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AUTHOR: MICHAEL SPAGAT and JODY OVERLAND, Brown University

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CONTRACTOR: Brown University

PRINCIPAL INVESTIGATOR: Michael Spagat

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HUMAN CAPITAL AND RUSSIA’S ECONOMIC TRANSFORMATION

Executive Summary

Russia’s population is currently much better educated than that of other countries with comparable living standards. This is excellent news for Russia, since an economy’s human capital serves as its primary basis for wealth creation.

However, considerable evidence indicates that Russia’s human capital base is rapidly eroding. Trained scientists and engineers, lacking access to modern commercially viable technology and market infrastructure, are earning higher wages as taxi drivers, kiosk clerks and maids than in their areas of expertise. Many of Russia’s brightest stars have emigrated in search of better lives. Young people, observing the poor earnings of the educated, and confronting an education system designed by the Soviet regime which is badly out of sync with the economy’s current and future needs, are naturally investing very lightly in their own educations.

Educational attainment has a strong tendency to perpetuate itself within families and societies. For example, well-educated parents are generally much more successful in educating their children than are poorly educated parents. Thus, the creation, currently rather advanced, of a "lost generation" of poorly educated adults creates a persistent drag that will hinder Russian economic development for years to come. Thus, Russia’s foundation for future prosperity is quickly eroding.

The task of rebuilding Russia’s human capital, after a serious deterioration, would last several generations and be very costly. Fortunately, relatively moderate investment in maintaining and transforming Russia’s human capital can prevent and reverse the deterioration presently under way. This follows from the tendency for a society’s human capital to persist combined with the fact that Russia is still a well-educated nation. The key to this program is a major restructuring of the country’s education system, along lines already proposed by the World Bank. By making the education system into an effective instrument for individual investments in commercially valued human capital, Russia can preserve the continuity of its intellectual traditions and lay a solid foundation for the future development of its economy. On the other hand, we believe that ignoring this problem leads to Russian impoverishment.
Because Russia is experiencing severe economic hardship it is difficult to find the internal political will for the allocation of adequate funding for educational reform and human capital maintenance. The current climate of intense political instability and wide-spread poverty makes investments which promise results only over a relatively long time horizon unattractive to a government concerned with maximizing its prospects of maintaining power in the short run. This is why western governments and agencies, which enjoy the political stability and resources to consider projects which bring about results over the longer term, are likely to be the only sources of funding able to finance this crucial aspect of Russia's economic transformation.
HUMAN CAPITAL AND RUSSIA'S ECONOMIC TRANSFORMATION

Jody Overland and Michael Spagat

Abstract

Russia has a much better educated population than other countries with comparable living standards. But Russia stands to lose out on that advantage if it does not soon invest in maintaining and transforming its "human capital."

Soviet cosmonaut Yuri Gagarin was the first man to orbit the earth. Since the 1930’s there have only been two non-Soviet world chess champions, and they reigned for a total of only six years. The USSR invented its own hydrogen bomb. Many Soviet military technologies, especially in the late Soviet period, were world class, such as the SU-27 and MIG-29 jet fighters, intercontinental ballistic missiles, and nuclear propelled ballistic missile bearing submarines. Soviet mathematicians and physicists were legendary, as were Soviet dancers, athletes and musicians. Yet, the USSR’s standard of living was comparable to that of such countries as Brazil, Gabon, Mexico, Trinidad and Tobago. The same is true for all the countries of the former Soviet Union and Eastern Europe (FSUUE) to which much of our analysis extends, with some modification.

A country’s wealth is determined significantly, perhaps primarily, by the quality of its "human capital," according to a large and growing body of evidence. Human capital refers to attributes such as skills, education, health and natural ability that enhance economic productivity. In principle, this is good news for Russia since, taking standard measures as in table I, Russia appears to have an impressive human capital stock. Apparently, Russia’s human capital is almost at West European levels, despite being much poorer than the West. Moreover, Russia seems to have significantly more human capital than countries with similar standards of living.

