

Smirnych, L. I.; Wörgötter, Andreas

**Working Paper**

## The importance of institutional and organizational characteristics for the use of fixed-term and agency work contracts in Russia

ECON WPS, No. 09/2016

**Provided in Cooperation with:**

TU Wien, Institute of Statistics and Mathematical Methods in Economics, Economics Research Unit (ECON)

*Suggested Citation:* Smirnych, L. I.; Wörgötter, Andreas (2016) : The importance of institutional and organizational characteristics for the use of fixed-term and agency work contracts in Russia, ECON WPS, No. 09/2016, Vienna University of Technology, Institute of Statistics and Mathematical Methods in Economics, Research Group Economics, Vienna

This Version is available at:

<https://hdl.handle.net/10419/147449>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

# The importance of institutional and organizational characteristics for the use of fixed-term and agency work contracts in Russia



by  
**Larisa Smirnykh**  
and **Andreas Wörgötter**

# THE IMPORTANCE OF INSTITUTIONAL AND ORGANIZATIONAL CHARACTERISTICS FOR THE USE OF FIXED-TERM AND AGENCY WORK CONTRACTS IN RUSSIA

Larisa Smirnykh<sup>1</sup> and Andreas Wörgötter<sup>2</sup>

## ABSTRACT

Non-renewable fixed-term and agency work contracts are becoming more used instead of the traditional Russian model of open-ended employment. The authors examine the influence of institutional and organizational factors on the use of two forms of non-standard work contracts in Russia with data from a Survey covering 3313 enterprises for the years 2009 to 2011. Probit and Tobit regressions are used to test several hypotheses about the use of non-standard work contracts derived from the literature. The results indicate that state-owned and unionized enterprises are more likely to use fixed-term contracts; and a high level of perceived dismissal protection for permanent workers is positively associated with fixed-term contracts use. The incidence and intensity of fixed-term and agency work contracts are lower at enterprises with flexible wages. A significant impact of organizational factors is confirmed only for fixed-term contracts. Enterprises use less fixed-term contracts, if they have workers with tenure from 5 to 10 years and high job complexity.

*JEL Classification:* J41; J21; J63; J23

*Keywords:* fixed-term contracts, agency work, non-standard employment, labor flexibility, Russia

---

<sup>1</sup> Larisa Smirnykh, Professor, Department of Applied Economics, National Research University Higher School of Economics, Moscow. E-mail: [ismirnykh@hse.ru](mailto:ismirnykh@hse.ru).

<sup>2</sup> Andreas Wörgötter, Adjunct Associate Professor, Department of Mathematical Economics, University of Technology, Vienna. E-mail: [andreas.woergoetter@econ.tuwien.ac.at](mailto:andreas.woergoetter@econ.tuwien.ac.at)

This paper is an output of a research project implemented as part of the Basic Research Program at the National Research University Higher School of Economics (HSE) in 2013-2016 and following up on earlier background research for the 2013 *OECD Economic Survey of the Russian Federation*. Its content is the responsibility of the authors and is not necessarily shared by their current or past affiliations.

Non-standard labor contracts became widely used in Russia since the reform period of the 1990s. They include different types of fixed-term contracts and agency labor. In Soviet times the application of fixed-term contracts was strictly limited by the Russian Federation Labor Code. In Russia, unlike most European countries, no reforms were carried out to making the use of fixed-term contracts easier for enterprises. Even recent labor legislation has not changed much. Often enterprises used fixed-term contracts extra-legally and (or) in the absence of norms regulating them, especially those concerning the employment of agency workers.

As a result, enterprises in Russia mostly had other framework conditions (institutional, economic, and financial) for the use of fixed-term contracts as compared to many Western countries. However, the level and scope of the use of fixed-term contracts in Russia turned out to be comparable to Western countries. In 2014, the proportion of employees in the EU28 with a contract of limited duration (fixed-term employment) was 14.0 %, just in between the 28.3 % in Poland and 1.5 % in Romania (Eurostat 2016). The proportion of employees working under fixed-term contracts at all enterprises in Russia accounts for an average of 6 % of the employed population (Gimpelson and Kapeliushnikov 2006), which is below the corresponding level of 11% in most developing countries (Aleksynska and Berg 2015). Our study explains how non-standard labor contracts became so popular and what the reasons for enterprises' demand for fixed-term and agency work contracts in Russia are.

Our research on Russia is based on a methodology for studying the effect of demand for fixed-term contracts used by researchers in other countries (Pfeifer 2005; Hagen 2003; Houseman, 2001). In this study, like other authors (Liu 2015; Aleksynska and Berg 2015; Van Jaarsveld et al. 2009), we consider institutional and organizational reasons for enterprises to use fixed-term contracts. The case of Russia is of particular interest compared to similar studies for other countries. While Russia belongs to the group of emerging markets with many similarities to the countries of Central and Eastern Europe it still maintains a strong Soviet-inherited influence of the administrative-command system. Through the example of Russia, we may conclude that an increase in the scale and expansion of the scope of using fixed-term contracts can take place not only under the influence of liberal reforms, which have occurred in many European countries since the 70s, but can also take place while maintaining high employment protection, a considerable share of the state property and with the participation of trade unions. Thus, by studying the case of Russia, we can not only test the significance of the impact of institutional and organizational factors on their use, but also identify the features of the Russian model of using fixed-term contracts.

For our analysis we use data for 2009-2011 on 3313 enterprises that are representative for Russia. This survey provides information about the economic situation and adopted management practices. We considered the following types of employees as working under non-standard contracts, (1) fixed-term contract workers, and (2) agency workers. Eventually, we focused only on the fixed terms of employment contracts, which distinguishes them from the so-called open-ended contracts, and considered employees working under any kinds of fixed-term contracts. Based on survey data we consider the level of perceived dismissal protection for permanent workers, as well as the share of state ownership, trade union influence and wage flexibility (wage arrears, pay performance) at the enterprise level as the institutional factors. We also consider organizational factors that characterize labor management and personnel structure of enterprises, indirectly reflecting their technical and technological level. Among such factors, we consider investment in specific human capital (tenure) and job complexity. We have evaluated the impact of institutional and organizational factors on the likelihood and intensity of use of fixed-term contracts with the help of Probit and Tobit regressions.

This research adds information that helps to elaborate on the impact of institutions and costs of fixed-term contracts on restructuring enterprises. The case of Russia adds details for

studies on about the use of fixed-term contracts in the course of transition to a market economy, lacking important market institutions, still under the excessive influence of the state.

## INSTITUTIONAL BACKGROUND

According to the Russian Federation Labor Code (RFLC), enterprises have the legal right to conclude fixed-term labor contracts for a period of up to five years with exceptions for some categories of workers and jobs (RFLC, 2001).

A fixed-term labor contract can be concluded for those cases when labor relations cannot be established for an open-ended period of time due to the nature of the job or conditions of its realization (Article 58 of RFLC). Reasons for a fixed-term labor contract (Article 57 of RFLC) include:

1. the temporary absence of employees with a valid contract;
2. a job of temporary nature (up to two months or seasonal work);
3. an urgent labor demand for an activity which is different from a regular job;
4. a labor demand for an additional production activity in case it is known in advance that these jobs have a temporary nature (up to one year);
5. jobs fulfilled in the course of a probation period and additional professional training;
6. jobs of a preliminary fixed term;
7. when a hired employee is a full-time student, an old-age pensioner or holds more than one job, if employees are hired for the position of top managers or other positions selected in the course of a competition.

Small businesses including individual entrepreneurs can conclude fixed-term labor contracts without restrictions if their total number of employees does not exceed 35 (20 for retail trade and consumer services).

The main advantage of fixed term contracts for employers is the lower cost of dismissal. Employees with a fixed-term contract have the same social entitlements as employees working under open-ended (standard) labor contracts. But they are not entitled to a severance payment when their contract expires. Thus the dismissal of employees working under fixed-term labor contracts is less expensive than working under permanent labor contracts.

