrected for spatial price differences.

Source: World Bank estimates using DEA.

56. **There is a limited correlation between expenditure per capita and overall efficiency.** In other words, at every level of spending there are more-efficient regions and less-efficient regions. Importantly, among the most efficient regions there are many that are known to be at the forefront of the education reforms (those regions are marked in bold in Figure 21).²⁸

57. **The Government of Russia also has an undertaking to estimate the level of inefficiency in the system.** However, the methodology currently applied by the Ministry of Regional Development is quite different from the one used here. The Ministry's approach is to calculate the *volume of inefficient expenditures* based on the difference between the federally

²⁸ The reform regions are identified as such through consultations with various sector experts. Some of those regions took part in the Russia Education Reform Project. The Project's development objective was to provide assistance to the Ministry of Education (MoE) and competitively selected regions of Russia to reform general and initial vocational education in order to: (a) improve quality and standards, (b) promote the efficient and equitable use of public resources for education, (c) modernize the education system networks and institutions, and (d) improve the flexibility and market relevance of the initial vocational education. The Project became effective in mid-2002. The participating regions included Chuvash Republic, Samara, and (later) Voronezh. There are also currently 31 regions participating in the Regional Comprehensive Project of Modernizing Education (more information is available at: www.kpmo.ru).

recommended and actual physical inputs/indicators (for example, the student-teacher ratio). This approach, and how it differs from the one used in our analysis, is described in Box 6.

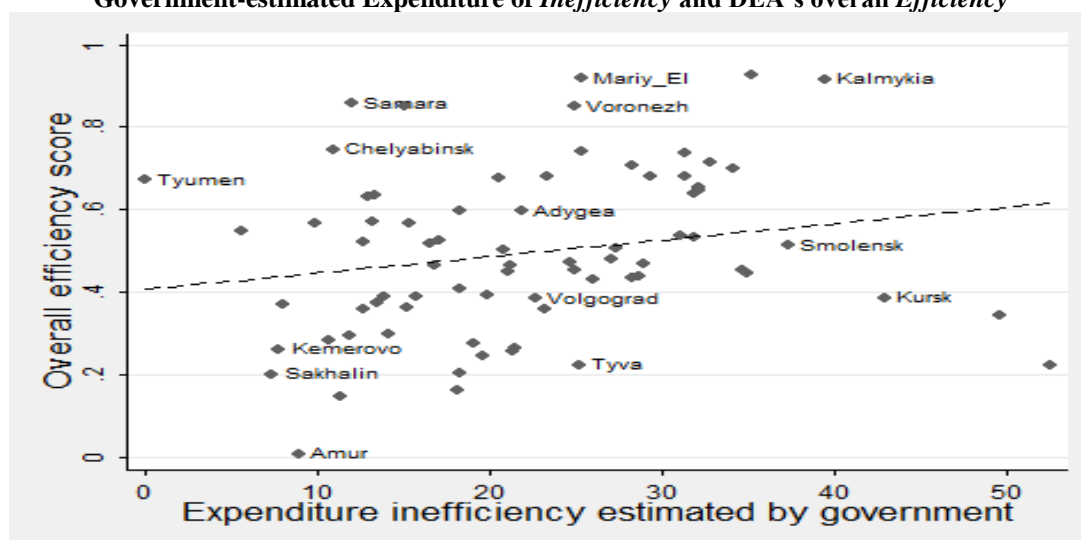
Box 6: Government-estimated Expenditure Efficiency

The Government is estimating *inefficient expenditures* based on the difference between the federally recommended and actual physical inputs. The Ministry of Regional Development has for both 2007 and 2008 estimated *inefficiency* over a range of public expenditures including educational expenditures. The Government's overall ranking includes aspects of satisfaction and degree of innovations and outcomes, but in this comparison we focus on the expenditure efficiency. Inefficient expenditure is estimated by calculating how much a region would spend if it followed federally recommended norms (on, for instance student/teacher ratios) compared to its total actual expenditure. This reveals how much a region could save if it followed federally recommended norms.

The Government's estimate of inefficient expenditures is substantially different from the concepts of overall and system efficiency applied in this paper. The DEA analysis measures relative efficiency based on comparisons across regions and using the education test scores as an outcome indicator. When comparing the two estimates of efficiency (the Government's and the one from the DEA analysis), we find that the most efficient regions according to the Government's method often emerge as the least efficient according to the DEA analysis. Looking at examples of regions that are overall efficient according to the DEA methodology, but are cost-inefficient according to the Government's estimations, we see regions such as Mordovia, Pskov, and Kirov that have low student-teacher ratios and small average school sizes. However, these three regions have better educational outcomes than the average and therefore end up being relatively more overall effective than other regions. The other end of the spectrum we see a region such as Kemerovo that has very high expenditure efficiency according to the government's measure, but low according to our DEA analysis. This is again explained by focus on outcomes; Kemerovo has much below average educational outcomes and therefore gets a very low score.

The examples of those regions illustrate that regions can be *cost-inefficient* because they have low student-teacher ratios, but still be overall efficient compared to other regions if they have good educational outcomes. While there is a negative correlation between the student-teacher ratio and educational outcomes in the bivariate analysis framework, this correlation is not significant once we control for other factors. There is no significant correlation between overall efficiency and student-teacher ratios after we account for factors beyond the control of the regions. The figure below shows the correlation between the Government's estimated inefficiency (input-based) and the DEA's overall efficiency (outcome-based). The two approaches to measuring efficiency complement each other.

Government-estimated Expenditure of *Inefficiency* and DEA's overall *Efficiency*



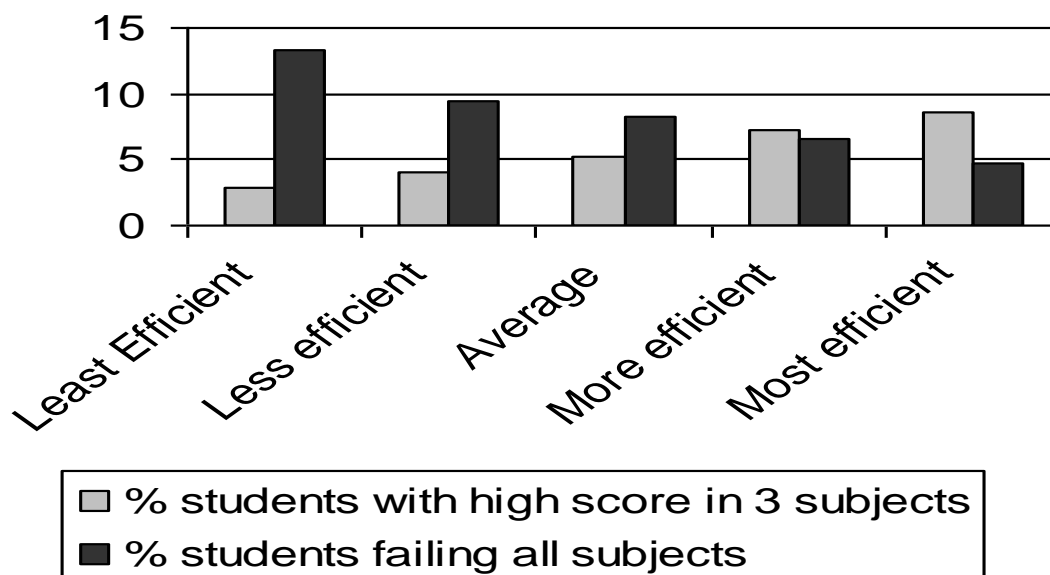
Source: World Bank calculations and Ministry of Regional Development.

58. Several factors are associated with efficiency at the regional level. Those can be classified into factors outside the immediate control of the region (such as geographic characteristics) and the policy variables under control of the region. Among factors that are beyond the immediate control of the regions are *population density*, *average wage in the economy*, and *distance to Moscow*. Population density impacts both overall and system efficiency positively, that is, higher density contributes to higher efficiency. A higher average wage in the economy reduces overall efficiency. The further away from Moscow a region is located, the less efficient it generally is. This could be due to less oversight from the Kremlin but could also reflect other aspects. A detailed analysis of the political economy considerations would be needed to shed more light on this issue. However, while such analysis might be important, it is outside of the scope of work undertaken here.

59. After controlling for factors beyond the regions' influence, several policy factors are found to be significantly related to overall and system efficiency. Those factors include the *share of schools with secondary shifts* and *preschool enrollment*. Regions with a higher share of schools with two shifts are less overall efficient, that is, they have worse educational outcomes compared to their level of expenditure relative to other regions. Regions that have higher enrollment in preprimary education get better educational outcomes for their expenditure in general education. A number of other variables related to administrative and institutional aspects (such as degree of decentralization, share of education expenditure executed at the municipal level, quality of regional governance, and so forth) were also tested in the efficiency context, but were not found to be significant. From regressions of efficiency and external factors we can gauge the degree to which factors under and beyond control of the oblast explain the variation we observe in efficiency. These regressions show that factors under control of the oblast are more important in explaining efficiency than the factors beyond control.

60. More efficient from a spending perspective regions also tend to have better education outcomes. The finding that more-efficient regions do not need to sacrifice education outcomes (Figure 22) is very reassuring from a policy perspective. It indicates that many regions could reduce inputs and in the longer term still achieve the same or even better (with enhanced quality of education inputs) education outcomes.

Figure 22: Overall Efficiency and Educational Outcomes



Note: The regions are grouped by quintiles of overall efficiency. *Source:* World Bank estimates.

61. **The existing education system has significant scope for optimizing inputs without jeopardizing education outcomes.** The analysis shows that quantitative inputs such as student-teacher ratio, average school size, and number of schools are significantly correlated with the cost per student, but are not significantly related to educational outcomes. There is scope for optimization of the quantity of physical inputs. However, the reduction in the quantity of inputs should be undertaken simultaneously with improving the *quality* of teaching inputs, since many factors capturing quality are found to explain the differences in education outcomes across regions.

62. **To summarize, the regional analysis of education suggests that:** (a) **substantial differences exist across regions** in per capita funding of education, inputs into the education system, and education outcomes; (b) there is no linear relationship between the regions' levels of development and education sector efficiency—at every level of spending there are efficient and inefficient regions; (c) reform-oriented regions are also found to be more efficient in transforming education inputs into education outcomes; (d) the *quantity* of inputs in the education system is closely related to costs per student but not to education outcomes; this represents opportunities for optimizing overall costs—education outcomes are related mostly to the *quality* of inputs; and (e) several policy factors are associated with efficiency at the regional level and thus represent levers for improving efficiency.

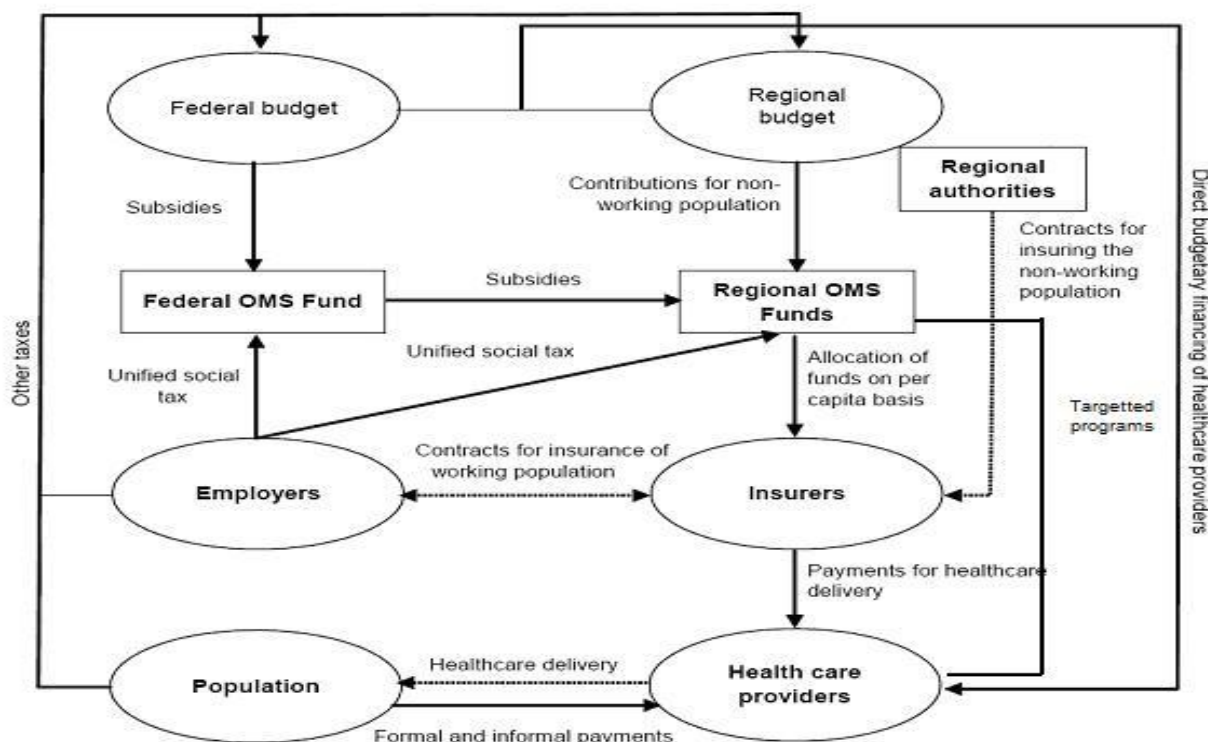
63. **We believe that the education sector could benefit from the following:** (i) Conducting an assessment of regional experiences with implementation of per capita (per student) financing to identify what works and what does not and what the key bottlenecks are for further rationalizing the system; (ii) Investigating further the practice of second shifts in schools and implementing measures to end this practice; (iii) Clarifying responsibilities of various levels of government in financing preschool education.

5. Regional analysis of health

5.1 The system of health care financing and health sector reforms

64. The system of health care financing is very complex and fragmented since financing originates from multiple sources and goes *through multiple channels* (Figure 23). It is also inefficient, as it unnecessarily duplicates administrative efforts and increases transaction costs.²⁹ Funding comes from federal, regional, and municipality budgets, in addition to the Mandatory Health Insurance (MHI) established in 1993.³⁰

Figure 23: Financing of Health Care



Note: OMS = MHI (Mandatory Health Insurance) in Russian.

