

NBER WORKING PAPER SERIES

INSIDER PRIVATIZATION AND CAREERS - A STUDY OF A RUSSIAN FIRM  
IN TRANSITION

Guido Friebel  
Elena Panova

Working Paper 12998  
<http://www.nber.org/papers/w12998>

NATIONAL BUREAU OF ECONOMIC RESEARCH  
1050 Massachusetts Avenue  
Cambridge, MA 02138  
March 2007

We would like to thank for helpful discussions: Erik Berglöf, Anders Björklund, Peter Gottschalk, Joep Konings, Margaret Meyer, Marc-Andreas Muendler, Åsa Rosén, Kathy Terrell and seminar participants at the CAFÉ conference in Nuremberg, Boston College, LICOS Leuven, London Business School, SITE (Stockholm School of Economics), SOFI (Stockholm University), University of Michigan, and the University of Toulouse. We are grateful for the support of SITE. This paper was presented at the Conference on Firm and Employees (CAFE) held September 29-30, 2006 in Nuremberg, Germany. We gratefully acknowledge the financial support provided by the Institute for Employment Research (IAB), the Data Access Center (FDZ-BA/IAB), The Deutsche Forschungsgemeinschaft (German Research Foundation), their Research Network "Flexibility in Heterogeneous Labour Markets", the Alfred P.Sloan Foundation and the National Science Foundation. All errors are ours. The views expressed herein are those of the author(s) and do not necessarily reflect the views of the National Bureau of Economic Research.

© 2007 by Guido Friebel and Elena Panova. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

Insider Privatization and Careers - A Study of a Russian Firm in Transition  
Guido Friebel and Elena Panova  
NBER Working Paper No. 12998  
March 2007  
JEL No. M5,P3

**ABSTRACT**

We study how transition has affected human resource policies of a Russian heavy industry firm. Our data set contains personnel files of 1538 white-collar workers over 17 years: from 1984 to 2000. We find career paths before the first year of Gaidar's reforms, 1992, when Russian transition to a market economy began. After 1992, promotions are blocked, because both (i) more managers are hired from the outside, and (ii) fewer managers leave the firm. A possible reason is an extremely weak outsider property rights enforcement in Russia. Keywords: institutional environment and internal labor market, transition to a market economy.

Guido Friebel  
21 Allee de Brienne  
31000 Toulouse  
France  
friebel@cict.fr

Elena Panova  
Université du Québec à Montréal  
Département des sciences économiques  
Case postale 8888, Succursale Centre-Ville  
Montréal (Québec), CANADA  
H3C 3P8  
e\_panova@yahoo.com

# 1 Introduction

How do firms adjust their personnel policies and internal structure to changes in their economic and institutional environment? Chandler (1977) has investigated how firms in the last century reacted to challenges posed by new technologies and by market demands by developing professional management, the line/staff and later the multidivisional organization. Doeringer and Piore (1971) have documented how and why firms created internal labor markets to protect their workers from market shocks and to provide them with incentives to invest in firm-specific human capital. Following Carter and Carter (1985), Lazear (1992), and Baker, Gibbs and Holmström (1994), a large number of studies has investigated the personnel files of single firms over a long period of time to learn more about their internal labor markets.<sup>1</sup> One main finding is that a firm’s organization structure and career paths remain remarkably stable, even in turbulent times.

In this paper, we investigate how Russian transition from a centrally-planned to a market economy has affected human resource policies of a heavy industry firm. We use personnel data set that covers a total of 1538 white-collar workers over up to 17 years: from 1984 to 2000. We find that from 1984 to 1991 (hereafter, *in Soviet times*), the firm featured stable patterns of upward mobility that look quite similar to the career paths in western firms. From the year 1992 when Gaidar’s reforms began, to 2000 (hereafter, *during the transition*), we do not observe career paths anymore. The reason is that in all tiers of the firm’s hierarchy except for the lowest one, both (i) more managers are hired from the outside market, and (ii) fewer managers leave the firm. As a result, the firm becomes “toploaded”, and promotions are blocked.

A possible reason is an extremely weak protection of outsider property rights in Russia (see for instance, Woodruff 2004). When the firm

---

<sup>1</sup>Including Ariga et al (1999), Dohmen (2004) and Dohmen et al (2004), Ichino (1999), Seltzer and Merret (2000), Treble et al (2001).

was privatized in 1993 through the so-called option 2 of the Russian voucher privatization, insiders received privileges for the acquisition of shares. Effectively, incumbent managers became the owners. They had an opportunity to hire managers who had a higher human capital than themselves,<sup>2</sup> most probably because skilled employees were leaving less successful enterprises.<sup>3</sup> The manager-owners decided both (i) to take an advantage of this opportunity, and (ii) to stay in the firm (in order to enforce their property rights),<sup>4</sup> sacrificing thereby the incentivising- and signalling benefits from promotions.<sup>5</sup>

The paper is organized as follows. The next Section describes the ownership structure, output performance, and employment policies from the firm-level perspective. Section 3 uses the personnel data to compare human resource policies in Soviet times and during the transition. The last Section discusses the main insights. All Figures are collected in the Appendix.

## 2 The firm and its environment

The firm that we investigate is one of the largest enterprises in the machinery industry in Russia. It was established in 1949. Prior to transition, it was one of the leading companies in the industry and was awarded a number of distinctions. This Section uses firm-level data<sup>6</sup> to describe

---

<sup>2</sup>Managers hired after 1992, where both more experienced and better educated than incumbents working on the same level.

