Attaching Workers Through In-kind Payments: Theory and Evidence from Russia.[1]

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Abstract

As a result of external shocks, the productivity of fixed capital may sometimes decrease in certain regions of an economy. There are exogenous obstacles to migration that make it hard for workers to reallocate to more profitable regions. We point to an *endogenous* obstacle that has not been considered before. Firms may devise "attachment" strategies to keep workers from moving out of a local labor market. When workers are compensated in kind, they find it difficult to raise the cash needed for migration. We show, first, that the feasibility of attachment depends on the inherited structure of local labor markets: Attachment can exist in equilibrium only if the labor market is sufficiently concentrated. Second, attachment is beneficial for both employers and employed workers, but it hurts unemployed and self-employed. An analysis of matched household-firm data from Russia corroborates our theory.

Key Words: Labor market competition, Transition, Russia, Labor tying.

JEL Classification Numbers: J42, M42, O15, P31

1 Introduction

Sometimes, economies are hit by massive shocks: trade liberalization, economic integration or secession, a collapse in the terms of trade, war, the fall of communism. These events have one thing in common — they dramatically affect the productivity of capital in different sectors. Formerly profitable enterprises, sometimes entire industries, decline, while others grow. When industries are localized, resources ought to reallocate across regions. In particular, one would expect a large relocation of workers. In a perfect world, this reallocation should be swift, but there are important obstacles slowing it down, for instance, underdeveloped housing markets, social norms, risk aversion.[1]

In this paper, we argue that there may also be strong *endogenous* forces slowing down labor reallocation. Firms may devise "attachment" strategies to keep workers from moving out of a local labor market. In the presence of sunk costs of investment, firms want to benefit as much as possible from their depreciating capital and thus need labor to match it. Firms can attach workers by compensating through non-monetary forms of compensation. When capital markets are imperfect, workers must have cash to finance the costs associated with migration. But when they are compensated through in-kind payments or fringe benefits, they are forced to consume and cannot save the cash needed for migration.

At first glance, one could think that attachment can only work in monopsonistic local labour markets. Firms ought to compete for workers not only in the level of compensation, but also in the *type* of compensation: Firms would poach workers from other firms that pay non-monetary compensation by offering cash wages. Our model, however, shows that this is not true. Attachment can, actually, be sustained as a *non-collusive* equilibrium in an oligopsonistic market, provided the number of firms in the local labor market is sufficiently small. The second result of the model is that attachment is not only good for firms, but also for the employed. However, it hurts the unemployed and the self-employed.

In other words, the main contribution of the model is that, first, too little labor market competition may, through attachment, obstruct labor relocation and the capacity of an economy to adjust to external shocks. Second, too little labor market competition may, through attachment, cause an externality on workers in segmented labor markets.

[1]See Roland (2000) for a survey of related literature. Our paper is concerned with strategies firms undertake to reduce the outward mobility in their labor markets. This is related but different to the problem of attracting workers through the provision of in-kind compensation as a safeguard against firm opportunism in the labor market, a topic that has been analyzed by the literature on company towns (see for instance the discussion in Williamson, 1985). The most important difference in perspective is that we do not seek to explain why workers would move into segmented labor markets, but rather, why they may find it hard to move away.

The intuition of the results is as follows: In the model, there are two periods. Workers are subject to a productivity shock that may make migration worth their while. Our labor market has a given amount of jobs and job-specific matching frictions. Worker/firm matches only survive one period. Whenever an employer opens a vacancy, it faces uncertainty about whether or not it may be able to fill it. It is the uncertainty about finding a matching worker in the second period that provides the rationale for paying non-monetary wages in the first period — employers like to retain workers in the local market to keep labor supply thick.

Employers cannot bind workers to the firm as matches are dissolved after each period. There is an important distinction between this attachment to a market and ties to a specific firm that have been analyzed before:[2] An employer's benefit from attaching workers must be shared with its competitors. We show that this creates an externality leading to the collapse of the attachment equilibrium when the number of local employers, N, increases above a certain threshold. A current employer internalizes only $1/N$ of the benefits of attaching the worker, but it fully bears the costs. It must compensate each worker for the forgone option to migrate to make her accept an attachment contract. This premium is independent of N, but the attachment benefits for the current employer are decreasing in N. At a certain number of firms, the costs outweigh the benefits and attachment ceases to be an equilibrium outcome.

The intuition for welfare results is straightforward. In attachment equilibrium, employed workers cause a negative externality on the unemployed. Each worker who accepts an attachment contract makes it harder for the unemployed to find a job in the second period. We can also show that total welfare in the local economy only increases if there is substantial labor shortage.

In our model, it is the presence of matching frictions that makes attachment desirable for employers. There may be many other reasons why employers prefer more rather than less labor supply. Our theory does not hinge on the precise motive for attachment. Efficiency wages could lead to similar results regarding attachment as the ones we generate in a matching model. (The Appendix contains a sketch of a model based on efficiency wages.) It should also be clear that we do not intend to contribute to the search literature. Rather, we have tried to set up a simple model that can generate predictions on how competition between employers — via the form of labor contracts — affects geographical mobility and worker welfare.

In Section 4, we look at Russia in the second half of 1990s as a testing ground for the theory. We start with providing some background. First, the productivity of many

[2]See Salop and Salop (1976) for a model where firms use backlogged wages to reduce worker turnover.

regionally concentrated industries has shifted dramatically with some regions enjoying high growth rates, while output in others has declined by more than 50% compared to pre-transition levels (Berkovitz and DeJong, 1999). Second, the rate of interregional migration is very low, around one percent per year (Goskomstat, 2000), even lower than the pre-transition level of roughly four percent. Third, many workers receive their compensation, fully or in part, in non-monetary forms.

With data from the Russian Longitudinal Monitoring Survey (RLMS)[3] we then investigate the two main predictions of the model. First, controlling for personal, firm-level and regional characteristics, the propensity of workers to leave a region should be an increasing function of competitiveness of the local labor market. We find that higher labor market concentration reduces geographical mobility, a result that is robust against various specifications, and of significant magnitude. An increase in labor market concentration by one standard deviation can reduce the propensity of an individual to leave by up to 3.6 percent points. Second, controlling for regional and personal characteristics, and the financial situation of firms (another important potential determinant of in-kind payments), in-kind payments should be more frequent in more concentrated local labor markets. Using a subset of the RLMS that has been matched with firm data,[4] we find corroborating evidence; a one-standard-deviation increase in market concentration increases the probability of in-kind payments by at least 3 percent points. We also discuss why we believe that our theory is better suited than alternative explanations to understand the regression results.

In the next section, we discuss our relation to the literature and some implications.

2 Literature and implications

We here discuss related literature on a) interlinkage of markets and labor-tying in development economies, b) oligopsony (monopsony) in the labor market, c) the Russian economy. Our paper also has a number of implications that we discuss below.

At first glance, the structure of our model seems to bear some resemblance with the literature on interlinked markets: in both cases, there are credit market imperfections and workers have reduced mobility. The literature on interlinkages has been motivated by many observations from developing countries where people often conduct their business in several markets with the same partners: Landlords, for instance, do not only employ workers, but also often provide them with credit, and traders do not only buy crops from farmers, but

[3]For more information on the RLMS, see Zohorri et al. (1998).

[4]We thank Klara Sabirianova for providing us with these unique data.

also often provide the farmers with seeds or credit to buy seeds.

The literature presents a number of explanations for such bundling (see the survey by Bell, 1988). Many of these explanations build on the idea that interlinking different transactions can help to overcome agency problems. For instance, when workers have no other collateral than their work, "pure" money lenders would not have use for it, while farmer/money-lenders do.