Source: Adapted from Tompson (2006); and OECD.

²⁹ Marquez, P. and others. 2008. "Better Outcomes Through Health Reforms in the Russian Federation. The Challenge in 2008 and Beyond." Washington, D.C.: The World Bank.

³⁰ The first law on medical insurance in the Russian Federation was adopted in 1991. Amended in 1993, it led to the creation of a Federal Fund for Mandatory Health Insurance, and of the territorial MHI funds in each of 89 Russian regions. The law mandates universal coverage for all citizens and includes a comprehensive package of medical benefits defined by the national and territorial programs of mandatory health insurance.

65. Budget funding accounts for about 60 percent of total public health spending in Russia, and the MHI for the rest. Most public sector funds, over 85 percent, are raised and allocated at the regional level through general revenues and the 3.1% rate of payroll tax. The equalization of budget transfers from the federal level, however, have never been earmarked for health, and regions have mostly been unwilling to either contribute for nonworking groups or to pool necessary funds under the regional health insurance funds, as called for in the legislation. Budgeted funds allocated for health have been kept with the regional health departments and municipalities. The role of intermediate health insurers has never been fully developed. Regions vary in the number, role, and effectiveness of health insurers acting as purchasers for the territorial mandatory health insurance funds (TMHIFs). These organizations, both public and private, do not compete; often, they act only as “pass-through” for bill claims, using their covered population to market private insurance policies and bearing little risk. However, they create administrative costs of about 3 percent by acting as mere intermediaries.

66. The provision of services as financed from the budget and from the Mandatory Health Insurance Fund (MHIF) is carefully divided by sources in the regulation on state guarantees. The source of financing largely depends on the type of service provided by the health care institution and the regional jurisdiction of the medical facility. Certain types of health care, for example, emergency care, socially significant types of health care (e.g. TB, HIV, mental care) and high-tech care, are not financed from MHI funds at all, they financed exclusively from budget sources. For other types of care, MHI funds are used to pay for only part of the costs of health care. According to regulation the current MHI system provide reimbursement for only five types of costs: wages, assessments on wages, the purchasing of medicines, disposables and food for patients. Budget funds are still being earmarked for the direct financing of the fixed costs of health care institutions depending on jurisdiction of health facility. In practice, there are often problems with the lack of coordination between various health care financing sources, which leads to a fragmented provision of health services. Box 7 describes the challenges with and benefits of the MHI system in Russia.³¹

³¹ The introduction of the national MHI system was a key result of the reforms undertaken in the early 1990s. A more detailed discussion of the history of health reforms in Russia can be found in Independent Institute for Social Policy. 2008. “*Assessment of the Health Care Reform Experience in Regions of the Russian Federation.*” Final analytical report prepared for the World Bank.

Box 7: The Challenges and Benefits of the MHI System

The payroll tax contribution accounts for a substantially smaller share of public health revenues than the share of the payroll tax contribution in classic Beveridge systems¹ (for example, Germany and the Netherlands). That is because of the low employer contribution rate and the absence of employee contributions. Local governments were reluctant to allocate resources to MHI funds, which led to chronic under-financing of contributions for the non-working population. Another challenge is the unrealistic level of state commitments to the provision of free health services, in view of the financial constraints faced by budgetary and health insurance funding sources.

Mixed financing mechanisms for providers (from insurance and budgetary sources) have not allowed completion of the introduction of remuneration methods, which enhance quality of services and improve efficiency. Most budget financing is still allocated to facilities and institutions based largely on number of beds and staffing, with little reference to volumes and quality of care actually provided. The MHI portion of providers' income is insufficient to create incentives to focus on outcomes.

The role of insurance companies also differs from that envisioned in the legislation. The insurance companies themselves have failed to develop into active, informed purchasers of health care services. Most are passive intermediaries, making money by simply channeling funds from regional MHI funds to health care providers.

The above-mentioned challenges notwithstanding, the introduction of the MHI system has brought about some benefits. First, as noted, the MHI system helped maintain health care spending levels in the 1990s, even if MHI contributions replaced, rather than supplemented, budgetary funds. Second, the creation of MHI marked the first steps toward a purchaser-provider separation, which has helped focus greater attention on questions of cost and efficiency. It has also spurred the development of clinical protocols and medical-economic standards in an effort to increase the accountability of health care providers for health care quality. The reforms have also helped generate a sense of accountability and cost-consciousness among many of the entities and professionals in the health care system, along with the acquisition of new financial, managerial, and administrative skills.

1. A classic Beveridge system is "The system of social security and health services arising out of the Beveridge report in England and Wales, first published in 1943. This report recommended provision of health care for all people through central taxation and other compulsory financial contributions and that a system of universal benefits should give support during unemployment or sickness and after disability and retirement" (<http://www.euro.who.int/observatory/Glossary/TopPage?phrase=Beveridge%20system>).

Source: Independent Institute for Social Policy. 2008. "Assessment of the Health Care Reform Experience in Regions of the Russian Federation." Final analytical report prepared for the World Bank.

67. The unfinished MHI reform is one of the reasons for the very limited shift in the structure of health care delivery. The reformers of the early 1990s focused on the reform of health care financing, believing that if financial arrangements were properly restructured, then financial pressures would bring the broader restructuring of health services provision that the sector needed. As a result, the basic structure of the health care system remained largely unchanged. Further reforms were envisioned around 1997/1998, including the drive to reduce excessive hospital capacity, but they were stalled by the onset of a financial crisis.

68. Over the past decade organizational and structural changes have taken place in regional health care systems. These changes were the result of reforms in federal legislation and of the desire of regional and local authorities to independently address some of the problems affecting the operation of health service delivery. The scope of health care reform has varied widely across the country depending on the commitment of regional and local authorities. In different regions there have been attempts to carry out the restructuring of the health care system. However, the high risks and major social and economic costs associated with carrying out large-

scale changes in the organization of health care without political and economic support from the Federal Government have hindered these efforts.³²

69. In spite of different innovations at the regional level, many fundamental dysfunctions in the health care system have not been resolved. To respond to challenges in health care system development, the Federal Government launched the Priority National Health Project in late 2005, which was intended to relieve the burden of accumulated problems and to significantly improve health care delivery during 2006–10. Federal budget spending on this project was about US\$ 5 billion, or 0.3 percent of the GDP annually, which is approximately 7 percent of the total public financing of health care. Priority areas of the National Health Project included strengthening of primary health care (PHC) by increasing salaries for primary care physicians, supplying equipment to outpatient and emergency health facilities, constructing 15 new high-tech medical centers, and expanding immunization and disease-prevention efforts.³³ The strategy of the targeted financing of selected problem areas under the National Health Project in order to improve provision of government guarantees to the population is focused on the growth of health service delivery capacities and on removal of resource restrictions in regard to some health care components. However, the Project proposed only limited institutional changes and has not addressed the underlying structural weaknesses of the health care system.

70. To further advance the reform agenda in the health sector, in 2007 the Russian Government started implementation of the National Pilot Project Aimed to Improve Quality of Health Care. The target areas for modernization of the health care financing system that are being pursued as part of the pilot project include a *single-payer financing system*, a *fund-holding system*, *payment for inpatient care on the basis of financial norms calculated in accordance with clinical standards*, and *performance-based compensation to medical staff*. These components of the reform have been implemented in 19 regions selected for the pilot. The main objective of the project was to encourage the selected regions to experiment with new financing mechanisms and to use the accumulated experience for identifying the most promising institutional changes in the health sector. More details on this Project are provided in Box 8.

³² Some of the first successful attempts to carry out comprehensive restructuring of health care delivery at the regional level were made in Chuvash Republic and Voronezh Oblast under the framework of the World Bank-funded Health Reform Implementation Project carried out over 2004–2008.

³³ The project will continue during 2009–12 and will include additional interventions targeted at the major problems of high mortality from road trauma, cardiovascular diseases, cancer, tuberculosis, and low birth rate.

Box 8: Details of the National Pilot Project Aimed to Improve Quality of Health Care

In the framework of the 2007–08 National Health Pilot Project, the following policy measures have been tried or adopted:

- Transition to predominantly single-source financing (through the system of Mandatory Health Insurance Funds);
- Payment for inpatient care in accordance with financial norms calculated on the basis of medical-economic standards and hospital performance assessment;
- Introduction of a fund-holding system for reimbursement of outpatient health care facilities;
- Introduction of performance-based compensation for medical personnel; and
- Launching a system of monitoring of the volume and quality of medical services provided.

The main objective of the project was to encourage the selected regions to experiment with new financing mechanisms. The pilot was implemented during June 2007–July 2008. The federal budget contribution was 5.4 billion rubles. The selected (pilot) regions co-financed implementation. Nineteen regions participated in various components of the project. Those include: Astrakhan, Belgorod, Vladimir, Vologda, Kaliningrad, Kaluga, Leningrad, Rostov, Tyumen, Samara, Sverdlovsk, Tver, and Tomsk provinces; Krasnodar, Perm, and Khabarovsk territories; the Republics of Chuvashia and Tatarstan; and Khanty-Mansiysk Autonomous District. The transition to single-payer financing has been tested in 12 of the 19 regions, new methods of payment for inpatient care have been tested in 13 regions, the fund-holding system has been tested in 10 regions, new employee compensation methods have been tested in 13 regions, and personalized accounting has been tested in 18 regions.

The project has yielded several useful results. For example, it has encouraged regions to promote and test pioneering innovations in health care financing and has demonstrated that regions can independently develop and implement institutional reforms in these target areas. These are without doubt positive initial results of the project. But the depth and pace of these reforms varies considerably among the regions participating in the project. This is determined not by external factors, but primarily by the varying strength of the political will of regional authorities to reform health care and by the differences in the reform experiences gained.

The project also had several shortcomings. These include: (a) lack of methodological guidelines for implementation of project activities (documents issued by the Federal Government established only the target areas for reform and did not contain even a minimum level of methodological support; therefore, the regions either used the procedures they already had or were forced to develop innovations during the period that the project was being carried out); (b) a very short implementation period, which proved insufficient considering that many project activities need a substantially longer period to be prepared and introduced; and (c) insufficient consideration given to regional characteristics such as initial conditions and the level of previously gained experience with selected activities.

Source: Independent Institute for Social Policy. 2008. “*Assessment of the Health Care Reform Experience in Regions of the Russian Federation*”. Final analytical report prepared for the World Bank.

71. Implementation of the National Pilot Project underscored once again that further advancement of the health system restructuring agenda is needed at the federal and regional levels to deal with the fundamental imbalances in the Russian health sector. This agenda should include strategies to deal with substantial regional inequalities in financing health care, balance government commitments for free health care and financial resources, overcome fragmentation of health care financing, shift resources away from specialist/hospital care and toward primary care, and to create incentives for health care providers to improve service quality and efficiency. These areas are discussed further in the analysis that follows.

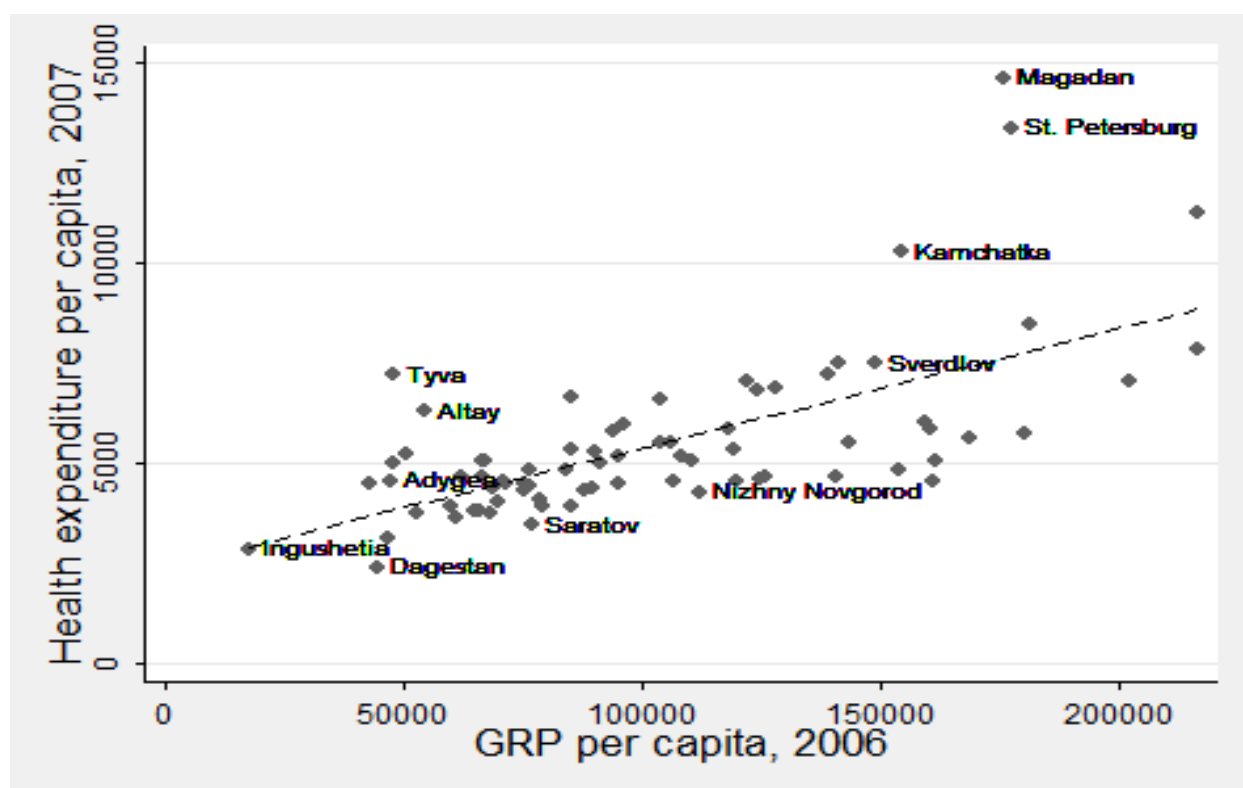
72. In April 2010 Federal Government has announced new initiative on modernization of healthcare system. Under this initiative payroll tax for MHI system will be increased from 3.1 percent to 5.1 percent. That will bring additional 460 billion Rubles (above 15 billion USD) earmarked for the MHI. These funds will be used to finance implementation of the regional

programs on healthcare modernization. It is announced that the goal of the initiative is not to renovate and equip existing inefficient network of health facilities but to optimize that network to meet a patient's real needs and improve efficiency and quality of health care delivery. Measurements of effectiveness and of the quality of health services should be included as a key section in each regional modernization program, such as increase in birth rates and life expectancy, and decrease in the death rate.

