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Book

The bonding effect of deferred compensation worker separations from a large firm in early transition Russia

The Bonding Effect of Deferred Compensation — Worker Separations from a Large Firm in Early Transition Russia*

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Abstract

Deferred payments, as implicit contracts, are predicted to bind workers to firms as long as workers believe that firms adhere to these implicit contracts. We employ a unique personnel data set from a Russian manufacturing firm to investigate whether wage arrears, delayed payments of wages, induce bonding effects. We find that workers' separation rates decrease dramatically when workers experience wage arrears, providing evidence for the bonding effects of deferred compensation schemes. After workers are repaid nominal wages, but have suffered real wage losses due to unexpectedly high inflation, we observe that workers affected by wage arrears again become much more likely to separate during and after the repayment period of a second episode of wage arrears, providing evidence for the weakening of the bonding effect after the firm's reputation for adequately compensating for deferred payments has been jeopardized.

1 Introduction

In deferred compensation schemes, workers are paid part of their compensation for contemporaneous production in later periods. Often, deferred payments come in the form of rising tenure-wage profiles. These schemes create incentives for workers to continue the employment relationship in order to capture these rewards. Several theoretical models have shown that deferred compensation schemes discourage turnover and encourage investment and effort provision (see Becker and Stigler, 1974; Lazear, 1979, for early accounts on deferred compensations).[1] In practice, it is typically difficult to write explicit and enforceable contracts on deferred compensations.[2] Workers will therefore only accept such compensation schemes if they believe

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[1] The idea of rising wage profiles in workers' finite careers goes back to Becker and Stigler (1974), who proposed a bonding scheme in which the firm awards workers wage premia throughout their terminable careers until they are detected shirking. To compensate for the discounted value of wage premia, the firm charges an entrance fee of equal value. Lazear (1979) continued this line of research and showed that countless increasing wage profiles exist that satisfy the essential feature of deferred compensation schemes, namely that the discounted value of productivity equals the discounted value of wages.

[2] For example, deferred compensation schemes that promise rewards if performance is adequate are often not enforceable in court.

that the firm sticks to its promise of future payments. Since in the absence of legally binding contracts, firms have an incentive to renege on wage premia of older workers, the literature suggests that reputation serves as an effective commitment device (see Akerlof and Katz, 1989; Carmichael, 1989; MacLeod and Malcomson, 1989, 1993, 1998). Despite advances in theory there is scant empirical evidence both on the bonding effect of deferred compensation schemes and on the role of reputation.[3]

In this paper, we provide such evidence using unique personnel data of a large Russian manufacturing firm that include wages, wages withheld (wage arrears) and the exact timing of workers' entry into and exit from the firm. We are thus in a position to study bonding effects of deferred compensation schemes using wage arrears as a special type of deferred payment. Wage arrears occurred in Russia and in this firm during the early 1990s when inflation was high. Whenever our firm withheld wages, it repaid them after some months in their entirety, but it did so in nominal terms. In a high inflation environment this meant, of course, large real losses to all affected workers, presumably leading to a loss in reputation for this firm. Having individual data on workers' separations, we thus can also study how workers who experienced deferred wage payments respond to a deteriorating reputation of the firm.

Previous research on wage arrears has hardly touched on the deferred payment aspect. This is, of course, not surprising since researchers wanted to understand why wage arrears, experienced by a majority of workers in CIS countries in the 1990s, existed and persisted for long periods. As data were available above all for Russia, we briefly report on the most pertinent studies on this practice in Russia. Layard and Richter (1995a,b) see wage arrears in Russia as a tool to trade off wages for continuous employment, while Lehmann et al. (1999) and Desai and Idson (2000) perceive arrears as an adjustment mechanism to cushion negative demand shocks or to accompany firm restructuring when mass layoffs are considered unwanted by the central government. Lehmann et al. (1999) also investigate, how local labor market conditions affect the quit behavior of workers hit by wage arrears, showing that workers who experience wage arrears quit firms only in regions where there are many outside opportunities. The interaction of wage arrears and local labor market conditions in Russia is addressed in the studies of Earle and Sabirianova (2002), and Earle and Sabirianova Peter (2009). Employing matched employer-employee data, they establish that workers' quit behavior is inversely related to the extent of the practice of wage arrears in the local labor market. In a companion paper, Earle et al. (2010) lucidly discuss why the massive practice of wage arrears in Russia in the years 1991–1998 can be considered a successful experiment in the normalization of deviant organizational practices.[4] It is worthwhile stressing that the cited studies all assume and in some cases show that wage arrears are deferred payments, i.e., that the owed wages are eventually paid out to workers. It is also noteworthy that only the study by Earle and Sabirianova (2002) briefly discusses bonding effects of wage arrears and altered tenure-wage profiles. However, the authors do not directly test bonding effects since their data do not permit such a test.

Wage arrears are a special form of deferred payments, as workers are promised to be paid part of their wages at a later time. Akerlof and Katz (1989) prove that implicit contracts with deferred payments do provide incentives for workers to remain, but require an assumption that firms must not deprive workers of the promised wages. This assumption has been addressed in

[3] The literature provided indirect evidence on whether firms offer pensions that are designed to retain and motivate workers (Wise, 1985); and whether mergers or high bankruptcy probabilities are associated with flatter wage profiles (Gokhale et al., 1995). Also, Huck et al. (2011) show in a lab experiment that "workers" provide more effort when the "employer" has a history of making generous wage offers in later periods of an employment relationship, but not in response to past honesty.

[4] Our firm practiced wage arrears only as long as it had severe liquidity problems, it did not engage in deviant practices because other firms did so. Therefore, the often critized "neoclassical" explanation of wage arrears as a temporary adjustment mechanism to large negative demand shocks told for example by Lehmann et al. (1999) and Desai and Idson (2000) seems applicable here.

the theoretical literature, showing that for implicit contracts with deferred compensations to survive, firms optimally decide to pay the promised wage to maintain their reputation (see Bull, 1987). Moreover, MacLeod and Malcomson (1989) demonstrate that, as implicit contracts, deferred payments crucially depend on workers' beliefs about how the firm executes these implicit contracts.

As long as workers believe that withheld amounts are eventually paid out by the firm, wage arrears are expected to bond workers to the firm if workers would forego the promised repayment upon leaving. When wage arrears occur for the first time and workers have no reason to believe that the firm will not repay them, the likelihood of a worker to separate should fall.[5] However, once workers learn that repayments fall short of their expectations, workers feel betrayed. The firm loses its reputation, and, as a consequence, the bonding effect of wage arrears fades away. Workers could then perceive the onset of delayed payments of wages as a threat of real income losses, and hence as a sign that it is better to leave the firm before being affected by wage arrears. The separation rate of yet unaffected workers would therefore rise when the firm reverts to wage arrears again. However, we note that the weakening of the bonding effect does not necessarily imply that the bonding effect of deferred compensation disappears completely. This is because workers whose wages are withheld might still be better off waiting to get at least some money back, as the alternative is to lose the whole withheld amount. The separation decision of workers affected by wage arrears in an environment in which they do not expect full repayment depends on outside options, the expected real income loss, which is determined by the timing and extent of cumulated future arrears and repayments.

These theoretical predictions are borne out by the personnel data of our firm, for which we observe main episodes of wage arrears in the years 1992 to 1995. Our analysis reveals that wage arrears have a very strong bonding effect on workers during the first episode. In fact, no worker whose wages are withheld separates in this first period of wage arrears. When repayments are made in nominal terms, workers incur large losses in real terms and learn that wage arrears are deferred wage payments that are only partially repaid in real terms. This weakens the bonding effect of wage arrears, as becomes visible when wage arrears reappear in a second episode shortly after the repayments of the first wage arrears are completed. Many workers separate preventively at the beginning of the second episode, when they observe other workers having wage arrears, while not yet affected themselves. While some workers whose wages were withheld in the second episode now separate even before the firm repays them, the bonding effect does not disappear entirely. The separation rate of affected workers is still lower, arguably because some workers consider themselves better off remaining with the firm since immediate separation would for all practical purposes imply the complete loss of the withheld wages. Importantly, the separation rate of workers rises sharply once no further repayments are expected.[6]

[5] The timing of the first wage arrears cycle in our firm coincided with a severe crisis of the main enterprises in the local labor market. These enterprises like our firm were connected to the military industrial complex. The reform government at the beginning of 1992 tried to address large macroeconomic disequilibria in the Russian economy by price liberalization and by slashing government subsidies to the military industrial complex. This lead to a collapse of the demand for output produced by firms connected to the military industrial complex in Russia and in our local labor market. Firms then used wage arrears as one tool to adjust to this collapse in demand. Since the macroeconomic reform measures took some time to affect the real economy and since we observe the appearance of wage arrears for the first time in April 1992 in our firm, it is highly unlikely that at this time other firms operating in the same local labor market had already gone through a cycle of wage arrears and repayments. Hence it is unlikely that workers in our firm had learned from workers in other firms about potential losses in real terms due the repayment of deferred wages in nominal terms.

[6] The Russian labor code in the 1990s already foresaw as is does now that firms have to pay their workers and not paying them was and is illegal. However, unlike today, in the 1990s there were no legal tools to enforce the law that declared wage arrears an illegal practice. As a consequence, there were very few cases where workers went to court to assert their claims of unpaid wages. Even in the case of a favorable judgment, given the length of the court procedure and given the high inflation environment workers only received a small fraction

The rest of the paper is organized as follows. Section 2 describes the firm and the personnel data in some detail honing in especially on the wage arrears data. In section 3 we briefly discuss our empirical strategy and report our findings. The same section also discusses the results from robustness checks and alternative mechanisms that could drive our results, while section 4 concludes.

2 Context and Data

We analyze unique data from the personnel records of a large Russian firm, covering the years 1990 to 2006. The firm is located in a provincial city not far from Moscow and operates in the sector "machine building and metal works". The firm was founded in the 1950s and was in Soviet times part of the military industrial complex, producing military hardware. It was privatized in 1992 using "insider privatization", i.e. giving shares to managers and workers who worked in the firm at the time of privatization. Like in many Russian enterprises ownership of shares became rapidly concentrated in the hand of a few managers in our firm. Already in 1992 when the first period of wage arrears occurred the CEO and a few top managers had a majority of shares under their control. Even though there was collective bargaining on paper in the firm, trade union representatives had virtually no influence on wage policy from early on in the transition, and wage determination was entirely the domain of top management.

During 1992 the reform program of the Gaidar government started to have a strong impact above all on firms connected to the military industrial complex. To combat large macroeconomic disequilibria in the Russian economy, the government liberalized prices of many goods and services and slashed the budget of the military and subsidies to enterprises. Hence the demand for military hardware collapsed and firms' losses were no longer compensated with subsidies coming from the central state budget. Consequently, like many other firms in the military sector our firm had to convert its production to civilian goods, which, of course, could not be done over night. The CEO and top management decided to convert the firm's production to well equipment for gas and oil production and smith-press equipment. This conversion process, while successfully accomplished over a period of three years,[7] was painful for management and the workforce leading to severe liquidity problems between 1992 and 1995. As mass layoffs were not an option for enterprises in Russia at the onset of transition (see, e.g. Gimpelson and Kapeliushnikov, 2013), like most Russian firms our firm withheld wages of a majority of workers for extended periods or put some workers on prolonged unpaid leave. Once the firm experienced a steady stream of orders for its new products at the beginning of 1996, such unorthodox methods of adjustment to negative demand shocks disappeared from the tool box of top management. In actual fact, after 1995 we do not have records of wage arrears in this firm.[8]

In the early years of transition the Russian labor market was in great turmoil and characterized by excessive turnover, caused predominantly by very large quit rates of workers. Many of them had the perception that better earnings opportunities existed outside the enterprises where they had worked thus far (Lehmann and Wadsworth, 2000). Table A1 in the appendix shows for our firm the composition of the workforce across six categories,[9] the evolution of

of the owed wages in real terms. So, when in the first half of the 1990s a worker leaves a firm that owes her or him wages she or he foregoes these owed earnings for all practical purposes.