Our model entails no agency considerations and firms do not interact with workers on more than one market. Rather, firms want to assure their labor input (in a way similar as in Bardhan (1983) who argues that employers benefit from labor-tying because it ensures labor supply in peak times). Firms in our model offer in-kind payments to reduce geographical mobility, and workers are willing to accept in-kind contracts if the value of provided goods are at least equal to their cash payment outside option plus the option value of migrating, which they forego if they accept in-kind payments. Hence, attachment contracts are creating surplus for any pair of firm and worker. However, as explained before, they impose an externality on the pool of unemployed workers.

This relates to the question whether interlinkages and in particular tying is good for workers.[5] Again, our framework is different from the existing labor tying literature as we consider imperfect competition in the labor market and involuntary unemployment both of which are important problems in transition and developing economies. Our theory provides a simple explanation why tying may be bad for the unemployed but not the employed. In our model, a sufficient amount of competition, then, has an important role to play: it makes attachment collapse, and protects unemployed from welfare losses due to attachment. These effects are absent in models of labor tying that either assume labor market monopsony (Bardhan, 1983) or perfect competition (Mukherjee and Ray, 1995).

There is also a small, but growing literature that uses concepts from industrial organization to analyze labor markets. Boal and Ransom (1997) and Bhaskar, Manning and To (2002) show that certain labor market phenomena can only be explained if the firms hold market power. Bhaskar et al. argue that it is however unrealistic to assume conventional monopsony: employers do compete with each other. Somewhat similarly to the examples discussed by Bhaskar et al., we are most interested in cases of intermediate competition: If there is perfect competition, attachment does not pay off; if there is monopsony, then attachment is costless – as the worker has no choice, the firm does not even need to compensate the worker for the forgone option to migrate. The problem becomes interesting when looking at oligopsony, as we do in this paper. Our paper is also related to Stevens

[5]See, for instance Schaffner (1995) who argues that landlords subject workers to "servility", and restrict their information to maintain servile relationships.

(1994) who looks at the provision of training and at poaching in a model with imperfect competition.

A number of papers look at the inter-regional migration and demonetization of worker compensation in Russia. Jarocinska and Woergoetter (2000) and Andrienko and Guriev (2004) have shown that there are substantial wage differences across regions and yet little inter-regional mobility. This points to the presence of frictions on the labor market. A number of papers have looked at demonetization of worker compensation as a source for such frictions.Commander and Schankerman (1997) have analyzed Russian firms' practice of providing social services to their workers. They argue that the absence of a public social security network reduces workers' mobility, since they fear exclusion from firm-provided social services. Their argument applies to mobility in the same labor market and not to mobility across segmented local labor markets. Also, it presumes that firms are worker-controlled. Grosfeld et al. (2001) relate the segmentation of the Russian labor market with respect to skills to the provision of fringe benefits. Earle and Sabirianova (2000, 2002) look at wage arrears as an equilibrium outcome between firms in a given local labor market. They argue that one firm's decision not to pay wages may be a strategic complement to the decisions of other firms. Our paper is related inasmuch as it looks at demonetization as a result of firm strategies, but its focus is different as their papers do not theoretically analyze the impact of market structure on feasibility of demonetization strategies. Moreover, they do not focus on territorial mobility as we do.

Our main interest is to study how the market structure affects territorial mobility and hence also the capability of an economy to adjust to shocks. Inherited labor market structures slow down reallocation of labor. As a result, segmented local labor markets are maintained. Thus, our theory also contributes to the understanding of regional disintegration in Russia which has attracted much interest in the economics profession. Blanchard and Shleifer (2000) argue that Russia performs poorly in comparison to China because weak central institutions fail to obstruct rent-seeking behavior of regional and local governments. If Tiebout competition were feasible, efforts to recentralize as the ones undertaken by the Putin administration would not be necessary. However, workers who live in concentrated labor markets cannot vote with their feet. It is most likely exactly these workers who are subject to the least efficient local governments. Hence, by undermining Tiebout competition, attachment contributes to regional disintegration. Berkovitz and DeJong (1999) have shown that Russia has "internal borders" that regional governments erect to pursue their particular political interests. Our model shows that labor markets are subject to similar internal borders as product markets.[6]

[6]This is also in line with Ericson's (1999) view of the Russian economy as a "post-soviet industrial

While Russia is a good testing ground for the theory, attachment seems to be a more general phenomenon, and our theory is relevant beyond transition. Throughout economic history, firm devised strategies to reduce territorial mobility of workers, for instance, company towns and the truck system,[7] or labor tying arrangements in rural economies. Post-bellum paternalism in the southern states of the US provides another interesting example. Alston and Ferrie (1993, 1999) show that when slaves were freed after the civil war, rural employers had to cope with high turnover rates. Southern landlords had to limit competition among themselves and prevent Northern capital from moving to the South. As a response, the farmers created a web of social control mechanisms, in-kind payments, services and protection from racist violence. They also exerted political power to keep the influence of the North out of their labor market. During World War I and following restrictive immigration legislation in the 1920s, immigration from outside of the US to the North was low and outmigration of former slaves became a threat. Then, landlords used state legislation prohibiting emigrant agents in conjunction with paternalistic benefits to limit out-migration. This strategic behavior prevailed until production became less labor-intensive, and long-term investments of workers and farmers in the fertility of the soil became less important.

Industrial firms in Russia are experiencing a transition similar to the one of rural firms in the southern states of the US, and firms appear to react in a similar way. Kornai (1992) has argued that dependance of workers on the party and on their firm was a constituting element of socialism. The collapse of communism frees the individual from party dominance. Workers should then move to where they are most productive, not where Stalin wanted them (or their parents) to be, but it appears that attachment strategies make this reallocation a complicated and probably long-lasting task.

3 The Model

We consider a local economy with N identical firms. Firms and workers live two periods. First-period labor supply is a continuum of workers, normalized to L_1. Second-period labor supply, L_2, is endogenous.

feudalism". Our attachment mechanism shows why quasi-feudal structures in Russia have emerged and how they can be sustained. We also stress that one should be most worried about the welfare of those outside the quasi-feudal arrangements – the unemployed and the self-employed.

[7]The truck system was widely used, particularly in the UK and US: workers were obliged to buy their goods in company stores, and often heavily indebted themselves, making it difficult for them to move (see Hilton, 1960).

There is also a geographically distant labor market labelled the "central" labor market, which is competitive. In order to find a job there, workers incur costs of migration and search, T. The workers' productivity in the central market is subject to a shock: with probability p, the wage w^m net of the costs of migration exceeds R, the productivity of a worker in the local labor market:

$$w^m - T > R. \tag{1}$$

With probability $1 - p$, the wage in the central market is low (for simplicity we assume that it is zero) so that migration does not pay off.

Costs of migration must be paid upfront. Thus, at the beginning of the second period, the worker needs at least T units of cash. Workers who are unemployed in the first period receive a wage of nil and cannot migrate. The ability of migration of workers who *have* a job in the first period depends on the contract they agreed upon with their first-period employer. If they agreed on a standard cash contract, they have enough cash to migrate (we assume that the cash wage exceeds T in equilibrium), and receive utility w^c. If they agreed on a contract specifying compensation in non-monetary form that provides utility w^a, they cannot migrate. This is what we call an attachment contract. We assume that the firm bears no additional cost of paying salary in-kind relative to the monetary salary providing an equivalent utility to the worker. This assumption is made for simplicity's sake and is not important for our main results.

Contracts cover only the current period.