5.2 Regional variations in health spending, physical inputs, and health outcomes

73. **There is a large variation in per capita health expenditure across regions.** Health expenditures are largely locally funded, and as a result vary substantially with the wealth of regions.³⁴³⁵ Average regional income explains about two-thirds of the variation in expenditure per capita. The highest-spending regions allocate 9 to 10 times as much of resources per capita as the lowest-spending regions, even after controlling for spatial price differences (Figure 24).

Figure 24: Regional Variation in Health Expenditure Per Capita



Note: All numbers are corrected for regional price differences. The vertical and horizontal lines are averages for the entire distribution, including the regions with very high levels of GRP per capita that have been excluded from the graph.

Source: World Bank calculations using regional database.

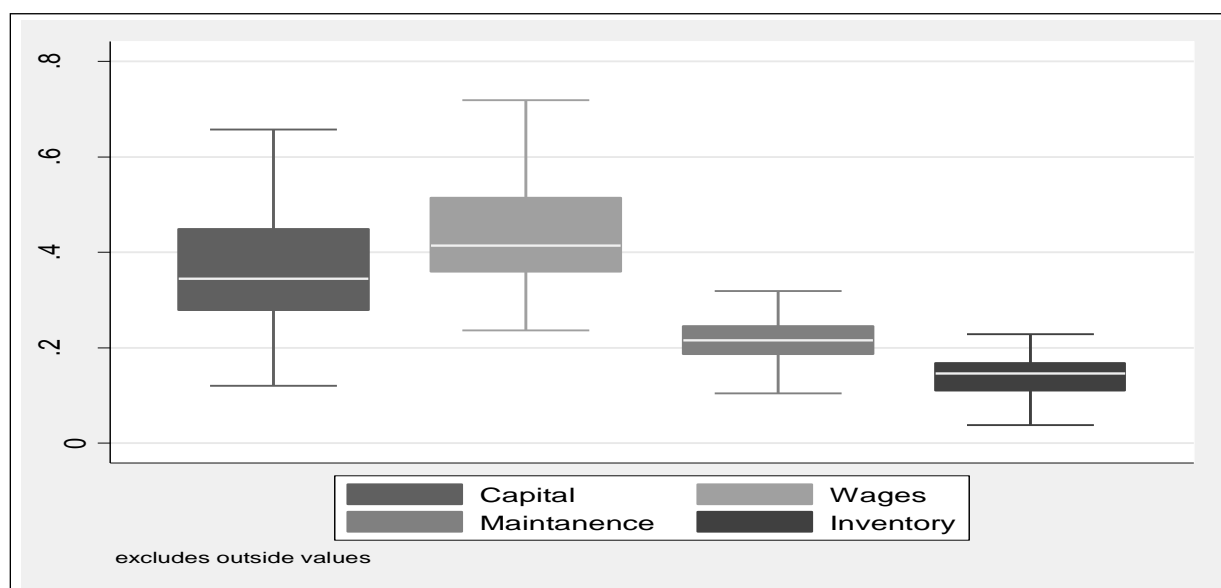
³⁴ On average across Russia, health spending per capita is similar to education spending per capita. In the analysis of education we look at general education spending per student.

³⁵ Health expenditures per capita are based on data from Ministry of Finance and include expenditures from Mandatory Health Insurance (MHI) fund.

74. **The health system continues to be heavily oriented toward hospital care. Yet, some regions seem to have refocused in establishing a more balanced health care delivery system.** On average, more than 92 percent of regional budget expenditure goes to inpatient expenditure, while 5 percent goes to outpatient care and around 2 percent to emergency care. However, in some regions inpatient care receives as little as 63 percent of budget funds, while in others it receives over 98 percent.³⁶ Similar variation in outpatient and emergency care is observed.

75. **Regional variations also exist in the structure of expenditure on physical inputs such as wages, capital, inventory, and maintenance.** Poorer regions seem to be disadvantaged in their ability to finance capital spending. The share of expenditure allocated to capital varies from 28 percent in low-spending regions to 45 percent in high-spending regions. The share of total expenditure spent on wages varies from 36 percent to 52 percent, respectively (Figure 25).

Figure 25: Share of Consolidated Regional Expenditure on Various Types of Physical Inputs across Regions



Note: The center box shows the distribution falling between the 25th and 75th percentile (regions are ranked by per capita spending). The line in the middle of the box is the median. The observations shown separately could be considered outliers in terms of the overall distribution.

Source: World Bank calculations using Ministry of Finance data (2006).

³⁶ Such variation may also reflect differences in organization of health care delivery. In Russia significant part of outpatient care is provided in rayon hospitals and community hospitals that is why some regions may spend 98% on care provided by hospitals.

76. A number of explanations have been proposed to why inpatient spending is so large a proportion of total spending and why it has been declining³⁷. The explanations include:

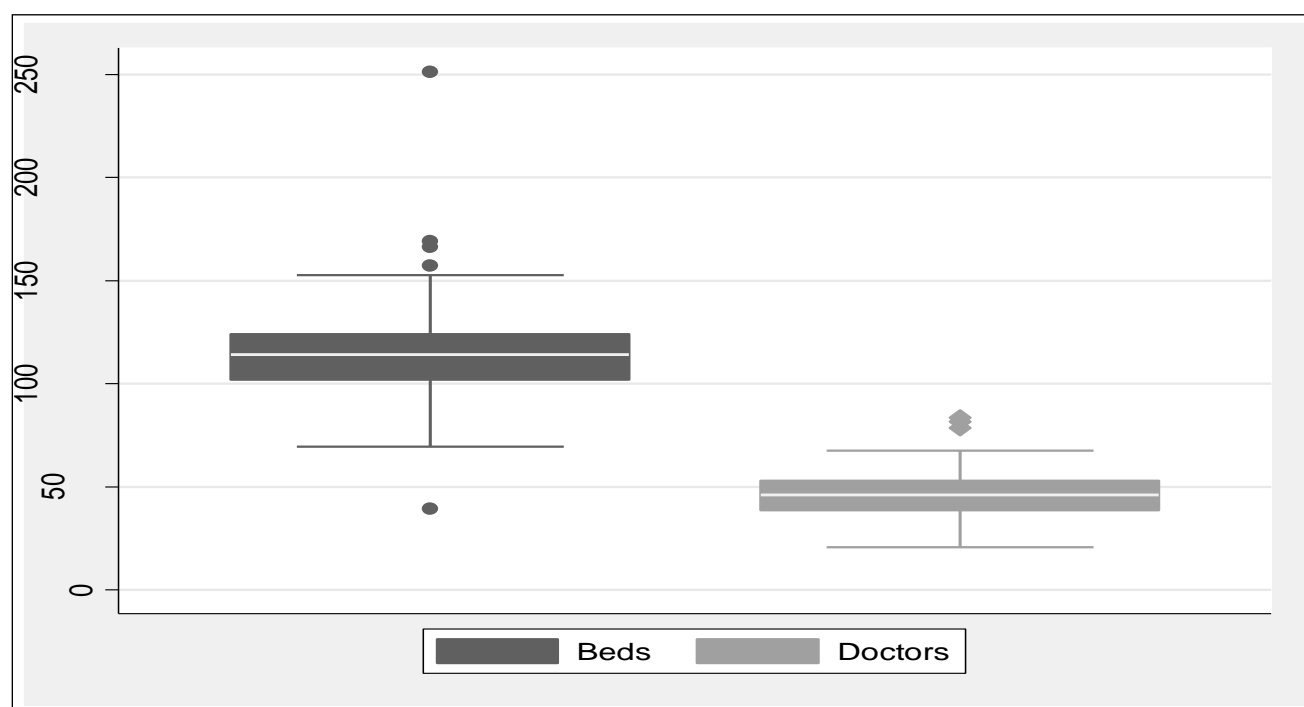
- *A high number of hospital beds per citizen.* The network of medical institutions is reforming very slowly, inpatient clinics even those in surplus are often not closed down, and the administration tries to make use of all the beds. Such means include: hospitalization of patients who could do without, extra long hospital stays, and hospitalization of patients whose medical conditions could be treated on an ambulatory basis.
- *A higher perceived skill level of specialists at inpatient facilities* as compared to outpatient ones. Patients try to get to a hospital just because the doctors are perceived to be better there.
- *Low income population groups prefer hospitals* because drugs are provided free of charge for inpatient care albeit not everywhere.

77. These problems are well known to health care managers and policy makers who have initiated reforms aimed at changing health care structures and process, as well incentives, at the regional health systems. For example, outpatient clinics have been equipped with state-of-the-art equipment funded by the government and the salaries of the primary care staff have increased considerably. In response to these and other initiatives the percentage of spending devoted to inpatient care fell from 64 percent in 2000 to 58.7 percent in 2007.

78. There are substantial regional differences in per capita physical inputs used. While in some regions there are less than 50 beds per 10,000 people, in others there are more than 150. Similarly, there are regions with 20 doctors per 10,000 people and others with more than 80 doctors per 10,000 people (Figure 26). It is noteworthy that while the number of beds and hospitals decreased somewhat over the last decade, the number of doctors increased despite the falling population.

³⁷ Marquez, P. and others. 2008. “*Public Spending in Russia for Health Care: Issues and Options.*” Washington, D.C.: The World Bank.

Figure 26: Variations in Doctors and Hospital Beds per 10,000 people Across Regions

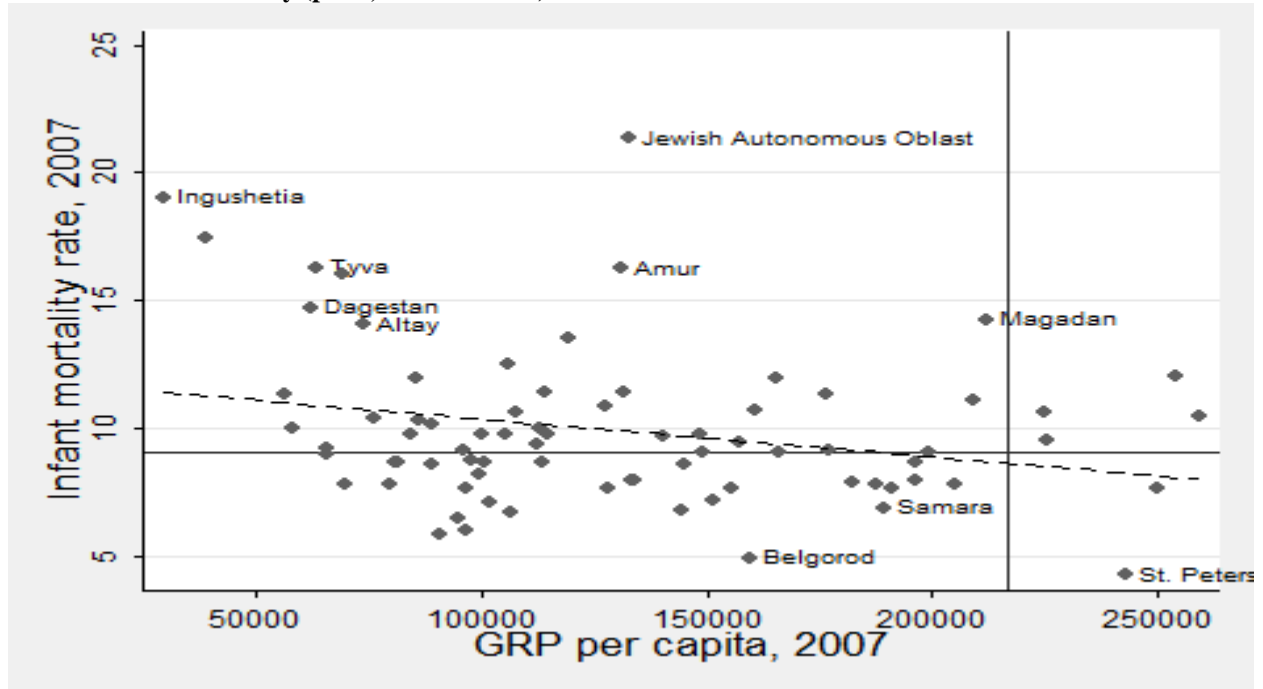


Source: World Bank regional database, 2006.