The use of fixed-term labor contracts is currently restricted by the RFLC:

1. Fixed-term labor contracts are not allowed in case it is found that they avoid providing employees with their legitimate rights and insurance arrangements (Article 58 of RFLC).
2. Unlike in many European countries, enterprises in Russia do not have any right to conclude several fixed-term labor contracts in succession with one and the same employee involved in one and the same operation. If this fact is established the Court has the right to declare a labor contract as open-ended<sup>3</sup> (Resolution of the Plenum of the Supreme Court of RF, 2004).
3. Moreover, a fixed-term contract can be declared open-ended if the Court establishes that the employee was forced to sign it.
4. Upon expiration of a fixed-term contract, if the employee continues to work and the employer does not demand the termination of the contract, it becomes open-ended (Article 58 of RFLC).

---

<sup>3</sup> An enterprise will be obliged not only to restore the workplace for an employee, to compensate his loss of earnings, moral damage and to pay a fine, but it will also lose the right to continue its activity for the period of up to three months.

5. If a fixed-term contract does not specify its validity period it is automatically declared as open-ended (Article 58 of RFLC).

When these institutional limitations apply and a fixed-term contract is not feasible, enterprises may use alternative external forms of labor flexibility, for example agency work. Contracts signed with agency employees are temporary, fixed-term contracts. However, agency labor differs significantly from other types of temporary employment. It is based on the cooperation of three members (an agency employee, an enterprise-user and a company-provider) contrary to other types of temporary employment with only two contracting members (an employee and an employer).

The peculiarity of agency work in Russia lies in the fact that this specific type of temporary employment was not included into the RFLC. Unlike regular workers on the payroll, agency workers are not accumulating benefits for the continuous service at an enterprise; they do not have the right to take part in a collective agreement of an enterprise, to receive bonuses for collective labor results and so on. An enterprise trade union cannot protect interests of agency workers. These workers are not covered by regional privileges; they are not eligible for benefits when performing unhealthy jobs and jobs with future preferential (early retirement) pensions, etc. All these drawbacks explain employee's aversion against agency labor.

Agency work is covered by the Civil and Tax Codes of Russian Federation. In particular organizations (companies-providers) providing enterprises-users with agency workers operated on the basis of a simplified taxation system (STS) and were exempt from value added tax (VAT)<sup>4</sup>, resulting in widespread tax evasion. Moreover, Russia was lagging behind other countries in the provision of social security and workplace safety conditions for agency workers. The ILO Convention № 181, regulating the utilization of agency work, was not ratified by Russia<sup>5</sup>. As a result, agency work has shifted to the informal sector.

Since 2014 the RFLC has included some additions which rule out civil law contracts for labor relations between employees and employers. Firstly, employers may not conclude civil contracts with their employees (Article 15 of RFLC). If employers conclude such contracts they commit an administrative offense. Secondly, the relationship between employees and employers should be considered as an employment relationship (Article 19 of RFLC). Additionally, since 2014 enterprises in Russia are forbidden to use employees from other organizations for unhealthy and dangerous jobs, on sea and mixed navigation (river-sea) vessels or in construction.

According to the new Law on Agency Work, from 2016 the conditions of labor remuneration for employees working under an agency contract should not be worse than those of enterprise-user's employees with the same labor functions and the same qualification. The Law includes time limitations for agency work provision. However, some tax incentives for the use of agency work remain.

## LITERATURE REVIEW AND HYPOTHESES

An excellent overview of the literature about determinants of fixed-term contracts is provided by Aleksynska and Berg, 2015. The following hypotheses build on this and other work with the main focus on Russia.

---

<sup>4</sup> The STS allowed the rate decrease of insurance fees contributed to off-budget funds (Retirement Fund, Social Security Fund, and Obligatory Medical Insurance Fund) for many organizations in comparison with the usual rates. Under certain conditions the rates of insurance fees according to STS are not at all specified (Federal Law 212-FL, 2009) for some types of labor activity and employees categories.

<sup>5</sup> The Convention is also not ratified by many other big countries (United States, Germany, United Kingdom, France).

## Employment protection and cost advantages

In theory, high levels of dismissal protection for permanent workers and low entry barriers for temporary workers should be associated with a large proportion of the workforce being hired on fixed-term contracts (Boeri 2011; Kahn 2007; Baranowska and Gebel 2010).

One implication of the Mortensen-Pissarides model (Mortensen and Pissarides 1999) is that the share of fixed-term contract workers increases with the strictness of employment (dismissal) protection for open-ended contracts (Boeri 2011). Terminating an employment relationship with permanent workers, at the initiative of employer, usually entails certain costs, including severance payments, costs associated with notification procedures and other compensatory payments if terminations are unfair (Lazear 1990; Lindbeck and Snower 2001; OECD 2004). The use of fixed-term contracts has often been explained by the significantly lower dismissal costs, as compared to open-ended work contracts. At the end of the fixed-term contract, generally no reasons need to be provided by the employer to justify the end of the employment relationship.

RFLC differentiates between open-ended and fixed-term work contracts (OECD 2011). While regular contracts are more protected than in any OECD country except Portugal fixed-term contracts are much less protected than on average in OECD countries. This is mainly because of a notice period and severance pay obligation of two months, independent of the tenure of the contract in case of job separation of a regular contract. Both regulations are absent for temporary work contracts. This makes an open-ended contract more expensive than a fixed-term work contract in the case of filling a temporary vacancy. Fixed-term contracts are providing a cost saving possibility to achieve numerical flexibility.

*Hypothesis 1:* A high level of perceived dismissal protection for permanent workers is positively associated with the use of fixed-term contracts.

However, enterprises can use other or several modes of labor flexibility as they react to demand fluctuations (Pfeifer 2005). They will choose between the different modes of flexibility by comparing their costs.

## Wage flexibility

Wage flexibility is an alternative to numerical flexibility (Clarke and Borisov 1999). *Wage flexibility* allows real wages to respond to changing macroeconomic conditions such as adverse shocks. The modes of labor flexibility can support or substitute each other so that all labor markets develop some forms of adaptability. A similar level of overall adaptability can be achieved by alternative combinations of numerical and wage flexibility.

The Russian model of wage determination at the enterprise level allows more wage flexibility, which greatly depends on their economic situation. In this connection, it is considered non-standard.

Wage flexibility includes arrears of wages and performance-based pay. Performance-based pay dominated in 1992 (Kapeliushnikov 2007). The start of market reforms in Russia meant the abolition of most administrative constraints that had operated under the former economic regime. The process of setting wages became decentralized. Enterprises were granted the right to make independent decisions on most issues relating to the setting and change of wages. From 1992 to 2008, direct government regulation remained only in the public sector where the single tariff scale was introduced.

Because of the changes, enterprises in Russia have found themselves in a fundamentally different institutional environment, whose primary feature is that today most enterprise managers in Russia have almost absolute power in setting wages. They can, without prior consent

of the other parties (workers, trade unions or their representatives), assign or adjust them. In the centrally planned system, the enterprise autonomy index in wage policy was equal to slightly over 30 points, whereas with the beginning of reforms, it has been maintained at the same level throughout the decade, fluctuating in the range of 70-80 points (Kapeliushnikov 2007). When setting wages, heads of enterprises have more freedom than in setting prices for manufactured products (Kapeliushnikov 2007).

In Russia the most important determinants of the level of wages is the economic performance of individual enterprises. A strong positive connection between performance indicators and the level of wages is not just valid "in fact", but formalized and enshrined in the existing staff remuneration systems. According to some estimates, in 60% of enterprises the payroll fund is formed in direct proportion to revenues (Kapeliushnikov 2007). Performance-related pay in such an institutional environment means that enterprises are willing to "share" with their workers part of the gains while workers are willing to carry part of the losses. As a result, wages vary with the profitability of the enterprise, in which an employee is engaged.

Wages arrears are a purely Russian phenomenon, which practically does not exist anywhere else (Earle and Sabirianova Peter 2004). In 2006 the Russian labor code has been amended with the article on the liability of the employer for violation of the terms of payment of wages (Article 142 of RFLC). This increased the cost for enterprises to use wage flexibility in the form of wage arrears. Due to possible fines, this made simultaneously fixed-term contracts more attractive for enterprises.

Wage flexibility and numerical flexibility (fixed-term contracts) are therefore more likely substitutes than compliments. In this case, if the costs of labor adjustment by wage flexibility are higher than the adjustment costs of fixed-term contracts, the enterprises will be more likely to use fixed-term contracts and vice-versa.