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2Jody Overland is completing his Ph.D. dissertation in economics at Brown University on economic growth and consumption. - email address 73110.3621@compuserve.com. Michael Spagat, an Assistant Professor of Economics at Brown University, has written widely on the Soviet and Russian economies. - email address MSpagat@Brownvm.Brown.edu. Address - Department of Economics, Brown University, Providence RI 02912.

Table 1. The FSUEE is Highly Educated Relative to its Standard of Living

<table>
<thead>
<tr>
<th>Countries*</th>
<th>GNP per capita</th>
<th>% Secondary Enrollment**</th>
<th>% Tertiary Enrollment**</th>
<th>pupil/teacher ratio: Primary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulgaria</td>
<td>1,330</td>
<td>71</td>
<td>30</td>
<td>15</td>
</tr>
<tr>
<td>Poland</td>
<td>1,910</td>
<td>83</td>
<td>22</td>
<td>17</td>
</tr>
<tr>
<td>Czechoslovakia</td>
<td>2,450</td>
<td>84</td>
<td>18</td>
<td>19</td>
</tr>
<tr>
<td>MI</td>
<td>2,490</td>
<td>55</td>
<td>18</td>
<td>25</td>
</tr>
<tr>
<td>Russia</td>
<td>2,510</td>
<td>90</td>
<td>25</td>
<td>9</td>
</tr>
<tr>
<td>Hungary</td>
<td>2,970</td>
<td>81</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>UMI</td>
<td>4,020</td>
<td>54</td>
<td>19</td>
<td>24</td>
</tr>
<tr>
<td>HI</td>
<td>22,160</td>
<td>93</td>
<td>36</td>
<td>17</td>
</tr>
</tbody>
</table>

Definitions: MI, Middle Income countries according to World Bank definitions; UMI, Upper-Middle Income; HI, High Income.


UN Demographic Yearbook, (1993).

*Figures for various years, 1989-92.

**Percent of school-age population.

A puzzle immediately arises. If human capital determines a country’s wealth then why is Russia so rich in human capital and yet have so poor a standard of living? A partial explanation is as follows. While the USSR did develop some impressive technology, its main achievements were in a narrow set of high-priority endeavors, almost exclusively military. Moreover, investments were not subjected to meaningful market tests, and bankruptcy was virtually unknown. Therefore, most of Russia’s technology remains far from the world
frontier. Thus, the country has an abundance of educated skilled laborers competing to work with very little productive technology. This holds skilled wages, and hence living standards, down to very low levels.

Another puzzle is to explain how the USSR’s supposedly well-educated workforce created such weak technology. Part of the explanation is that Soviet technology was not actually that bad considering the domination of the regime’s military-oriented goals. In many high-priority areas, where success was determined by world standards, such as military technology and space exploration, they often achieved world class results. Another crucial factor was that Soviet managers had extremely poor incentives to implement productive new technologies. So many excellent ideas developed internally, such as continuous casting steel production, were never implemented in the USSR on a significant scale. Researchers, knowing their ideas were unlikely to be implemented, had poor incentives to do good work. Finally, the flow of technological and economic information across and even within, Soviet borders, was highly restricted.

But poor Russian technology in the narrow sense is only part of the explanation of how Russia combines what appears to be good human capital with poor living standards. The term "technology" can, and will for the rest of the paper, be used in a broad sense to indicate all nonhuman contributors to economic production such as property rights, a functioning legal system, the presence of organizations that facilitate trade and information flows, and a reasonably honest and competent government and civil service. From this broad perspective, Russian technology is in even worse condition than it is under the narrow definition. This abysmal state of market infrastructure in Russia is a crucial factor that will hold down the standard of living for a long time to come.