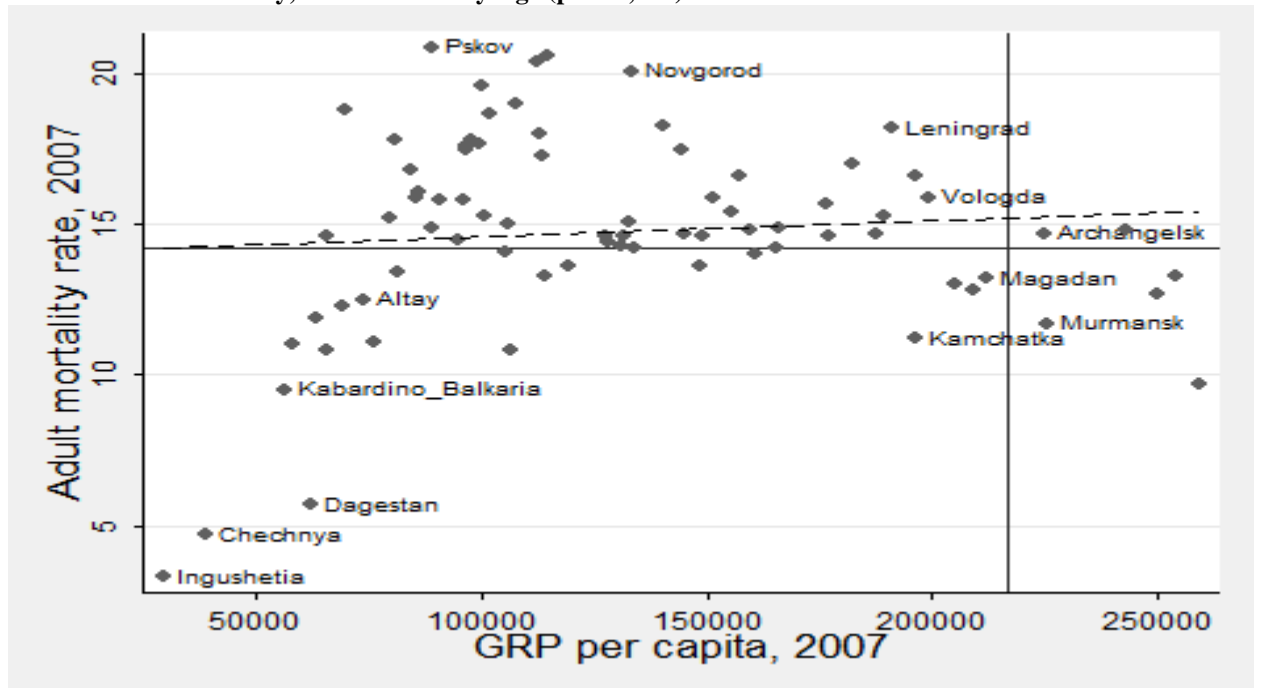
79. **There are substantial differences across regions in health outcomes.** Reflecting significant regional differences in socioeconomic status and public sector health care expenditures, differences can be observed when analyzing the regional variation measured in terms of several indicators: infant/child mortality, adult mortality, and life expectancy. For instance, infant mortality (per 1,000 live births) varies from 4.3 in Saint Petersburg to 19 in Ingushetia (Figure 27, Panel A). Death rates among the working-age population (per 100,000) vary from under 200 in South Caucasus republics to more than 1,000 in Evreyskaya AO, Kemerov, Novgorod, Pskov, Kareliya Republic, Smolensk, Tver, and Chita. Adult death rates (per 10,000, standardized by age) vary from under 5 to more than 20 (Figure 27, Panel B). In other words, on those indicators the difference between the worst- and best-performing regions is a factor of 5. Life expectancy at birth varies across regions from 59 years in Chukotka and Tuva to 74 years in Dagestan and Chechnya—a 15 years' difference within the same country (Figure 27, Panel C). In analyzing the efficiency of public health spending it is important to keep in mind that many determinants of health in Russia lie outside of the health sector domain, and hence require a different set of interventions (Box 9).

Figure 27: Regional Variation in Selected Health Outcomes

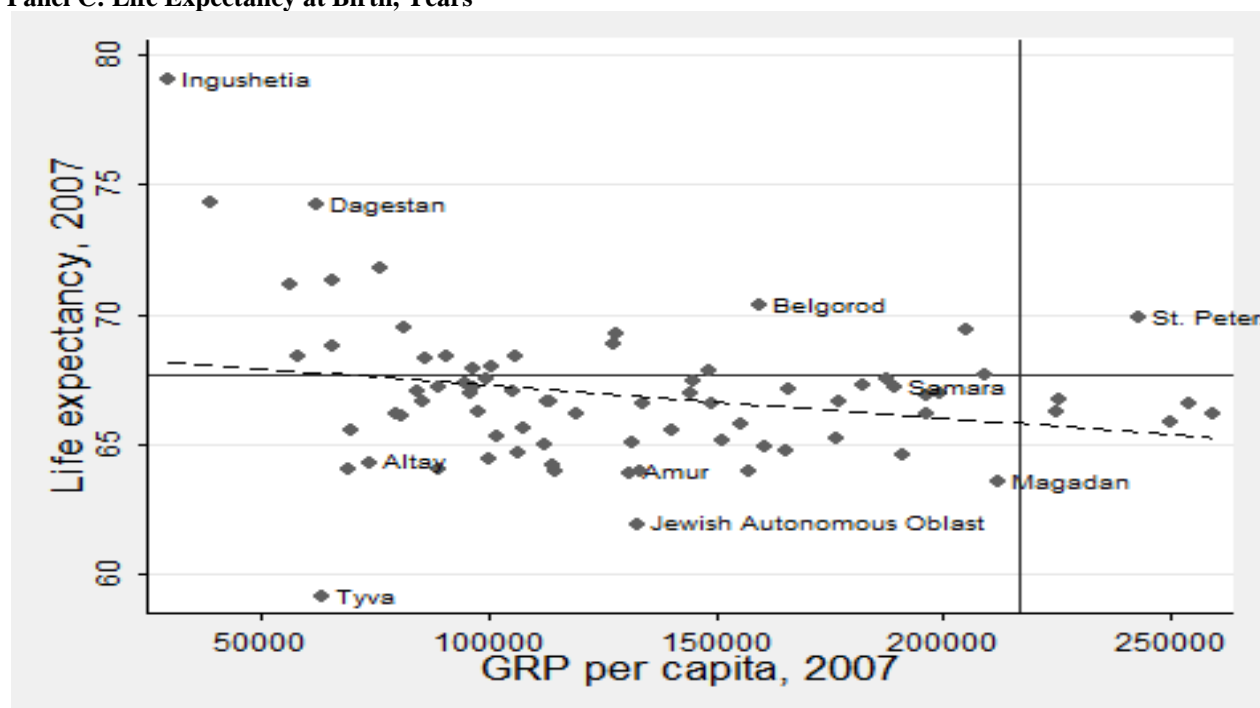
Panel A: Infant Mortality (per 1,000 live births)



Panel B: Adult Mortality, Standardized by Age (per 10,000)



Panel C: Life Expectancy at Birth, Years



Source: World Bank based on the RosStat data.

Box 9: Influencing the social risk factors associated with poor health status in the Russian Federation

Russia's demographic and health trends are characterized by low fertility and high adult mortality and morbidity rates. Russian adults suffer from higher levels of morbidity and disability and have a lower healthy life expectancy than other developed countries. Non communicable diseases (NCDs) and injuries represent the bulk of premature deaths and ill health burden. Cardiovascular diseases (CVDs) alone account for more than 50% of all deaths. Increasing urbanization, changing lifestyles, and aging of the population, contribute to the onset of NCDs. Alcohol abuse accounts for close to 20% of total disability-adjusted life years lost; tobacco consumption and nutritional-related factors also contribute to the burden of NCDs in Russia. Road traffic injuries and fatalities add to burden of disease and premature mortality and disability in Russia.

The etiology of most NCDs and injuries is complex as it influenced by social and behavioral factors. Risk factors should therefore be managed from multiple directions. The government's role in disease prevention is multi-faceted, from establishing institutions and infrastructure, setting priorities, rallying constituencies for disease prevention, implementing regulations and policies, to educating the public. Many disease prevention efforts also require health system reforms, for example, creating financial incentives to strengthen public health prevention and develop community-based intersectoral interventions to benefit the majority of population.

The most cost-effective interventions for behavioral change among the population are legislative and policy-based interventions. For the control of alcohol and tobacco use, legislative measures are especially useful and have been implemented in many Western countries. The strategies for preventing alcohol abuse include regulating the price and quality of alcohol, reducing the availability of products, introducing laws against underage drinking and drunk driving. Likewise, tobacco control strategies include regulating the price of tobacco, introducing excise tax increases, introducing smoking bans and restrictions in most public settings. To supplement legislative controls, media campaigns for anti-smoking and drinking are needed to influence public opinion against abusing alcohol and tobacco, or driving under influence of alcohol or drugs.

Health system interventions that rely on doctors and nurses to perform secondary prevention, including screening for risk factors, early treatment and counseling of patients at high risk, are also needed to effectively prevent and control NCDs.

In high income countries, using a series of simulation models, researchers have found that nearly half the reduction in cardiovascular disease mortality rates in recent decades can be attributed to population-level changes in risk factors such as tobacco use, diet and physical activity, and rest to health system interventions, particularly better access to diagnosis, drugs and follow up care.

Source: Marquez, P. and others. 2005. *Dying Too Young: Addressing Premature Mortality and Ill Health Due to Non-Communicable Diseases and Injuries in the Russian Federation*. Washington, D.C.: The World Bank; and Marquez, P. and Bliss. A. 2010. "Dangerous Roads: Russia's Safety Challenge." ECA KB 27, The World Bank.

5.3 Analysis of overall and system efficiency in the health sector

80. We estimate efficiency across regions by relating the health outcomes across regions to allocated regional resources. We capture health outcomes by infant, child, adult (age standardized) male mortality rates, and adult female mortality rates. We call the relative ability of regions to turn expenditure into these health outcomes *overall efficiency*, and the ability of regions to turn allocated physical resources (hospitals, doctors, and beds per capita) into health outcomes *system efficiency*.³⁸ Relative efficiency is estimated with the Data Envelopment Analysis (DEA), as described.³⁹ We are able to assess regions in their ability to achieve good health outcomes compared to how many resources they have allocated, and what they have achieved relative to other regions. For instance, the most-efficient region would receive a score of 1, while a similar but less-efficient region could receive a score of 0.95. An efficiency score of 0.95 would indicate that the region could reduce its expenditure by 5 percent and still achieve the same health outcomes, if it was as efficient as the similar region with a score of 1. The analysis shows that regions on average have a score of 0.74 in overall efficiency, i.e. on average regions could reduce inputs into the health sector by 26 percent and still produce the same outcomes if they were as efficient as the most efficient similar region. If all the 84 regions included in the analysis became as efficient as their best performing peer this would result in about 180 to 200 billion rubles, or 12% of the total public spending on health, that would become available for alternative uses within the sector.⁴⁰

81. We find that regions differ significantly in their efficiency levels.⁴¹ Importantly, regions with similar levels of spending can have substantial differences in efficiency levels (Figure 28). Interestingly, many regions that are known to be most health-reform oriented also appear among

³⁸ System efficiency is also often referred to as *technical* efficiency in the literature.

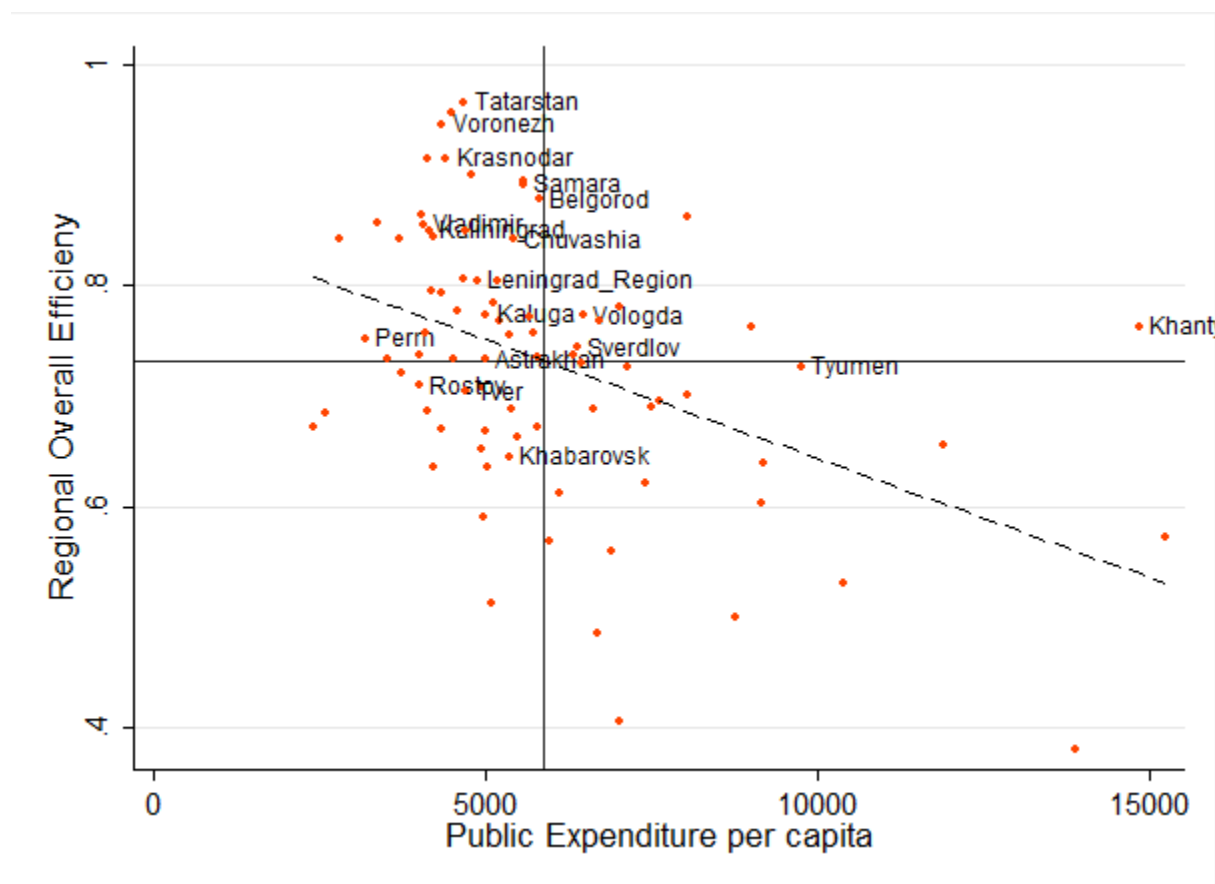
³⁹ Achieving good health outcomes is complex and depends on many different aspects. Some of those aspects cannot be measured and therefore cannot be analyzed quantitatively. The DEA method is also more suitable for analysis of efficiency across regions compared to the analysis of efficiency across countries, since regions have similar historical institutional characteristics.

⁴⁰ The estimated saving is calculated as one minus the efficiency score multiplied by total health public health expenditures (including MHI) in 2006 (the year the analysis for undertaken for).