*Hypothesis 2:* Wage flexibility is negatively associated with the use of fixed-term contracts.

## **State ownership**

State-owned enterprises (SOEs) have softer budget constraints than private enterprises (Kornai 1979; Earle and Estrin 2003). Therefore, the state-owned enterprises will not necessarily use fixed-term work contracts for saving costs.

SOEs in Russia usually serve a stable market, dominated by public procurement (Augustynowicz 2014). For this reason, they will be less interested than private enterprises to use fixed-term contracts to adapt to fluctuations in demand.

Nevertheless, SOEs may use fixed-term work contracts to reduce the cost of implementing projects with funding from the State. If savings can be kept, these funds can be directed to the promotion of employees.

In addition, SOEs in Russia often should downsize an inherited oversized labor force from Soviet times (Kapeliushnikov 1998). In order to achieve a gradual release of employees they can replace permanent jobs by temporary jobs. They will transfer a portion of permanent workers on fixed-term employment contracts.

*Hypothesis 3:* State ownership is positively associated with the use of fixed-term contracts.

## **Trade unions**

According to dual labor market theory and the core-periphery hypothesis, non-standard employment can be interpreted as a firm's peripheral workforce, while regular employment is the core workforce (Kalleberg 2001; Cappelli and Neumark 2004). The core-periphery hypoth-



esis implies that the regular employees gain more job security due to the use of a flexible workforce, since non-standard employment is used as a “buffer”, which is adjusted to demand fluctuations (Booth et al. 2002). Moreover, the core workforce has better working conditions including a higher income. This should lead to lower layoffs and quits among the regular employees, which results in higher job stability.

Trade unions mainly have members belonging to the core workforce, which further supports the existence of an internal dual labor market if this does not lead to the substitution of the core through the marginal work force. This also explains why the local trade union in a company usually accepts such initiatives from the management, although the central trade union opposes them in principle (Atkinson 1987). In Germany, the probability of non-standard contracts increases with the existence of a collective agreement (Kaiser and Pfeiffer 2000). In addition, the ambivalent influence of labor councils is confirmed in empirical studies for Germany (Boockmann and Hagen 2003).

In Russia about 45% of the total numbers of workers employed at enterprises of all forms of ownership are organized in a trade union (Kozina 2007). In Russia, like in other countries, there is a decrease in the share of industrial production personnel due to technological development and innovation. Those kinds of economic activities, in which trade unions were traditionally powerful, became exposed to severe economic competition. All this leads to weakening trade unions' positions (Vennuyten 2004). In addition there are purely Russian features characterizing the position of trade unions. Firstly, the Soviet past left its mark on Russian trade unions. In Russia, trade unions did not become independent organizations able to negotiate better working conditions for employees. Also, Russian trade unions have been extremely slow in gaining awareness of their independent role of a representative of workers' interests.

Secondly, trade unions are somewhat heterogeneous in Russia. At present, there are two types of trade unions at Russian enterprises: the so-called "old" ones, which constitute the majority and act on the principles of the past Soviet life, in fact performing the function of social patronage over workers (Sobolev 2007), and the "new" trade unions, which are relatively small organizations that appeared in response to intensification of contradictions in the labor sphere and try to act within the framework of classical trade unionism (Kozina 2007).

Thirdly, the arrival of transnational corporations (MNC) to the Russian market, followed by the introduction of new management practices, has resulted in a reduction of trade union members at the expense of highly skilled groups of workers and managers, and the role of trade unions in the labor and social program management has diminished. At the same time, it revealed the need to strengthen the protection of workers' rights. The traditional activity of Russian trade unions in distribution of social services and exchange of information with employees, inherited from the Soviet past, has proved inadequate in the new economic situation.

Fourthly, the legislation directs unions to interact with employers at the enterprise level. However, in practice such cooperation appears to be difficult, since the real owner to negotiate with can only be introduced at the level of the company management. This requires the establishment of horizontal and vertical links between professional organizations of different companies that are part of a corporation (holding), which are hampered by regional and sectorial differences in the interests of primary trade unions, and often face resistance from management.

Nevertheless, after the exodus of union members in the years of economic reforms, in recent years there has been growth in trade union membership. Still, trade unions in Russia have not yet become a full-fledged party, equal in strength in the negotiation process. In this regard, they are too weak and fragmented to confront the expansion of non-standard employment contracts offered by management.

*Hypothesis 4: A weak trade union is positively associated with fixed-term contracts.*

## Specific human capital

Investing in firm specific human capital becomes profitable in the long run. Hence, if the contract of employees ends after a relative short period, there is little incentive for firms to invest in the firm specific human capital of these employees. Therefore, an increasing share of fixed-term contracts force should go in line with decreasing investments in firm specific human capital (Arulampalam et al. 2004, Booth et al. 2002). Moreover, firms offering further training tend to make use of regular contracts rather than temporary employment (Shire et al. 2009; Albert et al. 2005). They find that firms, that do not provide vocational training, have higher shares of temporary work compared to firms offering further training. Their results also show, that firms providing on the job training discriminate against employees with temporary contracts. Consequently, an increasing share of employees with temporary contracts is reducing labor productivity due to lower investments in firm specific human capital.

Firms need to ensure that they have sufficient, knowledgeable staff to carry out the core operations of the firm and ensure its survival. Thus, firms seek the right balance between stability and flexibility in their workforce. Economists have long recognized that firms operate with this consideration in mind. Within a firm there are essentially two labor markets, a primary, or internal, market consisting of jobs that are well-paid, stable and with advancement opportunities and a secondary, or external, market, which is lower-paid, lower-skilled and with fewer opportunities for training and advancement (Doeringer and Piore 1971).

Dualism can arise along the permanent-temporary workers divide endogenously within a firm as a response to demand fluctuations (Saint-Paul 1996). As adjusting labor to demand fluctuations is costly, firms will have an incentive to differentiate contract forms between qualified workers, who are difficult to replace and unqualified workers, who are easy to replace.

Since 1994 in Russia, the duration of employment relationships in the same place of work (accumulation of specific human capital) has substantially declined. Since the late '90s and early 2000s, specific human capital in Russia has had no value (Malzeva 2009). Not only employees have not received any positive return on specific human capital, but they also have faced a kind of "penalty" for their specificity, which reduced their earnings. On average, in 2000-2006 a one-year increase in the duration of the relationship with a current employer led to a decrease in wages of 0.8%.

This happened for several reasons. Firstly, mobility proved more favorable to employees in the context of economic reforms. *Ceteris paribus*, individuals who changed their jobs between 2000 and 2006 gained 14.22% in wages compared to those who continued to work in the same place (Malzeva 2009). Secondly, due to economic globalization and development of the service sector, many business processes have become standardized. They require common competencies, not specific ones. In addition, management practices as outsourcing reduce the scope for internal labor markets, and labor productivity in several occupations does not change when people change companies. When accumulation of specific human capital is reduced, we can expect an increase in the level of demand for fixed-term contracts.

*Hypothesis 5:* The demand for fixed-term contracts increases with falling firm-specific human capital requirements.

## Job Complexity

Technological change and accompanying innovations have an influence on the structure of the workforce. On one side, such innovations can simplify work and downgrade skill requirements. On the other side, innovations can also require higher qualifications (skill-biased technological change), for instance computer and internet literacy. If technical progress is

weakening the position of unskilled (blue collar) workers, then there might be pressure to accept switching to non-standard contracts.

An emerging literature has shifted the focus to trade in tasks rather than trade in physical output (Grossman and Rossi-Hansberg 2008). The authors argue that the traditional view to classify workers as skilled or unskilled fails capturing the complexity of production. Workers should be classified according to the task they perform rather than their level of education. In routine jobs that require low levels of tasks, the demand for knowledgeable workers is limited. And vice versa, fixed-term employment contracts are less likely jobs with high complexity levels. Substitution of regular work contracts through fixed-term work contracts is more likely for low productivity workplaces, for which effort and human capital play a less important role and control costs are usually low.

