

CHAPTER 4

UPGRADING SKILLS

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Russia, even with its highly educated workforce, faces growing shortages of skills in industry. In the transition to a market economy, the Russian workforce underwent a wrenching reallocation of labor across industries and occupations.⁴⁶ And many specialized and technical skills imparted under central planning were no longer demanded by industry. Mismatches in the labor market became widespread, with sharp shortages of some types of skilled workers coexisting with excess supplies of others. The formal education system and the specialized vocational and technical training institutions in particular were poorly prepared to operate under these new market conditions and to supply the new skills required by the market. Employers who once hoarded labor are now reporting skill shortages as a major production constraint. And some are upgrading the skills of their existing workers through various training programs.

To raise labor productivity in industry, improve its international competitiveness, and participate more fully in the global knowledge economy, Russia must analyze these skill issues and develop policies to address them. Skill shortages can directly constrain production and prevent firms from meeting demand and using available inputs efficiently, with lower productivity as a consequence. And—indirectly—they can inhibit the absorption of new knowledge, a skill-intensive activity. For the economy, mismatches between the skills that firms require and what education and training institutions supply can waste scarce public and private resources. For individuals, they lead to sunk investments in their human capital that yield low returns and unfavorable labor market outcomes.

Corrective policies will depend on the causes of skill mismatches. The likely causes include:

- Inadequate funding or governance of education and training institutions, which constrain them from responding to the skill needs of the market.
- Inappropriate labor regulations, which inhibit hiring and firing by firms to meet staffing shortfalls.
- Restrictive compensation policies, which prevent some employers from paying competitive wages to attract needed labor.
- Market failures in the training market, such as high turnover of trained workers, which inhibit the willingness of employers to invest in training to meet their own skill needs.

This chapter uses the Russia Investment Climate Assessment Survey (the LME Survey) and related research and information sources to gain insights into these issues of skill shortages,

⁴⁶ According to Sabirianova (2001), more than 40% of all the employed in Russia changed their occupations during 1991–98, two-thirds of them during 1991–95. She termed this mass occupational change the “Great Human Capital Reallocation.”

mismatches, and in-service training. It examines recent trends in levels and quality of education, the effects of economic restructuring on the skill composition of the workforce, the returns to schooling, and the aggregate supply and demand for skills in the Russian labor market. Using data from firm surveys, it then characterizes the distribution and nature of staffing and skill shortages among different groups of manufacturing firms. That contributes to understanding more about reported staffing problems and skill shortages, including labor turnover, compensation policies, and the inhibiting effects of labor regulations. A discussion of worker training follows, presenting evidence on the distribution, intensity, and determinants of in-service training and the implications for productivity and wages. The chapter concludes with some policy implications.

EVOLUTION OF HUMAN CAPITAL IN RUSSIA

The transition from a centrally planned to a market economy has strongly affected the evolution of human capital in Russia. Before the transition, most of Russia's workforce was concentrated in industry, and the service sector was underdeveloped. Educational attainment was high, but the educational system was oriented toward providing narrowly defined technical skills at the expense of more general knowledge and skills. Wage inequality was artificially compressed, and rates of return to higher education were relatively low (in the 1–2 percent range).

This employment structure changed dramatically after 1991. In the first stage of the transition (1991–98), industrial restructuring was accompanied by decreases in employment and working hours and steep declines in real wages. The second stage (1999–2006)—against the background of a dynamic post crisis recovery, which positively affected all labor market indicators—led to rising returns to education and reports of skill shortages.

According to Barro and Lee (2001), Russia in 2001 had one of the most highly educated workforces in the world. For the population age 25 and over, Russia ranked seventh, with an average of 10.5 years of schooling. It was ahead of other BRIC and transition countries, as well as Germany, Japan, and the United Kingdom (annex figure A4.1). Russia also had one of the highest shares of population age 25 and over with tertiary education. More than half (57 percent) the population has attained tertiary education, 13 percentage points more than in Canada and more than twice that in other post-socialist countries⁴⁷ (annex figure A4.1).

Russia thus appears well situated to take advantage of knowledge-based economic activities requiring a well-educated workforce and a pool of researchers. Compared with other BRIC and transition countries, Russia in 2003 had twice as many researchers per million population (3,371) as the Czech Republic, Hungary, or Poland (averaging about 1,500), and five to ten times more researchers than Brazil (344 in 2000) or China (663). On this indicator, Russia is closer to France and Germany (with about 3,200), but behind the United States and Japan (4,500 to 5,300). It benefited from downsizing in the science sector during the transition, so that a significant proportion of the workforce has experience in research.

⁴⁷ This result was due in part to the very high proportion of the population that attended professional and technical colleges (or SSUZ in Russian). Considering only attendance at university-level institutions (or VUZ in Russian), Russia with 21% still ranked in the top 10 countries, sharing 9th and 10th place honors with Japan.

Despite the high formal educational attainment, Russia faces serious problems in the quality of the education. They include underfunding, low quality, the deterioration of secondary education, and an orientation to narrowly defined skills in professional education (annex 4.2).

High rates of educational attainment are not simply a legacy of the pre-transition period. While demand for higher education fell in the immediate post-reform period, enrollments rose again in the mid-1990s and today exceed the enrollment rates in the late 1980s (annex 4.3). How much of the increase in educational attainment of the workforce was the result of changes in the industrial and occupational composition of employment that accompanied restructuring? And how much of educational upgrading within industries and occupations? A decomposition of the effects of industrial and occupational changes⁴⁸ suggests that, while changes in the structure of industry and occupations contributed modestly to upgrading of the workforce in the early 1990s, most of the subsequent educational upgrading proceeded independent of restructuring. That this upgrading took place across the board, and within all industries and occupations, suggests a strong skill-biased change process, in technological change and in the transformation of organizational and institutional arrangements in the workplace. The demand for education is likely to increase in such an environment of change, given the comparative advantage of educated workers in implementing new technology or in responding to disequilibria (annex 4.3; Schultz 1975; Bartel and Lichtenber 1983; and Tan 2005).