[7] For this successful conversion to civilian production, the CEO of the firm was ranked among the top 35 managers in the Russian machine-building industry by Russian business magazine Kommersant (2006).

[8] However, for the Russian economy and industry at large wage arrears still grew after 1995 and reached a peak in 1998 during the financial crisis of that year, after which they were rapidly reduced (Gimpelson and Kapeliushnikov, 2013).

[9] In Soviet industry we find the six categories of workers given in the table. Even today, this classification

the total number of employees and average real monthly wages for the period 1991 to 2006. In column 8 of the table we see the tremendous reduction of employees (roughly one third of the original workforce) that occurred between December 1991 and December 1995 when the firm had finished the conversion process into civilian goods production. This net change in employment is driven by a separation rate of 75 percent and a hiring rate of 34 percent over the period. Virtually all separations were voluntary quits which implies that many workers in our firm must have seen better earnings opportunities or work conditions outside the firm. At the same time, the firm hired many new workers, replacing those who had left the firm[10] and must, therefore, have been aware of the importance of its reputation regarding the fair treatment of its workers.

The data record net monthly wages, wage arrears, and repayments of wage arrears. Separately recorded are monthly and annual bonuses and monthly working hours. Net monthly wages include all additional payments made in a particular month, like monthly bonuses for earlier completion of the planned work or annual premia. Data on wage arrears and repayments are given for the early transition period from 1992 to 1995, when wage arrears were a problem in the firm, while the data on wages and hours worked are available from 1990 to 2006. A rich set of demographic characteristics includes gender, birth date of all workers, marital status, number of workers' children and their birth dates, as well as workers' educational attainment. Finally, for those workers who entered or left the firm we have the exact dates when this occurred. We can thus very precisely link the occurrence of wage arrears and their repayments with the occurrence of workers' separations.[11]

Let us conclude this section with a thorough discussion of the wage arrears data that we have at our disposal. We have exact information on the amounts of withheld wages and on the months when this happened as well as on the amounts of repaid wages and on the months when these repayments occurred.[12] Figure A1 in the appendix shows the dynamics of monthly inflation starting one year before the reform policies were implemented in Russia (January 1992). By the standard definition of hyperinflation, i.e. the monthly inflation rate is greater than 50 per cent, we see three episodes: March 1991, January and March 1992. Wage arrears started in April 1992 as inspection of Table A2 in the appendix demonstrates after the last hyperinflation episode. However, from Figure A1 we can also infer that from April 1992 until the end 1994 when wage arrears and their repayments mainly took place in our firm monthly inflation oscillated between 10 and 40 percent. So, obviously nominal wages were withheld and repaid in a high inflation environment.

The upper panel of Figure 1 presents the aggregate amounts of wage arrears and their repayments in nominal terms, while the lower panel shows these amounts in real terms. We

is still used in many enterprises. It is also noteworthy that the composition of the workforce remained roughly the same over the entire reported period.

[10] Since the educational composition of those workers who left the firm in the years 1992 to 1995 is very similar to the educational composition of the workers hired in this period we are confident that the firm engaged above all in replacement hirings.

[11] Our records also contain detailed descriptions of all positions each worker ever held in this firm, except for the top management jobs. The records include position title and code, as well as the department and the subdepartment to which the position belongs. Such detailed descriptions allow us to identify all position changes in the firm, and thus to account for internal mobility.

[12] The above cited studies on wage arrears that inter alia also focus on the relationship between wage arrears and workers' quit behavior do not have such precise data at their disposal as we have in this study. While we have the exact cumulative amount of wage arrears and wage repayments for each worker, the studies based on the Russian Longitudinal Monitoring Survey (RLMS) use accumulated owed months of wages and accumulated paid off months of wages, which can be considered good proxies for accumulated wage arrears and repayments. More worrisome is the measure that captures workers' quits. Since employment state and tenure in the RLMS are only given annually in the reference week, it is not possible to exactly determine the date of workers' separations like we can with our personnel data. So, measurement error is a concern in these studies.

see two major episodes of wage arrears, from April 1992 to December 1992 and from August 1993 until December 1993, while repayments are from January to March 1993 following the first episode, and evenly spread out over the whole year 1994 following the second episode. There is a third episode of wage arrears in 1995, but as the lower panel makes clear these arrears are negligible in real terms. The firm repays all wages that it withholds in nominal terms; this is very clear from the upper panel of Figure 1 since the area of black bars (wage arrears) is identical to the area of gray bars (repayments) in both episodes.[13] The situation is very different in real terms, though, as inspection of the lower panel of Figure 1 shows. The firm pays back only a fraction of the withheld wages; in actual fact in the two episodes these fractions are 54 per cent and 48 percent respectively. While in absolute terms wage arrears are larger in episode 1, the relative burden is heavier in the second episode.[14] How the shown evolution of wage arrears and their repayments affects workers' behavior is of course the main focus of our study.

3 Analysis

3.1 Descriptive Analysis

The prevalence of wage arrears during the first two episodes was massive, as more than 90 percent of the workforce was affected. Table 1 shows the share of individuals by employment category whose wages were withheld at the end of particular periods. For illustrative purposes we split the first episode into two sub-periods because the timing of wage withholdings differed strongly across employment categories during the first episode (see Table A2 in the appendix for summary statistics on the incidence of wage withholdings by month). In particular, the large majority of accountants, engineers, and auxiliary production workers had wage arrears from April on, while other employment categories were affected not before October 1992.[15] In the first episode, the majority of the workforce got repaid the withheld wages in January 1993 (see Table A3 in the appendix for summary statistics on the incidence of completed repayments by month).[16] Nevertheless, payments of outstanding wages to service workers finished only in March 1993, and some workers were not fully repaid until June 1993.

The second episode starts shortly after the last repayments have been completed in the first episode: wage withholdings begin in August 1993 and occur until December 1993, while the repayment period spans the entire calendar year of 1994. In the second episode, the incidence of wage withholdings was quite uniform, as the majority of the workforce (more than 80 percent) was affected from the beginning of the episode (see also Table A2 in the appendix).[17] Most workers got their nominal wages back in full only a year later (see Table A3 in the appendix). The third episode of wage arrears occurs in the second half of 1995, with wage withholdings taking place from July to November, and repayments all done in December 1995. Notably,

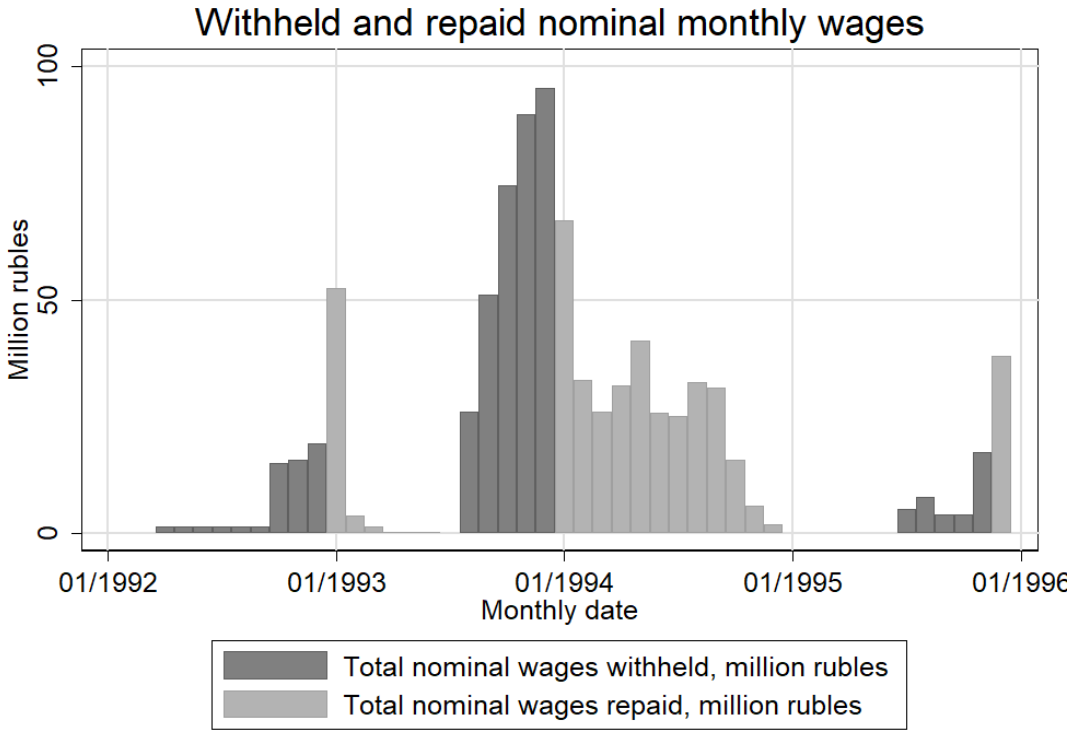
[13] In episode one the firm withholds 57.58 million rubles and repays 57.56 million rubles, while in episode two the respective numbers are 336.89 and 336.23 million rubles. In the second episode the numbers diverge somewhat because 251 workers leave the firm before they are paid the wage arrears in their entirety.

[14] Wage arrears in absolute terms are much larger in episode 1 because real wages are double to what they are during episode 2, as inspection of the last column of Table A.1 shows.

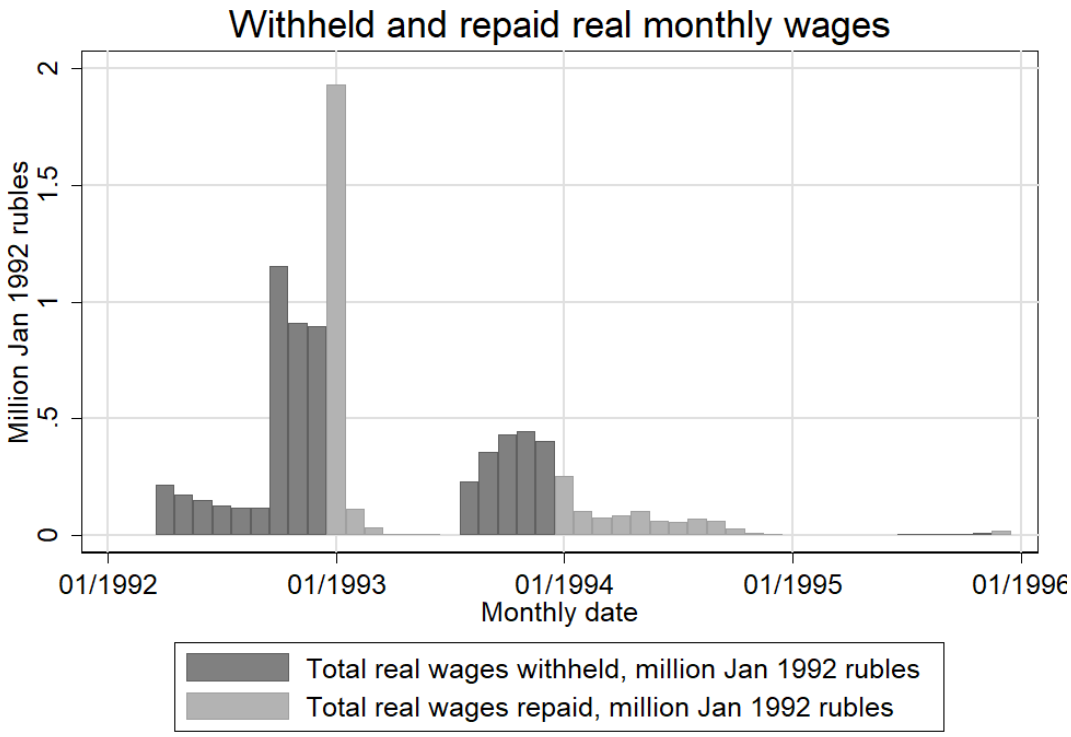
[15] According to Table A2, by December 1992, the last month when wages were withheld in the first episode, the firm owed wages to more than 90% of its workers. In September 1992, only 11% of managers and 9% of primary production and service workers were affected.