According to studies of stages of economic growth (Acemoglu et al. 2006; 2007), Russia is classified as a catching-up country (Gorban et al. 2010). The country has an innovative model of the "garage" type (Schumpeter model - 1). It is based on common and available knowledge, and within its framework enterprises prefer to hire workers from outside their business environment, and not to 'grow' them to accumulate the necessary knowledge and skills.

Due to import and adaptation of advanced technologies, big enterprises serve as the main drivers of productivity growth. However, using the technology and the experience of foreign enterprises, their level of innovative activity remains relatively low. In this regard, Russian enterprises still have a high proportion of manual workers (blue-collar employees) performing routine tasks. Many skills to perform these tasks can be applied by employees regardless of their occupations. Such skills and knowledge are gained relatively rapidly, and thus workers can be easily replaced.

*Hypothesis 6:* The presence of blue collar workers increases the demand for workers with fixed-term contracts.

## **METHODS**

### **Sample**

Data used for the present study were obtained from a representative Survey of Enterprises in Russia (RES) in 2009-11. The sample was created on two criteria: firm size and type of sectors. Data were formed according to the results of interviews with managers of enterprises.

The sample included 3313 enterprises with more than 50 employees operating in seven branches of the economy, including mining, manufacturing, construction, transport and communication, trade, finances and business services. The sample is not a panel, and each year it consists of different enterprises. The questionnaires for a year repeat almost 90% of the questions in the preceding years.

The data base obtained includes both current and retrospective information covering enterprises' main characteristics, which are subdivided into four groups. The first group includes factors characterizing the employment structure, and its demographic composition. The second includes factors showing enterprises' strategic behavior (innovations and investments, organizational characteristics), their personnel policy (recruiting and dismissal share, vacancies, employees training, and employees leave without payment, part time employment, and reduction of wages). The third group includes factors of enterprise characteristics (enterprise age, ownership status, size, industrial sector and region). And finally, the fourth group includes factors of enterprise's external appraisal of the present economic and institutional situation (changes over time, labor legislation appraisal, assessments of factors creating obstacles and threats for enterprise activity). The Enterprise Survey was specifically designed for research about the use of fixed-term contracts by enterprises.

## Measures

In this paper we analyze two types of non-standard labor contracts as dependent variables: i) general fixed-term contracts including all types of fixed-term contracts signed by an enterprise with an employee for a specified period of time; and ii) agency work contracts, *i.e.* when a labor contract for a specified period of time is signed by an employee and employment agency (a company supplying manpower to enterprises for a specified period of time).

Our examination of the use of fixed-term and agency work contracts looks at both incidence and intensity of use (Houseman 2001; Olsen and Kalleberg 2004). First we asked whether respondents used fixed-term (direct-hire or agency) workers. Second, we asked what percentage of the work force was covered by each type of contracts. Based on the responses to these questions, we constructed measures to reflect the incidence of use - whether or not these non-standard work arrangements were in use at all - and intensity of use - the extent to which they were being used.

Two categories of independent variables are included in our analysis: institutional characteristics and organizational characteristics. To evaluate institutional characteristics, we included *dismissal protection level* (stringency of law enforcement), with the value of 10 assigned to maximum level of perceived dismissal protection for permanent workers, and 1 as minimum level. We estimate also the extent *wage flexibility* as institutional characteristic. The wage flexibility was defined as a combination of wage arrears and performance-based pay. The enterprises use flexible wages (wage flexibility = 1), if it has either wage arrears or uses performance-based pay. Pressures on enterprises from institutional constituents to use the fixed-term and agency contracts were also measured by *state ownership* and *trade union presence*. We operationalized *state ownership* using a dummy variable indicating whether the enterprise was predominately (>50%) owned by a state institution (coded as 1). *Trade Union* presence measured whether a union was present in the enterprise (coded as 1).

We created two sets of indicator variables to measure organizational characteristics: (1) whether the *average tenure of workers was 5-10 years* (coded 1) and whether it was *more than 15 years* (coded 1); and (2) whether *job complexity* in the enterprise characterizes the execution of tasks through the use of blue-collar workers (coded 1 if the enterprise has blue color workers, 0 - have only other workers).

## Control variables

We included an array of control variables in the analyses based on previous research (Shire et al. 2009). Because larger organizations have more resources than smaller ones to create internal labor markets (Davis-Blake and Uzzi 1993), we measured size as a log transformation of the number of workers at an enterprise. A larger size can allow firms to adjust to varying demand by internal reorganization, including training of new employees, over a larger base (Knoke and Kalleberg 1994).

We also controlled for other enterprise characteristics that previous research investigated, including: the enterprises age (age groups), sectors and years (Houseman, 2001; Kalleberg and Reynolds 2000; Uzzi and Barsness 1998). The vector of control variables includes 9 age groups of enterprises (1: <=1 year; 9: >40 years) and seven industry dummies (mining, manufacturing, construction, transport and communication, trade, finances, business services).

The enterprises in sectors with highly volatile demand are more likely to recur to fixed-term work (Cappelli and Keller 2013). Aggregated influences (e.g. macroeconomic conditions) are taken into account with dummy variables for the years 2009-2011.

We controlled also the geographical location of an enterprise (1 = city with a population over 1 million; 4 = city with a population less than 100 thousand). The enterprises in urban

areas are more likely to use non-standard labor contracts mainly because the supply of such workers is higher and costs are lower (Abraham and Taylor, 1996).

Differences in the employment structure of enterprises are taken into account by the variable: share of female workers in total employment.

In assessing the incidence of fixed-term and agency contracts use, we analyze the data using Probit regressions, the recommended analytical approach for estimating models with dichotomous dependent variables. In evaluating the intensity of use of fixed-term and agency work contracts, we employed left-censored Tobit analysis, because our two dependent variables are left-censored at zero (Maddala 1992). We estimated the incidence and extent of use models for separate contracts (fixed-term and agency).

## RESULTS

### Descriptive Findings

Tables A.1 and A.2 in the Appendix present descriptive statistical information about the variables used for the analysis. Table A.3 shows the correlation matrix for dependent and independent variables.

On average 30% of enterprises used fixed-term contracts in 2009-11 (Table A.1). The share of enterprises with fixed-term contracts increased between 2009 (20%) and 2010 (38%), and fell again in 2011 (31%) (Table A.2). In comparison, about 40% of enterprises throughout the world employ temporary workers (Aleksynska and Berg 2015).

Enterprises in Russia found fixed-term labor contracts more attractive than agency work (difference of 27 percentage points). Thus the share of enterprises using agency work contracts were much lower (3%) than the share of enterprises with fixed-term labor contracts in the total number of enterprises (Table A.1). In comparison, in Germany about as many (3%) enterprises use agency work, but far fewer enterprises (17%) use fixed-term contracts (Hohendanner and Gerner, 2010).

Together with the increasing number of enterprises using non-standard labor contracts, the number of employees recruited under the conditions of these contracts was growing as well. In 2009-11, the percentage of employees working on the basis of fixed-term contracts of the total number of employees increased from 5% to about 6% (Table A.2). In comparison, the average share of temporary workers in developing countries is 11% (Aleksynska and Berg 2015).

The share of agency workers was falling from 0.5% (2009) to 0.2 % (2010) and then it grew again to the level of 0.4% (2011) (Table A.2). In Germany, about 2 % of all employees in 2008 were agency workers (Spermann 2011). The difference with the much lower Russian agency work shares is most likely related to the regulatory difference concerning work agencies. In Germany the Hartz-Reforms established a robust legal framework for agency work (Hüfner et al. 2012), whereas in Russia agency work is still situated at the border of informal work arrangements (Gimpelson and Kapeliushikov 2006).

The intensity of using non-standard labor contracts is characterized by the proportion of employees in enterprises which use such contracts. In 2009-11 the average percentage of employees working under the conditions of fixed- terms at enterprises using fixed-term labor contracts, was equal to 19% of the total number of employees. In comparison, among those enterprises that employ temporary workers, the average share is 27.5% (Aleksynska and Berg 2015).

The intensity of use of fixed-term contracts was highest in 2009 (24.61%). Then (2010) the enterprises with fixed-term contracts have reduced the number of employees with such contracts (14.01%). However, with the economic recovery (2011) the number of employees with fixed-term contracts in enterprises has increased (20.29%) (Table A.2).