The rising returns to education in Russia help explain why the demand for education was so strong over the transition. Mincer-type wage equations suggest that private returns to an extra year of schooling prior to the transition were in the range of 2–3 percent, reflecting wage compression resulting from the administratively set “wage grid” system. The demise of centralized wage-setting led to a rapid increase in the education premium. Returns to an extra year of education rose to about 7–8 percent in the first five years of transition, and then by an additional 2–3 percent in the later period, stabilizing at 8–10 percent by 2000–02 (annex 4.4).

When returns are differentiated by level of education, specialized training tends to yield lower payoffs than more general education. Vocational training increases the wages of secondary school graduates by about 5 percent. Tertiary professional and technical colleges, which provide training in specific skills, yield wage increases of 13 percent for males and 20 percent for females. University-educated males earn 50% more than those who complete secondary school, and the wage premium for females is about 70 percent. These high returns to university education explain why enrollment rates in higher education rose over the transition. And the fact that schooling returns stayed high despite the increasing supply of educated workers indicates that the demand for higher education is very strong, exceeding supply.

⁴⁸ A shift-share approach is used to decompose changes over time in educational attainment attributable to different components: one that measures the results of shifts in the industry and occupational composition of employment, holding education constant; another that measures the contribution of rising education, holding industry and occupation mix constant; and a third interaction term. The 1992–97 decomposition uses 6 education, 50 occupation and 15 industry groups, while the 1997–2002 decomposition relies on 7 education, 32 occupation and 19 industry groups.

SKILL CONSTRAINTS AND LABOR SHORTAGES

Given the concerns raised by the deteriorating quality and relevance of education and training in Russia, evidence from firm surveys, including the Russia LME Survey, provides insights into how employers perceive labor and skill shortages, whether these concerns are justified, and which firms are most affected. Several factors may constrain enterprises from responding to perceived skill shortages—particularly labor turnover, compensation policies, and labor legislation.

FIRMS' PERCEPTIONS

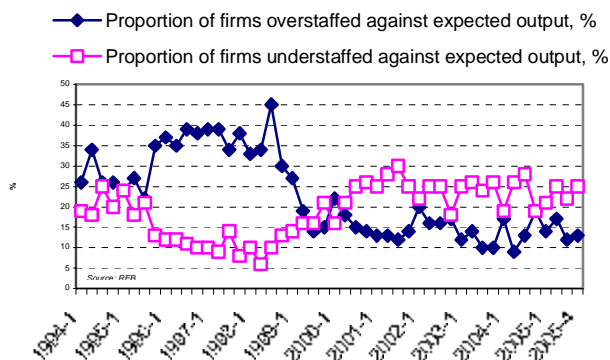
Respondents to the Russia LME Survey ranked “lack of skilled and qualified workforce” as the number 2 investment climate constraint to enterprise growth and development (the number 1 constraint is taxation). Small enterprises with fewer than 100 employees also ranked this skill constraint as major or severe, though not as highly as regulation or access and cost of finance (annex 4.5).⁴⁹ This skills constraint is not new, but has been growing with the transition from a planned to a market economy and with rapid economic growth since the late 1990s.

Time series data from the quarterly Russia Economic Barometer surveys provide insights into how overstaffing or understaffing in enterprises has changed over the last two decades. Before the 1998 financial crisis, the proportion of firms reporting that they were overstaffed relative to expected output in the coming year was high—in 1997, 38 percent of firms noted that they had redundant personnel. The strong recovery in industrial output after 1998 brought the proportion of overstaffed firms down to less than 15 percent (figure 4.1).

The proportion of firms reporting that staffing was not sufficient to meet expected demand started to grow after 1998, and by 2004 almost every fourth firm reported understaffing against expected output. The shift from overstaffing to labor shortage is consistent with labor use rates, which grew from around 70 percent in the mid 1990s to 90 percent in 2005, almost full use of the workforce. The shortages also grew with output, which increased 1.5 times over 1999–2005 as employment in the corporate sector fell slightly.

⁴⁹ In addition to ranking each constraint on a scale of 1 to 5, with 5 being a severe constraint, enterprises in the LME and SE surveys were also asked to identify the most severe constraint from among the previous list. This alternative ranking yielded broadly similar findings, with lack of a qualified workforce being ranked number 3 by medium and large enterprises and number 2 by small enterprises.

Figure 4.1 Overstaffing and understaffing in Russian enterprises



Source: LME Survey

In the 2005 Russia LME Survey, about 60 percent of surveyed managers rated their current staffing as “optimal” relative to current output, 27 percent as “understaffed,” and 13 percent as “overstaffed.” On average, understaffed firms were short of personnel by 17 percent, while overstaffed firms had 15 percent more workers than they needed (annex 4.6). This means that a sizable fraction of Russian enterprises have difficulties adjusting the size of their workforce to levels dictated by their output.

The probability and levels of understaffing are highest for firms operating in the textile industry, where more than 50 percent of surveyed firms reported staffing below the optimal, with the staffing gap averaging 22.6 percent relative to desired levels. New firms established in or after 1992, small enterprises with fewer than 250 employees, firms operating in metallurgy and machine building, and government-controlled firms (with more than 25 percent public ownership) are also more likely to report understaffing. Overstaffing is more prevalent among large firms (with more than 1,000 employees) and firms in chemicals.

Enterprises are concerned not only about overall staffing, but also about the desired skill mix. This is borne out by firms reporting understaffing in several occupational groups—managers, professionals, other white-collar employees, skilled workers, and unskilled workers. Firms that rank “skills and qualifications of the workforce” as a major or severe constraint are more likely to report understaffing in the different skill groups than are those that do not rank skill constraints highly (table 4.1). As might be expected, firms that have less-than-optimal staffing are also more likely than other firms to report understaffing in all skill categories, especially skilled workers (95 percent) and professionals (37 percent). Interestingly, firms with optimal or more-than-optimal staffing also report skill shortages in the same two skill categories. Specific skill shortages, especially of professional and skilled workers, can coexist with overall optimal or overstaffing in the enterprise. This also hints that firms face difficulties in adjusting and reallocating their workforce.