We first present the timing, then discuss worker/firm matching, bargaining and second-period labor supply. We then establish our proposition on the effect of competition on the feasibility of attachment, and discuss welfare implications.

3.1 Timing

1. First period:

   (a) Workers and firms are randomly matched. In each period, a worker is at maximum matched with a firm once, i.e., if workers do not find a match, they remain unemployed for the first period.[8]

[8]In our model, we do not distinguish between unemployed and self-employed. In order to do that, one would have to normalize wages by the self-employment income or unemployment benefit, depending on which is larger. For the sake of simplicity, we will refer to those who are not employed by a firm as unemployed; nonetheless, all results extend to the self-employed as long as the self-employment income is below the cost of migration.

(b) Any worker/firm match bargains individually over wages. Assuming that bargaining is efficient, the joint surplus is maximized by agreeing either on a cash or an attachment contract.

(c) First-period production takes place, workers and firms receive their payoffs. Unemployed get nil.

2. Second period:

(a) All matches dissolve.[9] Workers migrate or not, depending on whether migrating would pay off for them, and whether or not they have the cash needed. The remaining workers (including those who were unemployed in the first period) are matched according to the same matching technology.

(b) Workers and firms bargain about the second-period wage. At this stage, we can constrain our attention to cash wages, since workers and firms live only two periods.

(c) Second-period production takes place, workers and firms receive their payoffs.

3.2 Matching, bargaining and second-period labor supply

We assume that matching takes place according to a standard matching function (see Petrongolo and Pissarides, 2001). The number of successful matches between workers and firms, M, is determined by a matching function with constant returns to scale:

$$M = M(L, J) = J\beta(L/J) \tag{2}$$

Denoting $l = L/J$, the number of workers per job, $\beta(l)$ is the probability of a firm to fill a vacancy, and $\gamma(l) = \beta(l)/l$ denotes the probability to find a job for any given worker. According to the assumptions above, $\beta(l)$ is an increasing function (approaching 1 as l goes

[9] In principle we can also, at the cost of a more complicated model, assume that the first period matches are only destroyed with a certain probability. This would allow to handle both market-specific and firm-specific attachment. Certainly, each firm would prefer attaching workers to the firm rather than to the market. The firm may want to commit itself to some career path and to a wage profile that is convex in rank, as it is often done by large corporations that use internal labor markets. However, we believe that such a commitment would for many reasons not be credible in an environment with high volatility and high discount rates.

to infinity), and γ is a decreasing function (approaching 0 as l goes to infinity). Thus, $M(L,J) \leq L$ and $M(L,J) \leq J$. We also assume that $\beta(l)$ is concave.[10]

We assume that frictions are job-specific in order to have a matching technology that is independent of N. This is a simplifying assumption that allows us to concentrate on the effect of labor market concentration on attachment rather than on the efficiency of matching.[11]

After matches have been formed, firm and worker bargain. Without loss of generality, we assume that workers and firms have equal bargaining power. Let $q \leq M(L_1, J)$ be the number of workers with attachment contracts in the local economy; the number of workers with cash contracts is $M(L_1, J) - q$. With probability p, workers who are not attached leave the region. Hence, second-period labor supply is:

$$L_2 = L_1 - p\left(M(L_1, J) - q\right). \tag{3}$$

In what follows, we will for simplicity normalize the amount of jobs J to 1, and so that $M(L,J) = \beta(L)$.

3.3 Equilibrium

We now analyze how the number of attached workers q depends on N, the number of competitors in the market. In the second period, given equal bargaining power, the wage is $w_2 = R/2$, unemployed workers receive nil. The payoff of migrating workers is $w^m - T$. There are $\beta(L_2)$ employed workers; the firm's profit is thus $\frac{1}{N}\beta(L_2)R/2$.

Consider now the expected payoffs when a firm and a worker of mass dl bargain (at $t = 1b$).

1. Payoffs if negotiations break down are as follows:

   - the firm receives 0 + the second-period payoff of $\frac{1}{N}\beta(L_2)R/2$ (notice that we neglect the firm's first-period profits from other matches, since those do not depend on the outcome of the bargaining with the given worker);

[10] This holds, for instance, if M is a Cobb-Douglas function: $M = AJ^{1-\sigma}L^{\sigma}$ hence $\beta(l) = Al^{\sigma}$. Another standard specification comes from the urn-ball model in Petrongolo and Pissarides (2001): $M = J(1 - e^{-L/J})$, hence $\beta(l) = 1 - e^{-l}$.

[11] If matching were firm-specific, at a given number of jobs, a decrease in N should make it easier for firms and workers to match. Burdett et al. (2001) study the impact of the labor market structure on matching. However, their model does not allow to carry out comparative statics with regard to N in the case of multi-unit firms.

- the worker receives 0 + the second-period payoff of $[\gamma(L_2)R/2\,]\,dl$ (the worker is unemployed and hence cannot migrate);
- the sum of payoffs when negotiations break down is thus:

$$\frac{1}{N}\beta(L_2)R/2 + [\gamma(L_2)R/2]\ dl. \tag{4}$$

2. Payoffs if the firm and the worker agree on an attachment wage w_1^a:

- firm: $(R - w^a)\,dl + \frac{1}{N}\beta(L_2)R/2$;
- worker: $w^a dl + [\gamma(L_2)R/2]\,dl$;
- sum of payoffs:

$$Rdl + \frac{1}{N}\beta(L_2)R/2 + [\gamma(L_2)R/2]\,dl. \tag{5}$$

Subtracting (4) from (5), and given equal bargaining power, the attachment wage is:

$$w^a = \frac{1}{2}R \tag{6}$$

3. Payoffs if the firm and the worker agree on a cash wage w^c:

- firm: $(R - w^c)\,dl + \frac{1}{N}\beta(L_2 - pdl)R/2$;
- worker: $w^c dl + [(1-p)\gamma(L_2)R/2 + p(w^m - T)]\,dl$;
- sum of payoffs:

$$Rdl + \frac{1}{N}\beta(L_2 - pdl)R/2 + [\gamma(L_2)R/2]\,dl + p\,[w^m - T - \gamma(L_2)R/2]\,dl \tag{7}$$

Subtracting (4) from (7) yields the cash wage (given equal bargaining power):

$$w^c = \frac{1}{2}\left[R - \frac{1}{N}\beta'(L_2)pR/2 - p(w^m - T - \gamma(L_2)R/2)\right] \tag{8}$$

Notice that the attachment wage exceeds the cash wage. The worker is compensated for the forgone option to migrate in the future.

The sum of utilities under attachment contract (5) is larger than the one when the match breaks up (4). Thus, any match will result in employment. Remains the question when the worker and the firm agree on an attachment rather than a cash contract. Comparing (5) and (7), we obtain that attachment occurs whenever:

$$\frac{1}{N}\frac{R}{2}p\beta'(L_2) > p\left[w^m - T - \frac{R}{2}\gamma(L_2)\right]. \tag{9}$$

Substituting for L_2 into condition (9) yields:

$$N < \frac{\beta'(L_2)}{\frac{w^m-T}{R/2} - \gamma(L_2)} = \frac{\beta'\left(L_1 - p\left[\beta(L_1) - q\right]\right)}{\frac{w^m-T}{R/2} - \gamma\left(L_1 - p\left[\beta(L_1) - q\right]\right)}. \tag{10}$$

For a given N, the number of attached workers q solves (10), leading without further proof to the main proposition.