<sup>3</sup>Between 1996 and 1999, industrial employment in the region where the firm that we study is located has decreased by 9%. In the same period, the employment in the firm has decreased by only 6%.

<sup>4</sup>Potentially, the newly hired managers could take over the control. However, an obstacle, once again, was a weak enforcement of outsider ownership rights: it was limiting bank credit for acquisition of the firm's shares.

<sup>5</sup>Career prospects are among the most important instruments for encouraging employees to invest in firm-specific human capital (see Gibbons and Waldman 1999). Also, promotions signal the quality of employees, helping thereby to better allocate them among tasks (see Waldman, 1984; Sattinger, 1993).

<sup>6</sup>Unfortunately, we have no individual-level information about blue-collar workers, except for those of them who at some stage in their career moved into white collar or managerial positions. However, we have firm-level information about the employment and wages by both blue- and white collars.

how the firm was evolving in a changing institutional environment.

**Ownership structure** In March 1993, the firm was privatized through the so-called option 2 of the Russian voucher privatization, which provided privileges to insider workers and managers in acquiring shares. Since then, it has been a joint stock company. The annual report for 1997 indicates about 92% individual ownership. A total of 53.4% of the firm is owned by insiders. Neither municipality nor the regional government own shares, and there is no foreign capital. We have no information about the distribution of shareholdings. However, according to our interviews with managers in the firm, non-managerial employees delegate their votes to the manager of their department.

**Output performance** The firm went through a first output decline in 1987 when it had to cope with Gorbachev’s “perestroika” (see Figure 1). Decentralization of decision-making power damaged some of the traditional supply channels and affected demand. There is a steep drop in output from the beginning of Gaidar’s reforms in 1992 onwards, which is typical for these years, in particular, for heavy industry. From 1997, there was a positive tendency, and in 1999, the enterprise won an important tender to supply equipment to India.

At different points in time, the firm experimented with new product lines, for instance, tailor-made instruments. From late 1980’s until the late 90’s it has also been producing consumer goods (plastic chairs and tables). However, Figure 2 shows that there is a high correlation between the firm’s output and its specialization in the core business - the production of heavy machinery items.

**Employment policies from the firm-level perspective** Since 1988 and until 1997, industrial employment, that is, a number of workers employed in the core operations of the firm,<sup>7</sup> has steadily declined

---

<sup>7</sup>Similar to many other large industrial firms in Russia, the firm that we study had a large number of employees in non-industrial activities such as restaurants, hospitals, kindergartens, and housing. These individuals are out of our consideration.

(see Figure 1). Indeed, it fell from 4813 in 1998 to 3206 in 1998. Unfortunately, we cannot distinguish between an involuntary dismissal and a voluntary quit: it is a tradition in Russia to label any separation as a “quit”, so as to avoid subsequent stigmatization of a worker.

During transition, employment becomes more sensitive to output changes. However, it reacts with a lag. The most important wave of separations occurred in 1997, the first year of transition in which the firm’s real output has grown. Interestingly, that wave of separations followed the top manager’s dismissal initiated by the employees: an evidence of an active stance by new owners in the firm.

Furthermore, during transition, an increasing share of total wage bill (including wage arrears and in-kind payments) is allocated to white-collar workers (see Figure 3), and the ratio between white- and blue collar workers increases (see Figure 4). Notice, that this implies that more and more blue collars leave the firm (recall, that industrial employment has steadily declined).<sup>8</sup> Hence, the firm’s defensive (costcutting) restructuring might have mainly affected its blue collar workers.<sup>9</sup>

### 3 Personnel policies of the firm

**Personnel data** In order to better understand how transition has affected the firm’s hiring and promotion policies,<sup>10</sup> we investigate 17 years (1984-2000) of personnel files by 1538 white collar workers of the

---

<sup>8</sup>By the end of nineties, however, blue collars are more and more demanded by enterprises located in the same region as the firm that we study: the ratio of while collar- over blue collar vacancies in the region has decreased from 0.59 in 1996 to 0.2 in 2000.

<sup>9</sup>Following Grosfeld and Roland (1999), we distinguish between defensive and strategic restructuring. For a model on defensive and strategic restructuring of insider-privatized firms see Debande and Friebe (2005).

<sup>10</sup>Although we find more downward mobility than in other related work (there were 120 demotions in Soviet times, and 97 during the transition), we have not studied its determinants. The reason is that results could be difficult to interpret. Indeed, according to our interviews with human resource department, demotions are typically used as an employment insurance, in cases when (i) an employee reaches a retirement age, or (ii) he (she) becomes unable to fulfill his (her) duties for health reasons, or else, (iii) he (she) receives a primary job outside the firm, for instance, in informal sector.

firm.

We use the raw data from the human resource department. An employee's personnel file contains: a date of accession, a date of separation, dates of movements across job titles, an occupational code for each position defined by Goskomstat, the statistical office of Russia. We also know whether, in a given moment of time, an individual works in production and engineering, or in administration (sales, planning, accounting).<sup>11</sup>

Moreover, we know the following personal characteristics: age, work experience, education (years of schooling), gender, party and trade union membership, ethnicity, marital status, number of children, place of birth, place of university education, and field of study. We also know some of the job history of an individual: military service, date of leaving previous job, last employer. Unfortunately, we do not dispose of information about individual wages.

**Hierarchy and career paths** As in other related work (for instance, Baker, Gibbs and Holmström, 1994), human resources, as measured by “persondays per title”,<sup>12</sup> are concentrated on few job titles.<sup>13</sup> In our case twelve job titles represent about 90% of core white collar staff. We hence focus on these job titles.