⁴¹ Being economically efficient does not necessarily mean having best health outcomes; however, efficient regions are found to have better health outcomes. The DEA analysis estimates how much each region could reduce inputs and still achieve the same outcomes. In this setting, an efficient region might achieve mediocre outcomes but with very low inputs, and therefore be very efficient.

the most efficient in our analysis.⁴² For example, out of 19 regions that participated in the 2007/08 National Health Pilot Project (described above), 7 were ranked in our analysis as being in the top efficiency group, 4 were in the next efficiency group, and 5 had the lowest average efficiency. Similarly to the story that emerged in the efficiency analysis of education, we find that overall efficiency has a higher degree of correspondence with system efficiency.

Figure 28: Overall Efficiency and Health Expenditure Per Capita Across Regions



Source: World Bank estimates.

82. In the second stage of the analysis of efficiency we use the derived efficiency scores to investigate which regional factors are related to efficiency. There are effectively two groups of factors. The first group includes variables that are outside the immediate control of regional authorities. The second group includes factors that can be influenced by the regional policies. Once we identify significant factors in the first group, they are used as control variables in the regressions that investigate the importance of the policy variables (that is, the factors in the second group).

⁴² The reform regions are defined as such based on the extensive consultations with the sector experts in Russia. Those regions are the ones that are known to have introduced the most far-reaching structural reforms.

83. **The significant factors beyond control of the regions that are correlated with efficiency include:** *population density, share of private expenditures on health, and average wage in the economy.* The first two factors are positively correlated with both overall and system efficiency. In other words, more densely populated regions and regions with a higher share of private spending are generally more efficient. The average wage in the economy is negatively correlated with overall efficiency, which would be expected given that paying higher wages increases costs.

84. **Several regional characteristics are found to be correlated with overall and system efficiency.** Some factors are correlated with both types of efficiency. That means that these factors influence both how efficiently regions turn expenditure into health outcomes and how efficient regions turn allocated physical resources into health outcomes. In summarizing the results, all factors are divided into those positively related to efficiency and those negatively related to efficiency.

85. **The factors that are positively related to both overall and system efficiency include:**

- ***Share of regional budget expenditure on outpatient care.*** Regions that spend a higher share of their expenditure on outpatient procedures compared to inpatient and emergency care achieve better health outcomes for a given expenditure level and allocated physical resources.⁴³ Examples of regions with a higher share spent on outpatient procedures are Samara Oblast and Tatarstan Republic (well known in Russia to be health-reform-oriented regions), and Northern Osetiya-Alaniya Republic. Examples of regions that have spent little on outpatient procedures are Sakhalin Oblast, Tyva Republic, and Ust-Ordynsky Buryatsky AO.
- ***Share of doctors working as primary care physicians.*** Regions with a larger share of doctors working as primary care physicians have higher overall and system efficiency. Examples of regions with a high share of health employees working as primary care physicians are Chuvashia, Tatarstan, and Samara (again, all three being health-reform-oriented regions). Examples of regions having a small share of doctors working as primary care physicians are Karbardino-Balkaria, Yamalo-Nenetsk, and Novosibirsk. The experience of the Chuvash Republic presented below shows a successful example of changing incentives by linking payments for general practitioners to improved performance (Box 10).
- ***Share of regional budget allocated to capital expenditures.*** A higher share spent on capital is correlated with higher overall and system efficiency.⁴⁴ A higher absolute amount of capital expenditure per capita and per facility is generally also correlated with higher overall and system efficiency.⁴⁵ Examples of regions that spent a high share of

⁴³ However, it is important to recognize that many health outcomes are determined by multitude of factors outside of the health system.

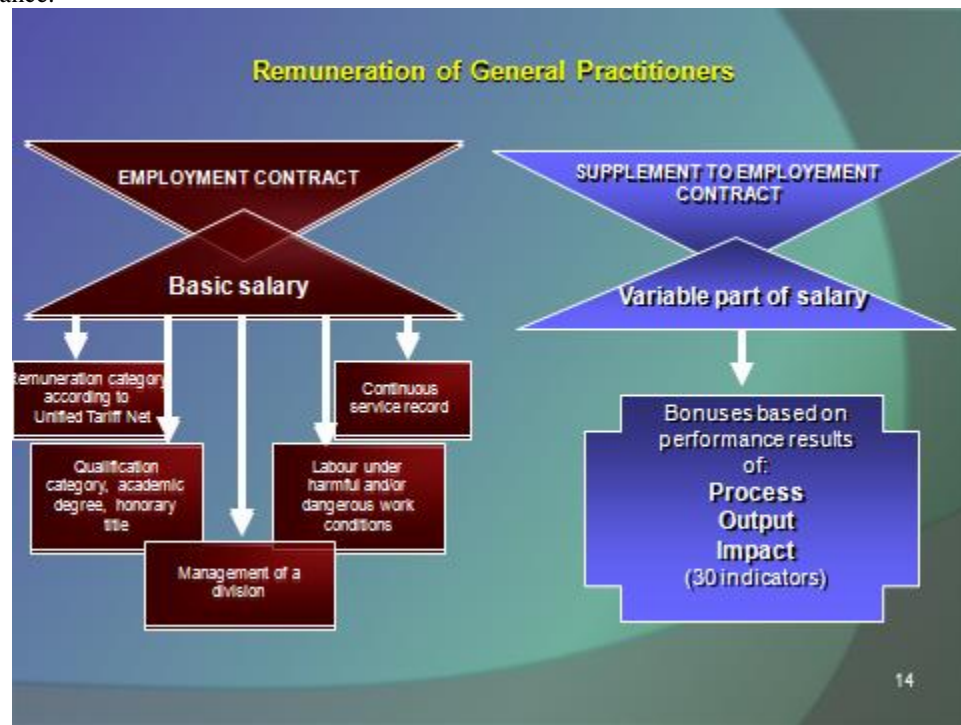
⁴⁴ It is important to emphasize that we are talking about a relative allocation of resources here. Hence, this Report does not suggest to invest more in absolute terms in construction and equipment.

⁴⁵ This is not meant to diminish the importance of other factors, since the quality of care at the facility level depends on infrastructure and process.

expenditure on capital investment include Samara and Belgorod Oblast and Tatarstan Republic (again, those are reform-oriented regions). Examples of regions that spent relatively little on capital include Amur and Sakhalin Oblasts and Tyva Republic. The larger share of expenditures spent on capital being efficiency-boosting is consistent with the need for investment in new technology that would increase efficiency. However, we do not have sufficient details on the exact type of capital investment that regions undertake. To go into this level of analysis, regional case studies would be needed.⁴⁶

Box 10: Changing the incentives systems in the Chuvash Republic by linking payments for general practitioners to improved performance measured by achievement of programmatic targets

The Chuvash Republic transitioned to a primarily single-channel system of health finance (pooling of funds from different sources) contributing to a reduction in fragmentation of sector finances as well as an increase in the overall level of financing to the sector. A performance-based remuneration system for general practitioners (GPs) was also to support the strengthening of primary care services; it is based on employment contracts between the administration of the health facility and the GP, specifying a basic salary rate and additional contracts specifying a variable part of remuneration directly dependent on performance.



Source: Ministry of Health of the Chuvash Republic.

⁴⁶ The framework of the Russia Social Expenditure Review envisions regional case studies in the next stage of the analysis.

86. **The factors that are *negatively related to both overall and system efficiency* include:**

- ***Average length of patient stay.*** Regions with a longer average length of stay for each patient are less overall and system efficient. Examples of regions with long average stays are Kamchatka, Magadan and Chukotka. Altay is an example of a region with a very low average stay.
- ***Emergency visits.*** The more emergency visits per capita regions have, the lower their overall and system efficiency. Regions with many emergency visits include Sakhalin, Novosibirsk, and Chukotka. Regions with few emergency visits include Dagestan, Ingushetia, and Chuvashia.

87. **The factors that are *negatively related to overall efficiency* include:**

- ***Number of facilities and hospital beds per capita.*** Regions that manage to serve the population with fewer facilities per capita are more overall efficient. The result holds controlling for population density, and indicates that some regions have been able to consolidate facilities and thereby reduce the overall cost per capita. Ryazan and Saratov Oblasts, for instance, are examples of regions that have similar population densities and urbanization rates, while Saratov has better health outcomes. Ryazan, on the other hand, had almost twice as many facilities per capita and 18 percent higher expenditure per capita in 2006.⁴⁷
- ***Relatively higher wages in the health sector compared to the economy's average wage.*** Paying relatively high wages in the health sector is unavoidable in some regions because they need to pay competitive wages to attract and keep personnel in the health profession. However, even after controlling for the average wage in the economy, we see substantial variation in how much regions pay relative to the average of the regional economy.⁴⁸ The results of the efficiency analysis indicate that regions that pay more relative to the average of the economy are less overall efficient. At the same time, there appears to be no relationship between health sector wages and system efficiency.

88. **The correlation between efficiency and *institutional and administrative regional aspects* is also of interest.** Freinkman and Plekhanov (2009), for example, have shown that a higher level of decentralization is associated with better quality in secondary education and utility provision. The impact is attributed to strengthened fiscal incentives rather than to different allocation of resources. We also undertake here the analysis of the institutional aspects in the context of the health sector. The following factors were found to be significantly related to efficiency:

- ***Informal payments to officials.*** In regions where experts found that the degree of informal payments is more common, they also found that both overall and system efficiency are lower. The link between informal payments and worse health outcomes is

⁴⁷ Marquez (2008) also argues that there is room for consolidation and restructuring of current facilities.

⁴⁸ A separate analysis of the health care systems and the wage-setting environment would be needed to understand why this is the case. Such an analysis, while interesting, is outside the scope of the work presented here.

likely related to the problem of equal access that arises from the wide practice of informal payments.

- ***Investment risk as a broad measure of institutions' quality.***⁴⁹ The index of investment risk is significantly negatively correlated with both overall and system efficiency. Hence, regions with worse institutions (measured by the risk on investment index) have lower efficiency. The index of investment risk compiled by the Expert Rating Agency takes into account local legislation, quality of local administration (municipal and regional governments), crime, lack of social cohesion and possibility of social unrest, environmental issues, downside risks to the regional economy, and enforcement of financial contracts.⁵⁰ All these aspects can be seen as reflections of the quality of public institutions within the region.
- ***Quality of local governance.*** We find that better local governance is associated with higher overall and system efficiency. However, this result is robust only in the bi-variate regression framework, likely because in the multivariate analysis this variable is highly correlated with other institutional factors, including those mentioned above.

89. **A number of other variables were also tested in the context of administrative and institutional aspects but were not found to be significant.** Those include: (a) share of regional budget expenditures from regional transfers; (b) share of municipal expenditures raised at the municipal level; (c) share of health care organizations that use medical-economic standards in provision of medical services; (d) share of health care organizations using performance-based payments to doctors; and (e) degree of decentralization developed by Kurlyandskaya and Nikolayenko (2005). Quality of government health care system management and quality of the government health care system financing as measured by the Independent Institute of Social Science were not found to be related to overall and system efficiency. The statistical insignificance of those factors does not necessarily mean they are in general not important for efficiency. Many of the reforms in the health system are recent, and as such they likely need more time to translate (if at all) into efficiency. Repeated careful assessments are needed to monitor those links between reforms and efficiency.

90. **To summarize, several key factors are found to be associated with higher efficiency in the delivery of health services.** These factors include: (a) a higher share of primary care physicians in the total number of doctors, (b) fewer emergency visits, (c) a larger share of expenditure spent on outpatient procedures and capital, (d) fewer personnel and facilities per capita, (e) shorter bed stays per admitted patient, and (f) better institutions. A shift to more primary care, more outpatient services, and less emergency care has already been identified by the Russian Government as objectives for future reforms. Hence, the analysis confirms that these are the right policy directions.

91. **From regressions of efficiency and external factors we can see that both external factors beyond control of the regions and factors under control of the regions can explain**

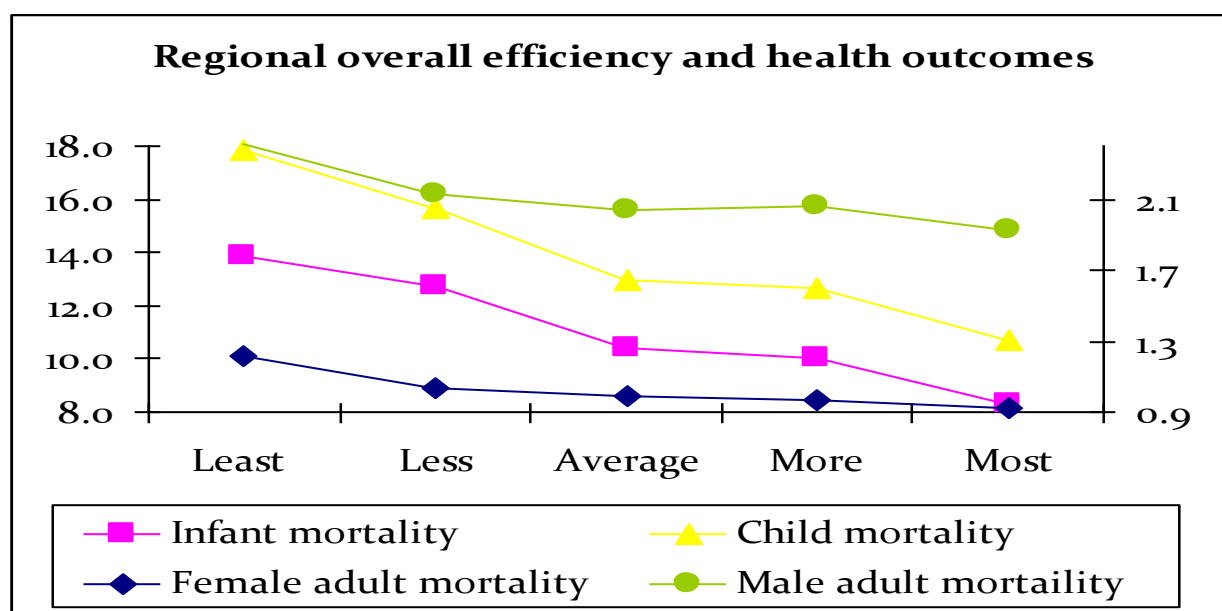
⁴⁹ Note that one can approach the measurement of institution quality in terms of how well resources are plan, organized and managed for the production of services.

