Worker Training in a Restructuring Economy: Evidence from the Russian Transition

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Abstract
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We use 1994-1998 data from the Russian Longitudinal Monitoring Survey (RLMS) to measure the incidence and determinants of several types of worker training and to estimate the effects of training on workers' interindustry, interfirm, and occupational mobility, their labor force transitions, and their wage growth in Russia compared to the U.S. We hypothesize that the shock of economic liberalization in Russia may raise the benefits of training, particularly retraining for new jobs, but uncertainty concerning the revaluation of skills may raise the costs, with an overall ambiguous effect on the amount of training undertaken. The RLMS indicates a lower rate of formal training than studies have found for the U.S., suggesting that the second effect dominates. Previous schooling is estimated to affect the probability of training positively, but the relationship is much stronger for additional training in the same field than for retraining for new fields, consistent with the hypothesis that schooling and training are complementary but become more substitutable in a restructuring environment. Foreign ownership of the firm also positively affects the probability of undertaking training, providing evidence of active restructuring by foreigner investors. Additional training in workers' current fields is estimated to reduce mobility and earnings, suggesting inertial programs from the pre-transition era. Retraining in new fields increases all types of worker mobility and has higher returns than those typically observed for training in the U.S., but it also raises the variance of earnings and the probability of unemployment, consistent with a search view of such retraining. Given the large returns to retraining, the efforts of Russian workers to learn new skills may increase as uncertainty is resolved and restructuring proceeds.

Keywords: training, retraining, on-the-job training, mobility, labor market, transition, Russia

1. Introduction

Worker training appears to play a central role in economic restructuring. When rapid structural change in technology or markets alter the relative value of various skills, training and retraining may be beneficial in facilitating the reallocation of labor to higher-valued uses. Despite the presence of such structural change in most modern economies, however, there has been rather little research on the influence of restructuring on the extent and nature of private-sector training decisions. Compared to training activities over the worker and job life cycle, the focus of most prior research, is more training actually undertaken by workers and firms in the restructuring context? How does structural change affect the determinants of training, in particular the relationship with prior formal schooling? Finally, what are the labor market consequences of training – including employment, wages, and job mobility – in a restructuring environment?

In this paper, we investigate these questions drawing upon the example of Russia, an economy undergoing vast structural changes in the 1990s. As in other transition economies, the socialist legacy of inefficiency in enterprise functioning and the large shifts in the demand for various types of labor associated with the initial shocks of transition suggest that workers should acquire new skills to be able to work with new technologies and to meet the demands of a market economy. Our underlying premise is that the magnitude and suddenness of the shock to the valuation of various types of skills in Russia may provide some general lessons on the role of training in the process of economic restructuring. We also compare our results with the empirical findings concerning private-sector training in stable market economies such as the U.S.

We argue that the restructuring context may raise the benefits of training, but the effects on the amount, the determinants, and the productivity of training are

ambiguous nevertheless. To start with, it is possible that the costs of training – particularly those faced by firms and workers – may also increase. If the new structure of returns to skill types is initially unknown, or only partly observed, then risk-averse agents may be reluctant to undertake investments. Only gradually, as relative price movements settle down, and search and experimentation with skill acquisition of various types unfolds, will the new earnings structure be revealed. As Bartel and Sicherman (1998) argue with respect to the possible future obsolence of skills due to technological change in the United States, our claim is that uncertainty about the new returns, as well as their future evolution, may actually depress training activities. Furthermore, the uncertainty may be reflected in a high variance in the outcomes of training.

Related to the incentives to acquire training, the characteristics that tend to lead individuals to train may differ in the restructuring context. Research going back to Mincer (1962) has emphasized the complementarity between formal schooling and subsequent on-the-job training. The complementarity may be lower under structural change, however, as the attributes associated with higher benefits or lower costs of skill acquisition may also change. Bartel and Sicherman (1998) find that a higher rate of technological change in an industry tends to reduce the training gap between higher and lower educated workers, implying that schooling and training become more substitutable. A similar effect may be present under structural change, suggesting a compositional change in the types of workers who acquire training, but an ambiguous impact on training overall. The relationship of job tenure with training may also be affected by the restructuring context; while Bartel and Sicherman (1998) and Loewenstein and Spletzer (1999b) find a positive association in U.S. data, this effect may be reduced by the need for labor reallocation.

The amount and productivity of training may also be affected by the possibility that training institutions and practices may be initially unresponsive to a new structure of returns. While it is frequently remarked that public educational systems display such unresponsiveness, private organizations may also have decision-making problems and poor incentive structures, for instance due to inadequate corporate governance, and they may tend to continue inertially with training programs inherited from the past. The skills taught in these programs may have much lower value than they did formerly, and the acquisition of these skills may tend to reduce rather than enhance worker mobility. This also suggests that such firm characteristics as size (which has been found by Lowenstein and Spletzer (1999b) and Veum (1995) to be positively associated with training) and ownership (reflecting corporate governance issues) may be important determinants of training in the restructuring context.

A final consideration in evaluating training under restructuring is the possibility of a second type of supply-side adjustment problem. When the magnitude of structural change is such that wholly new skills are in demand, then the extent of training may be inhibited by a lack of qualified trainers for those new fields. In sectors such as financial services, retail trade, and marketing, where there was a complete vacuum at the beginning of transition, for instance, there may be very little opportunity for workers to obtain training. A shortage of trainers in new fields may tend to reinforce the inertial tendency for existing institutions to continue training in old fields, even if it produces little return.

In applying these arguments to an empirical analysis of training in the Russian restructuring economy, we suggest that a crucial distinction, albeit not entirely unambiguous, concerns the difference between retraining – the acquisition of new skills that are useful for changing jobs and thus for promoting labor reallocation – on the one

hand, and types of additional training that simply enhance existing skills, on the other. While other studies using Western data have considered various components of total training (e.g., Barron, Berger, and Black, 1997; Lillard and Tan, 1992; Loewenstein and Spletzer, 1997, 1999a, 1999b; Lynch, 1992; Lynch and Black, 1998; Parent, 1999; Veum, 1993, 1995, 1997), none have disaggregated total training into retraining in different fields and additional training in the same field. Throughout the paper, we investigate the utility of this distinction, examining both the determinants and the consequences of these two types of training.

We hypothesize that restructuring will increase retraining but it may reduce additional training, with an ambiguous overall effect due to the opposing effects of return and risk concerning the new earnings structure. Retraining in new skills tends to increase wages and several types of worker mobility, including across jobs, occupations, and industries, while raising the variance of outcomes due to the uncertainty of returns. Additional training in the same type of skills workers already possess, on the other hand, may tend to retard mobility and may produce low returns in the restructuring context; some of this additional training may be the product of Soviet-era training institutions that have continued operating in the transition. We also hypothesize that the unexpected nature of the transition permits us to disentangle some of the usual problems of simultaneity in estimating the effects of schooling and job tenure on training in more stable market economies and thus to shed light, from a new angle, on the degree of complementarity or substitutability between formal education, prior informal on-the-job training (proxied by tenure) and the formal job training programs we are able to measure.

Our empirical analysis of these hypotheses employs a household panel data set, the Russian Longitudinal Monitoring Survey (RLMS), for the years 1994 to 1998. To

focus on the implications of training for restructuring the existing labor force, as opposed to the somewhat different issues of educational reform and problems of new entrants, we restrict the sample to individuals who were employed in 1994. With respect to the determinants of training, our method is to relate the characteristics of workers and employers to the probability and amount of training between 1994 and 1998. When examining the consequences of training, we take the 1998 outcomes, or the difference between the 1994 and 1998 outcomes, as our dependent variables. As discussed above, we distinguish additional training (in the same field as an individual is employed) from retraining (in other fields); these measures based on retrospective questions on the 1998 survey pertaining to the previous three years.