They are located as follows on five levels of the firm's hierarchy (see Figure 5).<sup>14</sup> On level 1: technician, planning technician, and an ac-

---

<sup>11</sup>Recall, that we do not consider employees working in other services than core production or administration.

<sup>12</sup>For any given individual we know (i) the date of accession into the firm, and the accession job title (ii) duration of stay on a given job title. For each job title, we can then add up the persondays over individuals. These persondays per title can be expressed as a ratio of the total human resources in the firm.

<sup>13</sup>Of course, each job title contains a variety of specifications, as described by Goskomstat's 5 digit code. However, we have pooled down most of that variety, keeping to make a distinction between employment in production, and in administration.

<sup>14</sup>We know the firm's hierarchy. Instead, Baker, Gibbs and Holmström (1994), had no information about the hierarchy of the firm that they have studied. They have built the hierarchy by looking at the flows of human resources between different job titles. Indeed, they first have established the lowest level of the hierarchy, mostly filled by workers hired on the outside market. Afterwards, they have determined level

countant; on level 2: an economist, a planning engineer, an engineer working in production unit, and a foremen (a managerial position in production);<sup>15</sup> on level 3: a head of bureau, the responsible of a non-production unit, and supervisor of a production unit; on level 4: a head of production, and a head non-production departments; on level 5: a top manager.

At comparing two columns of the table on Figure 5, we see that during transition, the firm has shifted employees from production-oriented job titles (technician, engineer) to job titles that are related to business administration and development (accountant, economist, planning technician, and planning engineer). Moreover, it has reallocated human resources towards four managerial jobs (supervisor of production unit, head of production department, head of non-production department, and top manager).

To find patterns of internal labour market mobility, we compute a transition matrix that captures accessions to the firm, separations from the firm, and movements across job titles for the whole time interval. We find that in Soviet times, the firm maintained career paths, some of them leading to the very top of the company (see Figure 7). These paths are indicted by arrows.<sup>16</sup> A number nearby an arrow is the probability of a person holding job title located at the bottom of the arrow to move to job title located at which the arrow points. This picture is very similar to the one that Baker, Gibbs and Holmström (1994) find for a large western firm.

Although in Soviet times employment and upward mobility were distorted by political influence, there is some evidence that firms used pro-

---

2 by looking at “where do employees mostly move from level 1”. Similarly, they have proceeded until top of the hierarchy (the general manager). We have firstly done the same exercise. The resulting hierarchy was the same as the one which we have received later from the human resource department of the firm.

<sup>15</sup>Becoming a “foreman” is a typical promotion for a blue collar worker.

<sup>16</sup>We here plot links between job titles that have a transition probability of at least 5%.



motions as the main instrument to incentivise and, in particular, to retain their workers (see Kornai, 1992). The main difference between Soviet and western firms is not so much the use of promotions, but rather the fact that in Soviet firms, promotions provided access to additional fringe benefit, rather than substantial wage increases.

Transition changes the firm’s promotion policies. Indeed, it becomes more or less impossible to move upward from level 2 (see Figure 8). The reason is that the previously existing career paths are blocked by increased hiring activity from the outside labor market to the upper levels of the hierarchy (see Figure 9).<sup>17</sup> Managers recruited to levels above the second are better educated and more experienced as compared both to (i) the incumbents, and to (ii) those managers who were recruited on the same level in Soviet times (see Figure 6).

**Hazards of promotions and exits** In order to better understand how the transition has affected labour mobility inside the firm, we consider separately two time intervals: 1984-1992 and 1992-2000. For each of them, we carry out a duration analysis on two events: (i) a “*promotion*”, that is, move from a lower- to a higher level of the hierarchy, and (ii) a “*separation*” from the firm.<sup>18</sup>

We first consider promotions. We put our data in the survival time form. Indeed, we observe an individual as of the beginning of a time interval (controlling for the exact date of the recruitment). To adjust time-varying variables (like age), we make at least one record in three years. We document the spans of time (the “survival time”) until a promotion.<sup>19</sup> After each promotion, the “survival time” is reset to 0.<sup>20</sup>

---

<sup>17</sup>These policies may be optimal response from constrained efficiency perspective. We thank Marc-Andreas Muendler for his discussion of this point.

<sup>18</sup>We follow the tradition of labor economics (see Van den Berg, 2001).

<sup>19</sup>Because there is always a record at the exact date of a promotion, time interval between two records can be shorter than three years.

<sup>20</sup>Because our data set contains repeated records of the same individuals, the assumption of independence of observations may be not adequate. Therefore, we use the robust estimate of variance controlling for identity.

We use an accelerated failure time model in which the natural logarithm of the survival time is assumed to be linearly dependent on covariates:<sup>21</sup>

$$\ln(t_j) = x_j\beta + \epsilon,$$

where  $x_j$  is a covariate vector,  $\beta$  is a vector of regression coefficients, and  $\epsilon$  is an error term with density  $f(\cdot)$ . As covariates, we pick three basic individual characteristics: *age* and *education* (to measure human capital);<sup>22</sup> and *gender*.<sup>23</sup> We assume that the density of the error term follows a generalized Gamma model<sup>24</sup>

$$f(t) = \begin{cases} \frac{|\kappa|}{\Gamma(\kappa-2)} (\kappa-2)^{\kappa-2} \exp \left[ \kappa^{-2} \left( \kappa \frac{\ln(t)-x\beta}{\sigma} - \exp \left( \kappa \frac{\ln(t)-x\beta}{\sigma} \right) \right) \right], & \text{if } \kappa \neq 0; \\ \frac{1}{\sqrt{2\pi}} \exp \left( -\frac{(\ln(t)-x\beta)^2}{2\sigma^2} \right), & \text{if } \kappa = 0, \end{cases}$$

where  $\kappa$  and  $\sigma$  are ancillary parameters to be estimated from the data (see Kalbfleish and Prentice, 1980).