Table 4.1 Percentage of firms reporting understaffing, by skill category

<i>Classification of enterprises</i>	<i>Managers</i>	<i>Professionals</i>	<i>Other white collar</i>	<i>Skilled workers</i>	<i>Unskilled workers</i>
Skills and qualifications of workforce a major or severe constraint					
Yes	51.1	51.8	68.4	53.8	60.3
No	40.1	38.0	40.1	25.5	38.0
Overall staffing in the firm:					
Optimal	3.0	11.8	0.7	37.0	4.9
Understaffed	8.1	37.0	4.4	95.6	29.3
Overstaffed	3.9	14.8	2.3	42.2	6.3
Total	4.5	19.1	1.9	53.6	11.7

Source: LME Survey.

The extent to which skill shortages are a problem varies across units within firms. Most firms identified two major problems—lack of technological capacity and lack of skilled and qualified workers, both concentrated in operating units, that is, on production lines. A much smaller fraction of firms reported these as major problems in the economic, human resource, and research and development units (annex 4.7).

Firms experiencing skill shortages cite several reasons for understaffing. The four most commonly cited are lack of workers with needed skills in the local labor market (72 percent), lower wages offered than other firms (41 percent), high labor turnover (30 percent), and high competition for workers in the local labor market (23 percent). These reasons are consistent with an inadequate supply of workers with relevant job skills in the local labor market, high rates of labor turnover, and payment of noncompetitive wages and salaries.

LABOR TURNOVER

Labor turnover in Russian firms has been higher than in other former Socialist countries during the transition to a market economy. In 2004 the average rate of new hires was about 29 percent, while the job separation rate was 31 percent, giving the Russian economy a gross labor turnover rate of about 60 percent. These turnover indicators are even higher if only industry is considered, with hiring, separation, and gross turnover rates of 30, 35, and 65 percent, respectively (Rosstat 2006).

These high rates of labor turnover were not neutral to skills. Managers surveyed in the Russia Economic Barometer were asked to compare the skill mix of those that were newly hired or separated to that of those who remained. Throughout 1996–2005, more than a third of all managers reported deterioration in the quality of their work force, about half reported no change in quality, and a tenth reported some improvements in quality due to labor turnover. The low quality of newly hired workers, not the high quality of separations, may have been responsible for the reported deterioration in workforce quality. Almost half the firms hired workers with lower quality skills, while only 10 percent improved workforce quality by hiring more skilled workers. Roughly equal proportions of firms improved workforce quality as suffered quality decreases

through job separations. The net outcome, at least for one segment of the firms surveyed, is that the overall quality of their workforce fell.

COMPENSATION POLICIES

Respondents to the Russia LME Survey listed noncompetitive wages as one reason for understaffing. If true, noncompetitive wages may account for the inability of firms experiencing labor or skill shortages either to retain their skilled workers or to hire equally or more skilled workers from the open labor market, as the Russia Economic Barometer data indicates. Firms may not offer competitive wages if they have below average performance and profitability—that is, if they are unable to pay high enough wages to retain their most skilled workers or to fill vacant positions with the skilled labor that they need.

Gimpelson (2004) used data from a survey of 300 large and medium-size firms in Russia to investigate whether skill shortages were driven by supply or by demand constraints, and what enterprises were doing to respond to reported skill shortfalls.⁵⁰ The analysis suggested that understaffed firms had lower labor productivity, profitability, and average wages than both optimally staffed and overstaffed firms. And if low-efficiency firms (those with low labor productivity, profitability, or wages) declared that they had labor or skill shortages, they were more likely to use workers with mass (generic) skills supplied by the traditional vocational education system. In contrast, efficient firms were more likely to search for workers with specific or unique skills, which are in limited supply.

⁵⁰ The survey in Gimpelson, conducted jointly by HSE and the Russian Public Opinion Research Center (ARPORC), surveyed 304 industrial enterprises located in 30 regions of Russia in 2003, with personnel managers as respondents.

Table 4.2 Staffing level and firm performance

<i>Staffing</i>	<i>Value added per worker</i>	<i>Value added per worker relative to industry average</i>	<i>Profitability in 2004</i>	<i>Average monthly wages in 2004, rubles</i>	<i>Employment in 2004</i>
Optimal	213.5	1.05	0.11	6,246	-0.53
Understaffed	171.4	0.88	0.08	5,620	-1.05
Overstaffed	179.8	0.90	0.10	6,295	-4.06

Source: LME Survey.

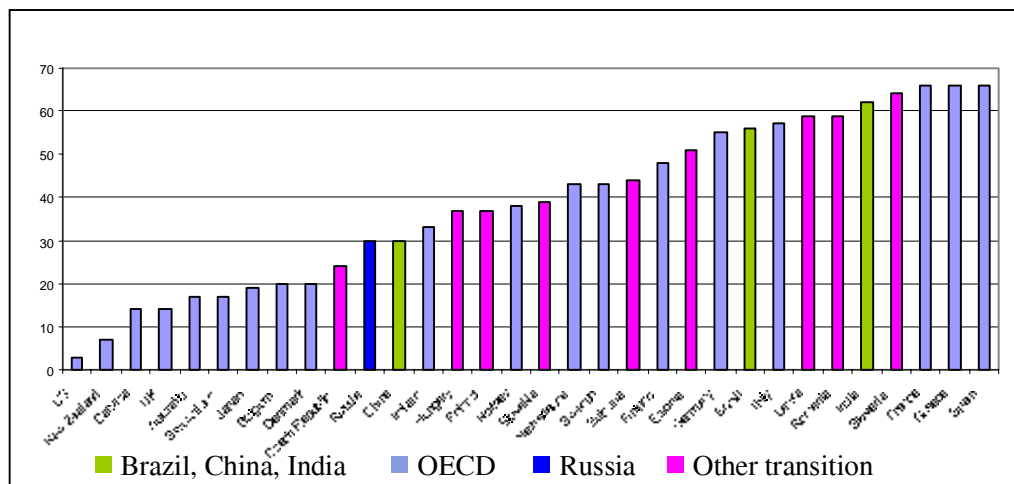
A similar pattern of reported staffing and firm performance emerges in the 2005 Russia LME Survey, which includes a much larger sample of industrial enterprises. Understaffed firms fared the worst in all these performance indicators (table 4.2). Though understaffed, they lost employment and showed negative net employment change over the previous year. Overstaffed firms, by contrast, were in slightly better economic shape and showed significant (and needed) downsizing over the past year. The best performance in labor productivity and profitability was by firms with optimal staffing. They paid wages comparable to those paid by overstaffed firms, significantly above those paid by understaffed and low-productivity firms.