[16] According to Table A3, 90% of managers, engineers and production workers got their nominal wages back in January 1993, but only 70% of accountants did. At the same time, nearly 95% of service workers received the withheld amounts only in March 1993.

[17] Table A2 shows that, in the second episode, 80% of managers and accountants get wage arrears in August 1993, but only about two thirds of other workers are affected. In December 1993, however, the share of workers whose wages were withheld goes to more than 95%.



(a) In nominal terms



(b) In real terms (Jan 1992 rubles)

Figure 1: Monthly aggregate amounts withheld and repaid

only a small share (less than 10 percent) of the workforce was confronted with wage arrears in the third episode, and managers were not affected at all.

Figure 2 depicts periods of wage withholdings and wage repayments. Dark grey bars rep-

Table 1: Average share of workers whose wages were withheld in corresponding periods, %

Category	Episode 1 Apr'92–Sep'92	Oct'92–Dec'92	Episode 2 Aug'93–Dec'93	Episode 3 Jul'95–Nov'95
Accountants	77	96	98	5.9
Managers	11	97	97	0
Engineers	83	94	94	11
Primary production workers	8.9	96	97	10
Auxiliary production workers	82	93	95	9.7
Service staff	13	93	95	13

resent the monthly share of the workforce whose wages are withheld in a given month, while light gray bars represent the share of workers who get some repayments in a given month. Finally, empty contoured bars represent the share of workers who get fully repaid in a given month. The figure also plots monthly separation rates as a line (scale on the right axis).[18] The thick black line represents the overall monthly separations. Thin dashed lines correspond to separations among workers who were affected by wage arrears in the corresponding episode, and among those workers who were not, respectively.

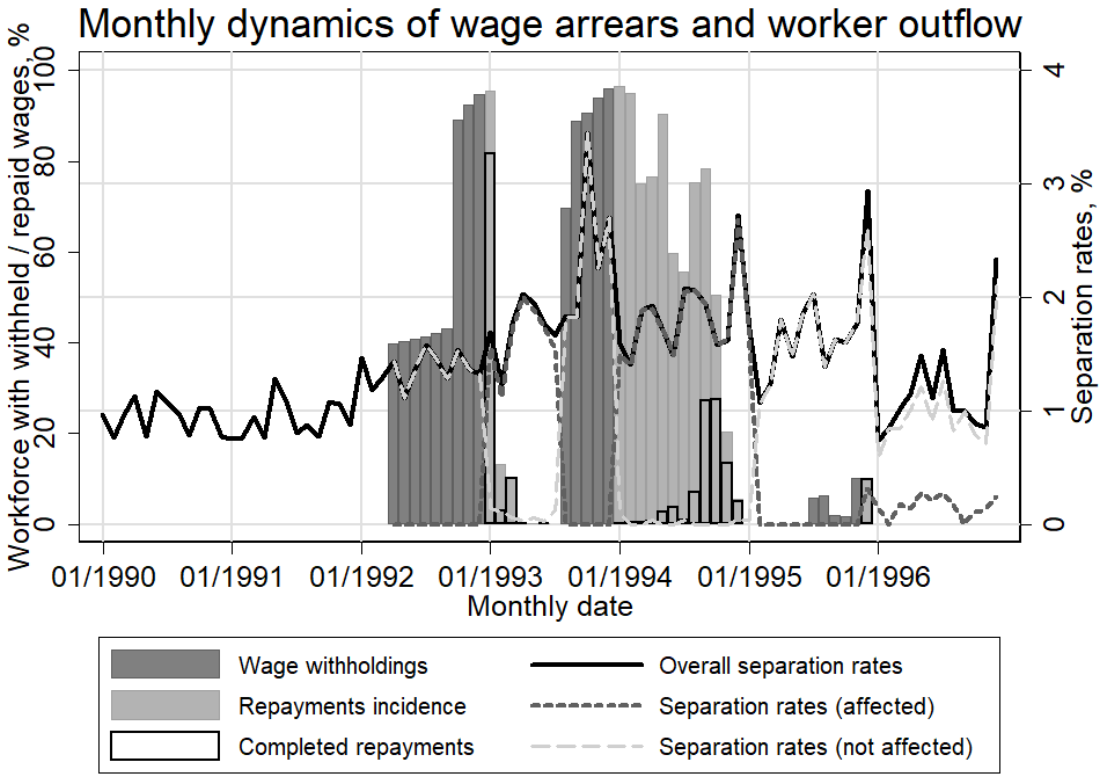


Figure 2: Wage withholdings, their repayments, and worker separations

There are several notable observations about the timing of wage arrears and separations to be made from this graph. First, during the first episode lasting from April 1992 to June 1993, overall monthly separations remain stable after an increase in January 1992, when the liberalization of prices began. Note, however, that separation rates among workers affected by wage

[18] We calculated monthly separation rates as the number of workers who left the firm in a given month divided by the total number of employees in that month. The reasons for job leaves are not reported in our data.

arrears (the short-dashed grey line) appear to be equal to zero up until January 1993, when the majority of the workforce receives repayments. Table 2 below provides more support to this observation — during the period of wage withholdings in the first episode, only workers not affected by wage arrears separate from the firm. Since no worker affected by wage arrears separated during the period of wage withholdings in the first episode, it appears that wage arrears had a strong bonding effect.

Table 2: Worker separations by the incidence of wage arrears

	Not Affected		Affected	
	per month	total	per month	total
Period				
Episode 1, withholdings	53	473	0	0
Episode 1, repayments, not yet repaid	2.5	15	.33	2
Episode 1, repayments, repaid fully	0	0	58	348
Episode 2, withholdings	78	389	0	0
Episode 2, repayments, not yet repaid	.5	6	21	251
Episode 2, repayments, repaid fully	0	0	34	409
Episode 3, withholdings	49	243	0	0
Episode 3, repayments, not yet repaid	75	75	0	0
Episode 3, repayments, repaid fully	0	0	9	9

Notes. Reported are average monthly and total numbers of workers separating during corresponding period, divided into two groups — those who were affected anytime during the corresponding episode of wage arrears, and those who were not.

This result is well aligned with theoretical predictions about the bonding effect of deferred payments. At the beginning of the first episode, workers have no reason to believe that the firm will not repay them.[19] It, therefore, seems that the increase in separation rates during the period of price liberalization might appear slower in our firm compared to the local labor market due to the bonding effect of wage arrears.

Second, it is notable that the overall separation rate increases markedly (by 0.59 percentage points in monthly separations, i.e. roughly a 40 percent increase) towards the end of the first episode, that is, after the firm repaid wage arrears to most of its workers. The rise in separation rates might reflect that affected workers are more likely to quit when no further repayments can be expected, either because they make up for intended separation that they postponed until they were repaid, or because they lose motivation as they perceive the firm's repayment policy as unfair in the wake of high inflation. After workers receive the withheld wages in the first episode, they realize that wage arrears do cause real income losses, as workers are not repaid fully in real terms due to high inflation.[20]

In our analysis below, it will become apparent, however, that increasing separation rates are not driven by the quitting behavior of affected workers, but stem mainly from employees who separate preemptively, potentially fearing another period of wage arrears. The perception that wage arrears reduce real wages becomes particular relevant when wage arrears reappear: in

[19] We do not observe wage arrears in 1990–1991 (the two earliest years in our personnel data set). Even if there were wage arrears before, inflation was negligible because of controlled prices, so payments in nominal terms and real terms coincide.

[20] Yearly inflation was 440.6% in 1992 (with a peak of 170% in January 1992), 252.8% in 1993, and 118.1% in 1994; see also Figure A1 in the appendix for the dynamics of monthly inflation rates. Note that these figures correspond to local (regional) CPI, assessed in 1997. Later, the Russian Statistical Agency has changed its methodology to calculate inflation rates, so current reports on monthly inflation for that period are lower.

the second episode of wage arrears (starting from August 1993), we see that overall separations jump up right at the beginning of the new episode.[21] The bonding effect of wage arrears fades because hitherto non-affected workers start fearing real income losses. Table 2 also suggests that many workers affected by wage arrears in the second episode separated even *before* they get fully repaid the withheld wages in nominal terms, providing another piece of evidence in favor of the weakening of the bonding effect.

3.2 Empirical Framework

Next, we scrutinize whether the observed separation patterns in the raw data are robust to controlling for potentially confounding factors such as individual characteristics or time-specific effects. Since we are interested in the determinants and the timing of job separations, we estimate the hazard rate of job separation (i.e., that a separation occurs at time t given that the worker who entered the firm at time t_0 had been employed up to time t) conditional on a set of observable characteristics X. The hazard rate of job separation is given by

$$\lambda \equiv \lambda(t, t_0, X) = \lim_{\varepsilon \to 0} \Pr\{t_1 \in [t, t+\varepsilon] | t_1 \geq t, t_0, X\}/\varepsilon, \tag{1}$$

Since the economic environment in which the firm operates is non-stationary (i.e., marked by political and (macro)economic shocks) calendar time dependence of job duration, and hence of separation rates, is to be expected. In a non-stationary environment, exit rates are likely correlated because turnover might be governed by firm policy or by shocks that affect workers in similar ways at a given calendar time. By reversing the role of calendar time and employment duration in a Cox proportional hazard model (Cox, 1972, 1975), we can account for a correlation between exit rates at the same (calendar) time for different individuals (proposed by Imbens, 1994). Such a model can be specified as

$$\lambda(t, t_0, X) = \lambda_0(t) * f(z(t - t_0), X; \theta), \tag{2}$$

where θ is a vector of parameters to be estimated. All events that affect separation rates of workers in the same way on a given day and that are not accounted for by a set of characteristics in X are captured by the baseline hazard $\lambda_0(t)$.

We further assume that $f(\cdot)$ is separable in terms of duration dependence and other observable characteristics, and that $f(\cdot)$ is the exponential function. We specify z as

$$z(t - t_0) = \exp \sum_{i=1}^{N} \alpha_i I\left[d_i < t - t_0 \leq d_{i+1}\right], \tag{3}$$

where $I[\cdot]$ is the indicator function, and $d_{i+1} - d_i$ denotes a particular period length.[22]

We therefore estimate the following model:

$$\lambda(t, t_0, X) = \lambda_0(t) * \exp \sum_{i=1}^{N} \alpha_i I\left[d_i < t - t_0 \leq d_{i+1}\right] * \exp\left(X\beta\right). \tag{4}$$

The set of explanatory variables X includes a set of worker characteristics, such as age, gender, educational attainment, marital status, the presence of children in the household, and

[21] Mann-Whitney U-test rejects the hypothesis that monthly separation rates during wage withholdings are equal between the second episode and other episodes ($p < 0.01$).

[22] We are not primarily interested in duration dependence, which is captured by $z(t - t_0)$, and therefore only approximate it by a step-function in firm tenure.

a set of job characteristics, including dummies for job levels and indicators for intra-firm mobility.[23] Since we are interested in the effects of the firm's wage arrear policy on affected and non-affected workers, we include dummy variables in X that indicate the incidence and timing of wage arrears.

In order to assess differences in the effect of wage arrears on separations between the first and second episode of wage arrears, we estimate the model separately for each of these two episodes. In our Cox proportional hazard regressions for the first period of arrears, we define an indicator variable that takes on the value of 1 once the worker becomes affected by wage arrears and that remains being equal to 1 until nominal arrears are fully repaid. We uncovered in our analysis in Table 2 that no worker affected during period 1 separated from the firm before repayment started, but that a few workers separated before being fully repaid. Hence, this dummy variable is identified from those who separate without being fully repaid.

For the second episode, we estimate two Cox proportional hazard models. In the first one, we use the same specification as for the first period. In addition, we estimate a model in which we add a dummy variable that indicates whether a worker had been affected in the first episode. This variable captures whether previous experience with wage arrears affects behavior. We conjecture that those who were affected by wage arrears in the first period have learned from personal experience and therefore have a stronger motive to separate in the second periods when wage arrears re-emerge. The coefficient estimates of these indicator variables are our main variables of interest.