⁵⁰ See: www.raexpert.org.

the variation we see in health expenditure efficiency. In comparison to education, we find that in the health sector external factors beyond control of the regions seem to play a larger part in explaining variation in efficiency across regions. This, among other factors, could be related to the role of private health expenditures. Private health care expenditures are expected to explain a large part of variation in efficiency as they impact health outcomes directly. However, we do not capture private health expenditures in our study.

92. More reform-oriented regions are also found to have better health outcomes. The regional analysis of health provides empirical evidence that regions that are at the forefront of implementing health reforms achieve better health outcomes at a lower cost and with fewer physical resources. This finding seems to be very robust to the choice of the health indicator used in the analysis (Figure 29).

Figure 29: Regional Health Outcomes compared to Overall Efficiency Levels



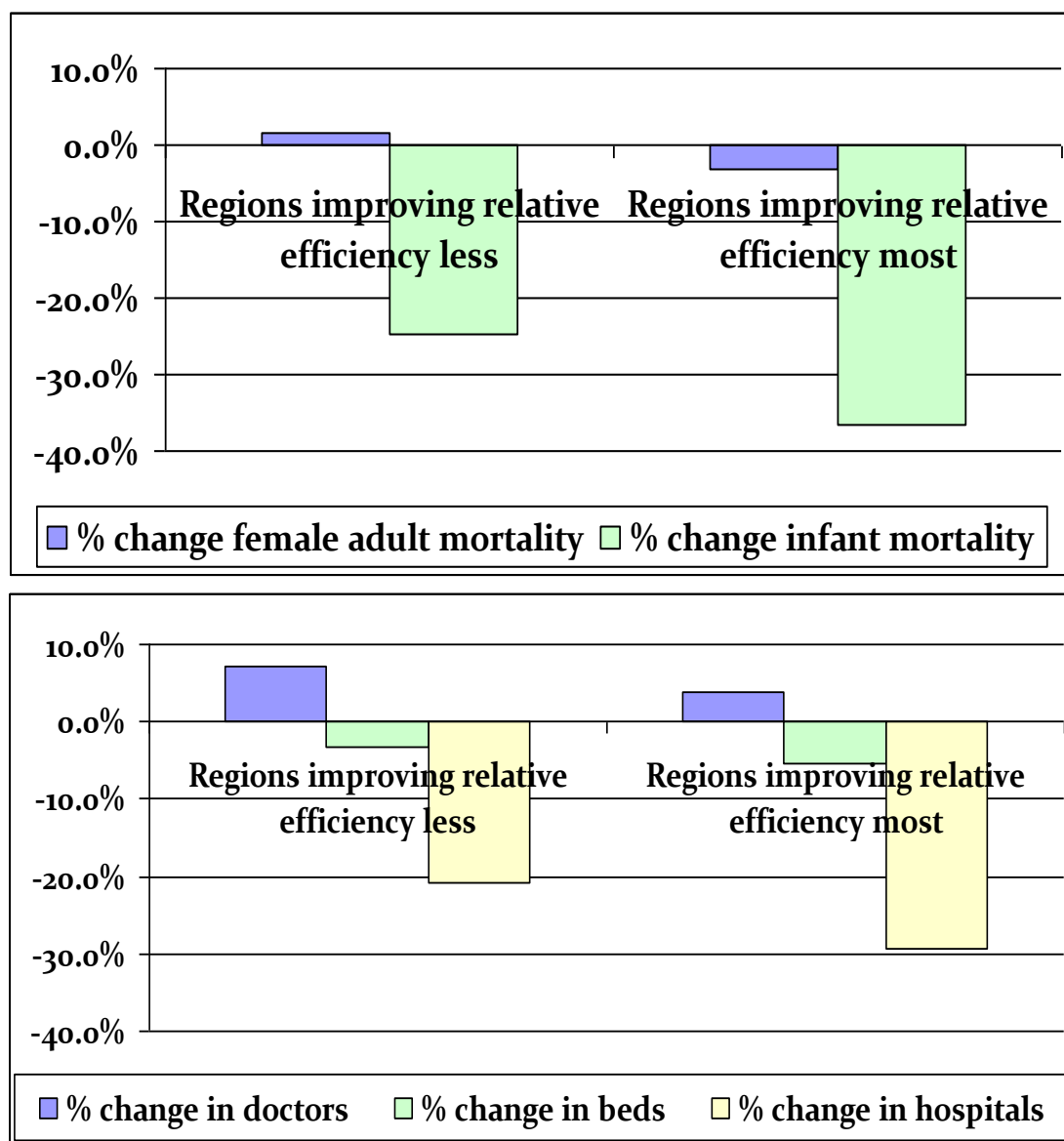
Note: Regions are assigned into one of five efficiency groups based on the quintiles of overall efficiency. Infant and child mortality is measured on the first axis. Male and female mortality is measured on the second axis.

Source: World Bank estimates.

93. Regions that improved overall and system efficiency most over time are found to have reduced physical inputs and improved health outcomes. Regions with the most improvement in overall efficiency are also found to have slashed the number of hospital beds and hospitals at a higher rate than other regions, and to have increased the number of health personnel less than other regions. Further, regions with the most improvement in overall efficiency also had larger improvements in health outcomes. Regions that had less improvement in overall efficiency actually had registered rising mortality rates. At the same time, regions with the most improvement in overall efficiency had declining adult mortality rates (Figure 30). Annex 4 presents more information about the changes in physical inputs and health outcomes across

regions with different levels of efficiency improvements. The evidence from Chuvash Republic highlights the link between health sector reforms and health indicators (Box 11).

Figure 30: Trends in Efficiency compared to Trends in Physical Inputs and Health Outcomes, 2001 to 2006



Note: The two groups of regions refer to the regions belonging to the first and fifth quintiles of the efficiency improvements.⁵¹

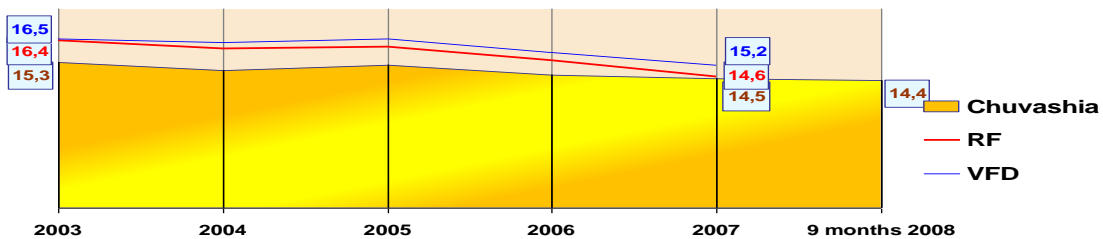
Source: World Bank estimates.

⁵¹ All regions have been ranked in terms of the degree of efficiency improvement. The 1st quintile represents the 20% of the worst performing regions, and the 5th quintile represents the 20% of the best performing regions.

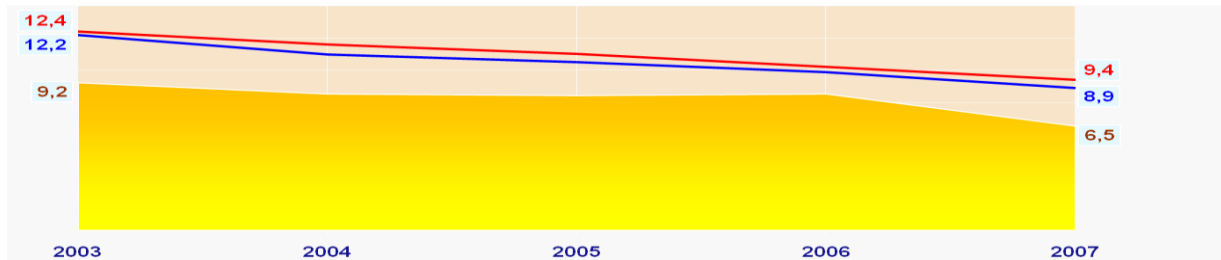
Box 11: Health System Reforms and Health Indicators in Chuvash Republic

Over the 2003-2008 period, the regional health systems in the Chuvash Republic was restructured to increase the access, quality and efficiency of health services, offering alternative models for improving the organization of service delivery to other regions in the Russian Federation. While it is not possible to directly link health outcome improvements in the Chuvash Republic solely to health system improvements supported under the World Bank's Health Reform Implementation Project, the health system reforms contributed to the positive developments experienced by the regions over the 2002-2008 period (see below).

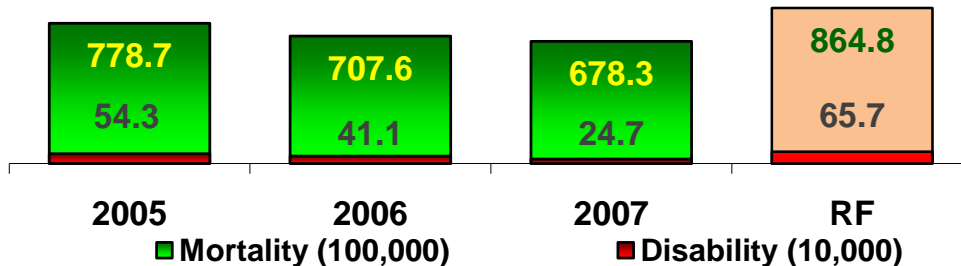
**Population's Mortality Rate, Chuvash Republic and Rest of Russian Federation
(per 1,000 of population)**



Infant Mortality Rate (per 1,000 live-born), Chuvash Republic and Rest of Russian Federation



Cardiovascular Disease Mortality in the Chuvash Republic and the Russian Federation



Source: Chuvash Republic Ministry of Health data sources.

94. **Analysis of the efficiency dynamics produced a list of regions with improved efficiency.**⁵² Regions that improved their overall efficiency score the most between 2001 and 2006 include Kaliningrad Oblast and Karachaevo-Cherkessia Republic. Regions with relatively large improvements in system efficiency include Kareliya Republic, Vologodsk Oblast, Kaliningrad Oblast, and Karachaevo-Cherkessia Republic. Some of the regions which improved both overall and system efficiency are presented in Table 5 below.

Table 5: Examples of Regions with Improved Efficiency, 2001 to 2006

	Improved Overall Efficiency
Improved System Efficiency	Kaliningrad, Karachaevo
	Cherkessia, Bryansk, Vladimir,
	Kaluga, Samara, Chuvash
	Republic

95. **What kind of health reforms did successful regions introduce? How did they do it?** The story of Chuvash Republic and Voronezh are very telling in this regard. These two regions, under the support of the World Bank-funded Health Reform Implementation Project over 2004-2008, provide an example of regions that in recent years have changed many of the aspects identified in this paper as those leading to higher health sector efficiency. In both regions, hospital beds were reduced while simultaneously increasing service delivery capacity at the primary health care level, specialized ambulatory services, and long term care facilities through the introduction of new technologies, adapting new clinical guidelines and protocols to coordinate the health care process, developing management information systems to coordinate the flow of patient information across facilities, improving the knowledge and skills of health personnel, changing incentives in the health system by linking payments to physicians and to facilities to outputs and performance targets. Details of the impact of these reforms in the Chuvash Republic and Voronezh are provided in Box 12.

96. **This regional example provides evidence that, given the political will and dedication to reforms at the regional level, deep-reaching, efficiency-enhancing reforms in the health sector are possible.** The potential areas for introducing further nationwide changes in the health sector include: (i) Introducing single-channel financing with Mandatory Health Insurance (MHI) resources and implementing a nationwide uniform approach to calculating health insurance payments for non-workers; (ii) Creating explicit incentives for regions to: (a) downsize hospital care (including reduction in the network), and (b) use freed resources for development of preventive/family/mobile care; promote regional successful experiences (in introducing those changes) to other regions; (iii) Using the resources freed from downsizing hospital care for development of preventive/family/mobile care with a focus on quality; and (iv) Promoting the spread of regional successful experiences in introducing health reforms to other regions, and create federal incentives for regions (especially poorer ones with a low capacity for reforms) to embark on further reforms.

⁵² The period for the analysis is 2001 to 2006. Hence, it does not cover the most recent period of health reforms.

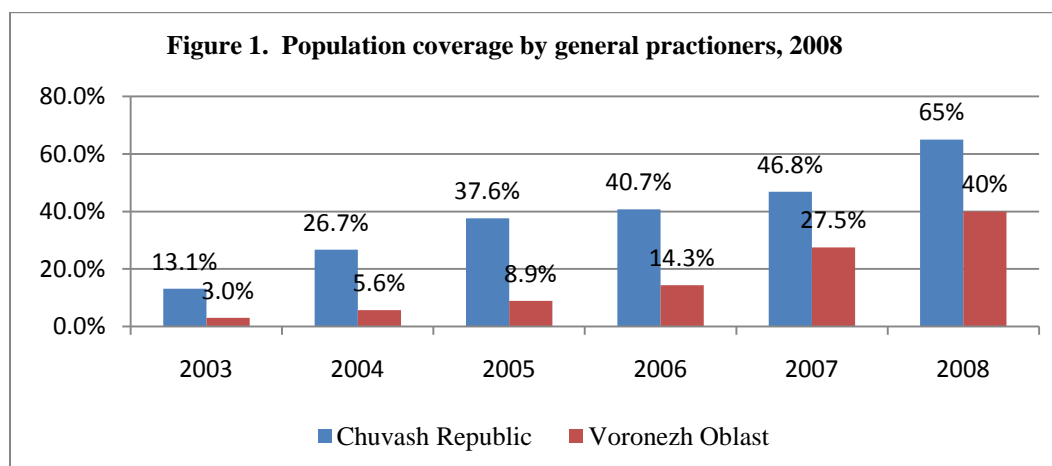
Box 12: Improving Efficiency and Effectiveness in Health Care Organization and Delivery at the regional level in the Russian Federation

The health care reform experience of the Chuvash Republic and Voronezh Oblast supported under the World Bank-funded Health Reform Implementation Project over 2004-2008 provides evidence that it is possible to effectively restructure the regional health systems in Russia. A critical lesson is that successful reforms require holistic and well-sequenced approaches, based on detailed master plans for investment in institutional and human resources development. Partial reforms produce imbalances.