Proposition 1 *The number of attached workers decreases with N. In particular:*

- All workers are attached, that is $q = M(L_1, J) = \beta(L_1)$, if:

$$N < N^* = \frac{\beta'(L_1)}{\frac{w^m-T}{R/2} - \gamma(L_1)}. \tag{11}$$

- A proportion $0 < q < \beta(L_1)$ of workers are attached if $N \in (N^*, N^{**})$ where:

$$N^{**} = \frac{\beta'(L_1 - p\beta(L_1))}{\frac{w^m-T}{R/2} - \gamma(L_1 - p\beta(L_1))} > N^*. \tag{12}$$

  Here, q decreases from $\beta(L_1)$ to 0 as N increases from N^* to N^{**}.

- No workers are attached, that is, $q = 0$, if $N > N^{**}$.

The intuition for Proposition 1 is as follows (see also Figure 1). Given efficient bargaining, any worker/firm match chooses the contract that maximizes their joint surplus. Inspection of (9) shows that the value of attachment (the LHS) increases in the impact the attachment of workers has on the firm's probability to fill a vacancy in the second period, $p\beta'\left(L_1 - p\left[M(L_1, J) - q\right]\right)$, and in R. Each firm internalizes only $1/N$ of this attachment benefit, as matches are destroyed in the beginning of the second period (attachment is market- not firm-specific). However, a worker only accepts an attachment contract when she is, through the first-period wage, compensated for the value of the forgone option to migrate, $p(w^m - T - \frac{R}{2}\gamma(L_2))$. When N increases, the LHS decreases, while the RHS is constant. Ultimately, the cost of attachment dominates the benefits for the individual firm. This free-riding effect makes attachment collapse.[12]

[12]The equilibrium in Proposition 1 is unique for a given N. This follows from the concavity of $\beta(l)$. If $\beta(l)$ were convex and $\gamma(l)$ declined sufficiently slowly with l, $N^* > N^{**}$. Then, the structure of the equilibrium would be as follows: (i) if $N < N^{**}$, there exists a unique equilibrium with full attachment $q = M(L_1, J)$; (ii) if $N \in (N^{**}, N^*)$, there exist at least three equilibria: a stable equilibrium with full attachment $q = M(L_1, J)$, a stable equilibrium without attachment $q = 0$, and at least one unstable equilibrium with partial attachment with q solving (10); (iii) if $N > N^*$, there exists a unique equilibrium without attachment $q = 0$.

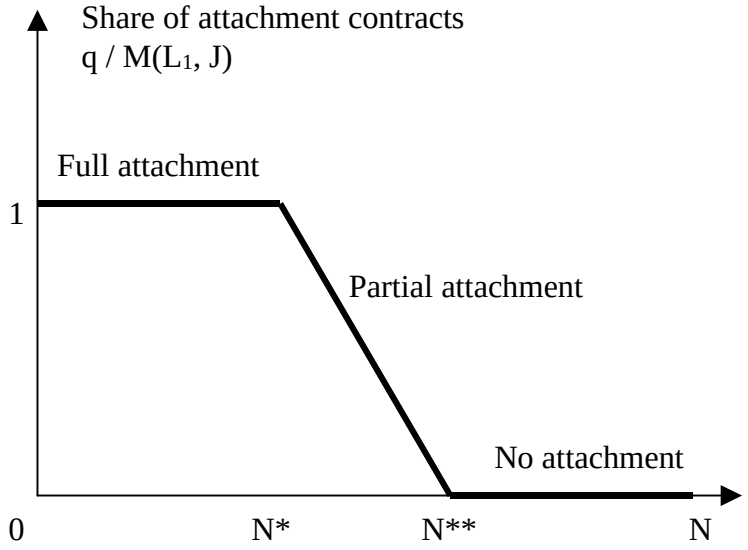

Figure 1: Share of attachment contracts in the first period $q/M(L_1, J)$ in equilibrium as a function of number of employers in the local labor market N.

Comments. The model above assumes that all the firms are symmetric. Suppose that firms differ in the stock of capital, and therefore, in the number of vacancies. Then there will be equilibria in which large firms will attach while the smaller ones will not. Indeed, the smaller the firm the larger the free-rider problem. The benefit of attachment per worker is proportional to the firms' employment while the cost of attachment is the same for all firms. Formally, the only change in (9) is that $1/N$ is replaced with the firm's share in the local employment. Notice that the attachment policies of the larger firms impose a negative externalities on the employees of small firms (as well as on the unemployed and the self-employed). The employees of the small firms are not attached and leave with probability p; however, with probability $1-p$ they stay and have to face a tougher competition for jobs in the second period.

The results are also robust to changes in the allocation of bargaining power. If the worker gets $\alpha < 1$ per cent of the joint surplus then condition (10) becomes $N < \frac{\beta'(L_2)}{\frac{w^m - T}{(1-\alpha)R} - \frac{\alpha}{(1-\alpha)}\gamma(L_2)}$. The properties of equilibrium do not change even if the worker has no bargaining power $\alpha = 0$ (the only difference is that the attached workers do not benefit from attachment). In the unlikely case where the worker has full bargaining power $\alpha = 1$, attachment never occurs — the benefit of attachment is trivial, and so is the right-hand side of (10).

One can also analyze the case where the bargaining power is endogenous to the local

labor market conditions with the worker's bargaining power α decreasing in unemployment and increasing in N. This would strengthen the results. Indeed, the effect of unemployment on the bargaining power provides the firm with even stronger incentives to attach the workers in order to increase its surplus in the second period. The link between labor market competition and the bargaining power also works in the same direction: as the number of firms increases, the attachment becomes even less likely as the firm expects to appropriate a lower share of returns to attachment.

3.4 Welfare

Because we assume efficient bargaining and equal allocation of bargaining power between worker and firm in a match, it is clear that firms and workers who are employed in the first period cannot lose from attachment. However, the unemployed of the first period suffer from attachment. A proportion p of the attached workers would migrate in the case of cash contracts. Under attachment, they stay, and reduce the probability of the unemployed to find a job in the second period. Thus, the fact that employed workers accept attachment contracts imposes an externality on the unemployed.[13]

How does the local economy as a whole fare under attachment? Consider the sum of the utilities (for clarity, we here drop the assumption that J is normalized to 1):

$$S = RM(L_1, J) + RM\left(L_1 - p\left[M(L_1, J) - q\right], J\right) + (w^m - T)p\left[M(L_1, J) - q\right]$$

The derivative with respect to q is

$$\partial S/\partial q = -p(w^m - T) + pR\beta'\left(L_1 - p\left[M(L_1, J) - q\right]\right) \tag{13}$$

From (13) we conclude that attachment decreases welfare if and only if unemployment in the second period is sufficiently high: $L_2/J > l^*$ where

$$\beta'(l^*) = \frac{w^m - T}{R}. \tag{14}$$

This result reveals the welfare implications of attachment. On one hand, attachment is beneficial to the local economy as it increases matching efficiency. On the other hand, attachment is costly because potentially mobile workers forgo the option to earn high wages outside. The former effect is more important if there is worker shortage in the

[13]This is somewhat similar to Rama and Scott (1999) where the dominant firm's employment decisions also have a negative effect on outsiders (small firms): downsizing the monopsony increases the pool of people looking for jobs in the local labor market which suppresses wages and local demand.

second period (L_2/J is low). Vice versa, if there is high unemployment (L_2/J is high), the marginal worker has a small effect on efficiency of matching, but the cost of attachment is even higher (each worker's local expected payoff is very low).[14]

Comments. One may wonder why firms from the central labor market would not be able to finance workers' migration from the local labor market. If workers and firms could write enforceable debt contracts, this would be possible. However, as workers have no collateral, and indentured servitude contracts cannot be enforced, such contracts would be infeasible: the worker would default on the debt, once she arrived in the central labor market. Entry of firms would be a second possibility. However, while the capital costs of incumbent firms is sunk, new entrants would have to pay a fixed cost, which, if high enough, would prevent firms from entering.