So the first solution to the above puzzle invokes technology to explain the fundamental imbalance between human capital and the standard of living. It leads naturally to two distinct scenarios for the future of the Russian economy. Under one, "the rosy scenario", Russia’s standard of living rises to meet its human capital level and under the other, "the deterioration scenario", human capital falls to match the standard of living.

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The Rosy Scenario vs. The Deterioration Scenario

Consider the implications for Russia's future of this portrait of a well-educated population constrained by bad technology, broadly construed. If global investors react to the opportunity to employ skilled workers at low wages by pouring capital into the country, Russia would get rich as the mismatch between skills and technology was systematically eliminated. Given the willingness and ability of financial institutions to shift large quantities of funds around the world, such a process could take place quickly.

Unfortunately, investors face a variety of risks that significantly diminish their incentives to invest in Russia. These include political instability, high inflation, possible expropriation of their investments, capricious taxation, threats from organized crime, unexpected changes in the still unsettled legal environment, the possibility of being caught in the middle of ethnic conflict or even civil war. Therefore, a formidable set of obstacles are blocking the realization of the rosy scenario, and will be for a prolonged period of time.

Consider now a formal economic model that studies the implications of the above situation for governmental human capital policy. In this model the economy evolves over time with a policymaker determining public investment in human capital development in every period. Such investment should be viewed very broadly to include, for example, supporting teachers and researchers, developing new skills in business and social sciences, paying decent student stipends, supporting public health and medical services, etc.

Human capital in the model exhibits persistence over time as long as the government makes reasonable investments in its maintenance. Specifically, it is expensive to significantly raise human capital levels and inexpensive to maintain moderate levels, but a failure to invest reasonable sums in human capital maintenance will lead to rapid deterioration. Common sense supports this formulation as illustrated by the following example. The existence of a good pool of well-trained doctors makes it relatively easy to train new physicians with a moderate level of support. However, if the pool of doctors is depleted, then the training of quality physicians becomes extremely expensive as trainees are forced to learn from old books, travel abroad for instruction, experiment on their own, etc.

Foreign investors in the model become increasingly willing to target Russia for investment as the economic environment stabilizes, which it does gradually over time. The

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government's objective is to provide the population with high levels of consumer goods. This completes the description of the model and we now turn to its implications.

First, human capital investment in early periods yields low short-run returns, because high instability, characteristic of the early periods in the model, drives away technology-enhancing foreign investment, a crucial ingredient to making human capital valuable.

Second, moderate investment in human capital in early periods yields a high return in the long run - when stability eventually arrives, that human capital attracts a flood of foreign investment, driving up wages and living standards. Thus, sustenance of human resources through a time of instability creates a rosy scenario. On the other hand, low early investment in human capital leads to significant deterioration in its level, which in the future becomes costly to reverse, perhaps prohibitively so. Under this scenario foreign investment is blocked by Russian instability in early periods and by low levels of human capital in later periods. The economy never takes off - the deterioration scenario. Comparison of the two scenarios shows that the standard of living resulting from a high-early-investment policy is significantly better than that resulting from a low early investment policy.

The third implication is that, for two main reasons, the Russian government has little incentive to focus on the future which leads to underinvestment in human capital. Political instability is an important part of the uncertainty repelling foreign investors. Therefore, the government's planning horizon is very short as no Russian government reasonably expects to remain in power for very long. Also, Russia is experiencing traumatic economic hardship that is not expected to last indefinitely, so the benefit of additional consumption now is much higher than that of anticipated additional future consumption. Intuitively, a student would derive more happiness from finding a twenty dollar bill on the sidewalk than the same person would as a financially secure adult.