Some of the results achieved are:

Increased Primary Care Coverage. The population covered by general practice units increased significantly in both regions (Figure 1). In 2010, the Chuvash Republic and Voronezh were ranked among the top three regions in the Russian Federation, as measured by the number of general practitioners per 100,000 population (the other region is Samara). The emphasis on the gatekeeping role of general practitioners, with care continuity, is already bearing fruit, with reduced cases referred to specialists. In the Chuvash Republic, referral to specialists declined from 8.7% in 2003 to 2.3% in 2008.

Restructured Hospital Care. Medical facilities were reorganized, and in some cases merged, to reduce excess hospital infrastructure and bed capacity. As a result, the number of hospitals was reduced in the Chuvash Republic by about 43% and in Voronezh by 54% (Figure 2). Similarly, the number of 24-hour hospital beds was reduced in the Chuvash Republic by 18% and in Voronezh by 20%. In Voronezh, the number of patients treated in day care facilities increased by 79% during this period, and in 2008, 40% of surgeries were done at ambulatory centers. Hospital admissions also decreased during this period (for example, in Voronezh City by 12%). All these improvements in health organization and service delivery also resulted in shorter average length of stay in hospitals, albeit at a still high level. In the Chuvash Republic, the average length of hospital stay was reduced from 13.2 days in 2002 to 12.1 in 2008; in Voronezh from 13.5 to 11.8 days. These figures under Box 12 are below the average for Russia, which is 13.6 days.

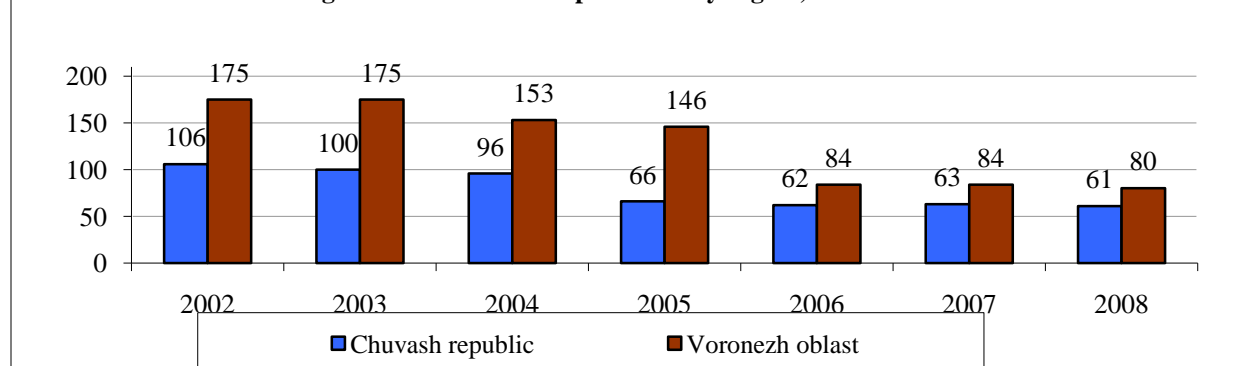


In both regions, the pre-hospital emergency medical services were also revamped and strengthened. This contributed to a timely response to emergency calls and improved quality of services. The average response time for 86% of emergency calls in the Chuvash Republic declined from 20.9 minutes in 2006 to 13.5 minutes in 2008, lower than the average of 25 minutes for all of Russia.

Process of Care. New disease management protocols developed by the MOHSD were adapted in accordance with local conditions: 220 in the Chuvash Republic and 154 in Voronezh. This is helping improve the quality of care and optimize referrals to hospitals. Over the 2002-2008 period, the percentage of patients readmitted for the same condition after discharge was reduced in the Chuvash Republic by 26% and in Voronezh by 44%.

Health Information Systems. Investments were made in the health information systems to coordinate the flow of clinical and financial information across the health systems in the two regions. Health care facilities, units within facilities and regional health agencies are now “virtually” connected through broadband wide area networks. Electronic health records, which collect data at the point of service, support clinical decision-making processes and facilitate performance measurement. Inter- and intra-regional medical consultations and distance learning activities were supported through the establishment of telemedicine networks. In Voronezh, the number of consultations using videoconferencing increased by 381% over the 2003-2008 period.

Figure 2. Number of hospital beds by region, 2002-08



Human Resources. Retraining of medical personnel and training of new general practitioners and nurses were done in regional institutions such as the Voronezh State Medical Academy, and outsourced to leading centers such as the Family Medicine Department of the St. Petersburg Medical Academy. An indicator of training quality is the share of certified physicians and nurses: in Chuvash Republic, certification increased by 29% among physicians and 55% among nurses over the 2002-2008 period. Managerial capacity was strengthened at all levels of the system through training in health policy and management, and health economics and finance.

Health Finance. The Chuvash Republic adopted “a single payer system” of health finance, pooling all funding sources (regional and municipal budgetary allocations for the non-working population, and health insurance contributions from employers and employees) under the management of the regional health insurance scheme. This has helped eliminate administrative duplication in the management of health financing (previously, certain services were funded using budgetary allocations managed by regional and municipal entities and others were funded by the regional health insurance agencies), and increased flexibility in the allocation of funds between services.

Major changes were also introduced in the payment methods for general practitioners and services provided at the facility level. In the Chuvash Republic, primary care facilities now remunerate general practitioners using contracts that include fixed salaries with variable monthly payments that are based on the attainment of program targets as measured by 30 indicators—for example, population coverage for priority services such as vaccinations or cervical cancer screening, and reduction of maternal and infant deaths. A similar arrangement was adopted in Voronezh. In both regions, 100% of general practitioner physicians now work under performance-based contracts. These payment modalities have helped general practitioners achieve remuneration levels that are 25% higher than salaried doctors, and regional authorities are able to attract and retain trained personnel in peri-urban and rural areas.

For services provided at the facility level, a new reimbursement system was introduced in the Chuvash Republic. It combines fixed tariffs and bonuses that vary in accordance with the performance of doctors and nurses in different types of facilities, as measured by process and outcome indicators (for example, compliance with treatment protocols, unjustified hospital admissions, and post-surgery complications).

Resource allocation has improved in both regions, with substantial increases in the resources channeled to primary care and outpatient services and a proportionate decline in funding allocated to hospital services due to the reduction in the number of hospitals and 24-hour beds. Spending on primary health care as a percentage of total health expenditure rose in the Chuvash Republic from 31% in 2002 to 46% in 2008 and in Voronezh from 42% in 2002 to 53% in 2008.

Source: Marquez, P and Lebedeva, N. 2010. “Restructuring Regional Health Systems in Russia.” ECA KB 32, The World Bank.

6. Conclusions

97. **The key objectives of the Russia Social Expenditure Review are:** (a) benchmarking Russia's social spending and some human development outcomes to those in OECD countries; (b) presenting the topology of Russia's regions in terms of spending efficiency in health and education; (c) identification of options for achieving higher levels of efficiency in public spending on health and education; and (d) identification of weaknesses in the system of inter-budgetary transfers and of options for its improvement.

98. **The analysis undertaken under the framework of the Social Expenditure Review leads to the following key messages:**

- Russia has significant scope for spending its existing fiscal resources allocated to social services more efficiently. The efficiency reforms could improve human development outcomes and at the same time protect the current fiscal envelope on social services from expanding. The findings indicate that better education and health outcomes could be achieved with a current input of physical resources into the education and health systems. Sector reforms and inter-budgetary transfers are important elements in optimizing service networks and in keeping under control physical (and fiscal) inputs in the provision of social services.
- The regional analysis of social sector spending and of the related human development outcomes suggests that some regions have made significant efficiency advances in the health and education sectors while at the same time protecting or improving human development outcomes. More-reform-oriented regions are also found to be generally more efficient at a given point in time. This evidence is encouraging and provides empirical support for further advancing the efficiency reform agenda.
- A quest for the quality of inputs in the provision of social services is of paramount importance in reducing the quantity of inputs while at the same time improving human development outcomes. For example, the analysis of the education sector shows that quantitative inputs such as the student-teacher ratio and the average school size are significantly correlated with the costs per student, but not with educational outcomes. At the same time, educational outcomes are found to be highly correlated with the factors capturing the quality of inputs in the education system. Any potential fiscal savings made from reducing the quantity of physical inputs in health and education could be used to enhance the quality of inputs.
- The current system of inter-budgetary transfers provides several options for changes that would position it better for the delivery of social services and the provision of budget efficiency incentives. The system in its current form already plays a crucial role in helping the regional/local governments in providing and financing social services such as health and education, not least through smoothing the regional differences in social spending per capita. However, several potential changes to the system of inter-budgetary transfers have the potential to make it even better positioned for the delivery of social services and the improvement of budget efficiency incentives.

99. **To sum up, additional social sector financing per se would not enable Russia to improve quality and performance.** The fundamental structural distortions in the health and education systems need to be resolved in order to fundamentally improve efficiency. Efficiency gains can also be achieved by introducing the changes to the current intergovernmental transfer system, which is intrinsically linked to regional governments' financing and provision of social services.

Annexes

Annex 1: Data and DEA Estimation of Efficiency

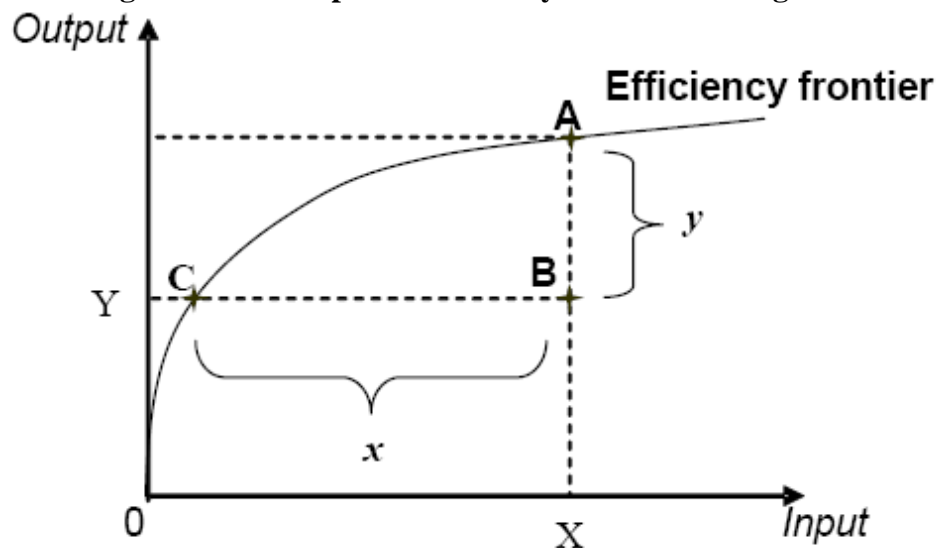
This appendix describes the principles of the Data Envelopment Analysis (DEA) analysis and the variables used in the analysis of Russian regions (oblasts) in the sectors of education and health.⁵³ It should be noted that other methods (both parametric and non-parametric) as for instance Stochastic Frontier analysis (SFA) and Free disposal Hull (FDH) are also options, but we found DEA the most appropriate for this analysis.⁵⁴

Figure A1 below illustrates the main principle of efficiency estimation. Two Oblasts A and B experience the same level of public expenditures (as input), but Oblast A achieves a higher output, and hence Oblast A is therefore considered to be more efficient. In this example Oblast A is considered to be on the efficiency frontier as no other Oblast with similar levels of input have a higher output. Oblast C spends less and also achieves lower output. Nevertheless, C can also be found on the efficiency frontier. Efficiency in the case of Oblasts A and C means that they have achieved the maximum amount of output that is achievable with the given amount of inputs. For Oblast B two alternative conclusions can be drawn. First, Oblast B can become more efficient by raising its output to the level of Oblast A by y . Alternatively, it can reach the efficiency frontier by reducing its inputs by x to the same level as Oblast C (it is able to sustain the same level of outcomes at the same time). This example illustrates that there are two options to reach the efficiency frontier. An Oblast can aim at maintaining the fixed level of output (Y) and adjust (reduce) the amount of input necessary. This is so-called input-efficiency. However, the Oblast can also keep the input (X) unchanged and aim at improving the level of output. This is called output-efficiency. Therefore, the information on inefficiency can be used as a tool to raise output and to reduce inputs. This report estimates input-efficiency, i.e., potential for reduction in X . In this report we further make a separation of types of inputs. We look at overall efficiency which uses expenditure as input. We then also look at system efficiency in which we use physical inputs as for instance number of teachers and number of doctors. Both measures are used to calculate input-efficiency.

⁵³ A previous attempt to measure efficiency in Russian regions using DEA approach was undertaken by Hauner (2007). Key differences in the definition of outcomes and measurement of expenditure explain the differences in results between our analysis and this previous study, Variables which considered as outcomes in Hauner's paper are treated an interim input in our analysis, where we differentiate between the system and overall efficiency. Hauner also measures the amount of expenditure spent on education/health as a percentage of gross regional product (GRP), while we use the per capita expenditure corrected for spatial differences in prices.

⁵⁴ See for instance Afonso *et al.*, (2005) and Mandl *et al* (2008) for overview and introduction to different methods and ways to estimate efficiency and Simar and Wilson (2000) for a more technical discussion of DEA.

Figure A1: Principles of efficiency estimation using DEA



The main advantage of the DEA method is its ability to accommodate a multiplicity of inputs and outputs. It is also useful because it takes into consideration returns to scale in calculating efficiency, allowing for the concept of increasing or decreasing efficiency based on size and output levels. A drawback of this technique is that model specification and inclusion/exclusion of variables can affect the results.