The closest line of research for western economies to the question of the effect of restructuring on training activities is the work discussed above by Bartel and Sicherman (1998, 1999), who use NLSY data to examine technological change and the acquisition of training. They present evidence that production workers in industries with higher rates of technological change are more likely to receive formal company training and that the training gap between high and low educated workers narrows. We build on their work and that of others, but by contrast with their analysis of the impact of differences in steady-state rates of technological change, the economic transition in Russia and other former socialist countries presents a situation more like a one-time shock, which we believe may provide some general lessons on the role of training in the process of economic restructuring.

Concerning other issues addressed in our paper, a growing body of research has examined labor mobility in Western economies, but very few have explicitly examined the relationship between training and labor mobility. Parent (1999) uses NLSY data and finds that training provided by employers reduces interfirm mobility. Loewenstein

and Spletzer (1997, 1999a) also find a negative relationship between training and mobility using NLSY data. However, they argue that the causation in part may go the other way. Employers belatedly find out which employees are less mobile and are more likely to invest in their training. Veum (1997) also uses the NLSY and finds limited evidence that company training reduces turnover. Felstead, Green, Mayhew, and Pack (1999), using British survey data, find that training has little if any impact on mobility.

There is no evidence on the effects of training using direct measures of training for the transition economies, aside from research on the impact of government training and other active labor market programs for reemployment of the unemployed (e.g., O'Leary (1997), Earle and Pauna (1998), O'Leary, Kolodziejczyk, and Lazar (1998), Kluve *et al* (1999), Terrell and Sorm (1999), Lubyova and van Ours (1999), and Lechner (2000)) in Central Europe. While there have been studies of labor mobility in transition economies, none explicitly examines the relationship between training and mobility (Boeri and Flinn (1999), Orazem and Vodopivec (1997)). To our knowledge, there are no studies of transition economies that attempt an overall quantification of the incidence of formal training, nor that estimate the determinants and effects of training on standard labor market outcomes.

The rest of the paper proceeds as follows. In the next section, we develop our hypotheses concerning the likely role of training activities in a transition economy. Section 3 describes the data and Section 4 presents the results. A brief conclusion appears in Section 5.

2. Worker Training in Transition

Russia in transition offers an unusual opportunity to examine the role of job training in a setting where there has been a large amount of structural change. The magnitudes of the changes dwarf what have been experienced in western economies due to plant closings, shifts in industrial and occupation demands, economic liberalization and the rise of market competition. Here we use this quasi-experiment to understand the incidence of various types of training and the effects of training on mobility and wages in the restructuring context.

We first consider the impact of restructuring on the amount of training. After decades of central planning, including strict controls on prices, wages, and all forms of economic activity, liberalization policies resulted in a drastic revaluation of activities and skills. If there is little uncertainty concerning the revaluation, then restructuring should raise the amount of training as workers shift their efforts to higher valued uses. But if uncertainty increases simultaneously, then risk-averse workers and firms may be less likely to undertake training. The situation has some similarity with Bartel and Sicherman's (1998, 1999) discussion of technological change, where the argument concerns industries with different rates of change, and uncertainty concerns the nature of future changes, that is the extent to which current skills may become obsolete. The transition was more akin to a one-time shock, particularly in countries such as Russia that adopted "big-bang" liberalizations, but the shock was so large that there was probably considerable uncertainty about the nature of the skill revaluation. Only gradually have workers and firms been able to learn, partly through experimentation and experience, where the new opportunities lie. Moreover, the severity of the recession, the lack of liquidity, and possibly a lack of qualified trainers might imply that formal programs are likely to be prohibitively expensive in the current

environment. Thus, while it seems clear that the social value of training increases with the extent of resource misallocation and the necessity for restructuring, uncertainty and various constraints may result in less training than in a stable economy. These theoretical considerations imply an ambiguous relationship, and our measurement of training levels in Russia compared to the U.S. will reflect these two opposing effects.

An important distinction in analyzing training in the restructuring context concerns the relationship between a worker's existing skill set and the skills taught in training programs. Training under restructuring may be a response to the shifts in labor demand across occupations and industries; in this case it would represent a more radical departure from the worker's previous skills rather than simple enhancement of the skill sets workers had at the beginning of transition. Although the distinction between these two types of training (additional training for the same tasks as the current job versus retraining in other fields) has not been analyzed in the Western training literature, it would appear to be particularly important for a restructuring economy such that in Russia. On the other hand, additional training could still be sizable because of inertia in the activities of training institutions inherited from the Soviet economic system, which organized a large amount of formal training – much of it through apprenticeships and specialized sub-organizations within firms. In fact, during the Soviet era, virtually every worker went through a formal program to provide additional training in his or her current job every five to seven years. These leftover training programs from the Soviet era may be of limited value in the new situation, but they may be continued nonetheless due to poor organizational or individual incentives. Moreover, it seems likely that Soviet workers had a higher specificity of skills, both firm- and occupation-specific human capital, which might raise the costs of retraining to work in new firms or occupations.

Indeed, we would argue that the degree to which training in Russia is dominated by retraining for new types of jobs may be taken as one indicator of the extent to which such obstacles have been overcome and genuine restructuring of the labor force is underway. Inertia may affect training decisions, so organizational characteristics such as corporate governance matter for training decisions. Inertia may be reflected in additional training in the same field in which an individual has worked. Such training reduces mobility and produces low and possibly negative returns.

Next, we turn to the determinants of training decisions: the relationship between the probability of training and the characteristics of workers and their employers. A first issue is the degree of complementarity or substitutability of formal schooling with subsequent training. Standard human capital theory going back to at least Mincer (1962) argues that different types of skill acquisition are complementary, and Veum (1995), Loewenstein and Spletzer (1999b), and Bartel and Sicherman (1998) have provided recent evidence in support of the positive schooling-training correlation. Empirical verification is hampered, however, by the possibility that schooling, subsequent skill acquisition, and career decisions are jointly determined. For instance, suppose that individuals have some unobserved "tolerance for change" that is associated with lower costs of formal schooling and training and also influences occupational choices (raising the attractiveness of fields in which change is more likely). Then the observation of a positive correlation between schooling and training may not reflect any complementarity of the two kinds of skill acquisition. In the transition context, however, the magnitude of the revaluation of skills was completely unforeseen, and educational choices by workers in our 1994 sample were made with little expectation of the shocks to come. Therefore, we can treat educational choices as

exogenous with respect to subsequent training decisions, particularly where the latter involves retraining for new fields.

Our analysis of the relationship of schooling and training in the restructuring context builds on Bartel and Sicherman's (1998) analysis of the attenuation of this relationship in industries with more rapid rates of technological change; it even becomes negative at high levels of some technological change measures. The argument that schooling and training become more substitutable in an environment of rapid change may be extrapolated to the restructuring environment, implying that we should observe a lower level of complementarity between schooling and training, particularly when we analyze retraining for other fields.

Another important aspect of inherited human capital in the transition concerns previous work experience and job tenure as proxies for informal on-the-job training. Bartel and Sicherman (1998) among others, report positive relationships between both of these variables and the probability of training (defined as formal, company-organized training). The positive association may be interpreted as evidence of complementarity among the types of human capital investment, but the interpretation is open to the objection that experience and more particularly job tenure may be endogenous, for reasons similar to those discussed in Loewenstein and Spletzer's (1998) analysis of training and mobility: firms tend to train stayers rather than movers. We can again exploit the unexpected nature of the transition to argue that previous job tenure is exogenous, thus providing a cleaner test of these relationships.