Combining the above observations we can predict that Russia will follow the deterioration scenario under which its human capital stock falls to match its current standard of living, the high long-run returns to human capital maintenance notwithstanding. This prediction corresponds well to Russian reality over the past few years. Funding for education has dropped from about 7 percent of GDP in the early 1970's to 3.8 percent in 1991 and 3.4 percent in 1995 while GDP has plummeted.\(^7\) Research and Development expenditure fell from 3.1 percent of GDP in 1990 to 1.2 percent of GDP in 1992, and further from there.\(^8\)


Health spending has fallen similarly along with public health. Stories proliferate about research scientists driving taxis, engineers selling tourist souvenirs, and teachers and doctors opening restaurants, while many highly qualified people continue to emigrate in search of better lives (the brain drain). The younger generation is investing lightly in education. For example, between 1991 and 1993 enrollments fell by 5 percent in higher education (while the corresponding figures were skyrocketing in western countries), 7 percent in vocational schools (PTUs), and 21 percent in preschools. The cost of reversing this process is mounting rapidly.

One method of paying for the maintenance of human capital would be through loans from an international organization, such as the World Bank. That would achieve several goals. First, such loans can unambiguously improve Russia's welfare by allowing it to enjoy the long-run benefits of a large human capital stock without incurring the costs of maintaining these stocks through lean economic times. Second, lenders can receive a fully competitive rate of return, since the large long-run difference between the rosy scenario and the deterioration scenario provides a solid basis for debt service. Third, future foreign investors will earn high returns by supplying technology to a stable Russia with abundant human capital.

Some readers might be confused at this point by an apparent contradiction. The model begins by assuming that Russian human capital is abundant relative to technology, but ends by favoring an initiative for human capital maintenance. Many would argue that Russian human capital is in relatively good shape and can absorb some neglect while more pressing needs are addressed. But it is a dangerous game to ignore human capital precisely because it is already abundant. Its presence inflates the difference in outcome between moderate investment and low investment. With a poorly educated population the difference would be slight. But in Russia, more is riding on human capital policy than would be the case for a typical middle-income developing country. As for scarce technology, investment in human capital is, in the long run, investment in technology, because, after stabilization, good human capital attracts good internationally mobile technology. Finally, note that we advocate merely human capital maintenance, not building up the human capital stock to the exclusion of all other considerations.

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*Russia: Education in the Transition, p. 17.*
Problems With Russian Education

Recall again the paradox of Russia's apparent combination of high human capital and low living standards. We now argue that part of its resolution is that standard measures of human capital exaggerate Russian strength. In particular, despite undeniable accomplishments, Russia's education system is inadequate and needs restructuring, for a variety of reasons.\(^{10}\)

First, the system does not offer an appropriate mix of specific skills for a modern market economy. The emphasis on science and engineering is excessive, especially in light of the collapse of Russia's military-industrial complex. In fact, 60 percent of higher education enrollment is in engineering programs, compared with only 20 percent in the OECD countries.\(^{11}\) The system seriously underemphasizes commercial skills such as banking, accounting, management, economics and marketing. Social science faculties are notoriously bad.

Second, the education system overemphasizes specialization. Vocational training, run by factories with highly uncertain futures, accounts for much of secondary education. Russia offers about twice as many vocational specializations as Germany, which has a much larger and more sophisticated economy.\(^{12}\) Moreover, vocational education has been sheltered relative to other types of education in the last few years, apparently due to the perception that during the current economic crisis it is crucial to protect institutions that lead people to real jobs.\(^{13}\) Nevertheless, studies show that the returns to academic/general education are significantly higher than the returns to technical/vocational education.\(^{14}\) The bulk of higher education takes place in engineering institutes founded by now-defunct production ministries that offer hundreds of degree programs, compared to a mere handful in western engineering schools. For example, one Soviet institute offered a degree in "ball bearings for paper mills."\(^{15}\)

Extreme specialization may even have offered certain advantages under the old technologically stagnant regime, but specialists tend to quickly become outmoded in market economies. In the Russian economy, which will be undergoing dramatic structural change for


\(^{11}\)Russia: Education in the Transition, p. 6.

\(^{12}\)Ibid, p. 6.