We find that in Soviet times, young age, male gender, and better education were helpful in receiving a promotion. Instead, during the transition, age and education variables are not statistically significant anymore (see Figure 10). More importantly, in Soviet times an employee could increase a probability to receive a promotion by simply staying in the firm. Unlike, during the transition, only the first few years of

---

<sup>21</sup>A statistical test based on the distribution of Schoenfeld residuals rejected Cox proportional hazard model.

<sup>22</sup>Age is highly correlated with work experience.

<sup>23</sup>We have tried to add to the set of covariates the following individual characteristics: number of children, dummy for being born in the region, dummy for employment in production division of the firm at some point of the career, and party membership. It turned out that none of them is statistically significant, even though we were adding them to the set of three basic covariates one by one (indeed, party membership was significant at 15% level in Soviet times, and became insignificant during transition). At the same time, age, education and gender remained significant with the same sign in all the regressions. We have not tried to use labour union membership as a regressor, because there is too little variation in the data: until the year 2000, the firm remains highly (more than 80%) unionized.

<sup>24</sup>We used Akaike Information Criterion to select Generalized gamma form among Exponential, Weibull, Lognormal, and Log-logistic, and generalized Gamma distributions. Moreover, the Wald likelihood ratio test has rejected the hypothesis of a Weibull distribution  $\kappa = 1$ . Hence, we have not imposed any restrictions on highly flexible baseline hazard function of the generalized Gamma distribution.

“waiting for a promotion” where increasing the probability of this event: “waiting for longer” was actually *decreasing* the probability to move up the firm’s hierarchy (see Figure 11)!<sup>25</sup>

We proceed in a similar way, consider separations. Once again, we use a generalized Gamma model with controlling variables being: *age*, *education*, *gender*, and *level in the hierarchy*. The general insight is the following. Despite worsen career perspectives during transition, people are less likely to leave the firm (see Figure 13), especially from the upper levels of the hierarchy (see Figure 12).<sup>26</sup>

## 4 Concluding discussion

In this paper we investigate how transition, a particularly drastic process of institutional and structural change, has affected the personnel policies of a Russian firm. A sizeable literature in on enterprise restructuring in transition measures the impact of privatization, the hardening of budget constraints, increasing competition, and price liberalization on enterprise performance (see Djankov and Murrell 2001). Insider-privatized firms usually show little signs of restructuring, while firms that are privatized to outsiders, in particular to foreigners, are more likely to improve their performance. In order to learn more about the micro channels through which transition affect enterprise performance, we “open the black box” of a heavy industry firm. The main changes after the reforms are as follows.

- (i) employment becomes more responsive to output changes after privatization;
- (ii) the wage bill is reallocated from blue- to white collars;
- (iii) separations affect blue collars, whereas white collars, especially those

---

<sup>25</sup>Notice also, that the incidence of promotion during the transition is only 64, as compared to 150 in Soviet times (the number of individuals in the two periods is more or less the same).

<sup>26</sup>There were only 316 separations during transition, as compared to 609 in Soviet times.

working on the upper tiers of the hierarchy, are less likely to leave the firm than before the reforms;

(iv) the use of white collar human resources is shifted from production- to administrative and management activities;

(v) more white collars are hired from the outside labour market, in particular for higher levels of its hierarchy;

(vi) the firm becomes “toploaded”, and promotions are blocked.

A possible story behind these changes is as follows. After the firm’s privatization, the incumbent managers became the owners. Weak outsider property right enforcement created strong incentives for them to stay inside the firm. At the same time, the labor market became thicker, making it possible to hire new workers and managers with a high human capital. Manager-owners did not forego these recruitment opportunities in order to be able to maintain career paths.

This interpretation firstly, points at the limits to a firm’s benefits from maintaining career paths; secondly, it indicates a new channel through which corporate governance may affect a firm’s human resource policies. We hope that these issues will receive better understanding in the future research.

## References

- [1] Ariga, Kenn, Yasushi Ohkusa, and Giorgio Brunello (1999), “Fast Track: Is it in the Genes? The Promotion Policy of a Large Japanese Firm,” *Journal of Economic Behavior and Organization* 38:385-402.
- [2] Baker, G., Gibbs Michael and Bengt Holmström (1994), “The Internal Economics of the Firm: Evidence from Personnel Data”, *Quarterly Journal of Economics* 109:881-919.
- [3] Carter, Michael and Susan Carter (1985), “Internal Labor Markets