Enterprises using agency work contracts had 13% of employees of the general staff number working on the basis of these contracts.

The intensity of use of agency workers at the enterprises with agency work contracts was maximal in 2009 (21.55%). In 2010, the number of agency workers (6.23%) has decreased significantly. And in 2011 their number (14.09%) increased again (Table A.2). In the immediate recovery after crisis in 2011 enterprises preferred to expand their labor force with fixed-term and agency work contracts.

Of the enterprises, 8% were owned by the State, and unions were present in 18% of the sample. On average, 23% of enterprises used wage flexibility and they evaluated dismissal protection at an average of 3.5 (max=10) (Table A.1). The mean number of workers with tenure from 5-10 years was 27% and number of workers with tenure more than 15 years only 7%. The proportion of enterprises with blue color workers in the sample was 42%, and of female workers 34% (Table A.1).

Half of the enterprises in the sample (50%) were up to 10 years old. The number of enterprises over the age of 40 years accounted 15% in the sample. More than half of enterprises (58%) are located in cities with a population over 1 million. 20% of enterprises are located in cities with a population of between 500000 and 1 million people (Table A.1).

Most enterprises in the sample belong to the industry sector (26%), on the second and third place are enterprises of trade (16%) and construction (15%), and the fourth and fifth place is occupied by enterprises of transport and communication (13%) and finance (13%) (Table A.1).

## **Empirical Results of Hypotheses Testing**

The results of the pooled sample Probit and Tobit models together with their marginal effects are presented in Table 1. Appendix tables A.4-A.5 also contain detailed estimation where each of the variables is included one-by-one. While Models 1 to 5 in Table A.4–A.5 include a test of the independent effect of the hypothesized predictor, Model 6 shows the results of the full model.

The estimation results provide strong support for the first four hypotheses. Specifically, state-owned and unionized enterprises are respectively associated with 6% and 10% more fixed-term contracts than non-state-owned and non-unionized enterprises (Model 2 and 3; Table A. 4). But these effects remained significant and positive only for the unionized enterprises in the full model (Model 6; Table A.4, Table 1). The correlation between the shares of fixed-term contracts in total employment is estimated with a pooled sample Tobit model (Table A.5, Table 1). The results show that in state-owned and unionized enterprises not only the probability of using fixed-term contract increases but also the intensity of its use. Both effects are significant in the full model (Table 1).

The relation between the utilization of fixed-term contracts and the presence of trade unions is also linked with enterprise size. Large-scale enterprises have more often powerful trade unions. Fixed-term labor contracts provided a possibility for trade unions to protect incumbent employees (and more likely their members) from dismissal. Thus the subdivision of employees into insiders (with open-ended contracts) and outsiders (with fixed-term contracts) was in complete correspondence with trade unions policy to protect their members. Our estimates find that the incidence and intensity of fixed-term labor contract at large-scale enterprises (Table A.4-A.5) and enterprises with trade unions are rather high (Table 1).

An increase of the level of perceived dismissal protection for permanent workers leads to a higher probability that enterprise uses fixed-term contracts. In particular, a one-unit increase in the level of perceived dismissal protection for permanent workers is associated with 6% more fixed-term contracts in Model 1 (Table A.4) and also 6% in Model 6 (Table A.4,

Table 1). Also, an increase in the level of perceived dismissal protection of open-ended contracts leads to an increase in intensity to use the fixed-term contracts (Table A.5, Table 1).

In addition, the presence of wage flexibility is significantly negatively correlated with the probability and intensity of using fixed-term contracts (Table 1). Such enterprises are 17% less likely to use fixed-term contracts than non-wage-flexibility enterprises. In enterprises with wage flexibility the share of workers with fixed-term contracts is by about 4% lower than in enterprises that do not have a flexible wage (Table 1).

These results give support to the Hypotheses 1-4 that enterprises in Russia use of fixed-term contracts under the influence of institutional factors.

The estimation results for the organization factors (tenure and share of blue color workers) are presented also in Tables A.4-A.5 and Table 1. When testing the Hypothesis 5, we proceeded from the fact that the average tenure of employees is a proxy for the accumulation of firm specific human capital. Our results show that the influence of tenure on the use and share of fixed-term contracts is mostly significant only for enterprises with an average tenure between 5 and 10 years. For these enterprises the expected negative sign is confirmed (Model 4; Table A.4-A.5). These effects also remain significant and negative in the full model (Table 1). The share of workers with tenure of more than 15 years is significantly positively correlated with the probability of using fixed-term contracts (Model 4; Table A.4-A.5) but it is not significant in the full model (Table 1). This finding might indicate the complexity of internal labor markets in Russia. For example, hiring and training costs are often larger for skilled workers so that fixed-term contracts using skilled workers are less attractive. Furthermore, skilled workers cannot be replaced easily by temporary workers with lower levels of human capital. From a labor supply perspective skilled workers have better overall employment chances (e.g., lower unemployment), which should lead to lower acceptance of fixed-term contracts among skilled workers (Pfeifer, 2005).

Our results are consistent with previous results on the impact of investments in specific human capital on the Russian labor market (Malzeva, 2009). We find also that enterprises differently evaluate investments in specific human capital. If the tenure of workers exceeds 15 years (tenure>15 years), the probability and intensity of fixed-term contracts are increasing. These workers have accumulated specific human capital in Soviet times, and they face little demand from enterprises. However, if the level of investments in specific human capital is less than 10 years (tenure<=10 years), the enterprises often have open-ended contracts with workers and are less likely to have workers with fixed-term employment contracts. Enterprises evaluate human capital higher if it is accumulated in the post-Soviet era (Malzeva, 2009).

*Table 1. Incidence and intensity of fixed-term contracts*

Variables	Incidence of fixed-term contracts (Probit model)		Intensity of fixed-term contracts (Tobit model)	
	dy/dx	Std. Err.	dy/dx	Std. Err.
<i>Institutional Characteristics</i>				
Dismissal protection level (max=10)	0,06**	0,03	1,68**	0,79
Wage flexibility (1= yes)	-0,17***	0,02	-4,10***	0,58
Union Presence (1= yes)	0,08***	0,02	1,21**	0,58
State ownership (1= yes)	0,04	0,03	1,45*	0,76
<i>Organizational Characteristics</i>				
Workers with tenure from 5 to 10 years (1=yes)	-0,07**	0,03	-2,43**	0,91
Workers with tenure >15 years	0,06	0,05	0,77	1,40

(1= yes)				
Blue color workers in Teams (1= yes)	0,11***	0,03	3,15***	0,73
N <sup>a</sup>	3296		3296	

Note: Levels of significance: \* - 0.10%; \*\* - 0.05%; \*\*\* - 0.01%.

<sup>a</sup> After eliminating outliers the sample size is 3296 observations.

Not only the qualification of workers, but also the quality of jobs has an impact on the use of fixed-term contracts. The lower the technology level, the lower the skill level that is needed for jobs in the enterprises. The greater the share of manual works in teams, the higher the proportion of blue color workers in enterprises. Such workers are easier to find in the external labor market. They are easier to replace. Therefore, blue color workers are more likely employed with fixed-term contracts than workers who perform more complex work and have open-ended contracts. Our findings show, that an enterprise with blue color workers is more likely to use fixed-term contracts; this is in line with Hypothesis 5 (Model 5; Table A.4-A.5). The share of enterprises with blue collar workers increases the incidence and intensity of the use of fixed-term contracts, which confirms the Hypothesis 6.

Most of the control variables were significant in Probit and Tobit models (Table A.4–A.5). Fixed-term contracts are more often used by medium and large-scale enterprises (more than 500 people). The development of market infrastructure, in particular the development of employment service suppliers (search of employees, selection, training, and manpower records management, etc.), is correlated with the probability of using fixed-term contracts. An insufficient development of such market services, including labor market services, observed in remote regions far from the Centre and in small and medium sized cities (with the population of less than 1 million people) positively affected the utilization of fixed-term contracts by enterprises.