Finally, it is important that matching frictions are not the only reason why firms would like to attach workers. There can be an alternative model (available from the authors upon request), where greater local labor supply makes it *cheaper* rather than *easier* for firms to fill their vacancies.

4 Russia

We first present facts on the Russian labor market in the second half of 1990s, then discuss data and our regression results, and potential alternative explanations and counterarguments.

4.1 Facts

Demonetization of workers' compensations: In the Soviet Union, firms provided a wide range of non-monetary benefits to their workers, including hospitals, housing, rest houses, child care, catering and education. While according to presidential decrees all assets related to the provision of such services had to be transferred to municipalities, firms have not discontinued the provision of social services. In concentrated local labor markets, firms own up to 85% of the social assets (Healey et al., 1998). A survey of 93 enterprises in Tratch et al. (1996) reports that firms even invest in new types of facilities to provide fringe benefits. A recent survey of 400 firms by Haaparanta et al. (2003) confirms widespread ownership of social assets and even investment in new ones. Even more striking, a survey of 200 firms

[14]The formally more correct expression of a social planner's problem would be to maximize welfare by choosing whether or not to ban attachment. Our results show that banning attachment increases welfare if there is high unemployment in the second period.

by Biletsky et al. (1999) shows that in-kind substitutes for wages are on the rise. In 1991, 3% of the firms provided in-kind payments. This figure increased to 27% by 1998. In-kind payments are a novel phenomenon, but the provision of fringe benefits could be attributed to the behavioral inertia of paternalistic managers. However, a VCIOM (1997) survey among managers of 142 enterprises indicates that the provision of fringe benefits follows the strategic patterns we have highlighted in our model: Only 37% of the respondents continued to run the social assets of their firm because of "Soviet traditions", while 51% responded that social assets were used in order to retain workers. Juurikkala and Lazareva (2004) show that provision of social survices reduces turnover of employees.

Besides the fringe benefits, the Russian workers in the second half of 1990s saw an explosion of in-kind payments per se.[15] As discussed in Clarke (2000), wages (and wage arrears) were commonly paid in the firms' outputs, food, and even manure (McMahon, 2001). The widespread demonetization of the economy reduced the transaction costs of barter exchanges for the firms, yet, it was still quite high for the workers. As argued in Clarke (2000), the workers were effectively forced to withdraw from the market economy and get involved in barter exchange.

Low mobility across regions, labor market segmentation: Given the huge productivity differences across regions, one should expect massive reallocation of workers across regions. Heleniak (1999), for instance, estimates the potential for migration from the Russian North only, at 2 mln. people. But, during the decade of transition, interregional migration in Russia was rather constant, at a level of 1% per year (Andrienko and Guriev, 2004, based on the official data). This is a surprisingly low number, since pre-transition levels were in the range of 4-5%.

Soviet-style industrialization resulted in geographical concentration of industrial activity, and local employment was oftentimes concentrated in one or very few large plants. Goskomstat (2000) data show that since the outset of transition, labor market segmentation has steadily increased. Consider the ratio of unemployed over vacancies by a) the larger, so-called "economic regions", b) the administrative regions (the "oblasts"). In the Central Region it was roughly 8 in 1993, increasing to 13 in 1996, and dropping to 8 in 1997, while for the Eastern Siberian Region, we find the ratio growing from 18 in 1993 to 76 in 1997. More striking, even *within* economic regions and across the smaller oblasts the ratios vary dramatically. Andrienko and Guriev (2004) discuss evidence on the lack of

[15]In this paper, we do not discuss the decline of in-kind wages in recent years. As 1998 meltdown drove the real interest rates down, the barter economy disappeared and in-kind transactions became really costly even for the firms. That in turn raised the cost of in-kind employee compensation. According to RLMS, the level of in-kind compensation has been steadily decreasing since 2000.

convergence between oblasts during 1990s. Table 1 presents the respective figures for four administrative regions, and Moscow, all of which belong to the Central Region, the most developed and densely populated economic region. The difference between, for instance, Moscow and Ryazan has increased between 1993 and 1997, and by 1997, the ratio was 48 times higher in Ryazan than in Moscow.

	1993	1994	1995	1996	1997
Bryansk oblast	58	158	58	62	84
Vladimir oblast	18	28	34	46	38
Moscow City	4	3	3	2	1
Ryazan oblast	24	28	48	42	48
Tula oblast	6	15	18	31	32

Table 1: Ratio of unemployed over vacancies in the Central economic region, Goskomstat, own calculations.

Scope for migration: Why are workers from Ryazan, a town situated barely 200 kilometers away from Moscow, not moving to the capital? The obvious answer to this question is: because migration may not be worth the costs. It is hard to estimate the real costs of migration, but we have tried to do so and to compare it with the benefits of internal migration. Monthly salaries in rubles were collected from 28 Russian towns and cities for up to ten occupations as well as rents and transportation prices. The source of this information are job advertisements in newspapers in October 2000. The full list is available on request. A simple back-of-the-envelope calculation for Moscow and Ryazan indicates that there is scope for migration, in particular for qualified workers. However, the associated costs (due to relatively high rents in Moscow, registration and moving expenses) are substantial–half-year to one year worth of wages in Moscow–and they must be paid upfront. Given that Ryazan salaries are not much above the minimum living standard in the first place, the in-kind payments are a serious if not an insurmountable obstacle for migration.

4.2 Empirics

Our model implies two empirical predictions. First, more competition in a local labor market should involve more migration. Second, more competition in a local labor market should reduce the frequency of non-monetary compensation for workers.

In the absence of micro-migration data, we use the "Russian Longitudinal Monitoring Survey" (RLMS),[16] a representative data set on Russian households. The RLMS is not

[16]For more information on the RLMS, see: http://www.cpc.unc.edu/projects/rlms.

a panel data set, but interviews in Round VI (winter 1995/96) and Round VII (winter 1996/97) were conducted in the same dwellings. In case surveyed persons had moved, interviewers were supposed to find out about their new residence, provided they had not left the community. Former respondents who had left the community were not followed up. We look at individuals in working age who were employed in Round VI.

For both hypotheses the main independent variable is a labor market competition index: *CR4* represents the percentage of the labor force employed by the largest four employers on the respective local labor market, constructed from Goskomstat data. A larger *CR4* is tantamount to more concentration (less competition) on the labor market.

We have used information on the so-called 38 'Primary Sampling Units' (PSUs), the communities where the RLMS survey was conducted. For each community, we located plants that are located there and calculated the share of four biggest employers in total local employment using Goskomstat Registry of Russian Industrial Enterprises (the census of Russian enterprises). We defined individual communities so that each one is a local labor market. In case where PSU is a stand-alone urban or rural settlement, we calculated the concentration at the level of the individual PSU. In the cases where PSU is a part (e.g. a district) of a large city (e.g. Moscow) we calculated concentration for the citywide labor market rather than a district labor market. This is consistent with a casual understanding of everyday commute distance in Russia.

Does higher labor market concentration involve less migration? Here, we look at the dependent variable '*Move*'. *Move* takes a value of nil if an individual interviewed in Round VI happened to live in the same community in Round VII. The variable takes a value of one, if the interviewers were not able to find an individual in the same community he or she dwelled in during Round VI. The category $Move = 1$ thus also includes non-respondents and people who passed away between Rounds VI and VII. It hence represents an imperfect measure for regional mobility.[17]

We also use a host of control variables from the RLMS: personal characteristics, job characteristics, household characteristics, proxies for the subjective well-being of individuals (for instance, satisfaction with life, intention to change job or to move away from a community). Moreover, we use information about the economy of each community. We have deflated all nominal variables by a local CPI that uses price information of 25 basic goods from the RLMS, and weighs them according to the Goskomstat methodology. Appendix III lists the variables we have looked at. Table C contains the descriptive statistics of the most important variables.