\(^{13}\)Ibid, p. 22.


years to come, the most valuable education will tend to be the most general. In support we can cite the following facts: in February of 1995 two-thirds of all unemployed workers had higher or specialized secondary education; in 1991 50 percent of college graduates did not work in their specialties and 20 percent were in jobs that did not require higher education; in a survey of 996 Moscow street traders conducted in 1992-93, 36.8% of the sample consisted of people who were either students, researchers, engineers, teachers or doctors.16

Third, the Russian system slights general analytic skills in favor of memorization of facts. In international achievement tests in science, students from the FSUEE rank near the top in awareness of facts, in the middle for the application of facts and near the bottom on the use of knowledge in unanticipated circumstances.17 Again, what served the FSUEE well under central planning becomes problematic in the rapidly changing environment of a transition economy.

Finally, as noted above, funding for research and education has been cut back sharply over the last four years making the current Russian system of public education, in essence, a poorly funded version of the Soviet system. In short, a serious reform of Russia's education systems is absolutely essential.

At this stage we wish to reiterate that Russia is a highly educated nation relative to its standard of living (Table I). Nonetheless, it should not come as a surprise that the system, which was designed to serve the goals of the Soviet regime, turns out to be out of sync with Russia's economic needs as it prepares for the twenty-first century.

The Timing of Educational Restructuring

While most analysts would agree that education in Russia must ultimately be reformed, many believe that restructuring should receive low priority and be postponed in favor of other more pressing needs. In practice the Russian government has followed this policy, doing little with human capital development other than slashing its funding. But in a recent paper we have studied the optimal timing of educational restructuring and concluded that reform, costly though it is, should be implemented early in the transition process.18

17See Russia: Education in the Transition, pp. 24 & 25.
The argument goes as follows. As emphasized above, instability diminishes skilled wages and, moreover, the educational system is not presently an effective tool for market-oriented human capital investments. Consequently, many young people are already withdrawing, fully or partially, from school in order to perform unskilled work. In fact, this "internal brain drain" phenomenon is very pronounced. In addition to the sharp drop in higher education enrollment there is widespread agreement that class attendance and school performance at all levels has dropped dramatically and that children are deeply involved in crime, organized and otherwise.\(^{19}\)

In any society, families play a crucial role in transmitting knowledge, skills, and the desire to learn from older to younger generations. Russia certainly follows this pattern. In fact, there is extensive evidence that both high and low education levels have a very strong tendency to be self-sustaining within families in Russia.\(^{20}\) We have noted above that many educated individuals are currently working outside their specialties, meaning that their specific human capital is not contributing to productivity. Nevertheless, these people, as well-educated individuals, are still able to facilitate the human capital acquisition activities of their children more effectively than can poorly-educated individuals. That is, a physicist who drives a taxi for a living is still in an excellent position to create a family environment conducive to learning for his children.

In this light, consider the next two generations in Russia. Today's younger generation while blessed with well-educated parents, lack economic incentives to invest in human capital, in particular, reasonable wage levels for the skills readily obtainable through the Russian education system are absent. If they continue to follow the money, then they will become significantly less educated than today's older generation, thereby placing their own children in a difficult bind for two separate reasons. First, their failure to invest in human capital will retard the economy's productivity growth and, hence, wages. Second, as poorly educated parents, they will be ineffective in facilitating their children's efforts to acquire human capital, leading many of these children to duplicate their parent's decisions not to invest in themselves. Temporary instability plus delay in educational restructuring translates into a persistent drop in

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productivity, as the process of rebuilding Russia’s intellectual level after the initial deterioration would be protracted and costly.

On the other hand, early educational reform can transform this deterioration scenario into a rosy scenario. Making the education system into an effective instrument for human capital investment would encourage many young people to invest intensively in human capital, boosting productivity growth and creating better parents. The key mechanism underlying this result is that early restructuring preserves the intergenerational continuity of Russia’s intellectual traditions, while these traditions adapt to the requirements of the market economy of the 21st century.