LABOR LEGISLATION

Russian enterprises may also be constrained from meeting reported skill shortages by employment protection legislation (EPL). An emerging literature suggests that overly strict employment protection legislation can impair hiring and firing, stifle job creation, and lead to higher unemployment. Labor legislation—for minimum wages, social benefits and guarantees, employment contracts, and layoff regulations—can change the labor costs that employers face and, if strictly enforced, lower incentives to hire new workers or discharge redundant ones, even when warranted by labor demand.

On the World Bank's "Doing Business" scale (World Bank 2006a), Russia gets a score of 30 on rigidity of employment, comparable to China but significantly lower than either Brazil or India, with scores of 56 and 62 respectively (figure 4.2). Russia's index of employment rigidity is closer to the average for the OECD and lower than that of most other transition countries, except for the Czech Republic. According to this source, firing costs in Russia measured in weeks of wages (as compensation for discharge) are also significantly lower than for other BRIC countries.

Figure 4.2 Rigidity of employment protection legislation, 2005



Source: World Bank (2006a).

The indexes in figure 4.2 may understate the extent to which EPL in Russia constrains the staffing decisions of employers⁵¹ since employment protection regulations are poorly and selectively enforced, so that their impact on staffing flexibility may differ from one firm to another.⁵² The actual “rule of law” is selective and varies by the region, the sector, the age of the firm, and the segment of the legislation.⁵³ In large and mostly unionized firms (accounting for roughly two-thirds of total employment in Russia), EPL is more strictly enforced, while the same provisions are barely binding on small firms. Instead of reducing uncertainty, Russia’s EPL regime increases it (through nonenforcement) and differentiates firms by their mandatory labor costs. Firms that enjoy discretion in applying EPL may avoid paying social benefits to their workers. Other firms that abide by the rules—typically large and medium-size firms—avoid creating new jobs and keep a low wage policy, and many rely on small firms as flexible suppliers of labor.

Not surprisingly, managers in the Russia LME Survey do not rank EPL highly as a production constraint, compared with the shortage of skilled labor.⁵⁴ Even so, about 17 percent of

⁵¹ Until 2002, employment in Russia was regulated by the Code of Laws on Labor (KZOT); reforms to the Labor Code in 2001 eliminated many contradictory and obsolete requirements, but left the employment protection part of the code almost unchanged. The major positive change was in abolishing trade unions’ veto power on mass layoffs. The new code required employers to hire employees on standard open-ended contracts with a full-time working week and restricted the use of fixed-term employment contracts to specific cases (which stimulated employers to use more temporary contracts under these exclusions). In spring 2004, the Supreme Court ruled against the more liberal interpretation of this part of the employment protection legislation and issued directives that fixed-term contracts signed illegitimately must be treated as open-ended.

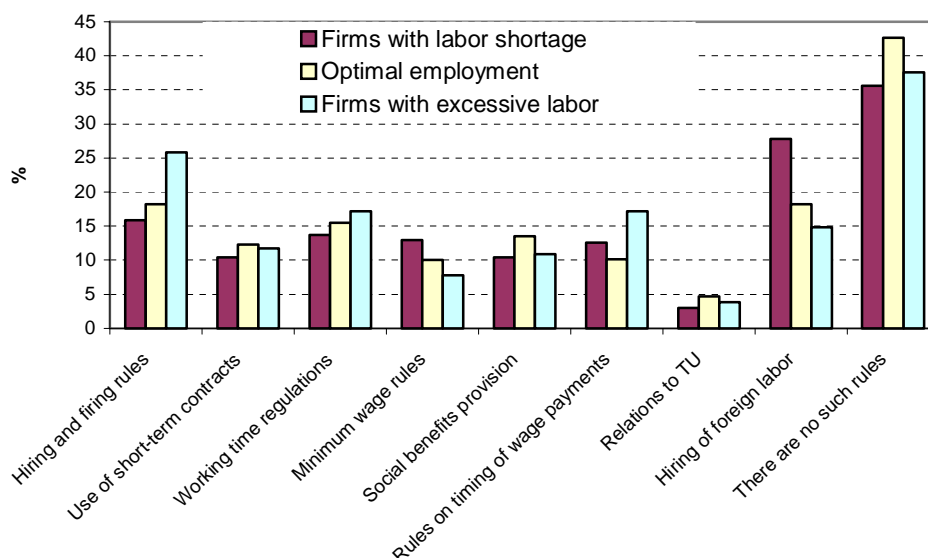
⁵² In a recent World Bank study, Rutkowski and Scarpetta (2005) argue that despite strict EPLs, flexible enforcement of stringent EPL rules provide CIS countries with considerable labor market flexibility.

⁵³ Regulations pertaining to layoffs are enforced better than regulations on overtime work.

⁵⁴ There are simple and quasi-legal ways to deal with EPL constraints and turn labor-management relations into something close to “employment-at-will.” First, employers can pressure workers to quit voluntarily. Second, there are informal practices of asking workers to submit an application to quit voluntarily during the job application. This

respondents ranked it as a notable constraint. In a separate question on labor regulations, only 40 percent of respondents believed that labor regulations do not create major problems for their enterprise (figure 4.3). One-fifth reported that rules on hiring foreign labor created serious difficulties, 19 percent pointed to hiring and firing rules, and 15 percent stressed working time regulations. Overstaffed firms tended to select hiring and firing rules, working time regulations, and rules on timing of wage payments as the most constraining of labor regulations. Understaffed firms tended to stress minimum wage rules and rules governing the hiring of foreign workers. Although the use of short-term contracts is restricted by labor law, 38 percent of surveyed firms reported using them to cover about 10 percent of their workforce.