- in Retailing: The Early Years”, *Industrial and Labor Relations Review* 38:586-98.
- [4] Chandler, Alfred D. (1977), *The Visible Hand: The Managerial Revolution in American Business*, Cambridge, Mass: Harvard University Press.
- [5] Debande, Olivier and Guido Friebel (2004), “A Positive Theory of “Give-away” Privatization”, *International Journal of Industrial Organization*, 22(8):1309-1325.
- [6] Djankov, Simeon and Peter Murrell (2002), “Enterprise Restructuring in Transition: A Quantitative Survey”, *Journal of Economic Literature* 40:739-92.
- [7] Doeringer, Peter and Michael Piore (1971), *Internal Labor Markets and Manpower Adjustment*. Lexington, Mass: D.C. Heath.
- [8] Dohmen, Thomas (2004), “Performance, Seniority and Wages: Formal Salary Systems and Individual Earnings Profiles”, *Labour Economics* 11:741-763.
- [9] Dohmen, Thomas, Ben Kriechel and Gerard A. Pfann (2004), “Monkey Bars and Ladders: The Importance of Lateral and Vertical Job Mobility in Internal Labor Market Careers”, *Journal of Population Economics* 17:193-228.
- [10] Gibbons, Robert and Michael Waldman (1999), “Careers in Organizations: Theory and Evidence”, in *Handbook of Labor Economics*, ed. by Orley C. Ashenfelter, and David Card, vol. 3B:2373-2437, Amsterdam, The Netherlands. Elsevier Science.
- [11] Grosfeld, Irena and Gerard Roland (1997), “Defensive and Strategic Restructuring in Central and Eastern European Enterprises”, *Journal of Transforming Economies and Societies* 3:21-46.
- [12] Ichino, Andrea and Giovanni Maggi (1999), “Work Environment and Individual Background: Explaining Regional Shirking Differentials in a Large Italian Firm”, *Quarterly Journal of Economics* 115:1057-90.

- [13] Kalbfleish, J. D. and R. L. Prentice, 1980. *The Statistical Analysis of Failure Time Data*, New York: John Wiley&Sons.
- [14] Kornai, Janos (1992), *The Socialist System - The Political Economy of Communism*, Princeton University Press.
- [15] Lazear, Edward (1992), "The Job as a Concept", in *Performance Measurement, Evaluation, and Incentives*, ed. William J. Bruns, Boston: Harvard Business School Press:183-215.
- [16] Lazear, Edward (2000), "Performance Pay and Productivity", *American Economic Review* 90:1346-61.
- [17] Sattinger, M. (1993), "Assignment models of the distributional earnings", *Journal of Economic Literature*, 31:831-880.
- [18] Seltzer, Andre, and David Merrett (2000): "Personnel Policies at the Union Bank of Australia: Evidence form the 1888-1900 Entry Cohorts", *Journal of Labor Economics* 18:573-613.
- [19] Treble, John, Tim Barmby, Sarah Bridges, and Edwin van Gameren (2001): "The Internal Economics of The Firm: Further Evidence From Personnel Data", *Labour Economics* 8:531-552.
- [20] Van den Berg, Gerard (2001): "Duration Models: Specification, Identification, and Multiple Durations, in: J.J. Heckman and E. Leamer, eds. *Handbook of Econometrics*, Volume V, North-Holland, Amsterdam.
- [21] Waldman, M. (1984): "Worker allocation, hierarchies and the wage distribution", *Review of Economic Studies*, 51:95-109.
- [22] Woodruff, Chris (2004): "Property Rights in Context: Privatization's Legacy for Corporate Legality in Poland and Russia," *Studies in Comparative International Development* 38:82-108.

# Appendix

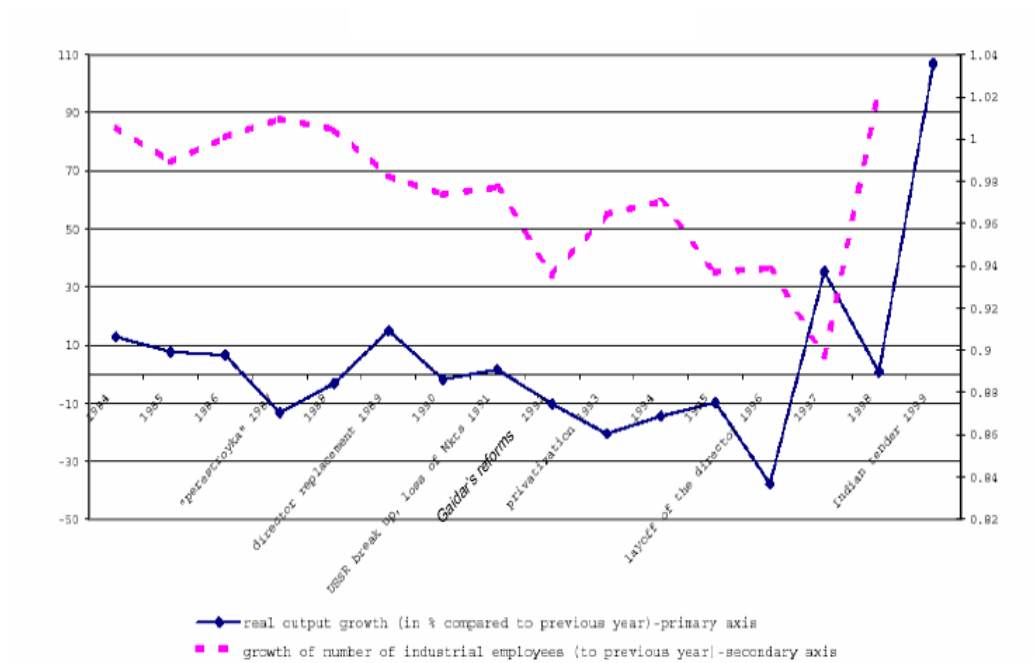


Figure 1: output and employment.