[17]According to Goskomstat, the mortality rate in Russia was roughly 1.5% in 1995. Thus we believe that the sample distortion due to non-respondents is more substantial than the one due to mortality.

Table A presents the results of different probit specifications for *Move*. We have run regressions with all potentially interesting personal, household and job characteristics, but we present only those variables that are jointly significant. Reported are the marginal effect of a change in the respective independent variable on an individual's likelihood to move (computed at the average value of the respective variable). The first specification includes dummies for the PSUs and provides a useful benchmark. Since *CR4* is a linear combination of PSU dummies, we replace, in spec. 2, the PSU dummies with the respective *CR4*, and control for the eight large economic regions, including a special dummy for Moscow.

Comparing spec. 1 and spec. 2, we note that the results of the two specifications differ only slightly. The positive sign of monthly household income (the first variable), deflated by the local consumer price index (CPI), is in line with our theory that highlights the importance of liquidity constraints on moving decisions. It should be noted that controlling for personal and job characteristics, individuals with higher income should be less willing to leave. Thus, the positive sign we find suggests that the liquidity effect of a higher income dominates the income effect.[18] Longer tenure in the firm makes workers less mobile, a fact that can be reconciled with the presence of relation-specific human capital. Education, measured in years, influences moving decisions positively. Older and married persons tend to move with lower probability, while men have a higher propensity to move. Individuals living in rented flats are more likely to migrate.[19] Having children in the age between 7 and 18 has a negative impact on moving decisions.

The major lesson from spec. 2 is that as predicted by our theory, higher labor market concentration as measured by *CR4* has a negative impact on individuals' moving decisions, the magnitude of which is substantial: when *CR4* increases by one standard deviation (.29), an individual's probability to move decreases by 3.6 percent points. Given that in our sample, *Move* equals 1 holds for only 17% of the surveyed individuals, the impact of labor market concentration is important.

Does higher local labor market concentration increase the probability of in-kind payments? The dependent variable to investigate this prediction is binary information about

[18]It would have been preferable to look at the *stock* of household savings, but such information is not available in the RLMS. We report regressions with household income rather then individual salaries since we believe the latter to be a better measure of liquidity. Nonetheless, we have also run regressions with monthly salary; the respective coefficient is positive and significant as well.

[19]This can be interpreted as a sign that people who move more often prefer to live in rented flats, rather then in their own flats (or company dormitories). However, the fact of renting an apartment is also a potential proxy for the cash individuals hold, since in Russia, flats rented on the market are usually of higher quality and more expensive.

whether or not a person received in-kind payments.[20] Specification 1 in Table B shows that while most personal characteristics have no significant impact, *CR4* has a significant positive impact on the occurrence of in-kind payments – in line with our theory.

One could argue that firms that are more cash-constrained may be forced to pay wages in non-monetary forms, and that firm liquidity is correlated with *CR4*. We have received access to unique matched worker/firm data for a subset of individuals from the RLMS. We use two proxies for the financial constraints a firm is subject to: (i) *cash_cl*, defined as the ratio of cash holdings of firms at the time of the survey (end 1995), divided by its current liabilities at the same date, and (ii) *cash_sales*, defined as the ratio of cash holdings over annual sales. While these variables restrict the sample to less than 1000 individuals, and one should thus take the results with a grain of salt, the results of the regression, the third and fourth columns in Table A, are very much in line with our theory. Both *CR4* and *cash_cl* have the signs one would expect, and they are statistically significant, *cash_sales* has the expected sign but is not significant. The influence of *CR4* on *inkind* slightly increases under the inclusion of these variables, but the main point is that concentration affects positively the probability of in-kind payments — providing additional support for our theory. The above regression also shows that personal characteristics have a negligeable effect on the occurrence of non-monetary compensation.

Additional regressions: Our mobility variable is of rather low quality. $Move = 1$ contains both non-respondents and migrants. A direct identification is impossible, but we use a Round VI question on on whether respondents intended to move in the course of the following 12 months. An individual's intention to move in Round VI is a good predictor for having $Move = 1$ in Round VII: the respective probability is 42% for those who intended to move vs. 15% for the rest of the sample. We have thus, for spec. 6 in Table A, removed individuals from the sample who did *not* intend to move, but had $Move = 1$ in Round VI, because they are more likely non-respondents.[21] The respective regression attributes a lower magnitude to *CR4*, but it remains significant, and the explanatory power more than doubles, compared to spec. 5. We have also run a regression for the subsample of individuals who intended to move in Round VI (Table A, spec.7). In this subsample, the coefficient for *CR4* is significant and very large (.29), but we would not want to overinter-

[20]Unfortunately, we do not know the magnitude of these payments. Neither do we have information about the potential provision of social services that are considered to be of a larger magnitude than inkind payments.

[21]If these individuals are not counted as migrants, the share of those who leave goes down to 4%, which is comparable to the official national average for gross outgoing mobility (2.1%). Moreover, our dataset is biased in favor of migration as we look at the potentially most mobile category of people. Also, our dataset covers non-registered mobility which is supposed to be quite large.

pret the result, since the sample size shrinks to 292 individuals. We have also estimated the determinants of the intention to move (results available upon requests); the intention to move itself does not depend on kind payments (controlling for income, apartment rental etc.). We have also found that the mobility depends on inkind controlling for intention to move.

We have also included additional controls and checked the results for various subsamples. First, we have tried to use alternative measures of income such as individual wage (rather than household income). Second, we have also tried to control for liquidity at a more aggregated level. We have used the ratio of per-capita monetary income deflated by the minimum living standard in the region (oblast), and the deflated per-capita bank deposits in the region. Third, in order to control for potential size effects, we have also run regressions for small and large towns separately, and taken out Moscow and St. Petersburg from the sample. Fourth, we have run regressions for towns with high and low concentrations separately (i.e. with CR4 above and below 0.5). Fifth, we controlled for occupations (9 occupations as classified by RLMS) but those turned out be insignificant and had no effect on the relationship between CR4 and mobility. The results of these regressions (available on request) are similar to the ones discussed above.

Finally, we have also estimated the effect of in-kind payments on outmigration in various specifications: separately, jointly with concentration, a two-stage-least-squares (inkind instrumented by CR4), and as a system of seemingly unrelated equations. In all specifications in-kind payments negatively influence outmigration, and in almost all specification the coefficient is significant. We found that whenever we study the effect of both *inkind* and *CR4* on *move,* the coefficients for *CR4* decreases in absolute value but remains significant. This implies that in-kind payments are only one of the channels through which *CR4* influences outmigration. The other potential channels are wage arrears and fringe benefits. RLMS has data on wage arrears. We have run regressions for wage arrears similar to those for *inkind* and the results were similar to ones reported above. Yet, even wage arrears and in-kind payments together do not fully explain the effect of concentration on outmigration. This hints at the importance of fringe benefits for which we do not have data; see Juurikkala and Lazareva, 2004, who use data from a different survey to show that ownership of social assets by firm reduces employee turnover – consistent with our predictions.