Some characteristics of firms, associated with the propensity to undertake restructuring, may also have an impact on training. Perhaps the most interesting hypothesis in the transition context concerns the relationship of firm ownership with the two types of training we have distinguished: additional training of workers in the same

field and retraining in other fields. Here we would argue that corporate governance considerations suggest that firms that have been privatized to foreign investors or other controlling outsiders may be more likely to adopt new technologies and change job assignments, possibly requiring greater retraining of their workers. If retraining in a new field is taken as representing restructuring, while additional training in the same field is not (reflecting instead a lack of response to new incentives), then such firm characteristics may have different relationships with the different types of training.

With respect to the consequences of training, we investigate several types of worker mobility and wage growth. Concerning mobility, studies in the U.S. have found that firm-organized training tends to reduce inter-firm mobility (quit rates), and given that most training is firm-organized, the result may be generalized as an average result of training. Again, we argue that the restructuring context matters: if our conjecture that the return to switching firms, industries or occupations in Russia may be much greater than in the standard setting of a stable market economy, then training may lead to higher rather than lower quits from the firm, as well as increased mobility across industries and occupations. The positive impact of training on quits should be much more pronounced for retraining in new fields, and it could be zero or negative for additional training.

Finally, concerning the impact of training on wage growth, it strikes us that a restructuring economy should have many possibilities for productive, wage-increasing labor mobility, if the necessary new skills can be acquired. Since mobility in general, and skill acquisition in particular, are costly processes, the revalued occupations may pay significant rents for some time before labor supply adjustments are complete. If this reasoning is correct, then the return to training in Russia should be higher than in the U.S. On the other hand, if much Russian training results from the inertial activities

of the old organizations set up to reproduce the skilled labor input for Soviet industry, then the return to training may be lower than in the U.S., since these sectors are dying in Russia. Furthermore, as we discussed above, job training may represent part of the process of search in the presence of uncertainty concerning the value of alternative opportunities. In this case, some experiments may be unsuccessful in the sense of leading to little or no wage growth, (although they may still contribute to learning about the nature of the human capital revaluation which has occurred). This reasoning implies that we may observe increased variation of earnings for workers undertaking training, particularly when it involves acquisition of skills in a different field than the worker's current job.

To summarize, three sets of empirical hypotheses emerge from our discussion in of the nature of training in a restructuring economy. First, we hypothesize that the total amount of training may be higher or lower, relative to the level in a stable market economy, because of the opposing effects of return and risk. But we have emphasized the importance of distinguishing retraining for new skills from additional training in the same field: quantities of each type may be taken as proxies for the amounts of restructuring and inertia, respectively. Second, concerning training determinants, we hypothesize that the impact of prior human capital on training is lower in a restructuring than in a stable economy, and lower for retraining than for additional training. Organizational characteristics associated with restructuring should be associated with training. Firms with concentrated outside owners, especially foreign investors, engage in more training. Third, concerning outcomes of training, we hypothesize that retraining increases job, industry, and occupational mobility while additional training in the same field reduces mobility. Returns to training overall may be higher or lower than in a stable economy; they are likely to be higher for retraining,

lower and perhaps negative for additional training in the same field. Finally, retraining is risky: the returns are highly variable, and retraining may sometimes lead to unemployment.

We discuss the data used to address these hypotheses in the next section.

3. Data

The data for this study are drawn from the Russian Longitudinal Monitoring Survey (RLMS), based on the first national probability sample drawn in the Russian Federation. The RLMS data consist of two longitudinal surveys of more than ten thousand individuals during 1992-1993 (Rounds 1-4) and 1994-1996, 1998 (Rounds 5-8). We employ data from the 5th Round in 1994 and the 8th Round in 1998. The size of the adult sample (individuals answering the adult questionnaire, typically individuals age 14 and over) in 1994 is 8,893 (4,896 employed), and in 1998 is 8,701 (4,250 employed). The number of adults in both the 1994 & 1998 rounds is 5,495. The number of adults employed in both 1994 and 1998 is 2,419. The number of employed respondents in both years with non-missing values for the variables used in the training and mobility analyses is 2,333. The number of respondents with non-missing values of the variables used in the wage growth analysis is 2,054. We also use a somewhat larger sample made up of the 3,068 individuals working in 1994, regardless of their employment status in 1998.

The panel structure of the RLMS permits us to examine changes in job characteristics of respondents who did and did not receive training (e.g. occupation, industry, firm and wages). Below we describe the construction of the variables used in the empirical analysis.

Training Measures

The training variables used in the analysis are constructed from a number of questions about participation in formal training programs that are asked in the RLMS. Although various types of informal skill acquisition, such as on-the-job learning, may represent quite important ways in which individuals enhance their skills and acquire new ones, we focus on formal training programs for measurement reasons.[1] We include any training organized by firms, government, private agencies, and by workers themselves. Our focus is on experienced workers to distinguish the job training and retraining issues that are central to restructuring from initial human capital acquisition decisions.

The first training measure is additional training in the same field, which is based on the 1998 RLMS question:

> "During the last 3 years were you are you studying additional training courses in your current profession, field?"

The second is retraining, which is defined using the following 1998 RLMS question:

> "During the last 2 years were you or are you studying courses where you studied some other profession, field, foreign language?"

These questions allow us, unlike previous studies, to examine the incidence of additional training and retraining, and to examine their effects on mobility and wage growth.

[1] Much of the evidence on the incidence of training in western economies pertains to formal training, largely because it is easier to measure (e.g. Lynch, 1992). Only a few surveys in the U.S. have attempted to measure informal training (e.g. the Employment Opportunity Pilot Project data, the Small Business Administration training survey data, the training supplements of the Current Population Surveys, the National Longitudinal Survey of the High School class of 1972, and National Longitudinal Survey of Youth). Loewenstein and Spletzer (1999b) discuss the difficulties of measuring informal training and the inconsistencies in the results across surveys. The evidence that does exist suggests that informal training has a high incidence rate, at least among new hires, in the U.S. economy. Using the 1992 Small Business Administration training survey, Barron, Berger, and Black (1997) find that 88.7% of new hires received informal training. However, since the work on the incidence of training is just beginning in Russia, it is

Worker Characteristics

We use a number of worker characteristics in our analysis of training, employment, mobility, and wage growth. We include in our models basic demographic characteristics such as gender, age, and years of schooling. These demographic characteristics along with years of tenure on the current job are available in each wave of the RLMS. After examining the answers to a set of open-ended questions on the individual survey questionnaires, we created a set of occupational codes using the International Labor Organization ISCO four-digit system. These codes are free of inconsistencies over time that are apparent in the original RLMS coding. These new codes are used to create occupation control variables at the one-digit level and to create a measure of occupational mobility.

Firm Characteristics

Unfortunately, no information on industry of the firm employing the worker-respondent was included in the original, published data. Therefore, we created industry codes based on the Goskomstat 5-digit OKONH system after examining the answers to open-ended questions concerning the nature of the employer on each individual survey questionnaire. In the industrial sector, after identifying the enterprise, we assigned the industry code for that enterprise used by Goskomstat, as reported in the Registry of Industrial Firms. In the non-industrial sector, we assigned a code based on available information about the enterprise. These industry codes were used to create control variables (economic sectors of services, industry, and agriculture) and to create a measure of industrial mobility between 1994 and 1998.