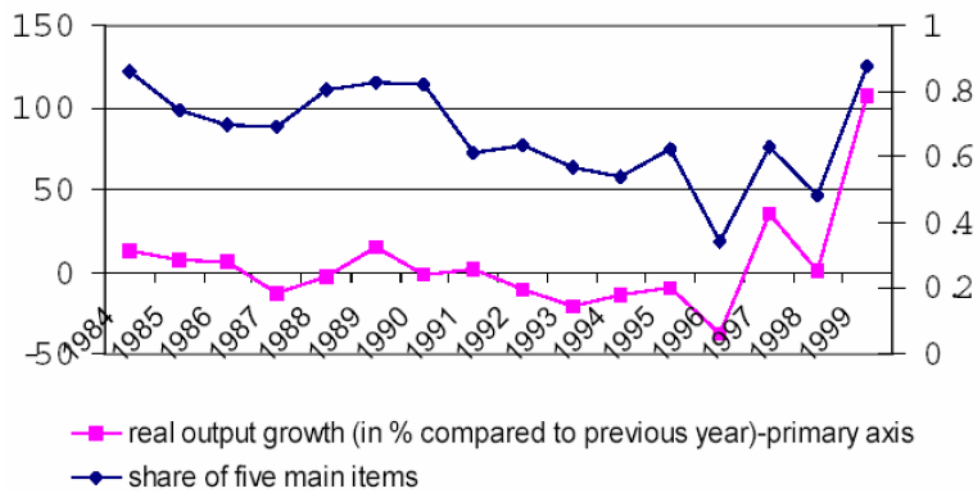


Figure 2: specialization and total output



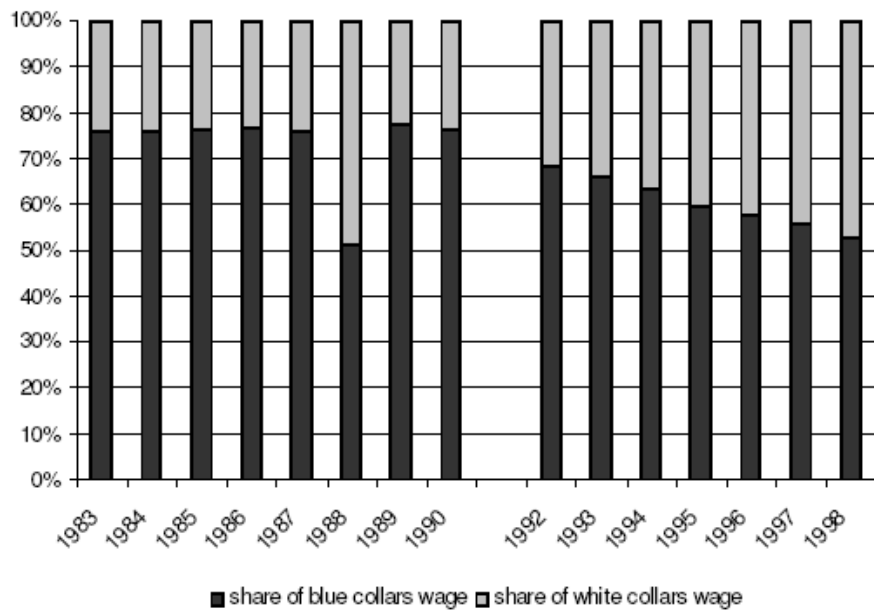


Figure 3: allocation of wage bill between white- and blue collars.

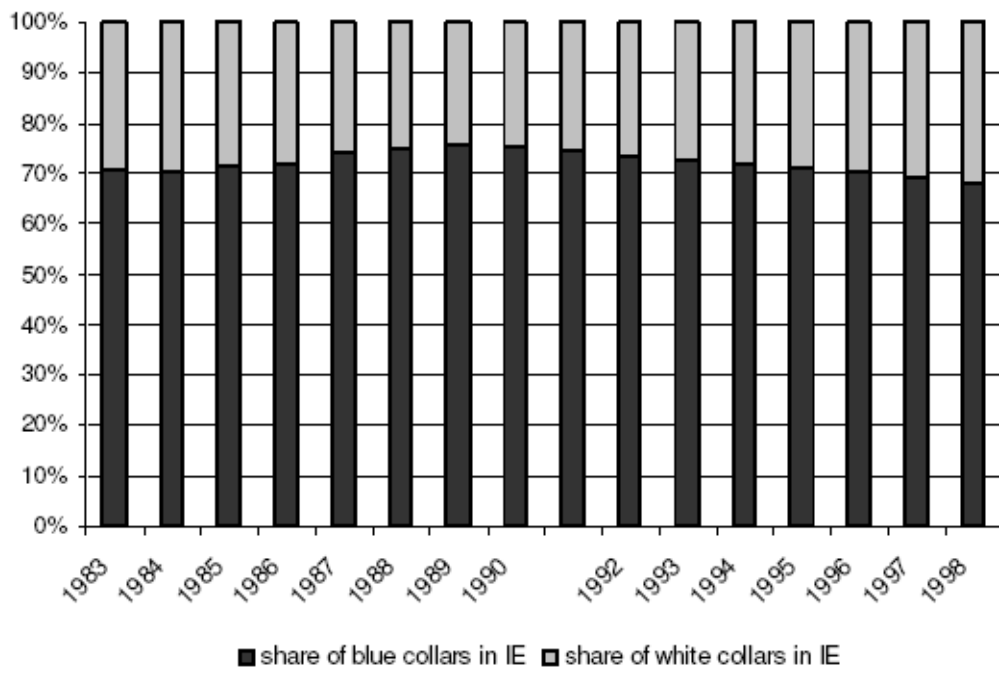


Figure 4: employment structure.

	job title	% of persondays before 1992	% of persondays after 1992
LEVEL 5	top management	3	4
LEVEL 4	head of production department	3	5
	head of department	2	2
LEVEL 3	supervisor	1	2
	head of bureau	8	9
LEVEL 2	engineer	43	38
	foreman	15	17
	planning engineer	4	5
	economist	3	5
LEVEL 1	technician	5	2
	accountant	2	4
	planning technician	1	2

Figure 5: allocation of human resources across jobs.