Figure 4.3 Firms reporting labor regulations as a major problem, by staffing level



Source: LME Survey.

Labor adjustment costs induced by the EPL are likely to make it more difficult for firms to search for and hire needed skilled workers. The regression estimates suggest that the EPL index is positively associated with the difficulties firms experience in searching for and hiring professionals and skilled workers (annex 4.8). The higher the sum of EPL rankings as a constraint, the more severely firms report search and hiring difficulties for both professionals and skilled workers. Firms able to circumvent employment protection legislation are less likely to rank search and hiring of skilled labor as a problem. The results also confirm that firms paying low, noncompetitive wages are more likely to report difficulties in searching for and hiring skilled labor.

allows managers to date the application and initiate a “voluntary” quit at any moment and at no cost. These and other informal practices can result in high labor turnover driven by quits with almost no lay-offs.

IN-SERVICE TRAINING

One possible solution to skill shortages in the local labor market is for employers to train or upgrade the skills of their existing workforce. The hiring versus retraining option is discussed by Denisova (2005), based on a survey of 1,000 industrial enterprises in 2004. In her survey, 56 percent of firms noted that retraining existing workers is the most efficient way to meet skill shortages, 35 percent prefer hiring from the external market, and 25 percent prefer agreements with education and training institutions.

The BEEPS and LME Survey data show that the selected comparators in East Asia and Latin America have a higher training incidence than the transition economies in Eastern Europe and OECD countries, with South Asia especially far behind (annex 4.9).⁵⁵ How does training incidence in Russia compare with its BRIC competitors—Brazil, India, and China? At 58 percent Russia trails behind China (92 percent) and Brazil (59 percent), but is way ahead of India (17 percent).⁵⁶

The Russia LME Survey elicited data about the skill groups that received in-service training and the number trained. It suggests that managers, professionals, and skilled workers are the three skill groups most likely to benefit from in-service training, consistent with the kinds of skill shortages that firms reported. On average, 10–11 percent of managers and professionals and about 8 percent of skilled workers received formal training.

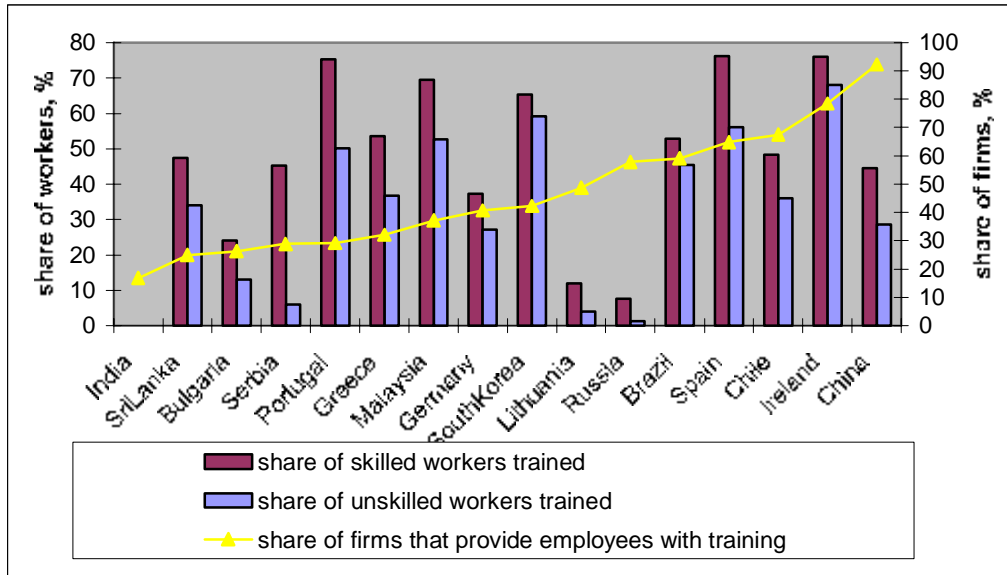
These figures, extremely low internationally, suggest that in-service training is not firmly entrenched in Russian firms. In Malaysia, a fast growing East Asian country that also ranked skill shortages highly,⁵⁷ a World Bank study (1997) estimated that 24 percent of managers, 32 percent of professionals and technicians, and 13–16 percent of production workers received formal in-service training. So while many more Russian firms train, they provide training to a smaller part of their workforce than do their fast growing counterparts in East Asia.

⁵⁵ The 17 countries clustered by region include Germany, Greece, Ireland, Portugal, South Korea and Spain (OECD), China, Malaysia and Thailand (East Asia), India and Sri Lanka (South Asia), Brazil and Chile (Latin America), Bulgaria, Lithuania, Serbia and Russia (Eastern Europe).

⁵⁶ We adopt a common weighting scheme based (arbitrarily) on the size distribution of firms in the India Enterprise survey. The size distribution of micro (15 or fewer workers), small (16-100 workers), medium (101-250 workers) and large firms (over 250 workers) in India is 40, 44, 7, and 8 percent; the corresponding size distribution for the pooled LME and SE surveys in Russia are 12, 16, 29, and 43 percent.

⁵⁷ In the Malaysian ICA survey, employers ranked the skills and education of the workforce as the number one “severe” or “very severe” investment climate constraint (World Bank 2005c).

Figure 4.4 Share of workforce trained and share of firms providing in-service training in Russia and elsewhere



Source: LME Survey.

Russia stands out among the BRIC group in the very small share of its workforce trained within the firm—7.7 of skilled and 1.4 percent of unskilled workers—compared with Brazil (53 and 45 percent) and China (44 and 28 percent) (figure 4.4).⁵⁸ The share of Russian workers trained in in-service programs is also lower than in several other transition countries (12–45 percent for skilled and 6–13 percent for unskilled workers), in selected developing countries (47–70 percent for skilled and 34–53 percent for unskilled), and significantly below OECD countries as a group (typically above 50 percent). It is possible, though unlikely, that these low estimates for Russia are a statistical artifact.⁵⁹ The recent survey of enterprise training practices by Denisova (2005) reports figures somewhat higher for Russia—about 20 percent of workers—though still below those of OECD countries.