3.3 Estimation Results

We start by assessing how the incidence of wage arrears affects separation rates in both periods. According to our hypothesis and in line with the descriptive analysis above, we expect strong bonding effects (i.e., lower separation rates of affected workers) in the first period and weaker but positive bonding effects in the second period. Table 3 shows the estimated coefficients for dummy variables for being affected by wage arrears and for being experienced with wage arrears in the first episode from our first model.

Table 3: The effect of having wage arrears

Dependent variable: hazard rate at t	(1) Episode 1 Apr'92–Jul'93	(2) Episode 2 Aug'93–Jan'95	(3) Episode 2 Aug'93–Jan'95
1 if affected at t	-3.824***	-3.703***	-3.710***
	(0.158)	(0.098)	(0.099)
1 if experienced arrears in the first episode			2.682
			(1.457)
Other controls	Yes	Yes	Yes
Observations	58569	55253	55253

Notes. Cox proportional hazard estimates, robust standard errors in parentheses. Other controls (not reported here) include: dummies for education, age, tenure, current position, gender, marital status, and the presence of children, as well as dummies for internal mobility (promotions, demotions, horizontal changes). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

[23] Age, tenure, and education control variables were transformed into the sets of categorical dummy variables to allow for more flexible model specifications. We divide tenure duration into 16 categories, age – into 49 categories, education – into 4 (high school or lower, professional education, higher education, and those who currently in the process of obtaining the college degree).

The estimates in Table 3 reveal that separation rates drop substantially once a worker is affected by wage arrears. In the first period, the hazard rate of job separation among affected workers is 45.8 times lower compared to that of unaffected workers, as the coefficient estimate of −3.824 in column (1) indicates. These results provide strong evidence for the bonding effect of deferred compensation schemes when workers still expect that wage arrears are adequately compensated for in the future.

The estimated effect of other control variables that are not reported in Table 3 are consistent with theories of worker turnover (see, e.g. Jovanovic, 1979) and findings in the empirical literature (e.g. Dohmen and Pfann, 2004). We show these estimates in the appendix.[24] We find that younger workers and workers with short tenure at the firm are more likely to separate. Production workers of lower subcategories have a higher estimated hazard rate of job separation than service staff (the reference group), while high-skilled production workers, managers and engineers have lower hazard rates of job separation (see Tables A7 and A8 in the appendix). Worker who have been promoted or changed jobs laterally within the firm during the period of 1992–1994 have a smaller separation hazard. Highly educated workers tend to separate more likely, possibly, because they have better outside options. Finally, we observe that female workers as well as married workers and those having at least one child are more likely to remain with the firm.

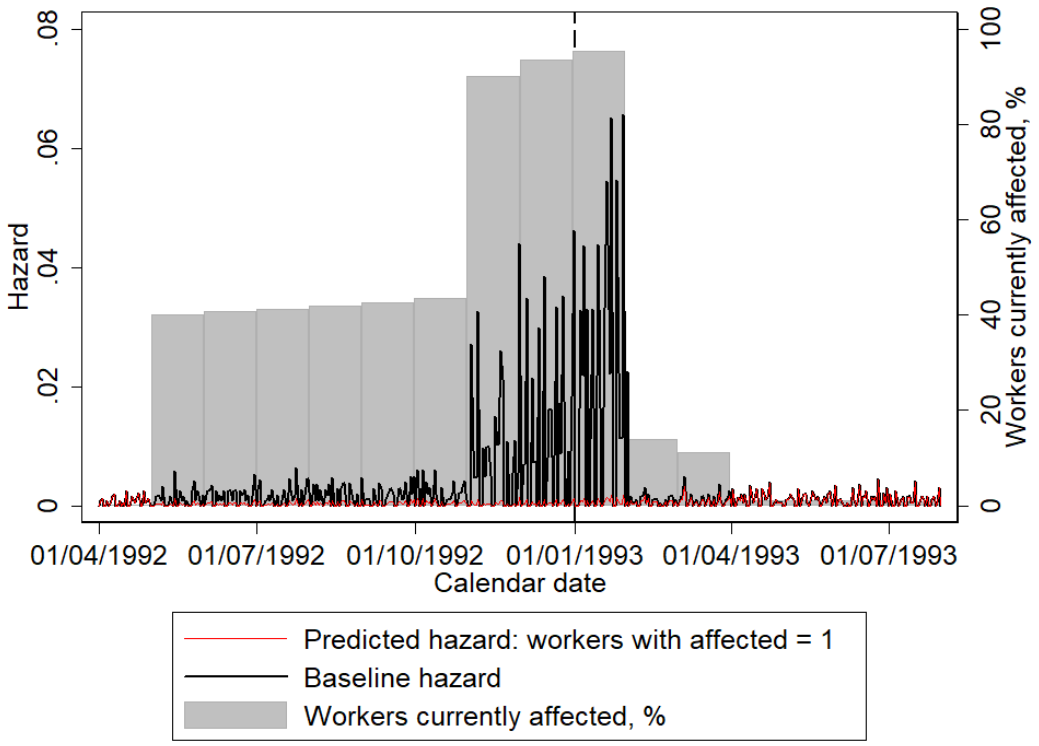
In the second period this relative drop in the job separation hazard is slightly less marked, but the bonding effect is still very strong (see column (2)). On average, affected workers are 40.6 times less likely to separate. Figure 3 visualizes this effect by plotting the baseline hazard from the specification of column (1) and column (2) of Table 3 along with the proportional (baseline) hazard rates for the workers affected by wage arrears (solid red line) in Panels (a) and (b) respectively. The Figure also displays the proportion of workers affected by wage arrears during these two episodes. The figure suggest, in addition to what the coefficient estimates in Table 3 indicate, that non-affected workers become relatively more likely to separate when wage arrears expand to more and more workers. Notably,the baseline hazard increases strongly shortly after the onset of wage arrears in the second period (see Panel (b) of Figure 3), indicating that workers now perceive wage arrears as disadvantageous and separate preventively to avoid being affected.

This is a first indication that workers have learned from observing the firm's behavior in the first period so that the bonding effect of wage arrears fades away. The estimates in column (3) of Table 3 provide some additional evidence, suggesting that those who had experienced wage arrears themselves in the first period become 14.6 times more likely to separate in the second episode of wage arrears compared to workers who were not subject to wage arrears in the first period. It is important to note that this effect is not statistically significant, likely due to lack of power. But if we are willing to interpret the very imprecisely estimated coefficient, we observe a dramatic increase in separation rates of workers who had already experienced wage arrears in the first episode.[25] In sum, our results indicate that deferred compensation backfires when workers fear that it results in income losses. First, when the firm starts using deferred compensation after an episode in which workers could learn that deferred wages cause real income losses, the separation rate rises even among workers that are not subject to wage arrears. Second, the bonding effect of wage arrears fades strongly among workers that previously had experienced that deferred wages result in income losses.

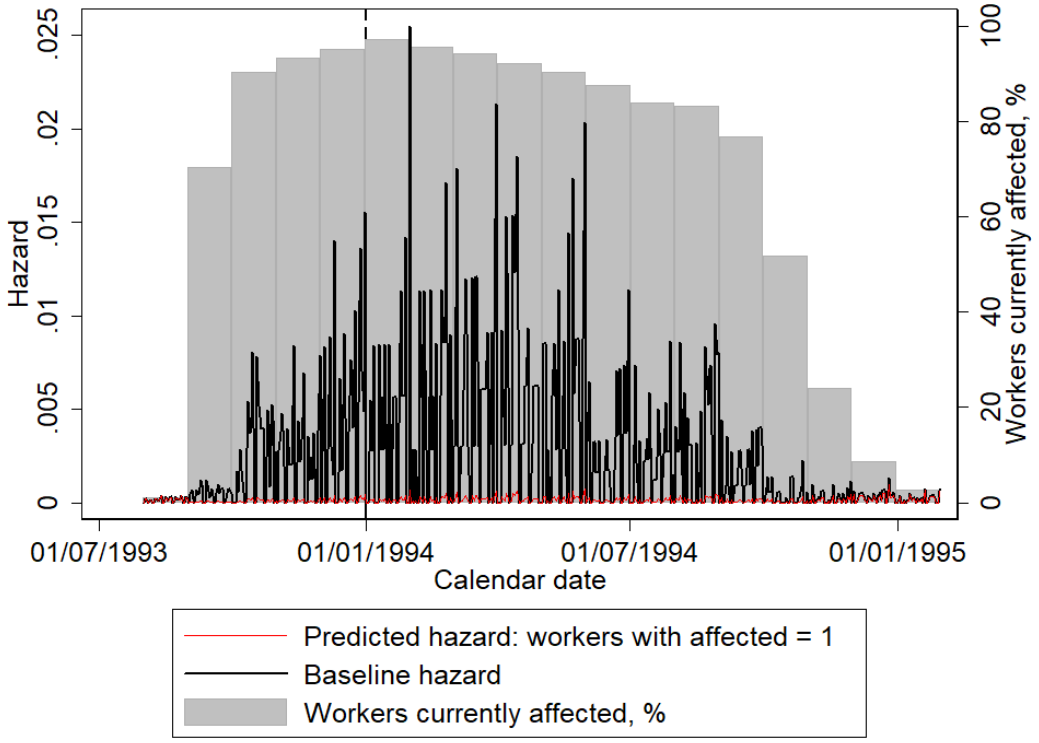
Additional evidence for the fading of the bonding effect comes from an inspection of the base-

[24] Tables A4, A5, and A6 show estimates for tenure and age dummies, respectively. Tables A7 and A8 show estimates for firm and career related characteristics, while A9 documents the estimates for additional individual characteristics.

[25] The estimates in column (3) also suggest a weakening in the bonding effect as the hazard rate for the workers who are affected by arrears in the second period and who had already experienced wage arrears in the first period is only 2.8 times lower than the one for workers who were not affected in both periods.



(a) Episode 1 (Jan'92–Jul'93)



(b) Episode 2 (Aug'93–Jan'95)

Figure 3: Baseline hazard rates for workers with and without wage arrears estimated from specifications (1) and (2) of Table 3

line hazard rate of a model estimated for the entire period that includes all control variables but the indicator variables for being affected. Figure 4 plots this baseline hazard rate and reveals that the risk of separation is higher in the second period of wage arrears than in the first period, indicating that separation rates rise for all workers when the firm starts using wage arrears again after workers had observed that wage arrears in the first period were associated with real income losses.[26]