<b>LEVEL:</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>years of schooling</b>				
1984-1991	14.24	14.40	14.33	15.66
hired from the outside	14.73	15.08	14.70	16.00
incumbents	13.50	14.29	14.26	15.62
1992-2000	14.26	14.32	14.53	15.79
hired from the outside	14.62	15.47	14.93	16.00
incumbents	13.38	13.90	14.19	15.55
<b>work experience</b>				
1984-1991	11.58	19.51	18.54	20.96
hired from the outside	8.31	21.17	15.10	22.67
incumbents	16.56	19.24	19.18	20.76
1992-2000	14.00	21.77	18.77	21.67
hired from the outside	12.48	22.26	20.63	23.46
incumbents	17.67	21.59	17.21	19.55

Figure 6: average education and work experience on the upper levels of the hierarchy.

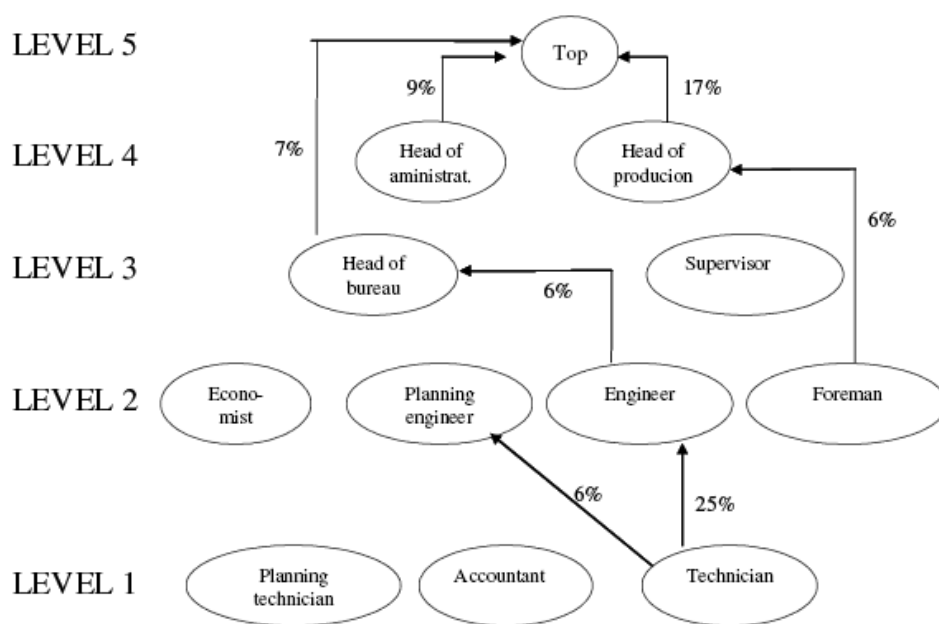


Figure 7: careers in Soviet times (1984-1991).

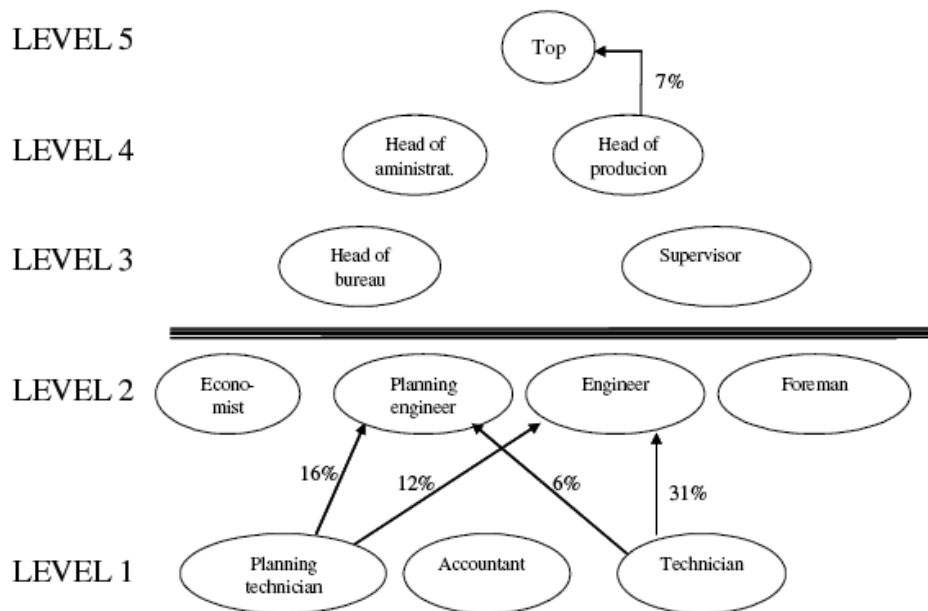


Figure 8: careers during transition (1992-2000)

	<b>Level</b>			
	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>accession to a level</b>	1 (895)	1(155)	1(118)	1(53)
1984-1991	0,55	0,55	0,52	0,55
1992-2000	0,45	0,45	0,48	0,46
<b>hired from outside</b>	0,74	0,20	0,31	0,30
1984-1991	0,37	0,08	0,08	0,06
1992-2000	0,37	0,12	0,23	0,25
<b>promoted</b>	0,26	0,80	0,69	0,70
1984-1991	0,14	0,48	0,43	0,49
1992-2000	0,11	0,32	0,25	0,21

Figure 9: accession to upper levels of the hierarchy.