Evidence from subsequent RLMS rounds: Our main regressions refer to RLMS rounds VI and VII. We could not use data from Round V because of triple-digit inflation in 1995. Using subsequent rounds is also problematic for a number of reasons. First, we only have firm-level data for Round V. Second, there no data on *wantmove* variable ("are you going to move within next 12 months?). This question was dropped from Round IX on, and there

were two years, rather than 12 month periods between Rounds VII and VIII, and Rounds VIII and IX. Yet, we have estimated basic specifications for Rounds VII-X. Table D reports the cross-section results from these rounds as well as an estimation of Cox proportional hazard model for the migration. To make the results comparable across rounds, we had to deflate household income using a region- rather PSU-level price index. The PSU-level price data are very incomplete, so it is not feasible to construct an index that would be consistent over time. Table E reports similar results for in-kind payments. The results are similar, although in two later rounds the coefficient on concentration is marginally insignificant.

4.3 Alternative explanations

The fact that *CR4* affects by the same time negatively the likelihood of outmigration *and* positively the likelihood of in-kind payments corroborates our theory. There are a number of alternative explanations and counter-arguments that are discussed below.

First, our theory is not the only one that would predict migration to decrease in labor market concentration. The observed impact of labor market concentration on mobility could be due to firms' higher market power in more concentrated labor markets. We have regressed wages on *CR4* and relevant controls and found that the effect of *CR4* on salaries is negative, significant and quite large: in different specifications, individual wage decreases by .4 to .5% when *CR4* increases by .01. Therefor the workers find it more difficult to finance the costs of migration since their income is lower. Empirically, however, we can distinguish ours from this explanation since (i) we find that CR4 affects mobility controlling for income (either household income, Table A, or individual wage, results available on request), (ii) our theory also predicts the effect of labor market concentration on the *composition* of wages which is consistent with evidence (Table B).

Second, assume that higher rates of labor market concentration are correlated with higher product market concentration. Then, when *CR4* is high, there are more rents that can be shared between managers and workers, which *ceteris paribus* makes current employment more attractive. As mentioned above, however, the evidence is not consistent with this explanation: higher concentration of market power results in lower rather than higher wages.

Third, there may be economies of scale in the provision of fringe benefits like hospitals, housing, schools etc. Then, a higher *CR4* can be an indicator for better provision of fringe benefits that compensate for potentially lower monetary wages. One could, in principle, test this theory: Our theory predicts both low outflows and low inflows from concentrated local labor markets. The alternative explanation would predict low outflows and *high* inflows.

Population changes on the local level are not available, but survey evidence suggests that workers are not very keen to move into local labor markets with high concentration, while many want to leave, but do not have the financial means to do so.[22] Motivated by the above argument, we have looked at the impact of living standard proxies that are not highly correlated with *CR4*. In spec. 5 (Table A), the additional independent variables are first, the availability of bank services; second, the quality of telecommunication services; and third, the quality or roads in the PSUs. While these variables matter, they reduce magnitude and significance of *CR4* only marginally.

5 Concluding remarks

We have presented a theory of attachment in which low migration arises endogenously due to the strategic behavior of oligopsonistic firms. We have shown that attachment emerges in concentrated local labor markets. It is beneficial for firms and employed workers but imposes a negative externality on the unemployed. Our theory fits Russia where many local labor markets are oligopsonistic, worker compensation is demonetized, and migration is low. An analysis of household and firm data shows that a) higher labor market competition decreases the outflow of workers; b) higher labor market competition increases the occurrence of in-kind payments. Both results are in line with our theory.

We have pointed to a number of implications for the Russian economy, but believe that our theory is of a more general nature. In particular, it points to a path dependency with respect to the structure of labor markets. Regional disparities in economies facing large shocks may sustain because few firms dominate a labor market, and not only because of exogenous frictions.

[22] In a survey of students, disabled, unemployed and retired individuals residing in Russian North, 54 to 68% (for various categories) responded that they would be willing to leave the region but only 3-11% said that they would have sufficient financial means to cover the migration costs fully or partially (Heleniak, 1999).

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Appendix I: Empirical analysis

List of variables

1. Personal characteristics: *male* (dummy, equals one if male); *married* (dummy, equals one if the person is married); *edyrs* (years spent on education); *age* (age in years).

2. Intention to move: *wantmove* (dummy, equals one if person wants to move in the coming year).

3. Household characteristics: *hhincome* (household income); *aprent* (dummy, equals one if the person rents his/her housing); *nkids7-18* (number of children aged 7-18 in the household).

4. Job characteristics: *jobsyr* (number of years spent in the firm); *inkind* (dummy, equals one if person received in-kind payments in the last month); *arr* (dummy, equals one if person had wage arrears in the last month).

5. Employer characteristics: *cash_cl* (firm's liquid assets over current liabilities as of Dec 31, 1995), *cash_sales* (firm's liquid assets as of Dec 31, 1995 over annual sales for 1996).

6. Geographical characteristics: *PSU* (primary sampling unit, 38 communities represented in the sample); *CR4* (labor market concentration ratio at the PSU level: the share of four biggest employers in the total employment in the PSU); *region* (regional dummies for eight regions: Moscow and StPetersberg, Central and Central Blacksoil region, North and Northwest, Volga, East Siberia and Far East, North Caucasus, Western Siberia, Urals).

7. *Move* (dummy, equals one if person is not found in the same community next year).

8. Community characteristics: *c6bank* (availability of bank offices); *c6telphp* (phone lines per 100 people); *c6roads* (quality of roads).

Table A: Probit (dF/dx) estimations for Move, RLMS Round VI.

Move	Spec.1	Spec.2	Spec.3	Spec.4	Spec.5	Spec.6	Spec.7
hhincome	.021*	.031***	.003	.003	.033***	.006*	-.016
	(.011)	(.012)	(.006)	(.005)	(.013)	(.004)	(.052)
jobsyr	-.001*	-.002**	-.001	-.001	-.001	-.001**	-.135**
	(.001)	(.001)	(.000)	(.000)	(.001)	(.000)	(.006)
edyrs	.003	.006**	-.002	-.001	.005*	.000	-.007
	(.002)	(.003)	(.001)	(.001)	(.003)	(.001)	.15
age	-.002***	-.002**	-.001*	-.001**	-.002***	-.001***	-.003*
	(.001)	(.001)	(.000)	(.000)	(.001)	(.000)	.002
male	.061***	.058***	.007	.004	.058***	.011***	.101**
	(.008)	(.009)	(.007)	(.006)	(.009)	(.004)	.044
married	-.027	-.030*	.004	.003	-.031*	.004	-.008
	(.018)	(.017)	(.007)	(.006)	(.018)	(.006)	(0.088)
aprent	.374***	.255***	.021	.018	.317***	.297***	.477***
	(.060)	(.085)	(.025)	(.022)	(.075)	(.065)	(.080)
nkids7-18	-.0115	-.016*	.003	.001	-.014	.000	.021
	(.010)	(.009)	(.004)	(.004)	(.010)	(.004)	.046
PSU dummies	sign.						
reg.dummies		sign.	sign	sign	sign.	sign.	sign.
CR4		-.123***	-.037**	-.035**	-.109**	-.034**	-.293**
		(.043)	(.017)	(.016)	(.047)	(.014)	(.120)
cash_cl			-.256*				
			(.114)				
cash_sales				-1.095**			
				(.043)			
c6bank					.020	-.008	.214
					(.045)	(.014)	(.142)
c6telphp					-.001	-.000	-.003*
					(.001)	(.000)	.002
c6roads					-.035**	-.010	-.149**
					(.016)	(.007)	.067
Observations	3819	3819	828	806	3252	2857	292
Log likelihood	-1461	-1552	-93.5	-87.4	-1262	-355	-160
Pseudo R^2	.135	.082	.140	.163	.102	.238	.183

***1%; **5%; *10%; standard errors in parentheses, adjusted for clustering at the PSU level (Spec. 1,2,5-7) or at the firm level (Spec. 3,4)

Table A: Specification 1 includes dummies for primary sample units (PSU). In Spec. 2-7 the PSU dummies are replaced with PSU-level four-firm labor market concentration ratio (complemented with dummies for eight regions of Russia). Spec. 3 and 4 include firm-level liquidity measures: employer's cash/current liabilities ratio and cash/annual sales ratio. Spec. 5-7 include PSU-level measures of local public good provision. Spec. 6 excludes the individuals who did not show up in Round VII but did not intend to move between Rounds VI and VII. Spec.7 only includes those individuals who intended to move between Rounds VI and VII.