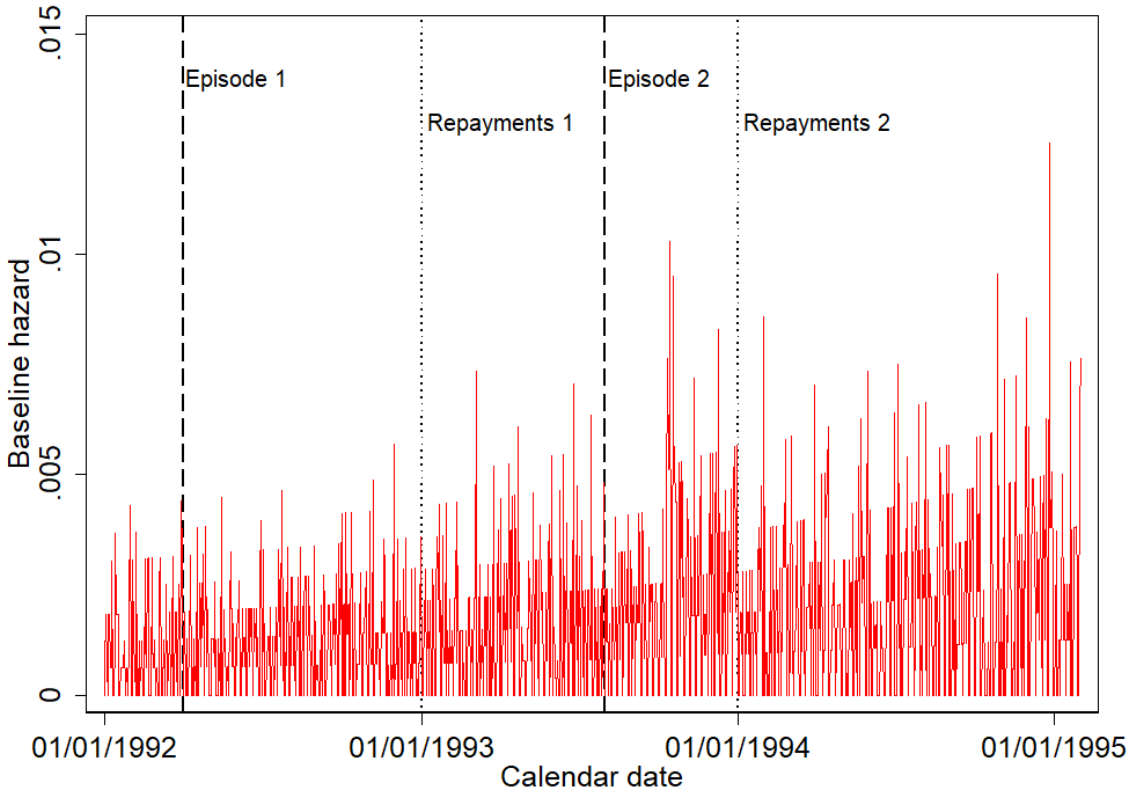


Figure 4: Baseline hazard contributions for Jan'92–Jan'95

Notes. Vertical dashed lines show the dates when the first and the second episodes of wage arrears start, correspondingly. Vertical dotted lines show the dates when corresponding repayments in the first and the second episodes of wage arrears begin.

Despite the fact that we control for a large set of observable characteristics, including education, age, gender, marital status, the presence of children, firm tenure, job position in the firm as well as intra-firm mobility, we acknowledge that our estimates might still be biased due to unobserved heterogeneity (e.g., because the incidence and the timing of withholdings or the timing of repayments might depend on unobserved characteristics. Importantly, however, since we find very strong effects, even when we condition on a large set of observable characteristics, we are confident, that the two main qualitative results hold: (1) deferred wages have strong bonding effects, but (2) these bonding effects fade when firms cannot credibly signal that deferred wages will be adequately compensated for in the future.

In a second set of regressions we investigate, how being repaid affects the separation hazard. To this end, we define an indicator variable that switches to one once the worker has been fully repaid. Clearly, this variable is not independent of the indicator variable for being affected

[26] Note that vertical dashed lines indicate the onset of the first and the second episodes of wage arrears. Vertical dotted lines in the figure mark the starting dates of the repayment periods during the first and second episode of wage arrears.

by a wage arrear. Therefore, we split the analysis for each episode of arrears into two sub-periods. The first sub-period comprises the months in which wage arrears accumulated (i.e., April 1992 until December 1992 and August 1993 until December 1993). As described above no repayments were made in this period. The second sub-period resembles the repayment period (i.e., January 1993 until July 1993 and January 1994 until January 1995). In the models for the first sub-period, we include an indicator variable for being affected, while in the model for the repayment period we include a dummy variable for being repaid.

Table 4 shows the estimated coefficients for these sub-periods. Columns (1) and (3) reveal the strong bonding effect of arrears during each of the sub-periods in which arrears accumulate. In fact, no affected workers separated during this sub-period of the first episode of wage arrears. Columns (2) and (3) indicate that the hazard rate rises dramatically once (affected) workers are repaid their nominal wages, while it does not rise in the first episode. These results corroborate our findings that deferred compensation induces strong bonding effects but that they backfire when they turn out to be disadvantageous for workers, as is reflected in the strong increase of separations at the end of the second episode of wage arrears.

Table 4: The effect of wage arrears in corresponding subperiods

Dependent variable: hazard rate at t	(1) Episode 1 Apr'92–Dec'92	(2) Episode 1 Jan'93–Jul'93	(3) Episode 2 Aug'93–Dec'93	(4) Episode 2 Jan'94–Jan'95	(5) Episode 2 Aug'93–Dec'93	(6) Episode 2 Jan'94–Jan'95
1 if wages withheld in t	-52.267		-45.518***		-68.129	
	(.)		(0.105)		(.)	
1 if repaid by t		-0.269		3.107***		3.110***
		(0.245)		(0.150)		(0.150)
1 if experienced arrears in the first episode					-20.172	0.954
					(.)	(0.929)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	34220	24349	16153	39100	16153	39100

Notes. Cox proportional hazard estimates, robust standard errors in parentheses. Other controls (not reported here) include: dummies for education, age, tenure, current position, gender, marital status, and the presence of children, as well as dummies for internal mobility (promotions, demotions, horizontal changes). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

3.4 Additional Results and Robustness

One issue that we have neglected in our main specification above is heterogeneity in the "treatment" effect (cf. Abbring and Van den Berg, 2003). Differences in the severeness of wage arrears, as measured, for example, by the absolute or relative amounts of wages being withheld might be related to differences in the strength of the bonding effect. In order to gauge the relevance of such variation in treatment intensity, we constructed a variable that captures the cumulative percentage of currently withheld wages and a variable that captures the cumulative repayments as a percentage of wages. Moreover, we constructed the difference between the share of withheld wages and the ratio of the repayment to the current wage (accumulated over the two episodes).

Our estimation results in Table 5 demonstrate again that wage arrears bond workers to firms in both episodes, that estimated bonding effect of our intensity measure of withheld wages is weaker in the second period, and that workers who had experienced wage arrears in the first episode have a higher hazard of rate of separation in the second period.

Table 5: The effect of the intensity of wage arrears

Dependent variable: hazard rate at t	(1) Episode 1 Apr'92–Jul'93	(2) Episode 2 Aug'93–Jan'95	(3) Episode 2 Aug'93–Jan'95
Cumulative share of withheld wages	-228.675*	-8.901***	-9.587***
	(91.682)	(0.346)	(0.356)
1 if experienced arrears in the first episode			5.596***
			(0.633)
Other controls	Yes	Yes	Yes
Observations	58137	54812	54812

Notes. Cox proportional hazard estimates, robust standard errors in parentheses. Reported are the estimates for the measures of intensity of wage arrears (cumulative share of withheld wages in monthly wages) and the dummy for previous experience with wage arrears. Other controls (not reported here) include the same set of characteristics as described in the notes for Table 3. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

3.5 Alternative Explanations

One could argue that the firm deliberately jeopardized the bonding effect of wage arrears by only repaying nominal wages in order to create an instrument that induces voluntary separations when wage arrears are used again. If that was the case we would expect that the firm implements wage arrears for those workers in the first period from whom it wants to separate later.[27] We believe that such a story is not plausible for the following reason. Our estimates suggest that separation rates rise generally during the second episode of wage arrears, i.e. also among workers who were not affected by arrears in the first period. If the firm used its wage arrear policy optimally this could only be squared with a downsizing motive of the firm. In that case, we would not only expect that the workforce shrinks, but also that separating workers are not replaced. But this is not what we observe in the data. Figure 5 below shows both monthly outflows and inflows, in addition to the shares of workers affected by wage arrears in corresponding months. It becomes apparent that the firm increases hiring after massive

[27] Let us recall that mass layoffs were not an option for Russian firms in the early years of transition.

separations at the beginning the second episode — average monthly hiring rates in 1994 are almost 2 times higher than in 1993 and nearly 4 times higher than in 1992. We also perform Granger causality test for inflows and outflows and find that outflows Granger cause inflows, but inflows do not Granger cause outflows. Also, we find that repayments Granger cause outflows, but wage withholdings do not. No doubt, Granger causality does not reflect causality in the economic sense but suggests the time sequence of the events, i.e. that outflows precede inflows.

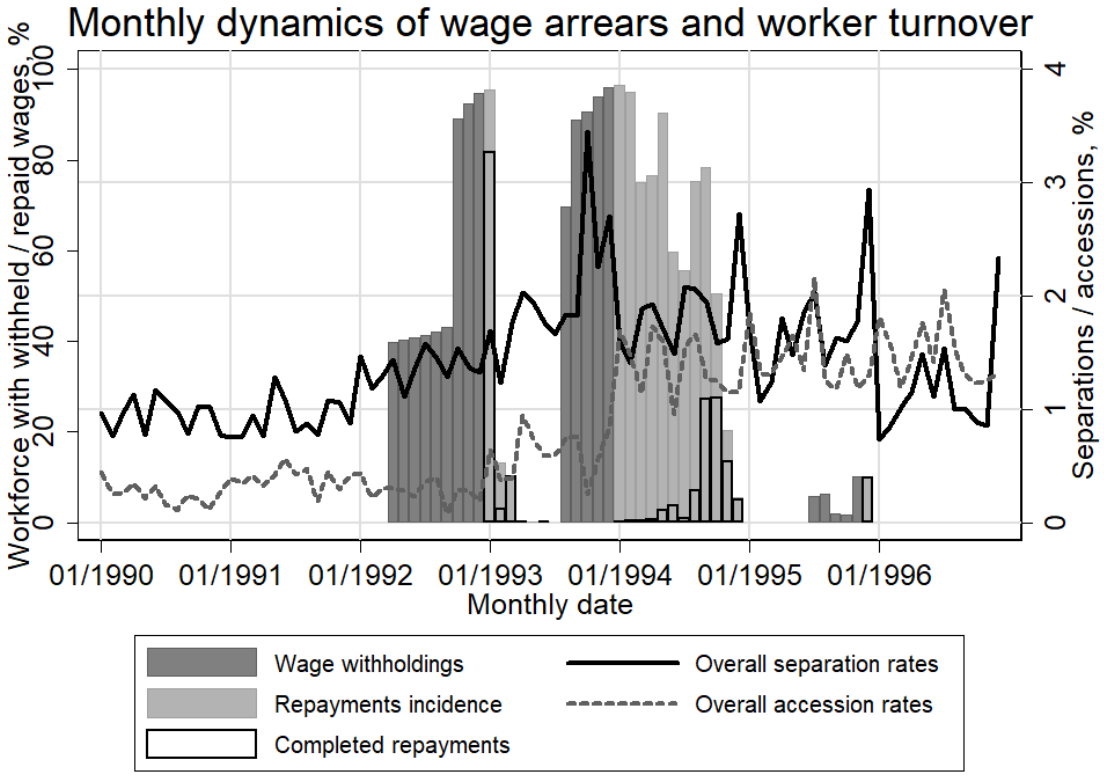


Figure 5: Separations, inflows, wage withholdings, and repayments

It also seems highly unlikely that the firm used its wage arrears policy purposefully to attach workers. In that case, we would have expected the firm to compensate real earnings losses by other means, for example, by future wage growth or by promotions. However, we do not observe this in the data. Real wages only increased once (see Figure A2 in the appendix), in January 1993, and have been falling after that, so there was no compensation in the form of increased real wages.[28] Moreover, we do not find that affected workers' relative compensation as measured by the rank in the earnings distribution changes after January 1994, when wages arrears came to a halt in the second period.

Likewise, we do not find evidence that the firm treats affected and non-affected workers differentially when it comes to job promotions. In addition, the absolute frequency of promotions is low relative to the incidence of wage arrears. As a result, the large majority of workers could not expect to be promoted, despite the fact that promotion rates rise during repayment periods. This increase in promotion rates is likely to come about as separations trigger vacancy chains which are filled by internal promotions and hiring at entry-job level, which is in line

[28] According to Figure A2, average nominal wages increased nearly 13 times in January 1993 to cope with inflation in 1992. Another substantial increase occurred in January 1994, but real wages never reached the same level as in January 1992. After January 1993, real wages were steadily falling.

with the finding that the firm aims to offset employment changes that are triggered by workers' separation decisions.