A second conclusion of our analysis is that if educational restructuring is not implemented very early in the transition process, then it is likely to be delayed for a very long time. This implies that the common view, that educational restructuring should receive low priority at early transition stages, appears to be quite wrong. The reason for the result is that human capital deterioration diminishes the impact of a late educational reform, because once intergenerational intellectual continuity is broken, reform has limited possibilities to reverse the damage.

A health analogy should help to illuminate the “now or never” result. Imagine a ten-year-old child who has had decent nutrition, basic vaccinations and reasonable treatment for various sicknesses throughout her life. Building on this base, the introduction of a superior new health care system in the society might enable this child to become an exceptionally healthy adult. But suppose instead that introduction of the new system is delayed while the child takes up smoking, gets poor treatment for various diseases, never exercises, and eats poorly. Her health may deteriorate to the point where the introduction of the new health care system would have little impact.

A third result in our model is that early restructuring reduces inequality by providing underprivileged youth with an avenue of upward mobility. Without early reform society tends to divide into two hardened classes: educated and uneducated. Offspring of uneducated parents remain trapped in poverty, because the education system does not allow these children to overcome their disadvantaged backgrounds. That is current Russian reality - inequality has been rising dramatically as the rich retreat to a world of private schools and hospitals while the poor are left with crumbling public systems.21

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21Russia: Education in the Transition, p xii.
A related point is that attempts to move the education system too quickly toward full self-financing are likely to be counterproductive. Most of the power of educational restructuring comes from its role in preserving intergenerational intellectual continuity. The trick is to induce children of moderately educated parents to invest seriously in human capital, placing them in a strong position in the future to contribute to their own childrens' education. If educational reform is largely financed through hefty tuition payments then these offspring of moderately educated parents might choose to save themselves some money by forgoing significant human capital acquisition. If so, generational continuity would be lost in these families. On this basis, we recommend a gradual phasing in of self-financing in the education sector.

Once again it should be emphasized that it is precisely the presence of a significant human capital stock in Russia that leads to the conclusion that early educational reform should have a high-priority claim on society's resources. If there were only weak intellectual traditions, as is the case in typical middle-income developing countries, then generational continuity would not arise as an issue and it might be reasonable to postpone a major human capital initiative.

Some Final Thoughts on Policy

In any society investment in human capital development is a long-run proposition, and as such is a tempting target for government budget cutters. We have argued that in contemporary Russia this familiar problem is particularly acute, because the long-run returns to human capital investment are particularly large, the short-run returns are especially small, and the government is particularly myopic. Thus, Russia finds itself at a crossroads and considerable evidence suggests that the country is now squandering a fundamental ingredient of its potential.

Governments in the West face weaker incentives to behave myopaically than does the Russian government. The West, by basing actions on a long-term perspective, can contribute to correcting a clear market failure in Russia. In fact although western policymaking often seems to be competing with the Russians on the myopia front, there are important areas in which the west is prepared to take a long-term perspective. For example, a research team at the World Bank has written an excellent proposal for restructuring Russia's education system that the Bank is prepared to implement. Unfortunately it languishes due to the Russian government's disinterest.

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22Ibid.
At the same time, the World Bank has poured a huge amount of money into the Russian energy sector, notwithstanding the fact that the market is not generally known to ignore lucrative energy investments. In effect, the World Bank is funding projects that the private sector considers insufficiently profitable, given the associated risks and that provide few extra social benefits. The reason for this approach, apparently, is to create the perception that the West is doing something immediate, tangible and beneficial for Russia. But the undeniable importance of energy for the Russian economy does not automatically make it the most appropriate target for Western intervention.

Government intervention generally should be directed at market failures. There are many well-known market failures associated with human capital formation and R&D. These problems are particularly acute in the contemporary Russian economy. They should rank high on the agenda of Western government aid programs, the World Bank, and the European Bank for Reconstruction and Development. We hope that in the future they will.