In addition to industry, we created a set of dummy variables measuring ownership of the firm. For respondents working in industry we obtained ownership

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natural to focus on formal training and to compare the results with those obtained for formal training in the United States.

information from the Goskomstat Registry of Industrial Firms. We used the four Goskomstat categories of ownership: state, private, mixed (state-private), foreign. For respondents working in the non-industrial sector we followed two approaches. If there were several respondents working in the same firm, we measured ownership based on the majority opinion of the respondents or on the basis of a high-ranking individual within the firm. In this way, the ownership measure is consistent across all workers in the firm. If there was only one person working in the firm, we used that person's responses to questions about ownership.

The four categories of ownership (state, foreign, private, and mixed) are constructed using the following RLMS questions:

1. "Is the government the owner or co-owner of your enterprise?"
2. "Is your enterprise owned or co-owned by foreign firms or foreign individuals"
3. "Is your enterprise owned or co-owned by Russian private individuals or Russian private firms"

Foreign firms are those for which the answer to question 2 is "yes." State firms are those for which the answer to question 1 is "yes," the answer to question 2 is "no," and the answer to question 3 is "no." Firms designated as (domestic) private are those for which the answer to question 1 is "no," the answer to question 2 is "no," and the answer to question 3 is "yes." Mixed firms are those for which the answer to question 1 is "yes," the answer to question 2 is "no," and the answer to question 3 is "yes."

Firm size is measured using the response to the RLMS question:

"How many people work in your enterprise?"

Because there are many missing values for this variable, we also created a firm size missing variable that is used in the analysis.

Local Characteristics

The share of workers employed in de novo firms is imputed for each RLMS district based on the RLMS question on the founding date of the enterprise. De novo firms are defined as firms founded between 1994 and 1998. This measure is used as a proxy for the local scale of job creation. The 1994 unemployment rate is taken from the regional yearbook and is determined using ILO methodology for each region in the Russian Federation. We expect to find a positive relationship between training and the share of workers employed in new firms. However, limited outside opportunities and a high unemployment rate probably reduce incentives to acquire additional training and retraining.

Worker Mobility and Wage Growth

Besides receipt of various types of training, the dependent variables in our analysis are worker mobility and wage growth. Worker mobility is measured in several ways. Using responses to the RLMS on the enterprise of the primary job, we construct a measure of interfirm mobility. Using the original RLMS survey responses, interfirm mobility is measured as a change in the enterprise of the primary job between 1994 and 1998. Occupational mobility is measured as a change in the newly created four-digit occupational code of the primary job between 1994 and 1998. Occupational mobility is further classified into interfirm occupational mobility, i.e., individuals who change occupations and firms, and intrafirm occupational mobility, i.e., individuals who change occupations but do not change firms. Industrial mobility is measured as a change in the five-digit industry code of the primary job between 1994 and 1998. These measures provide a comprehensive picture of the mobility of Russian workers.

We also measure mobility using the transition among employment states between 1994 and 1998. In particular, starting with a sample of those working in firms

in 1994, we observe whether each individual in 1998 was still employed in a firm, was self-employed, was unemployed, or was out of the labor force. Among the employed in 1998, the self-employed are individuals whose primary job was individual economic activity or who does not work at a firm or enterprise with more than one worker. The unemployed are those who did not have a job at the time of the 1998 interview, who had searched for a job in the previous 30 days and who reported themselves available to accept an appropriate job in the previous week. Those out of the labor force did not have a job at the time of the 1998 interview and had not searched in the previous 30 days or had searched but were not ready to accept an appropriate job in the previous week.

Wage growth is the difference in log of contractual wages for the primary and secondary jobs between 1994 and 1998. We needed to compute the contractual wage for both 1994 and 1998 for consistency because it was not available in the earlier RLMS rounds (1994-1996). Earlier RLMS questionnaires only asked actual earnings in previous month. Actual paid earnings is not an appropriate measure of the contractual wage given that 40-60% of Russian workers have wage arrears. Actual paid earnings are lower than the contractual wage when people did not get their wages in previous month and they are higher than the contractual wage when accumulated wage debt is paid.

We have imputed the contractual wage in the following way. For workers with wage arrears, the contractual wage is the total wage debt on the primary and secondary jobs owed to the worker divided by the number of monthly wages owed. For workers without wage arrears the contractual wage is the actual monthly wage received last month from primary and secondary jobs. Wages are measured in nominal terms so we measure the log wage growth between 1994 and 1998 without controlling for inflation.

However, since we have only one time period over which we are measuring wage growth, inflation between 1994 and 1998 is absorbed into the constant term of our log wage growth equation.

4. Results

In this section, we report our analysis of the training activities of Russian workers over the period 1994-1998 using the Russian Longitudinal Monitoring Survey data. Table 1 shows the incidence of formal training activities among Russian workers employed in 1994 and in both 1994 and 1998. Among those working in 1994, the training incidence rate between 1994 and 1998 is 11.93%. For those working in both 1994 and 1998, 13.93% received some form of training between 1994 and 1998. The majority of reported training is training received in the worker's current field. A smaller proportion of workers received retraining in other fields.

The RLMS also asks respondents about the duration of retraining and additional training in number of calendar days. We show in Table 1 the average number of calendar days over which training activities occurred. However, we choose to report the results using the incidence measures of training rather than the duration measures in the statistical models that follow. While we have also estimated our receipt of training, mobility, and wage growth models using the duration training measures and obtained qualitatively similar results to those reported below, we are concerned with the problem of measurement error inherent in the RLMS duration measures. The RLMS questions only ask about calendar days of training, not about the average hours of training per day. Bartel and Sicherman (1998) noticed a similar reliability problem with the pre-1988 NLSY training duration measures. Barron, Berger, and Black (1997) find a greater correlation between firm and worker reports of formal training incidence than

between firm and worker reports of the length of time it takes a worker to become fully trained in qualified, consistent with a greater potential measurement error problem with a length of time measure than with the incidence measure.[2] Given this potential problem, we believe it is appropriate to focus on our analyses using the incidence measures of training.

How do the incidence estimates for Russia from the RLMS compare to the incidence of formal training activities in the United States? The U.S. Current Population Surveys (CPS) provide estimates of the incidence of training on both the previous and current job in 1983 and 1991. For 1983, Lillard and Tan (1992) report that 11.7% of men needed formal training on their previous job in order to obtain their current job, and 38.0% of men working at the time of the survey said that they had received training to improve their skills while on their current job. For 1991, Loewenstein and Spletzer (1999b) report a 44.1% incidence rate of formal training among 16-64 year old workers while on their current job. However, an important weakness of the CPS training data is that the reference period is the entire current job, which varies from worker to worker.

On the other hand, the National Longitudinal Survey of Youth (NLSY) provides estimates of formal training incidence over fixed time periods but for a limited age range of workers. The individuals in the NLSY were aged 14-21 in 1979 at the beginning of the panel. Veum (1993) reports on the training received by individuals in the NLSY aged 21-29 in 1986 over the period from 1986 to 1991. He finds 38.0% received some type of training to help find a job, learn new job skills, or learn a new job between 1986 and 1991. Training categories in his analysis included business

[2] Veum (1995) also finds evidence consistent with this idea for company provided training. In regressions explaining wage levels and wage growth, the incidence of company provided training has a positive and significant effect on wage levels and wage growth, while hours of company provided

school, vocational or technical institute, correspondence courses, formal company training, seminars outside of work, and other forms of training. Loewenstein and Spletzer (1999b) analyze the training data for the same cohort of individuals between 1993 and 1994. They find over that year 17.3% of workers had engaged in some type of formal training.