Enterprises with a large share of female workers tend to use more often fixed-term contracts, as female workers have a higher rate of temporary absence, which usually is filled with non-standard work contracts (Table A.4). However, the share of female workers has no significant effect on the intensity of fixed-term contracts (Table A.5). The age of enterprises has a positive effect only on the probability of the use of fixed-term contracts. Enterprises with an age from 25 to 30 years more often use fixed-term contracts than other enterprises (Table A.4). But the age of enterprises has no effect on the intensity of the use of fixed-term contracts (Table A.5). Fixed-term contracts are used more often and in greater numbers in construction enterprises than in the mining industry. Less incidence and intensity of fixed-term contracts were observed in trade and finance, compared with mining industry (Table A.4–A.5).

Previous research suggested that institutional and organizational characteristics may have differing effects on different types of non-standard work (e.g., Davis-Blake and Uzzi 1993; Kalleberg 2000; Houseman 2001). Therefore, we tested whether the effects of institutional and organizational factors remain significant for the use of agency work contracts. Results indicate consistent support only for Hypothesis 2; Hypotheses 1,3,4,5, and 6 are not supported for agency work (Table A.6-A.7).

The effect of wage flexibility is significant for the use fixed-term contracts (Table A.4-A.5) and also for the use of agency work contracts (Table A.6-A.7). Enterprises with wage flexibility less likely use agency work contracts than enterprises without wage flexibility. There are fewer workers with agency work contracts in enterprises with wage flexibility.

Enterprise size has a significant influence on the use of agency work contracts (models of all specifications; Table A.6–A.7). Large enterprises use more often not only fixed-term contracts but also agency work contracts, compared with medium and small enterprises. In large enterprises there are more workers in the work force with non-standard employment contracts (fixed-term and agency work contracts) than in other enterprises (medium and small).



Fixed-term contracts are used more frequently in construction (compared with the mining). Agency work contracts often are more often used in trade, transport and communication and in industry (compared with mining).

For robustness checks, we have carried out calculations separately for each year. We assumed that enterprise demand for agency workers in Russia is unstable and changes over time. One reason for this is that institutional regulations on agency work in Russia are at the early stages of formation. Another reason is dependence of the demand for agency workers on the business cycle (de Graaf-Zijl and Berkhout 2007; Jahn and Bentzen 2010).

Our results show that a high level of perceived dismissal protection for permanent workers in 2010 had a positive correlation, and in 2011 a negative one with the probability of use and the number of agency workers. In 2010, there was a decrease in economic demand, which enterprises had to adapt to. At this time, a high level of perceived dismissal protection for permanent workers went together with increased precarious employment, in particular, often using agency workers.

In 2011 a gradual economic recovery started with a growing demand for agency workers at enterprises. However, during the period of economic recovery the least number of agency workers were hired at the enterprises with a high level of perceived dismissal protection for permanent workers. These results are consistent with economic theory that in times of crisis enterprises with a high level of perceived dismissal protection for permanent workers lay off fewer workers, and at the same time, in recovery periods they hire fewer of them (Shaw and Lazear 2008). Based on our results we can add that during periods of economic downturn enterprises with a high level of perceived dismissal protection for permanent workers have a high demand for agency labor contracts, and, on the contrary, in periods of economic recovery, their demand was low. During the recovery of the Russian economy in 2011 such enterprises not only had a low likelihood of use, but also a low number of agency workers (Table A.8-A.9).

During 2009-2011, in enterprises with flexible wages the demand for agency workers was lower. Yet, a significantly negative correlation was registered only for 2011. The results obtained have also demonstrated that during the crisis (2010) and the economic recovery (2011), large enterprises were more likely to hire agency workers and a larger number of them than small and medium enterprises. In 2009, the share of blue color workers reduced the likelihood of use, and trade union availability increased the number of employees working under agency labor contracts. However, these results were not confirmed for other years.

Since hypotheses about the impact of organizational and some institutional factors on the use of agency work contracts were not supported, we can assume that they are not important for agency work contracts. Perhaps the use of agency work contracts in Russia depends on other, most likely regulatory, factors.

## CONCLUSION

Non-standard labor contracts started to be widely used in Russia since the reform period of the 1990s. They include different types of fixed-term contracts and agency labor. In Soviet times the application of fixed-term contracts was limited by the Russian Federation Labor Code and the nature of labor relations was specified by employees' assignment to their workplaces with minimal use of outside auxiliary workers. Under the influence of reforms the activity of enterprises in Russia became exposed to demand fluctuations and business cycles, increasing the number of temporary workplaces. In 2009-11 on average 30% of enterprises used fixed-term contracts; the percentage of employees working on the basis of fixed-term contracts in the total number of employees was about 6%.

International corporations boosted the development of agency labor. Agency work was not specified in Russian Labor Legislation, but it was subject to Russian Civil and Tax Codes.

Its range was constantly expanding. In 2009-2011 in Russia about as many as 3% of enterprises used agency work; about 0.40 % of all employees were agency workers.

As a result, after 2000 the magnitude of non-standard labor contracts at enterprises in Russia became similar to other countries.

Using enterprises-level survey data, we find that a high level of perceived dismissal protection for permanent workers, state ownership (over 50%) and trade union presence are positively associated with the increased use fixed-term contracts (Hypotheses 1, 3, 4).

Pressure of the listed institutional factors makes enterprises adapt to market conditions and business cycles through increased use of fixed-term contracts. However, this is not the case for agency work contracts. The results obtained show that it was only in times of economic crisis (2009-2010) that the probability of the use of agency workers was high at enterprises with a high level of perceived dismissal protection for permanent workers. During the period of economic recovery, enterprises employed a low number of workers under agency work contracts (Hypotheses 1).

The probability to use fixed-term contracts is lower at enterprises with wage flexibility (Hypothesis 2). They display a lower concentration of employees with fixed-term contracts than enterprises, which not use wage flexibility. Wage flexibility includes wage arrears and performance-based pay. Our results suggest that wage flexibility is an alternative strategy of coping with external shocks. In this respect wage flexibility and using non-standard labor contracts are substitutes.

The impact of organizational factors is confirmed only for fixed-term contracts. On the one hand, in the face of market-based competition for a skilled and stable labor force, employers in Russia use tactics to promote long-term employment. Enterprises use less fixed-term contracts, if they have workers with tenure of more than 5 and less than 10 years (Hypothesis 5).

On the other hand, to gain competitive advantages enterprises search for ways to reduce costs. All risks of cost reduction are borne by workers who perform less skilled (fewer complex interactions between workers and production processes) functions, who can be easily found in the labor market and replaced without any additional training. Such employees are often blue color workers. The results we have obtained demonstrate that enterprises with blue color workers are more likely to use fixed-term contracts, and at a larger scale (Hypothesis 6). It is highly probable that at the enterprise level a peripheral labor market is formed mainly due to blue color workers, since the accumulation of firm-specific human capital is less likely for enterprises with blue color workers.

Our results show also, that large-scale enterprises more often use both types of non-standard contracts. They display also a higher intensity of employees with non-standard contracts than medium and small enterprises. The highest level of fixed-term contracts incidence and intensity is observed in construction. The incidence and intensity of agency work contracts are highest in trade.

The use of fixed-term and agency work contracts makes the Russian labor market more flexible. Non-standard labor contracts reduce job stability and they make employment precarious. All risks of labor flexibility are borne by workers with a non-standard contract. As our research has shown, the expansion of state ownership (an increase in the number of state-owned enterprises), and the influence of trade unions in Russia do not limit the use of fixed-term contracts. On the contrary, in market conditions state ownership and trade unions make enterprises use fixed-term contracts more widely.

At the enterprise level, the likelihood of using fixed-term contracts is falling due to the influence of organizational factors. Investment in firm-specific human capital, higher job complexity leads to a reduction in fixed-term contracts. Increasing the level of professional skills and investing firm-specific human capital can secure employees against fixed-term contracts.

Further research could shed some light on how greater labor flexibility associated with non-standard labor contracts affects hiring and job creation, as well as innovation and productivity of enterprises in Russia.