4 Conclusion

We analyzed wage arrears under the aspect of deferred compensation, using unique personnel data from a large Russian manufacturing firm that straddle the years 1990 to 2006. We find evidence for strong bonding effects of deferred compensation during the two major episodes of wage arrears in the years 1992 to 1995 in this firm. Having precise information on the timing and amount of nominal wage arrears and of repayments for each worker as well as on separation dates, we could test whether separation rates change during periods of outstanding wages and repayments. During the first episode of wage arrears our results show very strong bonding effects during periods for workers with outstanding wages and no change in turnover behavior during the repayment period.

Since these repayments were executed in nominal terms in times when monthly inflation oscillated between 10% and 40%, workers experienced large real wage losses when their compensation were deferred. We moot that the firm's reputation is suffering among workers as a consequence and that the deterioration of the firm's reputation should weaken the bonding effect when wage arrears occur again. We find that the bonding effect for workers affected by wage arrears in the second episode merely weakened. At the same time, however, the separation rate for the entire workforce increases, which indicates that the reappearance of wage arrears pushes some workers to separate from the firm. This effect seems to be particularly high for workers who had been affected by wage arrears in the first period, but also workers not affected by wage arrears in the first round separate preventively from the firm, that is, they leave the firm before they themselves become potential victims of wage arrears.

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Appendix

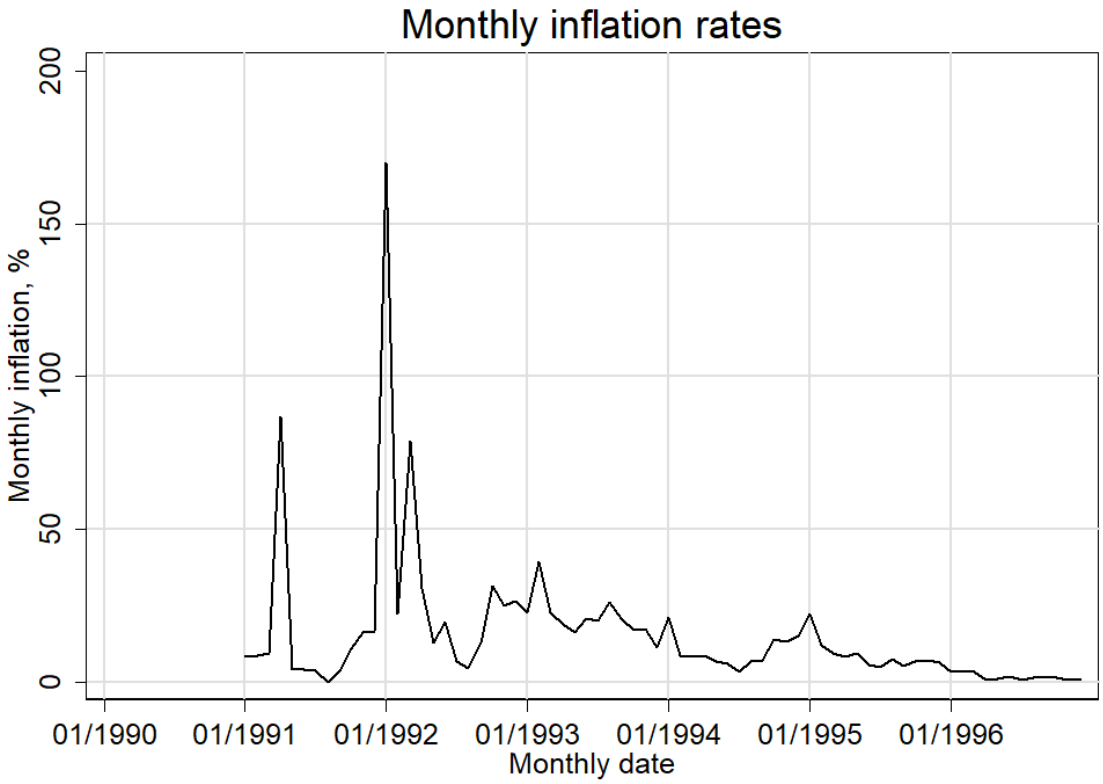

Figure A1: The dynamics of inflation

Source: Russian Statistical Agency.

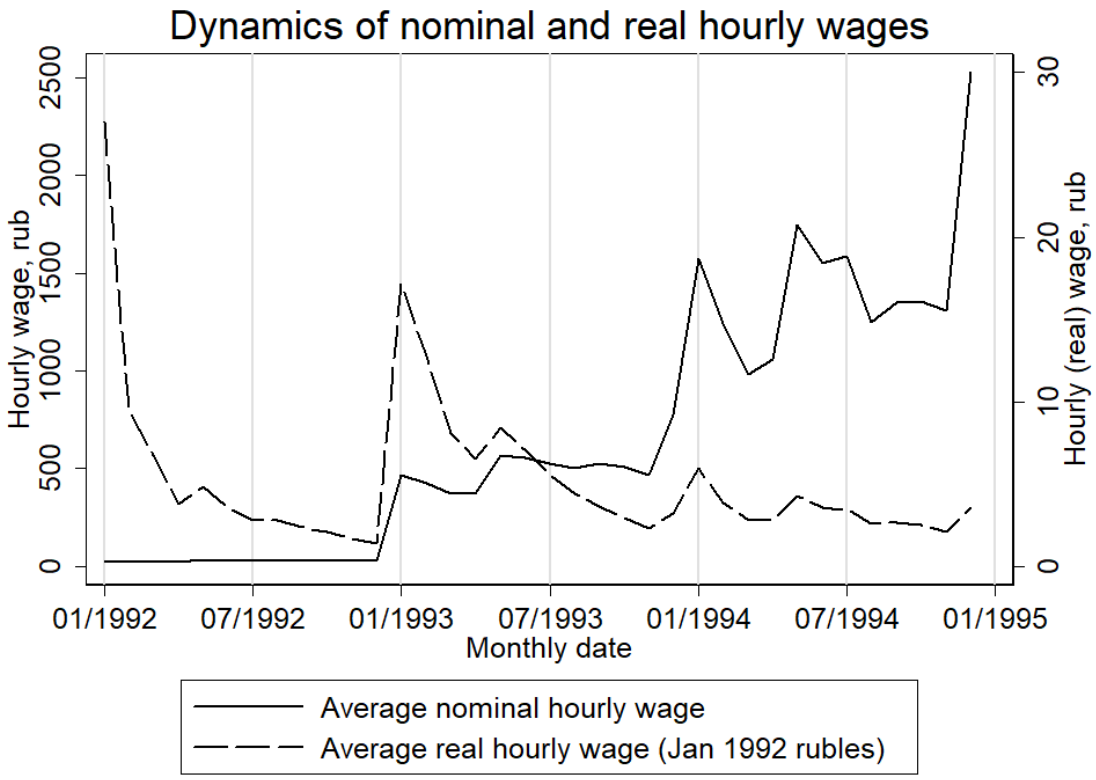

Figure A2: Dynamics of hourly wages in 1992–1994

Source: own computations.

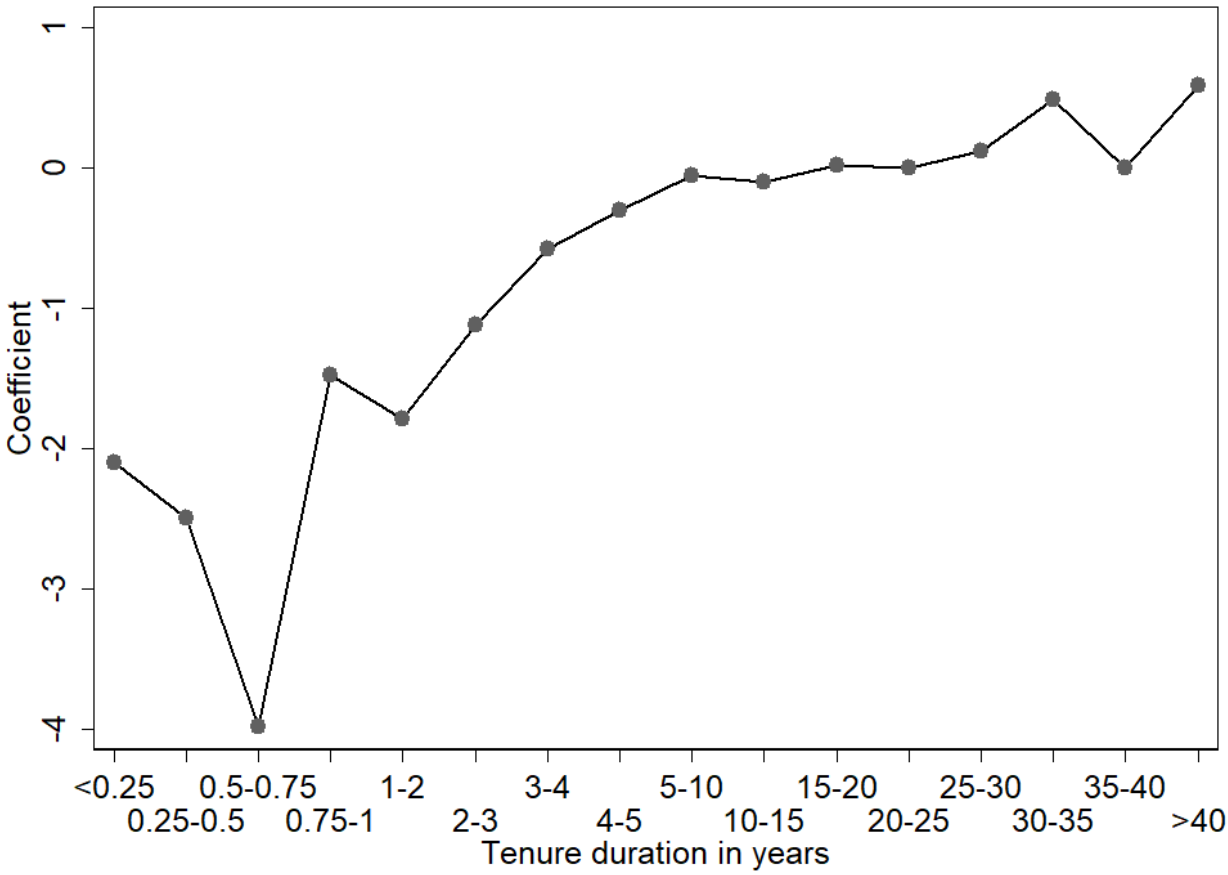

Figure A3: Coefficient estimates for tenure variables in a model, presented in Table 3, relative to the reference group (age=48)

Source: own computations.