Thus, it appears that there is more formal training undertaken by workers in the United States than in Russia. However, comparisons are difficult because the NLSY samples are much younger than the RLMS samples (average age of 38.54 in 1994). In order to remove the age effects, we recalculated training incidence using the RLMS data for the same age ranges in the NLSY data. For 21-29 individuals in the RLMS, which matches the age range used by Veum (1993), the training incidence rate is 15.7%. For the slightly older group of workers used by Loewenstein and Spletzer (1999b), the incidence rate is 13.9%. These calculations make it apparent that the incidence rate of formal training in the RLMS data is substantially below that observed in the NLSY data for the same age groups. In fact, given the relatively small proportion of training activities in Russia devoted to retraining, the RLMS incidence rates most likely overstate the amount of useful training taking place.

Table 2 shows the mean characteristics of workers in 1994 in the full RLMS sample of workers and the mean characteristics by receipt of training in subsequent years, where the sample includes individuals working in 1994 and observed (and responding to the training questions) in 1998. An interesting difference in the types of firms for which individuals work by the type of training received is that individuals receiving training in the same field are more likely to be working for state-owned firms than are individuals receiving retraining. In contrast, individuals receiving training in

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training have a very small and insignificant effect on wage levels and wage growth, consistent with a problem with error in the measurement of hours of company provided training.

other fields are more likely to be working for private domestic, foreign, or mixed firms than are individuals receiving training in the same field.

Table 3 provides probit estimates of the receipt of training as a function of several worker and firm characteristics. The first column shows the model explaining the receipt of any kind of training between 1994 and 1998. The next two columns show the models explaining the receipt of additional training and retraining. In the first column, we see that training falls with age and tenure, increases with schooling, is more likely to be undertaken by managers, professionals and technicians, is less likely to be undertaken by workers in industry and agriculture as opposed to services, is less likely to be undertaken by workers in domestic private firms, and is more likely to be undertaken by workers in large firms. Regions with a higher share of employed in de novo firms and lower unemployment rates tend to have higher incidence of training.

The results in models for the two individual types of training tell us what factors are driving the overall results for the receipt of training. For example, older individuals are likely to get less of both types of training. The variable measuring previous years of schooling has a much larger impact on additional training in the same field than on retraining, suggesting that the substitutability between schooling and training increases with the extent of restructuring. This is also consistent with Bartel and Sicherman's (1998) argument concerning the impact of technological change on the schooling-training relationship. Thus, the results here support the complementarity hypothesis overall, while providing some evidence that schooling may increase the ability to deal with change, thus substituting to some extent for training. In addition, service workers are more likely to invest in retraining while technicians are more likely to receive additional training. Firm size is a more important determinant for the receipt of additional training in the same field than it is for the retraining.

We can compare our results on the determinants of the incidence of formal training in the RLMS with those for the United States reported by Loewenstein and Spletzer (1999b) using the 1993-94 NLSY data and by Veum (1995) using the 1990 NLSY data. Like the RLMS results, both Loewenstein and Spletzer (1999b) and Veum (1995) report that higher education levels are associated with higher probability of the receipt of training. Loewenstein and Spletzer (1999b) and Veum (1995) both find that larger firms are more likely to provide training (except for outside seminars), consistent with the RLMS results for the provision of training in the same field. The RLMS estimates suggest a flat tenure profile for the probability of receiving training (this is also the case when a quadratic tenure specification is employed). In contrast, Bartel and Sicherman (1998), Loewenstein and Spletzer (1999b), and Veum (1997) find fairly strong evidence that the probability of the receipt of formal training increases with tenure, although at a decreasing rate. [3]

Turning to the effects of training, we first consider worker mobility of several types: across industries, firms, occupations, and labor force states, and within firms. Table 4 shows the proportion of all workers that experienced mobility between 1994 and 1998, along with mobility experiences of those workers that have received some form of training in that period. The mobility rates of those receiving retraining in other fields appear higher than the mobility rates of the typical worker. On the other hand, the mobility rates of those receiving training in the same field appear to be lower than those of the typical worker.

[3] While Veum (1995), using a linear specification, finds no relationship between the receipt of company provided training and tenure, Veum (1997), using a quadratic specification, finds that additional tenure increases the probability of the receipt of company provided training at decreasing rate, similar to Bartel and Sicherman (1998) and Loewenstein and Spletzer (1999b).

Table 5 shows probit estimates explaining interindustry, interfirm mobility, and occupational mobility as a function of a number of worker and firm characteristics, including the receipt of training between 1994 and 1998. We focus on the results for the training variables. Additional training in the same field appears to reduce all types of mobility, while retraining appears to raise mobility. The results for additional training in the same field are consistent with those using NLSY data in the United States that the receipt of training is associated with lower mobility (e.g. Loewenstein and Spletzer 1997, 1999a; Parent, 1999). Retraining works in exactly the opposite direction, providing further support that the distinction between types of training is an important one. This type of training appears to facilitate worker mobility and is more likely to be the result of workers' adjustments to transition and restructuring than is additional training in the same field.

Finally, we note that the insignificant coefficients on years of schooling in each of the equations is slightly puzzling in light of the argument that schooling enhances the ability to deal with change. However, in some cases schooling may be more like an investment in occupation-specific skills. In these cases additional schooling may reduce the propensity to mobility, especially occupational mobility within and across firms, leading to the observation of insignificant effects in the mobility equations.

In Table 6, we estimate the effect of training on employment transitions between 1994 and 1998. We estimate a multinomial logit model in which the employed in 1994 either transition to self-employment, unemployment, out of the labor force, or remain employed in an enterprise in 1998. 74.5% of the sample remains employed in an enterprise in 1998, 4.6% transitions to self-employment, 5.2% transitions to unemployment, and 15.7% transitions to out of the labor force in 1998. The reference category in Table 6 is remaining employed in an enterprise in 1998. This

transition is a function of training and other observable firm and worker characteristics in 1994. We find that additional training in the same field reduces the probability of transiting from employment to self-employment, unemployment or out of the labor force relative to staying employed. Thus, additional training in the same field is associated with lower levels of mobility into any other employment state. In contrast, retraining only raises the probability of transiting to unemployment relative to remaining employed. While retraining may help mobility to a different industry or occupation, as we saw in Table 5, Table 6 also shows that there is some risk involved: it also raises the chances of being unemployed. Such unemployment may reflect training failures or it may represent productive search that is complementary with the new skills, but in either case the finding is consistent with our view of such retraining as involving search and experimentation in the presence of uncertainty.

Finally, in Table 7 we examine the relationship between training and wage growth. In the U.S., the typical finding is that training leads to increases in wage growth (e.g., Veum, 1995; Barron, Berger and Black, 1999; Loewenstein and Spletzer, 1999b), consistent with what one would expect from a standard human capital model. In Panel A, we show the average growth in nominal log wages between 1994 and 1998 for all workers and workers receiving the two different types of training. Across the entire sample, nominal log wages increase by 1.291 or 264% (calculated as exp(1.291)-1). At the same time, prices in Russia increased by 476% (CPI in December 1994 = 43.234 (December 1995=100); CPI in December 1998 = 249.305). So real wages of these workers declined substantially from 1994 to 1998. The average wage growth of those obtaining retraining in another field is higher than the wage growth of the typical worker, while the average wage growth of workers receiving the additional training in the same field look similar to the wage growth of the typical worker. This provides

some initial evidence that types of training associated with labor reallocation and acquisition of new skills may be more productive in a transition economy such as Russia's than training that merely enhances an existing skill set. Also note that the standard deviation of wages is higher for workers retraining than for additional training, consistent with our hypothesis that the revaluation of skills led to significant uncertainty about the returns to retraining of various types, thus that retraining involves a process of search.