⁵⁸ The sample is restricted to countries included in the 2005 BEEPS or with Investment Climate Surveys that asked about in-service training and the shares of skilled and unskilled workers that received formal training. Skilled workers are defined to include managers, professionals, and skilled production workers, while unskilled workers include unskilled production workers and other nonproduction or other white-collar employees.

⁵⁹ In the Russia LME Survey, firms reported shares of workers trained in several intervals, including an open-ended “35 percent or more” trained. In calculating shares trained, the mean for this last interval was assumed generously to be 45 percent, possibly biasing up training estimates for Russia. Tabulations of the small sample of Russian firms in the BEEPS also reveal low shares of workers trained relative to other countries in the 2005 BEEPS sample.

Table 4.3 Incidence of formal training, by firm characteristics

<i>Firm characteristic</i>	<i>In-house training</i>	<i>External training</i>	<i>Any formal training</i>
All firms	42.81	62.37	69.60
<i>Firm has less than 250 workers</i>			
No	51.41	72.71	79.12
Yes	31.08	48.33	56.67
<i>Firm has exports</i>			
No	35.87	55.82	63.54
Yes	51.24	70.34	76.96
<i>Firm spends on R&D</i>			
No	34.72	55.15	62.15
Yes	48.13	68.03	75.24
<i>Firm was established on or after 1992</i>			
No	43.54	64.27	70.76
Yes	41.31	55.19	65.42
<i>Firm has 10 percent or more foreign ownership</i>			
No	43.16	64.43	71.02
Yes	42.22	58.77	67.13
<i>Firm has 25 percent or more of shares controlled by government</i>			
No	43.03	62.23	69.77
Yes	42.49	62.60	69.33
<i>Investment risk of the region</i>			
Minimal	37.91	60.71	66.34
Moderate	48.27	66.67	75.50
High	41.64	59.33	66.36

Source: LME Survey.

Which firms train, and where do they get their training? The incidence of in-service training is higher among firms that are larger, export-oriented and firms that invest in research and development (table 4.3). Long-established firms are more likely to provide in-service training than newer firms. Domestically owned firms tend to train more than foreign-owned firms, and government ownership makes no difference to the likelihood of training. Localities rated moderate in investment risk tend to have a higher incidence of training than minimal risk or high risk regions.

The probit-regression analysis (annex 4.10) reinforces the correlations reported. First, the likelihood of in-service training is higher in larger firms (those with more than 250 employees), and in localities moderate in investment risk rather than in either low or high risk regions. Second, firms that employ a larger proportion of workers with higher education are also more likely to train. The empirical evidence from many countries is that both forms of skills—educational attainment of the workforce and post-school training—are highly correlated.⁶⁰ Educated workers are not only more productive in performing given tasks but are thought to be more adept at evaluating new information and learning from it.

⁶⁰ See Tan and Batra (1995) for estimates on the education-training relationship in five developing countries in East Asia and Latin America; Tan (2000) and World Bank (1997, 2005c) for related training analyses for Malaysia.

Firms that engage in R&D, and to less extent, export-oriented firms are also more likely to train. The technology literature suggests that much of the productivity gain from introducing a new or improved product or technology is realized through intensive learning-by-doing (Enos 1962; Bell and Pavitt 1992). To use the new technology, firms have to adjust management, reorganize production lines, and upgrade worker skills. Export orientation can also have a salutary effect on training. Employers that export have greater incentives to train their workers to produce high-quality products meeting the exacting standards of foreign buyers, and to increase labor productivity to meet competitive pressures (Tan and Batra 1995; Batra and Stone 2004).

Training from external sources tends to be more common among long-established firms where the government has controlling interests and in export-oriented firms with a high share of highly educated workers. This reliance on external training appears to be a carryover from the pre-transition period where many state-owned enterprises had arrangements to hire specifically trained graduates from related vocational and technical training institutions. By contrast, in-house training is shaped less by the share of highly educated workers and more by the firm's export orientation, location in moderate investment risk regions, and R&D spending. Employers appear to rely more on in-house training when industry or work-relevant skills are not available locally or when innovative activities require intensive on-the-job learning and training specific to the new technologies being developed or used.

Are firms reporting understaffing more likely to train to meet skill shortfalls? Surprisingly, no. Reported understaffing was not correlated with in-service training; nor were employer assessments of occupation-specific understaffing. In fact, firms with overstaffing were more likely than those with optimal staffing or understaffing to provide in-service training. One explanation, consistent with table 4.2, is that skill shortages in specific skill groups can coexist with overall optimal or overstaffing, so even these firms train. Another explanation is that there are different sources of demand for training—not just for making up numerical labor shortfalls, but also for meeting the specific skill needs of exporting and new technology, as suggested by table 4.3.

So why do Russian firms not train in-house to meet skill shortfalls? Information on why employers might not train or train very little, not elicited in the Russia LME Survey, is available in the World Business Environment Survey (WBES). The WBES asked firms to rank statements about what factors influenced their decisions on how much to invest in training workers.⁶¹ Firms that do not train identified the following key reasons for not training:

- Use of “mature” technologies that did not require training or skills upgrading.
- “Lack of affordability of training” because of limited funding, which might suggest a weakness in financial markets.
- High labor turnover of trained staff, an externality that prevents them from recouping the cost of training.

⁶¹ The World Business Environment Survey (WBES) was an enterprise survey fielded to more than 10,000 firms in 80 countries between late 1998 and mid-2000. The analyses reported in Batra and Stone (2004) are based on a special survey module that focused on competition, trade, firm capabilities in terms of technology, and worker training in 28 of the WBES countries.

- Adequate informal on-the-job training or that skilled workers were readily available in the labor market.