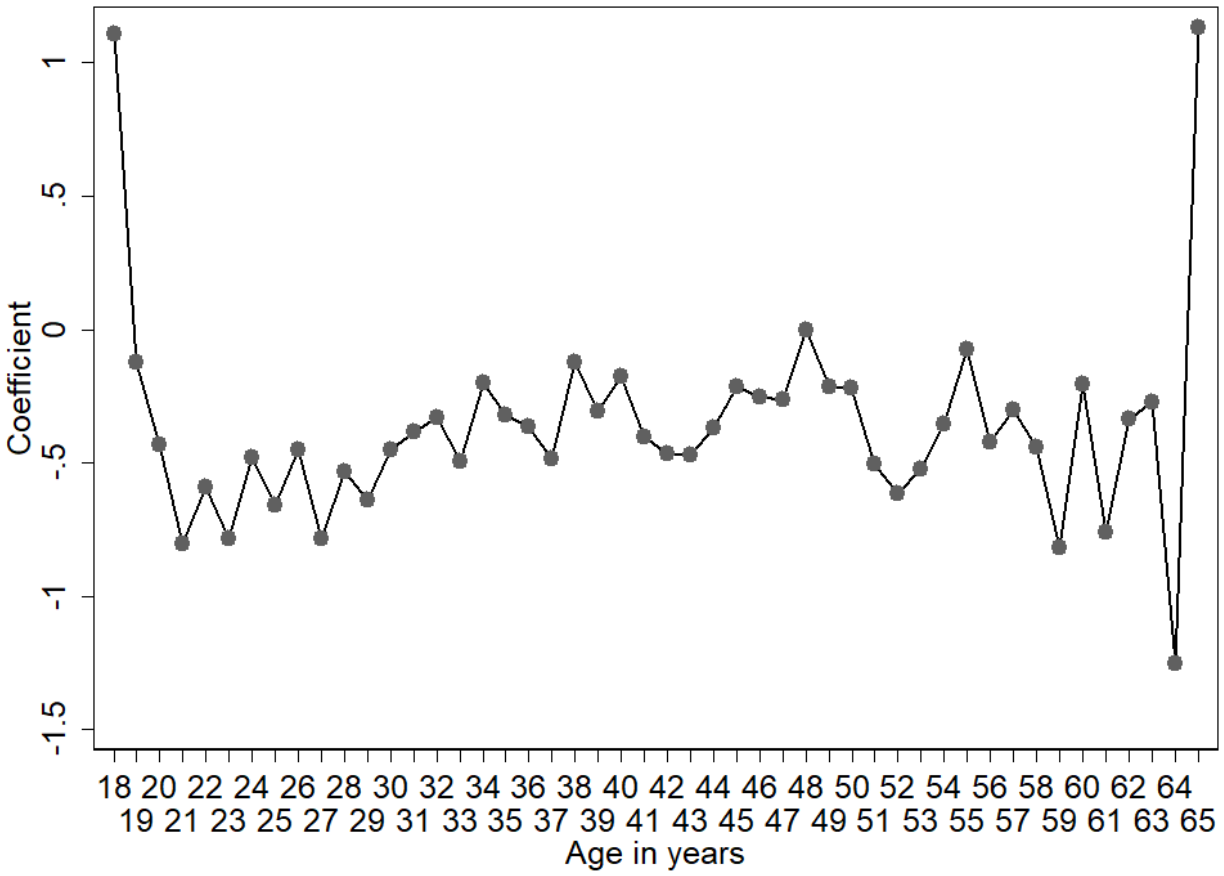

Figure A4: Coefficient estimates for age variables in a model presented in Table 3, relative to the reference group (age=48)

Source: own computations.

Table A1: Composition of the workforce

Year	Accountants ~	Managers ~	Engineers ~	Production workers primary	Production workers auxiliary	Service staff ~	Total # of employees	Real Wage (in Jan'92 rub.)
1991	1.1	4.9	29	43	20	8.3	4262	1573
1992	1.4	5.1	28	45	21	8.3	3881	681
1993	1.6	5.9	29	47	19	8.8	3393	819
1994	1.8	7	30	49	20	8.4	3029	337
1995	1.8	6.7	31	48	20	8.1	2896	313
1996	2	6.9	30	48	19	8.3	2900	193
1997	2.2	6.3	26	48	20	7.9	2964	466
1998	2	6.6	25	50	19	7.7	2991	532
1999	1.8	6.4	25	48	19	7	2955	301
2000	1.7	6.4	25	48	17	7	2975	300
2001	1.9	6.3	24	49	18	6.9	3042	292
2002	1.7	6.2	24	49	19	6.7	3064	305
2003	1.8	6.3	23	48	19	7.1	3084	352
2004	1.8	6.1	25	49	18	6.5	3204	350
2005	1.8	5.7	25	49	19	6.2	3403	381
2006	1.8	5.4	25	48	20	5.9	3618	382

Source: own computations.

Table A2: Number and percentage of workers whose wages were withheld, by month

Category	Statistic	Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Accountants	# of affected	1992	35	35	36	36	36	36	42	42	45
	percentage	1992	76.1	74.5	76.6	78.3	76.6	76.6	89.4	89.4	95.7
Managers	# of affected	1992	20	21	20	20	21	22	185	187	187
	percentage	1992	10.4	10.8	10.3	10.4	10.7	11.5	96.4	96.4	96.9
Engineers	# of affected	1992	831	844	832	833	834	833	895	898	905
	percentage	1992	79.1	80.2	80.3	81.1	82.3	83.1	90.7	92.1	93.9
Primary production workers	# of affected	1992	138	139	138	139	138	138	1436	1440	1450
	percentage	1992	8.38	8.42	8.60	8.71	8.76	8.86	93.1	94.4	96.2
Auxiliary production workers	# of affected	1992	543	547	546	546	546	546	576	579	591
	percentage	1992	74.2	75.8	76.9	78.4	80.1	82.0	87.7	89.6	93.2
Service staff	# of affected	1992	11	14	18	21	26	38	170	244	260
	percentage	1992	3.65	4.62	6.04	7.17	8.93	13.2	59.0	86.2	92.5
Accountants	# of affected	1993	.	.	.	.	39	44	44	44	44
	percentage	1993	.	.	.	.	81.3	95.7	97.8	97.8	97.8
Managers	# of affected	1993	.	.	.	.	160	186	185	190	186
	percentage	1993	.	.	.	.	82.5	93.9	95.4	96.0	97.4
Engineers	# of affected	1993	.	.	.	.	587	762	761	767	773
	percentage	1993	.	.	.	.	67.6	88.7	90.7	92.4	94.5
Primary production workers	# of affected	1993	.	.	.	.	985	1255	1263	1265	1279
	percentage	1993	.	.	.	.	70.9	91.3	92.2	95.0	97.0
Auxiliary production workers	# of affected	1993	.	.	.	.	387	469	475	477	481
	percentage	1993	.	.	.	.	68.0	84.1	87.0	92.1	95.4
Service staff	# of affected	1993	.	.	.	.	158	212	214	254	216
	percentage	1993	.	.	.	.	60.5	81.9	83.9	93.4	95.2
Accountants	# of affected	1995	.	.	.	3	2	2	.	3	.
	percentage	1995	.	.	.	5.88	3.92	3.92	.	5.88	.
Engineers	# of affected	1995	.	.	.	49	53	18	16	83	.
	percentage	1995	.	.	.	6.46	7.14	2.42	2.19	11.4	.
Primary production workers	# of affected	1995	.	.	.	76	80	25	26	129	.
	percentage	1995	.	.	.	6.16	6.51	2.03	2.11	10.5	.
Auxiliary production workers	# of affected	1995	.	.	.	22	31	9	2	46	.
	percentage	1995	.	.	.	4.55	6.44	1.88	0.42	9.70	.
Service staff	# of affected	1995	.	.	.	15	17	4	6	26	.
	percentage	1995	.	.	.	7.43	8.59	2.02	3.05	13.3	.

Source: own computations.

Table A3: Number and percentage of workers whose withheld wages were repaid, by month

Category	Statistic	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Accountants	# of fully repaid	1993	32	7	6	.	.	.	.	.	.	.	.	.
	percentage	1993	71.1	15.6	13.3	.	.	.	.	.	.	.	.	.
Managers	# of fully repaid	1993	175	6	.	.	.	.	.	.	.	.	.	.
	percentage	1993	93.6	3.17	.	.	.	.	.	.	.	.	.	.
Engineers	# of fully repaid	1993	811	29	43	.	.	3	.	.	.	.	.	.
	percentage	1993	89.6	3.25	4.89	.	.	0.36	.	.	.	.	.	.
Primary production workers	# of fully repaid	1993	1369	38	36	1	.	.	.	.	.	.	.	.
	percentage	1993	94.4	2.67	2.58	0.073	.	.	.	.	.	.	.	.
Auxiliary production workers	# of fully repaid	1993	540	17	30	1	.	.	.	.	.	.	.	.
	percentage	1993	91.4	2.93	5.22	0.18	.	.	.	.	.	.	.	.
Service staff	# of fully repaid	1993	15	5	240	.	.	.	.	.	.	.	.	.
	percentage	1993	5.77	1.95	94.1	.	.	.	.	.	.	.	.	.
Accountants	# of fully repaid	1994	.	.	.	1	1	4	.	1	19	7	6	3
	percentage	1994	.	.	.	2.33	2.33	9.30	.	2.63	50	18.4	16.2	8.82
Managers	# of fully repaid	1994	.	.	.	1	7	4	2	17	62	58	16	.
	percentage	1994	.	.	.	0.53	3.78	2.16	1.10	9.66	35.8	33.7	9.36	.
Engineers	# of fully repaid	1994	.	3	1	6	21	30	7	50	215	232	86	48
	percentage	1994	.	0.39	0.13	0.81	2.83	4.20	1	7.26	31.9	35.2	13.4	7.63
Primary production workers	# of fully repaid	1994	.	5	8	3	30	48	11	92	350	366	203	67
	percentage	1994	.	0.39	0.64	0.25	2.47	4.05	0.94	8.05	30.9	33.4	18.8	6.32
Auxiliary production workers	# of fully repaid	1994	1	2	1	8	20	20	5	43	120	108	59	23
	percentage	1994	0.21	0.38	0.22	1.80	4.48	4.82	1.23	10.9	31.6	29.4	16.4	6.59
Service staff	# of fully repaid	1994	.	.	2	1	8	6	1	10	47	46	30	7
	percentage	1994	.	.	0.93	0.48	3.94	3.05	0.51	5.29	25.4	25.4	17.0	4.02
Accountants	# of fully repaid	1995	.	.	.	.	.	.	.	.	.	.	.	3
	percentage	1995	.	.	.	.	.	.	.	.	.	.	.	8.82
Engineers	# of fully repaid	1995	.	.	.	.	.	.	.	.	.	.	.	83
	percentage	1995	.	.	.	.	.	.	.	.	.	.	.	18.5
Primary production workers	# of fully repaid	1995	.	.	.	.	.	.	.	.	.	.	.	126
	percentage	1995	.	.	.	.	.	.	.	.	.	.	.	14.3
Auxiliary production workers	# of fully repaid	1995	.	.	.	.	.	.	.	.	.	.	.	46
	percentage	1995	.	.	.	.	.	.	.	.	.	.	.	18.0
Service staff	# of fully repaid	1995	.	.	.	.	.	.	.	.	.	.	.	26
	percentage	1995	.	.	.	.	.	.	.	.	.	.	.	20.2

Source: own computations.

Table A4: Tenure variables

Dep. var.: $\lambda(t)$	Episode 1 Apr'92–Jul'93	Episode 2 Aug'93–Jan'95	Episode 2 Aug'93–Jan'95
Tenure $0-3$ months	-2.307**	-4.908***	-2.302
	(0.747)	(0.458)	(1.446)
Tenure $3-6$ months	-1.640**	-5.364***	-2.900
	(0.595)	(0.743)	(1.677)
Tenure $6-9$ months	-45.297	-5.114***	-2.955*
	(.)	(1.058)	(1.494)
Tenure $9-12$ months	0.010	-2.310***	-1.084*
	(0.497)	(0.527)	(0.524)
Tenure $1-2$ years	-1.262***	-2.213***	-2.065***
	(0.376)	(0.364)	(0.366)
Tenure $2-3$ years	-0.488	-2.009***	-2.005***
	(0.302)	(0.363)	(0.363)
Tenure $3-4$ years	0.019	-1.361***	-1.358***
	(0.214)	(0.285)	(0.285)
Tenure $4-5$ years	0.140	-0.557**	-0.553**
	(0.211)	(0.206)	(0.206)
Tenure $5-10$ years	0.250	-0.263*	-0.260*
	(0.159)	(0.126)	(0.126)
Tenure $10-15$ years	0.019	-0.250*	-0.249*
	(0.156)	(0.120)	(0.120)
Tenure $15-20$ years	0.191	-0.128	-0.127
	(0.147)	(0.114)	(0.114)
Tenure $25-30$ years	0.409*	-0.177	-0.178
	(0.192)	(0.182)	(0.182)
Tenure $30-35$ years	0.245	0.223	0.222
	(0.352)	(0.241)	(0.242)
Tenure $35-40$ years	0.201	-0.400	-0.399
	(0.604)	(0.477)	(0.477)
Tenure ≥ 40 years	0.955	0.215	0.215
	(0.731)	(0.643)	(0.644)
Other controls	Yes	Yes	Yes
Observations	58569	55253	55253