In Panel B, Log wage growth between 1994 and 1998 is regressed on the log change in hours of work, a number of worker and firm characteristics observed in 1994, and whether workers have received training between 1994 and 1998. In the first column, we see that the dummy variable for either type of training in insignificantly related to wage growth. However, when the two separate types of training are included in the wage growth equation, a different pattern emerges. Consistent with theory, retraining raises wage growth. Additional training in the same field is associated with lower wage growth, even though as we saw in Table 6 that it was associated with more employment stability. These results suggest that the training most likely to be associated with restructuring, retraining in other fields, has the highest return. Training most likely to be coming from leftover programs from the pre-transition era, additional training in the same field, is less likely to be imparting skills valuable in a market economy and actually yields negative returns.[4]

The returns obtained from retraining in other fields are substantially larger than those observed for training investments over similar periods in the United States. According to the estimates in Table 7, retraining increases log wages between 1994 and

[4] These results may be due in part to unobserved heterogeneity in the type of workers obtaining training. Because our dependent variable is wage growth rather than level, however, any fixed heterogeneity will be differenced out, leaving only heterogeneity that is correlated with the change in the value of human capital rather than the level of ability.

1998 by .304 or 35.5% (calculated as exp(.304)-1).[5] Barron, Berger, and Black (1999) calculate elasticities of wage growth over a two year period with respect to training using the 1982 EOPP and 1992 SBA data. These elasticities are .028 and .020 respectively. While these seem fairly low compared to the Russian results, they cannot be directly compared because the training is measured in terms of hours rather than a dummy variable for the receipt of training. Better comparisons can be obtained using the NLSY results of Veum (1995) and Loewenstein and Spletzer (1999b). Using dummy variables for the reciept of training and controlling for a number of other characteristics, Veum (1995) finds that company provided formal training increases log wages between 1986 and 1990 by .0897 or 9.38% and that seminars outside of work increase log wages by .0848 or 8.85%. Similarly, Loewenstein and Spletzer (1999b) find that after controlling for several characteristics, receipt of formal training increases log wages between 1993 and 1994 by .0328 or 3.33% across jobs and up to .0452 or 4.62% within jobs. These are much smaller estimated effects than those estimated for retraining in using the RLMS data between 1994 and 1998. The difference is even more impressive when we consider that the NLSY sample is much younger (e.g. ages 21-29 in 1986) with presumably steeper earnings profiles and possibly more intensive training activities than the older RLMS sample (average age = 38.47 in 1994).

5. Conclusion

Most of the research on private-sector training decisions by workers and firms has ignored issues of structural change and demand shifts. Perhaps because Western

[5] One reader suggested that retraining may be more likely when an individual is faced with a larger negative shock, implying that the retraining variable is endogenous in the job mobility equations. However, this suggests that the coefficient on retraining should be biased downward in the wage growth equation. The fact that we find that retraining has a strong positive impact in the wage growth equation suggests that retraining is not only reflecting a negative shock.

economies tend to be relatively stable, or perhaps because of economists' predilection for analyzing static equilibria, the focus has rather been on training patterns over the worker and job life-cycles. A notable exception is Bartel and Sicherman's (1998) analysis of the impact of technological change on the incidence of training and on the training gap between high and low-educated workers. In their analysis, technological change is treated as a continuous process, with a constant rate over time and varying only across industries. By contrast, the restructuring situation is more akin to a one-time shock of dramatic structural change and sudden shifts in the demand for different types of human capital.

This paper has made a first attempt to measure the causes and consequences of worker training in this restructuring environment. We have argued that transition economies in general, and Russia in particular, represent a fruitful setting to investigate this question, given the suddenness and magnitude of the shocks from liberalization and opening to the world economy.

We have hypothesized that the restructuring process, relative to the situation in a stable market economy, has ambiguous effects on the incidence of training. On the one hand, the need for labor reallocation would appear to promote training, particularly retraining of the "job-switching" type that provides new skills for new types of work. On the other hand, the increased uncertainty associated with the shift in the earnings structure suggests that workers and firms may be reluctant to undertake training investments. The possibility that formal schooling and training tend to be more substitutable in a restructuring context led us to conjecture that the correlation of the previous years of schooling and the training variables might be attenuated, similar to Bartel and Sicherman's (1998) argument concerning the impact of technological

change. The role of firms in training their workers and the problems of corporate governance in the transition environment led us to hypothesize that training might be higher in privately owned companies, particularly those dominated by foreign investors. We also hypothesized that restructuring would tend to increase the covariance of training with mobility, as workers retrain for new types of work, and perhaps with wages, as the initial disequilibrium created by the transition shocks permits short-run rents to be gathered by the first movers to new fields.

Drawing upon household panel data for Russia, we have examined evidence concerning these hypotheses. Our findings suggest that that the incidence of formal training by Russian workers is below that observed for workers in the United States during roughly the same time period. We put forth the interpretation that uncertainty associated with the revaluation of skills may be outweighing the potential returns to training in a restructuring environment. Our analysis goes on to provide evidence for this interpretation in several ways. Retraining in other fields is estimated to have strongly positive effects on labor mobility and on wage growth, which supports our contention that such training has substantial potential returns, but it also raises wage variability and the probability of a transition to unemployment, implying there may be significant risks. The negative returns to additional training in the current field are consistent with the view that such training represents the inertia of the old system of training institutions. These training programs may be offering skills that might have been useful during the Soviet era but have ceased to be so in a restructuring economy.

The results thus suggest a fairly coherent picture of training in Russia. But they also provide some broader lessons for the analysis of training. First, we have demonstrated the importance of distinguishing retraining in new skills from additional training in the current field. Although the distinction is somewhat ambiguous and

difficult to measure, our analysis shows substantial differences in behavior of the two types, both in the process determining the decision to undertake the training and in the consequences for mobility and earnings. Furthermore, understanding retraining requires an appreciation of the role of uncertainty and the tradeoff between risk and return, while additional training may be more explicable in terms of problems of corporate governance, bounded rationality, and costs of adjustment. The use of training appears to vary by type of firm, including size and industry, but we also show that certain types of owners – notably foreign investors – are more likely to engage in training their workers. Finally, our results also provide evidence that the substitutability of education and training increases in the restructuring context, as education has a much stronger effect on skill enhancement than on retraining for new jobs, while nonetheless confirming the education-training complementarity overall. Although these findings are based on our analysis of Russian data, they are suggestive of relationships that may hold in any economy restructuring in response to technological change or to shifts in preferences, resources or competition.

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Table 1: Incidence of Training among Russian Workers between 1994 and 1998

	Proportion of Respondents Employed in 1994 Receiving Training	***Proportion of Respondents Employed in 1994 and 1998 Receiving Training***
Incidence of Training (Percentage)		
Any Type of Training	11.93%	13.93%
Additional Training (in the same field)	9.88%	12.00%
Retraining (in other fields)	3.29%	3.34%
N	[3,068]	[2,333]
Average Duration of Training per Trainee (Days)		
Any Type of Training	50.65	46.67
N	[356]	[319]
Additional Training (in the same field)	37.48	34.91
N	[299]	[277]
Retraining (in other fields)	72.02	69.83
N	[96]	[76]

Source: Authors' estimates from the Russian Longitudinal Monitoring Surveys.