PRODUCTIVITY AND WAGE OUTCOMES OF TRAINING

In-service training makes sense only if employer investments in the training and skill-upgrading of employees yield positive returns in higher productivity and profits. If formal training is associated with higher firm-level productivity, as suggested by the preponderance of evidence from both industrial and developing countries,⁶² which source of training (in-house company programs or training from external training providers) has the largest impact on productivity? If training increases productivity, employers also need to determine whether, or how much, to share productivity gains from training with workers in higher wages. This calculation will depend on how transferable skills gained from training are to other potential employers (Becker 1976; Tan 1980; Acemoglu and Pischke 1998).

A production function approach is used to estimate the productivity impact of training (annex 4.11).⁶³ Before turning to the training results, some parameters estimated by these models are noteworthy. First, the estimated production function parameters of capital and labor coefficients are positive and statistically significant, consistent with those reported by other studies of the Russian economy. Second, consistent with the belief that education raises productivity, the production function results indicate that increased educational attainment of the firm's workforce of one year is associated with higher firm-level productivity of about 4–5 percent. Third, regions with moderate or high investment risk have productivity 27 to 33 percent lower, respectively, than regions with low investment risk. It appears that firms in moderate to high investment risk regions have greater incentives to train in-house to compensate for skill shortfalls in the local markets and for their lower overall productivity.

The production function results support the hypothesis that training is associated with higher productivity. The measure for any formal in-service training is positive and statistically significant at the 1 percent level, suggesting that training is associated with a 22 percent increase in firm productivity. When training is disaggregated by source, only external training is significant. But when firms are distinguished by whether they rely only on in-house, only on external training, or use both in-house and external training, the results suggest that using both sources of training is most productive (28 percent), while using only external training sources is associated with a 17 percent increase in productivity.

Similar positive effects of training are found on average monthly wages in firms (annex 4.12). In general, Russian employers pay higher wages when enterprises are large (with over 250 employees) and export-oriented, engage in R&D activities, and employ a more highly educated workforce. Consistent with the earlier training-productivity finding, enterprises that train also pay

⁶² Cross-sectional studies have found a strong positive association between in-service training and productivity and wage levels of firms (Tan and Batra 1995; Batra and Stone 2004).

⁶³ Production functions are economic models used to measure the average relationships between output and inputs, such as capital equipment, labor, intermediate inputs, raw materials, and energy. Production functions are estimated in logarithmic form so that the estimated parameters can be interpreted as elasticities. Some studies use a gross output measure; others (including this one) rely on a value-added specification.

monthly wages 16 percent higher than non-training firms, a difference statistically significant at the 1 percent level.

The wage effects of training differ by training source depending on whether firm-level or occupation-level wages are studied. The firm-level results suggest that external training is associated with the largest wage gains (18 percent) while the wage effects of in-house training programs are not statistically significant. Occupation-level wages are most strongly affected by in-house training (16 percent), a result that is statistically significant, but they are not affected by training from external sources. By averaging across occupations, firm-level mean wages may conceal considerable within-firm variation in wages by skill or occupation. This dispersion of skill-wage differentials within and across firms is better explained by in-house training than by external training, possibly reflecting skill-wage premiums associated with innovating firms that rely on in-house training.

TRAINING AND KNOWLEDGE-ABSORPTIVE CAPACITY

Training and knowledge absorption are complementary, in the sense that the firm’s capacity to innovate or absorb new knowledge, and to benefit from absorption, depends on the skills and training of the workforce. The previous analyses have already shown in-service training and R&D spending (a crude measure of knowledge absorption) to be highly correlated. Training is also highly correlated with other indicators of innovativeness—such as third party R&D or licensing of patents and know-how, introduction of new production technologies, and high-technology exports. The more pertinent issue is not just whether training and absorption are correlated but whether absorption is possible without a highly skilled and trained workforce.

As the measure of absorption, a composite indicator variable is used.⁶⁴ Table 4.4 shows the distribution of firms for each of the variables that make up this composite absorption indicator: 463 firms are defined as being “absorptive” according to their R&D spending, and those so defined are more likely to train (77 percent) than those that are not (63 percent). Each of the absorption variables that go into the composite indicator is similarly correlated with training. The bivariate probit analysis confirms that training and absorption decisions are made jointly (annex 4.13)

Table 4.4 Innovation and training variables

<i>Innovation measures</i>	<i>Sample size if meet innovation criterion</i>		<i>% training if meet innovation criterion</i>	
	Yes	No	Yes	No
R&D spending over 1 million rubles	211	779	0.79	0.67
Introduced new process technology	293	697	0.80	0.65
Purchased patents, licenses or know-how	161	829	0.74	0.69
Composite innovation indicator	463	527	0.77	0.63

Source: LME Survey; figures calculated by the authors.

⁶⁴ The composite indicator equals 1 if the firm has substantial R&D spending (over a million rubles), or has purchased technology licenses, patents, and know-how, or has introduced new production processes—and 0 otherwise.

Moreover, the regression analysis shows that both training and innovating have a larger impact on productivity (and the only significant effect in the endogenous model) than no training or innovating, only training, or only innovating (annex 4.13).

The wage regression using predicted values suggest that all three states—just training, just innovating, and investing in both activities—are associated with wage gains. Curiously, just innovating but not training has the largest coefficient. The alternative “exogenous” wage model also yields different results: “just training” or “investing in both” show wage gains but “just innovating” does not.

POLICY IMPLICATIONS

Together, the analyses of the Russia LME Survey data and comparisons of findings with those from other developed and developing countries suggest that employer perceptions of shortages of skilled and qualified workers are real. They tell a broadly consistent story about the nature of skill shortages:

- A high and rising demand for educated and skilled workers.
- An educational and training system that is underfunded below the tertiary level and faces numerous challenges, including deteriorating quality and unresponsiveness to industry’s skill needs.
- An industrial sector with high labor turnover (which inhibits training) and constraints on its ability to adjust its workforce and skill mix.
- For some noncompetitive enterprises the inability to pay competitive wages to attract and retain needed skills.

The analyses suggest that most enterprises have not responded to these skill shortages by training their employees in-house or training more of them, despite the productivity and wage gains that might come from such investments.