	1984 to 1991		1992 to 2000	
	$\beta_1$ *coefficient	robust standart error	$\beta_1$ *coefficient	robust standart error
Years of schooling	.05**	.01	-.08	.05
Dummy for sex (1=male)	.96**	.012	.92**	.43
Age in years	-.03**	.01	.02	.01
Constant	-3.24**	.029	-2.12*	1.19
$\ln \sigma$	.67**	.10	.549	.16
$ t $	-.76**	.18	-3.30	1.14
$\sigma$	-.51	.05	1.73	.28
# observations	3510		3148	
# promotions	158		64	
# individuals	1088		991	
Time at risk	5120.13		4959.95	
Log likelihood	-213.83		-195.44	
Wald $\chi^2$	173.49		19.86	
Prob. > $\chi^2$	0.000		0.000	

Figure 10: promotions (\* - significance at 10% level, \*\* - significance at 5% level).



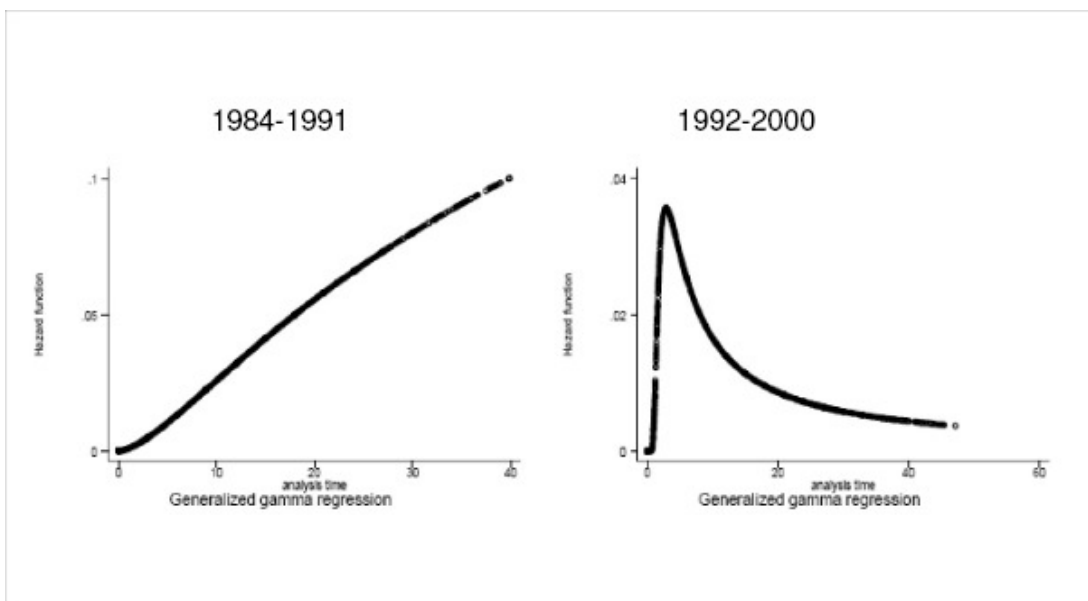


Figure 11: baseline hazard of a promotion.

	1984 to 1991		1992 to 2000	
	$\hat{\sigma}$ *coefficient	robust standart error	$\hat{\sigma}$ *coefficient	robust standart error
Years of schooling	.06*	.01	.03	.05
Dummy for sex (1=male)	.53*	.012	.97*	.21
Age in years	.01	.01	-.01	.01
Level in the hierarchy	.10*	.05	-.26**	.11
Constant	-1.49*	.39	-1.8**	.79
$\ln \hat{\sigma}$	.65*	.01	.59*	.01
$\hat{\kappa}$	1.70*	.14	-.19	.15
$\hat{\sigma}$	1.91	.07	1.81	.08
# observations	3510		3148	
# separations	609		316	
#individuals	1088		991	
Time at risk	5120.13		4959.95	
Log likelihood	-1600.03		-712.90	
Wald $\chi^2$	37.73		26.17	
Prob.> $\chi^2$	0.000		0.000	

Figure 12: separations.

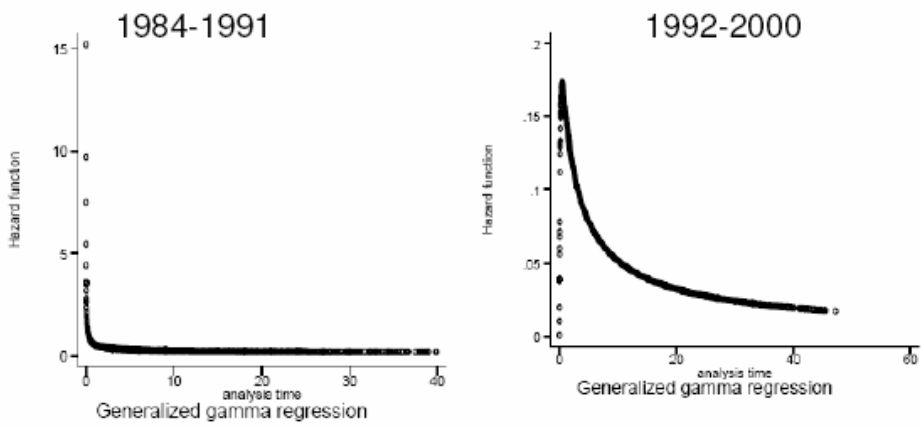


Figure 13: baseline hazard of a separation.