Table 2: 1994 Characteristics of Russian Workers, by Receipt of Training from 1994 to 1998

		All Respondents Employed in 1994 and 1998	*Received Additional Training*	*Received Retraining*
Individual Chars	Female	0.536	0.671	0.667
	Age (years)	38.466	37.675	33.808
		(10.329)	(10.108)	(10.370)
	Schooling (years)	11.932	13.466	12.801
		(2.484)	(2.034)	(2.218)
	Tenure (years)	9.055	8.657	7.136
		(8.693)	(8.354)	(8.504)
Occupations	Managers and Professionals	0.207	0.432	0.308
	Technicians	0.169	0.293	0.218
	Clerks	0.074	0.054	0.077
	Service Workers	0.078	0.036	0.141
	Craft Workers	0.182	0.075	0.077
	Operators and Assemblers	0.196	0.086	0.141
	Unskilled Workers	0.094	0.025	0.038
Sectors	Industry	0.290	0.175	0.321
	Agriculture	0.139	0.032	0.051
	Services	0.571	0.793	0.628
Own	State	0.525	0.739	0.577
	Domestic Private	0.143	0.061	0.115
	Mixed	0.319	0.186	0.282
	Foreign	0.013	0.014	0.026
Size	Firm Size (,000 employed)	2.166	4.820	1.563
		(15.707)	(27.832)	(5.363)
	Firm Size Missing	0.190	0.164	0.154
Local	Share of Employed in De	0.158	0.168	0.185
	Novo Firms	(0.081)	(0.079)	(0.066)
	1994 Unemployment Rate	7.646	7.457	7.437
		(1.665)	(1.421)	(1.348)
	N	2,333	280	78

Note: Standard deviations are in parentheses. Sample consists of respondents employed in 1994 and 1998.
Source: Authors' estimates from the Russian Longitudinal Monitoring Surveys.

Table 3: Determinants of Receipt of Training 1994-1998, Probit Estimates

		Receipt of any Type of Training	*Receipt of Additional Training*	*Receipt of Retraining*
Individual Characteristics	Female	0.011	0.016	0.004
		(0.784)	(1.275)	(0.608)
	Age (years)	-0.002***	-0.001**	-0.001***
		(-3.009)	(-2.127)	(-4.171)
	Schooling (years)	0.015***	0.014***	0.002
		(3.901)	(3.962)	(1.280)
	Tenure (years)	-0.001	-0.001	0.000
		(-1.199)	(-1.255)	(0.221)
Occupations (Craft Workers are omitted)	Managers and Professionals	0.091***	0.069***	0.026**
		(3.374)	(2.958)	(1.992)
	Technicians	0.091***	0.068***	0.020
		(3.650)	(3.127)	(1.626)
	Clerks	0.022	0.008	0.017
		(0.678)	(0.292)	(1.233)
	Service Workers	-0.005	-0.040	0.033**
		(-0.149)	(-1.299)	(2.521)
	Operators and Assemblers	0.022	0.010	0.016
		(0.883)	(0.429)	(1.418)
	Unskilled Workers	-0.027	-0.040	0.009
		(-0.752)	(-1.245)	(0.526)
Sectors (Services are omitted)	Industry	-0.030*	-0.033**	0.014*
		(-1.693)	(-2.110)	(1.785)
	Agriculture	-0.095***	-0.086***	-0.010
		(-3.528)	(-3.435)	(-0.788)
Ownership (State is omitted)	Domestic Private	-0.089***	-0.087***	-0.015
		(-4.012)	(-4.196)	(-1.532)
	Mixed	-0.031*	-0.032**	-0.005
		(-1.844)	(-2.231)	(-0.565)
	Foreign	-0.012	0.013	0.004
		(-0.223)	(0.285)	(0.194)
Size	Firm Size (,000 employed)	0.001*	0.001**	-0.000
		(1.847	(1.976)	(-0.789)
	Firm Size Missing Dummy	-0.023	-0.010	-0.011
		(-1.389)	(-0.661)	(-1.470)
Local	Share of Employed in De Novo Firms	0.253***	0.137**	0.120***
		(3.341)	(2.031)	(3.960)
	1994 Unemployment Rate	-0.009**	-0.007**	-0.004*
		(-2.442)	(-2.081)	(-1.954)
	Intercept	-0.271***	-0.252***	-0.086***
		(-4.229)	(-4.436)	(-2.693)
	LR chi2(19)	255.37	252.60	66.07
	Pseudo R^2	0.138	0.151	0.087

Note: *** – significant at the 1% level, ** – significant at the 5% level; *–significant at the 10% level; t-statistics are in parentheses; t-statistics are defined with robust standard errors. Sample consists of respondents employed in 1994 and 1998. N= 2,333. The explanatory variables are measured in 1994. Coefficients show the marginal effect dF/dX.
Source: Authors' estimates from the Russian Longitudinal Monitoring Surveys.

Table 4: Mobility 1994-1998, by Receipt of Training

	All Respondents Employed in 1994 and 1998	*Received any Type of Training*	*Received Additional Training*	*Received Retraining*
Interindustry Mobility	0.244	0.203	0.168	0.372
Interfirm Mobility	0.266	0.222	0.186	0.397
Occupational Mobility	0.275	0.197	0.150	0.423
Intrafirm Occupational Mobility	0.127	0.091	0.070	0.191
Interfirm Occupational Mobility	0.148	0.106	0.080	0.232
N	2,333	325	280	78

Note: Sample consists of respondents employed in 1994 and 1998.
Source: Authors' estimates from the Russian Longitudinal Monitoring Surveys.

Table 5: Training and Mobility 1994-1998, Probit Estimates

		Inter-Industry Mobility	*Interfirm Mobility*	*Occupational Mobility*	*Intrafirm Mobility*
Type of Training	Additional Training	-0.103***	-0.112***	-0.148***	-0.039
		(-3.424)	(-3.607)	(-4.391)	(-1.389)
	Retraining	0.130***	0.133***	0.185***	0.091**
		(2.905)	(2.820)	(3.685)	(2.080)
Individual Characteristics	Female	-0.097***	-0.103***	-0.068***	-0.001
		(-4.670)	(-4.766)	(-3.054)	(-0.080)
	Age (years)	-0.004***	-0.005***	-0.003***	-0.001
		(-4.255)	(-4.592)	(-3.335)	(-0.895)
	Schooling (years)	0.001	0.002	0.007	0.002
		(0.223)	(0.457)	(1.212)	(0.374)
	Tenure (years)	-0.009***	-0.009***	-0.006***	-0.001
		(-6.747)	(-6.810)	(-4.311)	(-1.151)
Occupations (Craft Workers are omitted)	Managers and Professionals	-0.059*	-0.047	-0.112***	-0.082**
		(-1.643)	(-1.270)	(-2.872)	(-2.382)
	Technicians	-0.040	-0.038	-0.072**	-0.055*
		(-1.166)	(-1.077)	(-1.967)	(-1.759)
	Clerks	-0.048	-0.039	-0.000	-0.039
		(-1.120)	(-0.876)	(-0.007)	(-1.082)
	Service Workers	-0.102**	-0.080*	-0.045	-0.023
		(-2.470)	(-1.907)	(-1.060)	(-0.637)
	Operators and Assemblers	-0.035	-0.035	-0.043	-0.021
		(-1.247)	(-1.193)	(-1.451)	(-0.833)
	Unskilled Workers	0.023	0.009	0.009	-0.024
		(0.638)	(0.244)	(0.238)	(-0.731)
Sectors (Services are omitted)	Industry	-0.029	-0.045*	0.029	0.009
		(-1.150)	(-1.722)	(1.127)	(0.365)
	Agriculture	-0.123***	-0.145***	0.099***	0.109***
		(-3.847)	(-4.304)	(3.139)	(4.403)
Ownership (State is omitted)	Domestic Private	0.123***	0.149***	0.100***	0.004
		(4.634)	(5.383)	(3.535)	(0.135)
	Mixed	0.044*	0.060**	-0.003	0.022
		(1.850)	(2.392)	(-0.117)	(1.086)
	Foreign	0.108	0.096	0.073	0.036
		(1.539)	(1.315)	(0.923)	(0.502)
Size	Firm Size (,000 employed)	-0.005**	-0.006**	-0.002	-0.001
		(-2.022)	(-2.024)	(-1.441)	(-0.917)
	Firm Size Missing Dummy	0.019	0.045*	0.018	0.007
		(0.844)	(1.927)	(0.769)	(0.331)
Local	Share of Employed in De	0.279**	0.373***	0.306***	0.032
	Novo Firms	(2.586)	(3.346)	(2.631)	(0.316)
	1994 Unemployment Rate	-0.003	-0.004	-0.006	-0.003
		(-0.449)	(-0.674)	(-0.996)	(-0.683)
	LR chi2(23)	268.52	295.56	197.84	77.85
	Pseudo R^2	0.104	0.112	0.073	0.058
	N	2,333	2,333	2,333	1,712