These results have implications for training policy in Russia. It is clear that Russian industrial enterprises underinvest in training their employees. While the incidence is high, the proportion of employees provided in-house training in different skill categories is one of the lowest among the countries with data, both high-income and developing countries. If in-service training is critical to the effective use of new technologies and to productivity growth, as the literature and the estimates reported in this chapter suggest, then Russia’s underinvestment in workforce skills places it at a relative disadvantage to its OECD, BRIC, and East Asian competitors. Improving the investment climate in Russia should have a salutary effect on business operations and growth and should create incentives for the private sector to invest in both physical and human capital. Policies to foster greater technological change should also induce more in-service training, given the evidence of a strong training-absorption nexus.

Market failures diminish employer incentives to train, and the appropriate policy response depends on the nature of the market failure. While not Russia-specific, available WBES data suggest that three market failures—high cost of training, training externalities from turnover of skilled workers, and information problems—are key constraints for training.

- When costs are high, financial sector reforms to improve access to funding for all kinds of investments, including training, are likely to be most important for smaller enterprises.
- When employer incentives to train are low because of turnover or “poaching” of skilled workers by other employers, mandates or collective action to get all firms to train can help internalize some of these externalities. The Human Resource Development Fund of Malaysia has, since its introduction in the mid 1990s, increased training among firms.⁶⁵
- When poor information is the constraint, the appropriate policy response is to disseminate widely the evidence on the productivity benefits of training, best practices in training know-how, and information about the availability, offerings, and cost of services from different public and private sector training providers.

The Russian government should consider putting in place employer-targeted training policies to remedy the underinvestment in in-service training. It can draw on the experiences of many other countries, both industrial and developing, that have used payroll-levy training funds, tax incentives for employer-sponsored training, and matching grants. Designing a training policy appropriate to Russia is beyond the scope of this chapter, but the global experience with training levies (Middleton, Ziderman, and Adams 1993; Gill, Fluitman, and Dar 2000) suggests several lessons for Russia:

- Employers should be closely involved in the governance of levy funds, as in Argentina, Brazil, and Chile, which have vested supervision of levies in industrial bodies.
- Policies should be designed to increase competition in training provision from all providers, both public and private, including the employer.
- Levy funds should be strictly earmarked for training and not diverted to other government uses, as happened with training levies in several Latin American and African countries.

⁶⁵ Taiwan (China) and Singapore are two other East Asian economies that have used direct reimbursement of approved training expenses, funded through payroll levies, to encourage firms to train their employees. A training grant scheme in Taiwan (China) led to dramatic increases in training, which continued after the program ended in the 1970s. Singapore used a levy on the wages of unskilled workers to finance training grants to employers to upgrade worker skills. The Skills Development Fund’s aggressive efforts to raise awareness of and direct training among firms led to a steady rise in training, especially among smaller firms. See Tan (2000) for an extended discussion of the Malaysian experience and an impact evaluation of the HRDF policy.

Although international evidence shows that levy schemes can increase training by enterprises, they also have problems. Levies have been inequitable in the sense that large employers tend to benefit more than small or medium-size employers. Employer reactions to the schemes have also been mixed, with many firms, especially smaller businesses, feeling that a levy is simply another tax with very little benefit for them. This may also be the response of many Russian firms that already face relatively high payroll taxes, unless they are reassured that funds earmarked for training are not diverted elsewhere and that training funds are capably and transparently used.

Training levies do not work particularly well for small and medium enterprises, the group of enterprises in Russia that exhibited the lowest incidence and intensity of in-service training. China, Malaysia, Brazil, and Chile suggest that small and medium enterprises are not likely to take up training policies and that targeted training programs are required to reach such firms. Encouraging training in small and medium enterprises may require more active approaches to address systemic weaknesses both in training and technological capabilities and in access to finance. Mexico's experience with training programs for small and medium enterprises offers some lessons.

An alternative is to use matching grants, which can help to develop a training culture, although by themselves grants will not expand the training market. The most successful schemes are demand-driven, implemented by the private sector and intended to sustain training markets. Chile and Mauritius report good results by using private agents to administer their schemes. Higher investments in training have been matched by fewer enterprise failures. A side benefit has been a new network of industry management training consultants available to enterprises that want to invest in enterprise-based training.

Singapore has a program to build up its stock of industry trainers, and Japan's Industrial and Vocational Training Association has trained more than 30,000 industry trainers in the past 30 years. It is important to generate training capacity in enterprises and increase the propensity for workers to undertake training. Grants should not be restricted to state-run training institutions. Funds should strengthen and diversify the supply of training and stimulate demand. Strong training cultures have been established in much of Europe, in Japan, Korea, and Singapore, and (judging by the levels of in-company training) in Brazil and Chile.

Whatever training policy is eventually adopted in Russia, it is imperative that enterprises and employer associations have meaningful input into the design, so that the training system is responsive to their needs and those of other key stakeholders. Where warranted, industry could take joint responsibility with government for the management and delivery of training (Brazil).

At an institutional level, involving Russian employers in the management of individual vocational and technical institutes should help ensure a steady flow of information on skills needed by local industry—as well as opportunities for instructors to upgrade their knowledge and for students to be placed with employers. The Indian government is taking a similar approach in its efforts to reform the moribund public-sector industrial training institutes. It introduced Institutional Management Committees (IMCs) in 1998 to involve employers in overseeing the operations of the industrial training institutes. There are now 350 IMCs in 18 states, with more in the pipeline. IMCs are supported by the Confederation of Indian Industries and the Federation of Indian Chamber of Commerce and Industry, with each IMC chaired by a local industry

representative. As currently structured, however, IMCs have limited decision-making powers because most states in India do not allow industrial training institutes to have significant financial authority or provide incentives to revamp training offerings. Nor may they retain student fees and other nontraditional sources of revenues from, for example, delivering tailored training courses to employers.

Employers could also form public-private partnerships to deliver demand-driven, low-cost training that is largely self-financing. Malaysia's Penang Skills Development Centre suggests how the private sector in different Russian regions can partner with state governments in the reform and management of tertiary-level professional and technical institutes.