## REFERENCES

- Earle, John S., and Saul Estrin. 2003. Privatization, Competition, and Budget Constraints: Disciplining Enterprises in Russia. *Economics of Planning* 36(1): 1–22.
- Earle, John S., and Klara Sabirianova Peter. 2004. Contract Violations, Neighborhood Effects, and Wage Arrears in Russia. William Davidson Institute Working Paper, No 708.
- Faccini, Renato. 2014. Reassessing labour market reforms: temporary contracts as a screening device. *The Economic Journal* 124(575): 167-200.
- Gimpelson, Vladimir, and Rostislav Kapeliushnikov. 2006. Non-standard employment in the Russian economy. The Publishing House of NRU HSE, Moscow.
- Credit Suisse AG. Research Institute. 2013. *Global Wealth Report*.
- Gorban, Maria, Sergei Guriev, Kostroma L., Feduykin I., Shapochka E. 2010. Innovative activity of big business in Russia: mechanisms, barriers, perspectives. *Russian Journal of management* 8(4): 81–112.
- Grossman, Gene M., and Esteban Rossi-Hansberg. 2008. Trading Tasks: A Simple Theory of Offshoring. *American Economic Review* 98(5): 1978-1997.
- Hagen, Tobias. 2002. Do Temporary Workers Receive Risk Premiums? Assessing the Wage Effects of Fixed-Term Contracts in West Germany by a Matching Estimator Compared with Parametric Approaches. *Labour* 16(4) 667-705.
- Hagen, Tobias. 2003. Do Fixed-Term Contracts Increase the Long-Term Employment Opportunities of the Unemployed? ZEW Discussion Paper No 03-49, Mannheim.
- Hevenstone, Debra. 2010. National Context and Atypical Employment. *International Sociology* 25(3): 315–347.
- Hohendanner, Christian, and Hans-Dieter Gerner. 2010. Die Übernahme befristet Beschäftigter im Kontext betrieblicher Personalpolitik. *Soziale Welt* 61(1): 27-50.
- Hohendanner, Christian. 2010. Befristete Arbeitsverträge Zwischen Auf-und Abschwung. Unsichere Zeiten, Unsichere Verträge? *IAB-Kurzbericht* 14/2010, Nürnberg: Institut für Arbeitsmarkt-und Berufsforschung.
- Houseman, Susan N. 2001. Why employers use flexible staffing arrangements: Evidence from an establishment survey. *Industrial and Labor Relations Review* 55(1): 149-170.
- Hüfner, Felix, Caroline Klein, and Andreas Wörgötter. 2012. The German labor market in the great recession - lessons for other countries. In J. Colombano and A. Shaw (Eds.), *Learning from the World: New Ideas to Redevelop America*. New York: Palgrave Macmillan.
- Jahn, Elke J., and Jan Bentzen. 2010. What Drives the Demand for Temporary Agency Workers? IZA Discussion Paper No. 5333, November. Bonn: IZA.
- Jahn, Elke J. 2010. Reassessing the wage penalty for temps in Germany. *Jahrbücher für Nationalökonomie und Statistik - Journal of Economics and Statistics* 230(2): 208-233.
- Kahn, Laurence M. 2010. Employment Protection Reforms, Employment and the Incidence of Temporary Jobs in Europe: 1996-2001, *Labour Economics* 17(1): 1–15.
- Kahn, Laurence M. 2007. The Impact of Employment Protection Mandates on Demographic Temporary Employment Patterns: International Microeconomic Evidence. *Economic Journal* 117(521): 333–356.
- Kaiser, Ulrich, and Friedhelm Pfeiffer. 2000. Collective wage agreements and the adjustment of workers and hours in German service firms, Mannheim: Centre for European Economic Research (ZEW), Discussion Paper, No 00-33.
- Kalleberg, Arne. L., and Jeremy Reynolds. 2000. Organization size and flexible staffing arrangements in the United States. In F. Carré, M. A. Ferber, L. Golden, & S. A. Herzenberg (Eds.), *Nonstandard work: The nature and challenges of changing employment arrangements*: 145-165. Champaign, IL: Industrial Relations Research Association.

- Kalleberg, Arne L. 2000. Nonstandard Employment Relations: Part-Time, Temporary, and Contract Work. *Annual Review of Sociology* 26: 341–65.
- Kalleberg, Arne L. 2001. Organizing flexibility: the flexible firm in a new century. *British Journal of Industrial Relations* 39(4): 479-504.
- Kapeliushnikov, Rostislav. 2007. Mechanisms of wage formation in the Russian industry. In Vladimir Gimpelson and Rostislav Kapeliushnikov (eds), *Wages in Russia: Evolution and Differentiation*. Moscow, NRU HSE.
- Kapeliushnikov, Rostislav. 1998. Excessive employment of workers in the Russian industry: sources problems and solutions. *Problems of Forecasting* 6: 23-31.
- Keller, Berndt, and Hartmut Seifert. 2007. Atypische Beschäftigungsverhältnisse. In Berndt Keller and Hartmut Seifert (Eds.), *Atypische Beschäftigung – Flexibilisierung und soziale Risiken*: 11-26. Berlin: Hans Böckler Stiftung.
- Knoke, David, and Arne L. Kalleberg. 1994. Job training in U.S. Organizations. *American Sociological Review* 59(4): 537-546.
- Kornai, Janos. 1979. Resource-constrained versus demand-constrained systems. *Econometrica* 47(4): 801-819.
- Kozina, Irina M. 2007. The post-Soviet unions. *Notes of the Fatherland* 37 (4): 94-108.
- Kugler, Maurice, and Eric Verhoogen. 2012. Prices, Plant Size, and Product Quality. *Review of Economic Studies* 79 (1): 307–339.
- Lazear, Edward P. 1990. Job Security Provisions and Employment. *The Quarterly Journal of Economics* 105(3): 699–726.
- Lindbeck, Assar, and Dennis J. Snower. 2001. Insiders versus Outsiders. *The Journal of Economic Perspectives* 15(1): 165–188.
- Liu, Xiangmin. 2015. How institutional and organizational characteristics explain the growth of contingent work in China. *ILR Review* 68(2): 372–97.
- Maddala, G S. 1992. *Introduction to econometrics (2nd ed.)*. New York: MacMillan.
- Malzeva, Inna Olegovna. 2009. Labor mobility and stability: how high return on specific human capital in Russia? *The HSE Economic Journal* (2): 243–278.
- Mayer, Kyle J., and Jack A. Nickerson. 2005. Antecedents and performance implications of contracting for knowledge workers: Evidence from information technology services. *Organization Science* 16(3): 225-242.
- Mortensen, Dale, and Christopher Pissarides. 1999. Job Reallocation, Employment Fluctuations, and Unemployment. In John B. Taylor and Michael Woodford (Eds.), *Handbook of Macroeconomics*. Amsterdam: Elsevier.
- Nickell, Stephen. 1997. Unemployment and Labor Market Rigidities: Europe versus North America. *The Journal of Economic Perspectives* 11(3): 55–74.
- Nollen, Stanley D., and Helen Axel. 1996. *Managing Contingent Workers: How to reap the benefits and reduce the risks*, New York: American Management Association.
- OECD. 2004. *OECD Employment Outlook*. Paris: OECD Publishing.
- OECD. 2009. *OECD Economic Surveys: Russian Federation 2009*. Paris: OECD Publishing.
- OECD. 2011. *OECD Reviews of Labour Market and Social Policies: Russian Federation 2011*. Paris: OECD Publishing.
- Oi, Walter Y. 1962. Labour as a quasi-fixed factor. *The Journal of Political Economy* 70(6): 538-555.
- Olsen, Karen M., and Arne L. Kalleberg. 2004. Non-standard work in two different employment regimes: Norway and the United States. *Work, Employment and Society* 18(2): 321–348.

Osterman, Paul S. 1994. Internal Labor Markets: Theory and Change. In Clark Kerr and Paul D. Staudohar (Eds.), *Labor Economics and Industrial Relations: Markets and Institutions*: 303-339. Cambridge, Massachusetts: Harvard University Press.

Pfeifer, Christian. 2005. Flexibility, dual labour markets, and temporary employment – Empirical evidence from German establishment data. *Management Revue* 16(3): 404-422.

Polavieja, Javier G. 2006. The incidence of temporary employment in advanced economies: Why is Spain different? *European Sociological Review* 22(1): 61-78.

Saint-Paul, Gilles. 1996. *Dual Labor Markets: A Macroeconomic Perspective*. Cambridge, MA: The MIT Press.