Notes. Cox proportional hazard estimates, robust standard errors in parentheses. Reported are tenure variables used in the model, presented in Table 3. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A5: Age variables, pt. 1

Dep. var.: $\lambda(t)$	Episode 1 Apr'92–Jul'93	Episode 2 Aug'93–Jan'95	Episode 2 Aug'93–Jan'95
Age = 17	-40.620	-43.248	-43.066
	(.)	(.)	(.)
Age = 18	-43.542	0.670	0.808
	(.)	(1.214)	(1.210)
Age = 19	-45.348	0.212	0.410
	(.)	(1.104)	(1.077)
Age = 20	-0.847	-0.376	-0.349
	(0.647)	(0.827)	(0.819)
Age = 21	-1.624**	-0.180	-0.155
	(0.596)	(0.506)	(0.512)
Age = 22	-1.188**	-0.874*	-0.898*
	(0.412)	(0.432)	(0.434)
Age = 23	-1.029**	-0.987*	-1.002*
	(0.373)	(0.429)	(0.428)
Age = 24	-0.682*	-0.973*	-0.976*
	(0.316)	(0.399)	(0.398)
Age = 25	-1.479***	-0.846*	-0.855*
	(0.372)	(0.344)	(0.344)
Age = 26	-0.741*	-1.004**	-1.015**
	(0.305)	(0.321)	(0.321)
Age = 27	-0.939**	-1.048**	-1.060**
	(0.316)	(0.334)	(0.334)
Age = 28	-0.866**	-0.608*	-0.619*
	(0.296)	(0.289)	(0.288)
Age = 29	-0.944**	-1.016***	-1.026***
	(0.300)	(0.299)	(0.299)
Age = 30	-0.554	-0.603*	-0.603*
	(0.284)	(0.272)	(0.273)
Age = 31	-0.749**	-0.375	-0.379
	(0.290)	(0.283)	(0.283)
Age = 32	-0.635*	-0.362	-0.364
	(0.275)	(0.240)	(0.240)
Age = 33	-0.431	-0.737**	-0.736**
	(0.272)	(0.257)	(0.257)
Age = 34	-0.217	-0.295	-0.296
	(0.263)	(0.233)	(0.233)
Age = 35	-0.507	-0.210	-0.211
	(0.275)	(0.243)	(0.243)
Age = 36	-0.364	-0.271	-0.272
	(0.269)	(0.246)	(0.245)
Age = 37	-0.593*	-0.512*	-0.512*
	(0.286)	(0.241)	(0.241)
Age = 38	-0.054	-0.299	-0.299
	(0.259)	(0.233)	(0.233)
Age = 39	-0.249	-0.277	-0.280
	(0.275)	(0.236)	(0.236)
Age = 40	-0.206	-0.200	-0.200
	(0.261)	(0.234)	(0.234)
Other controls	Yes	Yes	Yes
Observations	58569	55253	55253

Notes. Cox proportional hazard estimates, robust standard errors in parentheses. Reported are age variables used in the model, presented in Table 3. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A6: Age variables, pt. 2

Dep. var.: $\lambda(t)$	Episode 1 Apr'92–Jul'93	Episode 2 Aug'93–Jan'95	Episode 2 Aug'93–Jan'95
Age = 41	-0.380	-0.679*	-0.679*
	(0.280)	(0.269)	(0.269)
Age = 42	-0.565	-0.515*	-0.519*
	(0.294)	(0.263)	(0.263)
Age = 43	-0.130	-0.514*	-0.514*
	(0.274)	(0.238)	(0.238)
Age = 44	-0.331	-0.284	-0.283
	(0.283)	(0.234)	(0.235)
Age = 45	-0.065	-0.133	-0.135
	(0.273)	(0.237)	(0.238)
Age = 46	-0.225	-0.293	-0.293
	(0.304)	(0.251)	(0.252)
Age = 47	-0.059	-0.268	-0.268
	(0.317)	(0.247)	(0.248)
Age = 49	-0.148	-0.344	-0.344
	(0.331)	(0.315)	(0.315)
Age = 50	-0.312	0.215	0.217
	(0.358)	(0.269)	(0.269)
Age = 51	-0.474	-0.252	-0.250
	(0.348)	(0.271)	(0.272)
Age = 52	-0.632	-0.446	-0.448
	(0.371)	(0.295)	(0.296)
Age = 53	-0.271	-0.455	-0.457
	(0.435)	(0.302)	(0.303)
Age = 54	-0.034	-0.450	-0.452
	(0.367)	(0.377)	(0.379)
Age = 55	-0.213	0.321	0.320
	(0.434)	(0.317)	(0.317)
Age = 56	-0.794	-0.336	-0.338
	(0.492)	(0.380)	(0.380)
Age = 57	-0.501	-0.571	-0.573
	(0.545)	(0.335)	(0.335)
Age = 58	-0.059	-0.453	-0.450
	(0.446)	(0.561)	(0.561)
Age = 59	-0.250	-0.590	-0.588
	(0.606)	(0.516)	(0.516)
Age = 60	-0.715	-0.391	-0.396
	(0.754)	(0.609)	(0.610)
Age = 61	-1.654	-0.152	-0.155
	(1.022)	(0.605)	(0.606)
Age = 62	-0.604	-0.801	-0.804
	(0.729)	(0.541)	(0.541)
Age = 63	-0.268	-0.959	-0.964
	(0.986)	(0.710)	(0.709)
Age = 64	-45.117	-0.302	-0.310
	(.)	(1.223)	(1.222)
Age = 65	0.270	1.344	1.340
	(0.738)	(0.824)	(0.827)
Other controls	Yes	Yes	Yes
Observations	58569	55253	55253

Notes. Cox proportional hazard estimates, robust standard errors in parentheses. Reported are age variables used in the model, presented in Table 3. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A7: Position variables, pt. 1

Dep. var.: $\lambda(t)$	Episode 1 Apr'92–Jul'93	Episode 2 Aug'93–Jan'95	Episode 2 Aug'93–Jan'95
1 if got promotion	0.083	-1.379***	-1.380***
	(0.426)	(0.398)	(0.398)
1 if got demotion	-41.459	-0.980	-0.978
	(.)	(0.600)	(0.600)
1 if got horizontal change	0.004	-0.479**	-0.482**
	(0.485)	(0.160)	(0.161)
Accountant	0.693	0.321	0.315
	(0.428)	(0.274)	(0.274)
Chief accountant	-44.439	-45.120	-45.146
	(.)	(.)	(.)
Manager	-1.146***	-1.064***	-1.060***
	(0.294)	(0.231)	(0.231)
Technician/Engineer	0.490**	-0.562***	-0.558***
	(0.181)	(0.136)	(0.137)
Technician/Engineer, cat. 1	0.796**	-0.654*	-0.664*
	(0.259)	(0.302)	(0.302)
Technician/Engineer, cat. 2	0.214	-0.837***	-0.835***
	(0.288)	(0.251)	(0.251)
Technician/Engineer, cat. 3	0.760	-0.133	-0.156
	(0.501)	(1.150)	(1.132)
Chief technician/Chief engineer	0.234	-0.598*	-0.594*
	(0.312)	(0.262)	(0.262)
Other controls	Yes	Yes	Yes
Observations	58569	55253	55253

Notes. Cox proportional hazard estimates, robust standard errors in parentheses. Reported are position variables used in the model, presented in Table 3. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A8: Position variables, pt. 2

Dep. var.: $\lambda(t)$	Episode 1 Apr'92–Jul'93	Episode 2 Aug'93–Jan'95	Episode 2 Aug'93–Jan'95
Primary production worker	-44.712	-2.410*	-2.409*
	(.)	(0.941)	(0.941)
Primary production worker, cat. 1	1.123*	-0.162	-0.118
	(0.546)	(1.071)	(1.080)
Primary production worker, cat. 2	0.822***	-0.017	-0.004
	(0.219)	(0.206)	(0.208)
Primary production worker, cat. 3	0.364*	-0.137	-0.137
	(0.151)	(0.119)	(0.119)
Primary production worker, cat. 4	0.117	-0.219	-0.216
	(0.171)	(0.134)	(0.134)
Primary production worker, cat. 5	-0.654**	-0.873***	-0.872***
	(0.220)	(0.159)	(0.160)
Primary production worker, cat. 6	-0.930**	-1.108***	-1.106***
	(0.340)	(0.241)	(0.241)
Primary production worker, cat. 7	-0.423	-0.116	-0.107
	(0.946)	(0.577)	(0.577)
Primary production worker, cat. 8	-42.263	-43.981	-44.011
	(.)	(.)	(.)
Auxiliary production worker	-42.072	-43.241	-43.258
	(.)	(.)	(.)
Auxiliary production worker, cat. 1	2.034	1.629*	1.841**
	(1.112)	(0.815)	(0.707)
Auxiliary production worker, cat. 2	0.970***	0.592**	0.604**
	(0.271)	(0.227)	(0.226)
Auxiliary production worker, cat. 3	1.205***	0.254	0.257
	(0.167)	(0.138)	(0.138)
Auxiliary production worker, cat. 4	0.824***	-0.030	-0.031
	(0.199)	(0.169)	(0.170)
Auxiliary production worker, cat. 5	0.338	-0.323	-0.320
	(0.276)	(0.191)	(0.191)
Auxiliary production worker, cat. 6	-44.728	-1.107*	-1.103*
	(.)	(0.510)	(0.510)
Service worker	0.000	0.000	0.000
	(.)	(.)	(.)
Other controls	Yes	Yes	Yes
Observations	58569	55253	55253

Notes. Cox proportional hazard estimates, robust standard errors in parentheses. Reported are position variables used in the model, presented in Table 3. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A9: Basic individual controls

Dep. var.: $\lambda(t)$	Episode 1 Apr'92–Jul'93	Episode 2 Aug'93–Jan'95	Episode 2 Aug'93–Jan'95
1 if has higher education	0.320*	0.316*	0.314*
	(0.137)	(0.136)	(0.136)
1 if incomplete higher	-0.105	0.143	0.110
	(0.415)	(0.439)	(0.440)
1 if complete professional	0.144	0.376***	0.376***
	(0.079)	(0.077)	(0.077)
1 if female	-0.182*	-0.163*	-0.162*
	(0.087)	(0.081)	(0.082)
1 if married	-1.497***	-1.493***	-1.484***
	(0.337)	(0.347)	(0.348)
1 if has kids	-0.687***	-0.400***	-0.403***
	(0.083)	(0.088)	(0.088)
1 if of retire age	0.816*	0.216	0.219
	(0.402)	(0.364)	(0.364)
Other controls	Yes	Yes	Yes
Observations	58569	55253	55253

Notes. Cox proportional hazard estimates, robust standard errors in parentheses. Reported are individual characteristics variables used in the model, presented in Table 3. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Связывающий эффект отложенных платежей — увольнения работников из крупной компании в России в ранний переходный период

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29 Мая 2020

Аннотация

Пока работники верят, что фирмы-работодатели придерживаются неявных соглашений, отложенные платежи, как неявные контракты по заработной плате, должны удерживать сотрудников на рабочих местах. Используя уникальные данные кадровых записей одной Российской производственной фирмы, мы исследуем, создают ли задержки заработной платы связывающий эффект. Наши результаты показывают, что темпы увольнений работников резко снижаются, когда возникает задолженность по заработной плате, что свидетельствует в пользу наличия связывающих эффектов схем отсроченных платежей. После того, как задолженность была погашена в номинальном выражении, работники понесли потери в заработной плате в реальном выражении из-за неожиданно высокой инфляции. Когда в фирме возникает новая волна задержек заработной платы, вероятность увольнения среди работников, вновь попавших под влияние задолженностей, вырастает во время и после погашения задолженностей во второй волне, что свидетельствует об ослаблении связывающего эффекта в силу того, что репутация фирмы, как адекватно компенсирующей отложенные платежи, была поставлена под угрозу.