Notes: *** – significant at the 1% level, ** – significant at the 5% level; *–significant at the 10% level; t-statistics are in parentheses and defined with robust standard errors. Sample consists of respondents employed in 1994 and 1998 (last column includes only those not changing firms from 1994-98). The explanatory variables except training are measured in 1994. Coefficients show the marginal effect dF/dX. Intercept is not shown.
Source: Authors' estimates from the Russian Longitudinal Monitoring Surveys.

Table 6: Training and Employment Transitions 1994-1998, MNL Estimates

		Transition to Self –Employment	*Transition to Unemployment*	*Transition to Out-of-Labor Force*
Type of Training	Additional Training	-0.032**	-0.018	-0.199***
		(-1.988)	(-1.175)	(-4.678)
	Retraining	0.022	0.042***	-0.024
		(1.401)	(2.726)	(-0.466)
Individual Characteristics	Female	-0.024***	-0.003	0.019
		(-3.266)	(-0.323)	(1.447)
	Age (years)	-0.000	-0.001***	0.007***
		(-1.252)	(-3.028)	(11.317)
	Schooling (years)	-0.001	-0.001	-0.011***
		(-0.288)	(-0.633)	(-4.245)
	Tenure (years)	-0.001*	-0.001	0.000
		(-1.914)	(-1.343)	(0.456)
Occupations (Craft Workers are omitted)	Managers and Professionals	-0.005	-0.006	-0.029
		(-0.388)	(-0.363)	(-1.219)
	Technicians	-0.009	0.005	0.016
		(-0.711)	(0.374)	(0.790)
	Clerks	-0.016	-0.016	0.000
		(-0.930)	(-0.835)	(0.020)
	Service Workers	-0.007	0.005	0.014
		(-0.548)	(0.312)	(0.619)
	Operators and Assemblers	-0.012	-0.016	-0.035**
		(-1.234)	(-1.203)	(-1.996)
	Unskilled Workers	-0.021	0.022	0.016
		(-1.529)	(1.597)	(0.795)
Sectors (Services are omitted)	Industry	-0.012	0.005	-0.018
		(-1.297)	(0.465)	(-1.265)
	Agriculture	-0.007	-0.016	0.021
		(-0.570)	(-1.079)	(1.370)
Ownership (State is omitted)	Domestic Private	0.035***	0.021*	0.024
		(4.129)	(1.862)	(1.486)
	Mixed	-0.008	-0.006	-0.000
		(-0.744)	(-0.573)	(-0.032)
	Foreign	0.048**	0.036	-0.082
		(2.478)	(1.323)	(-1.164)
Size	Firm Size (,000 employed)	-0.000	0.000	-0.001
		(-0.034)	(0.112)	(-0.854)
	Firm Size Missing Dummy	0.014**	0.003	0.018
		(2.008)	(0.359)	(1.358)
Local	Share of Employed in De Novo Firms	-0.044	-0.037	-0.199***
		(-1.090)	(-0.746)	(-3.005)
	1994 Unemployment Rate	-0.003	0.004**	0.012***
		(-1.199)	(2.321)	(3.930)
	Intercept	-0.041	-0.069*	-0.349***
		(-1.258)	(-1.863)	(-6.955)
N = 3,068 LR $chi^2(69) = 662.77$ Pseudo $R^2 = 0.132$				

Notes: *** – significant at the 1% level, ** – significant at the 5% level; *–significant at the 10% level; t-statistics are in parentheses and defined with robust standard errors. Sample consists of respondents employed in 1994. The explanatory variables except training are measured in 1994. Training is received between 1994 and 1998. Coefficients show the marginal effect dF/dX. The base category is employed in 1994 and 1998.
Source: Authors' estimates from the Russian Longitudinal Monitoring Surveys.

Table 7: The Impact of Training on Wage Growth, 1994-1998

Panel A: Wage Growth 1994-1998, by Receipt of Training 1994-1998

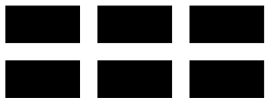
	All Respondents Employed in 1994 and 1998	***Received any Type of Training***	***Received Additional Training***	***Received Retraining***
Nominal Log Wage Growth, 1994-1998	1.291 (1.001)	1.316 (1.062)	1.286 (1.047)	1.621 (1.315)
N	2,054	299	267	65

Note: Standard deviations are in parentheses.

Panel B: Least Squares Estimates of Logarithmic Nominal Wage Growth, 1994-1998

Independent Variables	***(1)***	***(2)***
Any Type of Training	-0.062 (-0.935)	
Additional Training		-0.133* (-1.933)
Retraining		0.304* (1.825)
Growth Rate of Hours of Work, 1994-98	0.161*** (4.019)	0.159*** (3.982)
Hours of Work Missing	0.056 (0.867)	0.054 (0.843)
Female	-0.115** (-2.129)	-0.114** (-2.108)
Age (years)	-0.006*** (-2.609)	-0.006** (-2.533)
Schooling (years)	-0.009 (-0.690)	-0.010 (-0.724)
Tenure (years)	-0.008*** (-2.768)	-0.008*** (-2.773)
Occupation (craft workers are omitted)		
Managers and Professionals	0.112 (1.225)	0.119 (1.293)
Technicians	0.187** (2.349)	0.192** (2.418)
Clerks	0.030 (0.311)	0.028 (0.284)
Service Workers	-0.004 (-0.040)	-0.020 (-0.210)
Operators and Assemblers	-0.068 (-0.904)	-0.072 (-0.958)
Unskilled Workers	-0.021 (-0.234)	-0.022 (-0.243)
Intercept	1.719*** (8.748)	1.716*** 8.724
N = 2,054 R^2	F(13, 2040) = 5.29 0.033	F(14, 2039) = 5.36 0.037

Notes: *** – significant at the 1% level, ** – significant at the 5% level; *–significant at the 10% level; t-statistics are defined with robust standard errors. Standard deviations are in parentheses. Sample consists of employed in 1994 and 1998 (2,054 observations with complete wage data for 1994 and 1998). The explanatory variables besides growth rate in hours worked and training are measured in 1994.
Source: Authors' estimates from the Russian Longitudinal Monitoring Surveys.



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