Some of the advantages of DEA are:

- Provides a direct measure of relative efficiency that can be consistently compared across units of analysis (e.g., region)
- No need to explicitly specify a structural form for the production function
- Capable of handling multiple inputs and outputs
- Capable of being used with any combination of input-output measures
- The sources of inefficiency can be analyzed and quantified by regressing efficiency scores obtained in the 1st stage of the analysis on various potential explanatory variables in the 2nd stage of the analysis

Some of the disadvantages of DEA are:

- Assumes that the production function has the same form across units of analysis
- Multiplicity of other factors affecting efficiency may not be observed/captured
- Results are sensitive to the selection of inputs and outputs
- Impossible to test for the best specification of the production function

Given the caveats of the DEA methodology and data limitations, the authors suggest that the results of the regional analysis should not be used as direct indicator of the performance of regional governments. This is especially so considering that many factors outside of public

spending influence outcomes. However they still capture key aspects of the relative performance of different regions.

In order to calculate the input efficiency scores for each Oblast the program FEAR⁵⁵ developed and made available by Wilson (2007) was utilized. On a technical level the efficiency scores were calculated by assuming Variable Returns to Scale, and the correction for bias as suggested by Simar and Wilson (2005) was made. Further, to insure higher values indicate better outcomes (a condition for using DEA) the inverse of the original variable was used where appropriate.

Table A1 below shows the variables used as inputs and outputs for the DEA analysis undertaken for health and education. Table A2a and A2b give further details by showing the source and values for all variables utilized in both the DEA calculations and the analysis of correlations between input efficiency and the way each oblast delivers the service.

Table A1: Inputs and outputs utilized in the DEA Estimation

	Inputs		Outcomes
	Health		
Overall efficiency.	Health expenditure per capita		Infant, child, adult male, and adult female mortality rates
System efficiency	Doctors, beds, and facilities per 10.000 people		
	Education		
Overall efficiency.	Public expenditures per student in general education		First principal factor of educational outcomes: 1) share of student scoring more than 200 points in three subjects in 2007, 2) share of students not passing one subject in 2008.
System efficiency	Student teacher ratio, average school size, and share of teachers with higher education		

Table A2a: Data description for data used in DEA health analysis, 2006

	Obs	Mean	S.D.	Min	Max
Input and output variables					
Total government expenditure per capita, corrected for spatial price differences ^{*2}	84	5813	2424	2412	15252
Physical health care inputs per 10.000: Beds ¹	85	115.7	25.0	39.5	251.4
Physical health care inputs per 10.000: Hospitals ¹	84	0.727	0.643	0.242	5.742
Physical health care inputs per 10.000: Doctors ¹	85	46.6	11.6	20.8	83.5
Infant mortality rate ¹	85	11.1	3.7	4.7	31.4
Child mortality rate ¹	85	14.0	4.3	6.7	34.7
Adult male mortality rate ¹	85	2.12	0.35	0.88	2.73
Adult female mortality rate ¹	85	1.03	0.16	0.53	1.55
Overall efficiency	84	0.737	0.121	0.380	0.967
System efficiency	84	0.754	0.104	0.428	0.949
Correlates - Expenditure					
Share of regional consolidated budget on wages (budget code 210) ²	85	0.437	0.138	0.074	0.798

⁵⁵Frontier Efficiency Analysis with R. Downloadable from <http://www.clemson.edu/economics/faculty/wilson/Software/FEAR/fear.html>

Share of regional consolidated budget on capital (budget code 310) ²	85	0.392	0.187	0.120	0.961
Regional consolidated budget on capital expenditures (budget code 310) per facility ²	85	19945	18147	2611	112553
Share of regional consolidated budget on maintenance (budget code 220) ²	85	0.234	0.158	0.059	1.580
Share of regional consolidated budget on inventory (budget code 340) ²	85	0.142	0.049	0.017	0.357
Regional consolidated budget on inventory expenditures (budget code 340) per facility ²	85	7194	5426	93	30736
Share of regional consolidated budget on outpatient procedures (budget code 902) ²	85	0.060	0.069	0.004	0.585
Share of regional consolidated budget on hospitals procedures (budget code 901) ²	85	0.911	0.104	0.045	0.981
Share of regional consolidated budget on emergency (budget code 904) ²	85	0.029	0.043	0.004	0.370

Correlates - Facilities

Average length of hospital stay, 2007 data ³	82	13.2	1.1	10.3	16.0
Ratio of nurses to doctors, 2005 data ²	84	2.6	0.6	1.3	4.4
Average health wage relative to average of economy, 2007 data ³	77	24.7	10.9	3.2	59.3
Bed occupation days per capita, 2007 data ³	82	3.1	0.6	1.1	6.2
Clinic visits per capita, 2007 data ³	82	8.4	1.4	2.9	13.2
Emergency calls per capita, 2007 data ³	82	0.36	0.06	0.20	0.69

Institutional variables

Share of health care organization, that use medical-economic standards ³	80	43.0	42.3	0	100
Share of health care organization paying for medical help by results of functioning ³	80	35.2	37.5	0	100
Share of health care organization paying employees, based on results ³	79	10.5	28.2	0	100
Share of total funding coming from MHIs ²	85	0.44	0.11	0.18	0.92
Share of regional expenditure executed at municipal level ²	85	0.38	0.14	0.00	0.75
Share of municipal expenditures raised at municipal level ²	85	37.9	12.6	10.2	84.8
Share of regional budget from regional transfers ²	62	0.16	0.13	0.01	0.56
Degree of decentralization ⁴					
More decentralized regions	85	0.13	0.34	0.00	1.00
Most decentralized regions	85	0.21	0.41	0.00	1.00

Sources: 1) Data from Rosstat 2) Expenditure data from Ministry of Finance 3) Data from Ministry of Regional Development 4) Lev Freinkman & Alexander Plekhanov personal communication.

Notes: * Spatial adjustment for prices is based on the cost of a consumer basket developed and used by Rosstat.

Table A2b: Description of data used in DEA education analysis, 2007

	Obs	Mean	S.D.	Min	Max
Input and output variables					
Overall efficiency	76	0.496	0.197	0.01	0.927
System efficiency	76	0.950	0.201	0.01	0.897
Total government expenditure per student, corrected for spatial price differences ^{*2}	85	33535	15546	9902	102285
Share students with more than 200 points in three subjects ⁵	77	5.6	3.7	0.4	18.2
Share of students that did not pass one subjects ⁵	82	8.9	4.1	3.0	29.3
Student teacher ratio ⁵	85	11.3	1.6	7.9	15.2
Average school size ⁵	85	267	102	107	572
Share of teacher with higher education ⁵	85	92.4	4.7	70.9	98.6
Correlated Variables					
Preschool enrollment rate in 2000 ⁴	84	57.8	13.7	4.4	83.8
Share of schools with second shifts in 2006 ⁴	85	14.3	7.7	0.0	46.6
Average wage in economy ³	81	13300	3504	7685	28157
Rate of urbanization ¹	84	67.8	15.6	0.0	100.0
Population density ¹	84	179	1089	0	9506
Share of regional expenditure executed at municipal level ²	85	0.874	0.158	0.000	0.995
Share of municipal expenditures raised at municipal level ²	84	73338	671817	11	6157337
Share of regional budget from regional transfers ²	62	0.158	0.131	0.011	0.557
Number of computers per student 2005 ⁵	85	2.92	0.78	1.00	5.30
Share of institutions with all types of facilities (2004) ³	82	53.6	20.6	12.1	99.9
Number of schools ⁵	85	744	558	43	3185
Ratio of cohort being tested ^{1,5}	84	0.567	0.130	0.050	1.010
Distance to Moscow ¹	85	2438	2696	0	11876

Sources: 1) Data from Rosstat 2) Expenditure data from Ministry of Finance 3) Data from Ministry of Regional Development 4) Lev Freinkman & Alexander Plekhanov personal communication. 5) Russian Education Statistics

Notes: * Spatial adjustment for prices is based on the cost of a consumer basket developed and used by Rosstat.

Annex 2: Regressions Explaining Regional Variation in Expenditure per Student

Table: Regressions Explaining Variation in Expenditure per Student across Regions, 2007
All Variables Are in Logs

	Expenditure per Student (corrected for spatial price differences)			
	Bivariate Regressions	Multivariate Regression	Multivariate Regression	Multivariate Regression with Significant Variables Only
Average student-teacher ratio	-0.32 (1.00)	-0.93 (2.63)**		-0.74 (3.16)***
Average school size	-0.11 (0.76)		-0.33 (2.54)**	
Number of students per computer (2005)	-0.67 (4.70)***	-0.13 (0.69)	-0.23 (1.18)	
Number of institutions	-0.17 (2.90)***	-0.18 (2.90)***	-0.17 (2.99)**	-0.13 (3.36)***
Average wage in education sector	1.09 (6.85)***	0.94 (4.21)***	1.003 (4.28)***	1.14 (8.78)***
Share of institutions with all types of facilities (2004)	0.12 (1.26)	0.06 (0.55)	0.02 (0.26)	
Share of pedagogical staff with higher education	-1.49 (1.60)	-1.27 (1.63)	-1.25 (1.40)	
Share of schools with two shifts	-0.04 (0.50)	-0.01 (0.20)	0.05 (0.65)	
Population density	-0.08 (2.18)**	0.02 (0.46)	0.04 (0.92)	
Urbanization	0.33 (1.49)	0.15 (0.47)	-0.07 (0.23)	
Investment risk/Quality of institutions	-0.05 (0.36)	-0.18 (0.84)	-0.07 (0.34)	
Constant		10.05 (2.69)**	10.07 (2.41)**	2.19 (1.43)
Observations	81-85	78	78	81
R-squared		0.61	0.61	0.56

*Significant at 10 percent. **Significant at 5 percent. ***Significant at 1 percent.

Note: The first column is bivariate regressions between each individual variable and expenditure per student corrected for spatial differences. Columns 2 and 3 are multivariate regressions with all the listed variables, where column 2 excludes average school size and column 3 excludes student-teacher ratio. These two columns are included because student-teacher ratio and average school size are highly correlated. Column 4 shows the significant variables remaining when the most insignificant variables are removed. Robust t-statistics in parentheses.

Annex 3: Results of Regressions Exploring the Correlates of Education Outcomes

Regressions Explaining Variation in Educational Outcomes, 2007

All Variables are in Logs

	Educational Outcomes – USE Scores			
	Bivariate Regressions	Multivariate Regression	Multivariate Regression	Multivariate Regression with Significant Variables Only
Average student-teacher ratio	-0.72 (1.80)*	-1.35 (1.90)*		-0.72 (1.97)*
Average school size	-0.33 (2.67)***		0.198 (1.00)	
Share of teachers of pension age	-0.44 (3.06)***	-0.34 (2.02)*	-0.58 (3.46)***	-0.31 (3.65)**
Share of schools with second shifts	-0.41 (3.65)***	-0.38 (2.40)**	-0.39 (2.30)**	-0.31 (2.81)***
Preschool enrollment rate in 2001	0.42 (1.75)*	0.54 (2.10)**	0.41 (1.52)	0.51 (2.37)**
Share of working-age population with a university degree	-0.32 (1.16)	0.63 (2.19)**	0.43 (1.43)	0.5 (1.98)**
Urbanization rate	0 (0.01)	-0.21 (0.42)	-0.01 (0.02)	
Number of students per computer	-0.01 (0.03)	0.37 (1.40)	0 (0.00)	
Share of institutions with all types of facilities (2004)	0.07 (0.45)	0.17 (0.85)	-0.04 (0.21)	
Average wage in education sector	-0.39 (1.71)*	0.24 (0.64)	-0.22 (0.74)	
Share of pedagogical staff with higher education	2.07 (1.89)*	-1.19 (0.82)	-0.09 (0.07)	
Share of cohort participating in USE. t	-1.11 (2.57)**	-1.32 (2.31)**	-1.27 (2.29)**	-1.19 (2.66)**
Investment risk/Quality of institutions	-0.47 (1.82)*	0.154 (0.61)	0.19 (0.77)	
Expenditure per student	-0.17 (1.58)	0.05 (0.35)	0.255 (1.51)	
Constant		2.128 (0.35)	-1.752 (0.31)	-0.37 (0.26)
Observations		74	74	75
R-squared		0.34	0.31	0.31

*Significant at 10 percent. **Significant at 5 percent. ***Significant at 1 percent.

Note: The first column is bivariate regressions between each individual variable and expenditure per student corrected for spatial differences. Columns 2 and 3 are multivariate regressions with all the listed variables, where column 2 excludes average school size and column 3 excludes student-teacher ratio. These two columns are included because student-teacher ratio and average school size are highly correlated. Column 4 shows the significant variables remaining when the most insignificant variables are removed. Robust t-statistics are in parentheses.

Annex 4: Progress in Physical Inputs and Health Outcomes across Regions with Various Degrees of Efficiency Improvement

Average Percentage Change in Physical Inputs and Health Outcomes across Terciles of Percentage Change in Efficiency, 2001 to 2006			
Overall Efficiency			
	Little Improvement in Efficiency (%)	Average Improvement in Efficiency (%)	Most Improvement in Efficiency (%)
<i>Physical Inputs</i>			
Doctors	7.2	4.0	3.9
Beds	-3.4	-3.5	-5.4
Hospitals	-20.9	-22.2	-29.4
<i>Mortality Rates</i>			
Infant mortality	-24.7	-26.5	-36.6
Child Mortality	-22.7	-27.4	-36.8
Male adult	4.4	-1.0	-2.0
Female adult	1.6	-3.0	-3.1
System Efficiency			
<i>Physical Inputs</i>			
Doctors	6.6	4.3	4.1
Beds	-3.5	-5.2	-3.6
Hospitals	-18.2	-28.3	-26.0
<i>Mortality Rates</i>			
Infant mortality	-26.2	-28.3	-33.3
Child mortality	-24.6	-28.7	-33.6
Male adult	2.9	-0.5	-1.1
Female adult	0.3	-2.2	-2.6

Source: World Bank calculations.

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