Table B: Probit (dF/dx) estimations for Inkind, RLMS Round VI

Inkind	Spec. 1	Spec. 2	Spec. 3	Spec. 4
hhincome	.003	.003	.004	.000
	(.009)	(.015)	(.022)	(.012)
jobsyr	-.000	.000	.001	-.000
	(.000)	(.001)	(.001)	(.000)
edyrs	-.005***	-.004	-.005	-.004**
	(.002)	(.002)	(.003)	(.002)
age	-.000	.000	-.000	-.000
	(.001)	(.001)	(.001)	(.001)
male	.016	-.001	.001	.013
	(.009)	(.011)	(.016)	(0.10)
married	-.027	-.001	-.001	-.004
	(.018)	(.018)	(.025)	(.012)
aprent	.003	.001	.001	.044*
	(.010)	(.025)	(.036)	(.024)
nkids7-18	-.015***	.015*	.020*	.016*
	(.005)	(.009)	(.012)	(.006)
regional dummies	sign.	sign.	sign.	sign.
CR4	.093**	.101**	.148**	.064**
	(.029)	(.049)	(.067)	(.032)
cash_cl		-.393**		
		(.132)		
cash_sales			-.914	
			(.689)	
c6bank				.037***
				(.011)
c6telphp				.009
				(.023)
c6roads				.000
				(.000)
Observations	3910	948	891	3318
Log likelihood	-1062	-272	-269	-869
Pseudo R^2	.062	0.152	0.140	.079

*** 1%; ** 5%; * 10%; S.E. in parentheses, adjusted for clustering at the PSU level (1,4) or at the firm level (2,3)

Table B: Specification 1 is the basic specification. Spec. 2 and 3 include firm-level liquidity measures: employer's cash/current liabilities ratio and cash/annual sales ratio. Spec. 4 includes PSU-level measures of local public good provision.

Table C: Descriptive statistics, RLMS Round VI

Variable	Obs	Mean	Std.dev.	Min	Max
move	4961	.17	.38	0	1
hhincome, def	5302	.46	.55	0	6.18
jobsyr	4101	8.62	8.67	1	44
edyrs	5288	12.19	2.78	0	27
age	5302	43.83	12.32	20	60
male	5302	.49	.49	0	1
married	5286	.72	.45	0	1
aprent	5285	.054	.23	0	1
nkids7-18	5302	.73	.88	0	7
CR4	5302	.59	.29	.07	1
inkind	4036	.084	.28	0	1
cash_cl	1134	.08	.32	0	1.89
cash_sales	849	.009	.024	0	.42
c6bank	5119	1.06	.24	1	2
c6telphp	4489	35.99	22.91	.2	98
c6roads	5122	1.87	.66	1	4
wantmove	5302	.087	.28	0	1

Table D: Probit (dF/dx) estimations for Move

Round	VI	VIII	VII	IX	X	Cox
hhincdef	0.149***	3.930**	3.082*	1.523**	0.586*	1.322***
	-0.049	-1.833	-1.685	-0.644	-0.356	-0.134
jobsyr	-0.002	-0.002**	-0.001	-0.002*	-0.002***	-0.003
	-0.001	-0.001	-0.001	-0.001	-0.001	-0.003
edyrs	0.001	0.003	0.008**	0.005**	0.002	0.003
	-0.001	-0.003	-0.004	-0.002	-0.003	-0.005
age	-0.003***	-0.002**	-0.003***	-0.002*	-0.001**	-0.006***
	-0.001	-0.001	-0.001	-0.001	-0.001	-0.002
male	0.140***	0.139***	0.107***	0.084***	0.073***	0.311***
	-0.015	-0.013	-0.011	-0.012	-0.009	-0.046
married	-0.075***	-0.071***	-0.082***	-0.069***	-0.061***	-0.014
	-0.022	-0.022	-0.017	-0.018	-0.016	-0.056
aprent	0.218***	0.132*	0.199***	0.206***	0.093***	0.355***
	-0.073	-0.079	-0.057	-0.051	-0.033	-0.077
nkids7	-0.057**	-0.057***	-0.036	-0.056***	-0.013	-0.084
	-0.027	-0.021	-0.026	-0.016	-0.019	-0.052
CR4	-0.166*	-0.199*	-0.219**	-0.158	-0.146	-0.706**
	-0.086	-0.104	-0.093	-0.124	-0.09	-0.317
regional dummies	sign	sign	sign	sign	sign	sign
Observations	4074	3761	3739	3797	4198	19569
Log likelihood	-2525	-2313	-2094	-1892	-1809	
Pseudo R^2	.092	.080	.096	.109	.083	

***1%; **5%; *10%; standard errors in parentheses, adjusted for clustering at the PSU level

Table D: The table reports estimations of basic specification for RLMS rounds VI-X. To make the results comparable across time we use an oblast-level consumer price index to deflate household income rather than a PSU-level cost of a 25 product basket (the latter is hard to construct over time).

The last column reports an estimation of a Cox proportional hazard model for the risk of Move=1.

Table E: Probit (dF/dx) estimations for Inkind

Round	VI	VIII	VII	IX	X
hhincdef	-0.055**	-2.586*	-2.509	-2.001***	-0.927***
	-0.025	-1.499	-1.649	-0.369	-0.213
jobsyr	0	0	-0.001	0	-0.001
	-0.001	-0.001	-0.001	-0.001	-0.001
edyrs	0.001	-0.009***	-0.008***	-0.006***	-0.006***
	-0.001	-0.002	-0.002	-0.002	-0.002
age	0	0	0.003***	0	0.001
	-0.001	-0.001	-0.001	0	0
male	0.018**	0.037**	0.026**	0.023**	0.023***
	-0.009	-0.016	-0.013	-0.009	-0.008
married	0.004	-0.011	-0.017	0.006	-0.016*
	-0.013	-0.014	-0.012	-0.007	-0.008
aprent	0.029	-0.034	0.028	-0.01	0
	-0.026	-0.023	-0.027	-0.013	-0.014
nkids7	0.006	0.007	-0.023	-0.001	0.004
	-0.009	-0.008	-0.017	-0.011	-0.01
CR4	0.071**	0.116**	0.137**	0.126***	0.093***
	-0.031	-0.051	-0.067	-0.032	-0.023
regional dummies	sign	sign	sign	sign	sign
Observations	3915	3595	3446	3493	3870
Log likelihood	-1076	-1224	-1371	-906	972
Pseudo R^2	.055	0.101	0.097	.157	.117

*** 1%; ** 5%; * 10%; S.E. in parentheses, adjusted for clustering at the PSU level

Table E: The Table reports estimations of basic specification for RLMS rounds VI-X. To make the results comparable across time we use an oblast-level consumer price index to deflate household income rather than a PSU-level cost of a 25 product basket (the latter is hard to construct over time).