Shaw, Kathryn, and Edward P. Lazear. 2008. Tenure and output. *Labor Economics* 15(4): 704-723.

Shire, Karen A., Hannelore Mottweiler, Annika Schönauer, and Mireia Valverde. 2009. Temporary work in coordinated market economies: Evidence from front-line service workplaces. *Industrial and Labor Relations Review* 62(4): 602-17.

Siebert, Horst. 1997. Labor Market Rigidities: At the Root of Unemployment in Europe. *The Journal of Economic Perspectives* 11(3): 37-54.

Smirnykh, Larisa. 2015. Innovations at Russian enterprises: is there any impact of fixed-term contracts? Working paper WP15/2015/04. Moscow: Publishing House of the Higher School of Economics.

Sobolev, Eduard. 2007. *Socio-labor relations in the Russian economy: conflict of interest or search for agreement*. Moscow: Institute of Economics, Russian Academy of Sciences.

Spermann, Alexander. 2011. The New Role of Temporary Agency Work in Germany. IZA Discussion Paper, No. 6180. Bonn: IZA.

The Labour Code of the Russian Federation. 2001. Federal Law of December 30, № 197-FL.

Ton, Zeynep. 2014. *The Good Jobs Strategy: How the smartest companies invest in employees to lower costs and boost profits*, Seattle, WA: Lake Union Publishing.

Uzzi, Brian, and Zoe I. Barsness. 1998. Contingent Employment in British Establishments: Organizational Determinants of the Use of Fixed-Term Hires and Part-Time Workers. *Social Forces* 76(3): 967-1005.

Van Jaarsveld, Danielle, Hyunji Kwon, and Ann Frost. 2009. The Effects of Institutional and Organizational Characteristics on Work Force Flexibility: Evidence from Call Centers in three Liberal Market Economies. *Industrial and Labor Relations Review* 62(4): 573-601.

Verhoogen, Eric A. 2008. Trade, Quality Upgrading, and Wage Inequality in the Mexican Manufacturing Sector. *The Quarterly Journal of Economics* 123(2): 489-530.

Yeaple, Stephen R. 2005. A simple model of firm heterogeneity, international trade, and wages. *Journal of International Economics* 65(1): 1-20.

## APPENDIX

Table A.1. Descriptive statistics

Variable	Mean	Std. Dev.
Incidence of Use of fixed-term contracts (1=yes)	0,30	0,46
Workers with fixed-term contract, %	5,61	16,15
Incidence of Use of agency work contracts (1=yes)	0,03	0,17
Agency Workers, %	0,40	4,29
Dismissal protection level (max=10)	3,46	2,89
Wage flexibility (1= yes)	0,23	0,42
Union Presence (1= yes)	0,18	0,38
State ownership (1= yes)	0,08	0,27
Workers with tenure from 5 to 10 years (1=yes)	0,27	0,26
Workers with tenure >15 years (1= yes)	0,07	0,16
Blue color worker Force in Teams (1= yes)	0,42	0,32
Female workers (1=yes)	0,34	0,29
Age, years	19,89	24,85
Age (ln)	2,43	1,09
Age Groups:		
1 - <= 5 years	0,21	0,41
5 - <= 10 years	0,23	0,42
10 - <= 15 years	0,13	0,34
15 - <= 20 years	0,16	0,37
20 - <= 25 years	0,02	0,15
25 - <= 30 years	0,01	0,10
30 - <= 40 years	0,03	0,17
>40 years	0,15	0,36
Size(ln)	4,56	1,51
Locality, Cities with population:		
500 thousand - 1 million	0,20	0,40
100 thousand -500 thousand	0,10	0,30
< 100 thousand	0,12	0,33
Sectors:		
Industry	0,26	0,44
Construction	0,15	0,35
Trade	0,16	0,36
Transport and Communications	0,13	0,34
Finance	0,13	0,33
Business Services	0,06	0,25

Table A.2. Non-standard contracts in 2009-11, %

Types of contracts	Years			
	2009	2010	2011	2009-2011
<i>Firms with fixed-term contracts</i>				
Total	20.23 (40.19)	38.16 (48.60)	31.12 (46.32)	29.79 (45.74)
Share of employees with fixed-term contracts (basis: all enterprises)	4.98 (16.12)	5.35 (14.39)	6.31 (17.37)	5.61 (16.15)
N (all enterprises)	1038	980	1295	3313
Share of employees with fixed-term contracts (basis: enterprises with fixed-term contracts)	24.61 (28.36)	14.01 (20.53)	20.29 (26.21)	18.83 (25.04)
N (enterprises with fixed-term contracts)	210	374	403	987
<i>Firms with agency work contracts</i>				
Total	2.31 (15.03)	3.27 (17.78)	3.32 (17.92)	2.99 (17.02)
Share of employees with agency work contracts (basis: all enterprises)	0.50 (5.22)	0.20 (2.26)	0.48 (4.63)	0.40 (4.29)
N (all enterprises)	1038	980	1295	3313
Share of employees with agency work contracts (basis: enterprises with agency work contracts)	21.55 (27.48)	6.23 (11.09)	14.09 (21.54)	13.36 (21.17)
N (enterprises with agency work contracts)	24	32	43	99

Note: The numbers in brackets are standard deviations



Table A.3. Correlation Matrix

	Variable	1	2	3	4	5	6	7	8	9	10	11
1.	Incidence of Use of fixed-term contracts (1=yes)	1										
2.	Workers with fixed-term contract, %	0,5333*	1									
3.	Incidence of Use of agency work contracts (1=yes)	0,1183*	0,0286	1								
4.	Agency Workers, %	0,0279	0,0175	0,5298*	1							
5.	Dismissal protection level (max=10)	0,0335	0,0056	0,0202	-0,0065	1						
6.	Wage flexibility (1= yes)	-0,1671*	-0,0563	-0,0528	-0,0285	-0,0419	1					
7.	Union Presence (1= yes)	0,1915*	-0,003	0,0424	-0,0017	0,0056	-0,0606*	1				
8.	State ownership (1= yes)	0,1015*	0,0125	0,0003	-0,0095	-0,0131	-0,0594*	0,2321*	1			
9.	Workers with tenure from 5 to 10 years (1=yes)	-0,0694*	-0,0486	-0,0161	-0,0178	0,0701*	0,0256	-0,0417	-0,0171	1		
10.	Workers with tenure >15 years (1= yes)	0,1312*	-0,0038	0,0059	-0,0162	-0,0266	-0,0661*	0,2667*	0,1797*	-0,1537*	1	
11.	Blue color worker Force in Teams (1= yes)	0,1182*	0,0589*	-0,0035	0,0032	0,0101	0,0665*	0,1642*	0,0335	-0,0173	0,1258*	1

Note: Levels of significance: \* - 0.001%.

Table A.4. Incidence of fixed-term contracts (Probit model)

Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	dy/dx	Std. Err.	dy/dx	Std. Err.	dy/dx	Std. Err.	dy/dx	Std. Err.	dy/dx	Std. Err.	dy/dx	Std. Err.
<i>Institutional Characteristics</i>												
Dismissal protection level (max=10)	0,06**	0,03									0,06**	0,03
Wage flexibility (1= yes)	-0,17***	0,02									-0,17***	0,02
Union Presence (1= yes)			0,10***	0,02							0,08***	0,02
State ownership (1= yes)					0,06**	0,03					0,04	0,03
<i>Organizational Characteristics</i>												
Workers with tenure from 5 to 10 years (1=yes)							-0,07**	0,03			-0,07**	0,03
Workers with tenure >15 years (1= yes)							0,11**	0,05			0,06	0,05
Blue color worker Force in Teams (1= yes)									0,10***	0,03	0,11***	0,03
<i>Control Variables</i>												
Female workers (1=yes)	0,06**	0,03	0,07**	0,03	0,07**	0,03	0,07**	0,03	0,08**	0,03	0,06**	0,03
Age Groups:												
1 - <= 5 years	0,07*	0,04	0,08**	0,04	0,08**	0,04	0,09**	0,04	0,08**	0,04	0,08**	0,04
5 - <= 10years	0,05	0,04	0,06	0,04	0,06	0,04	0,08**	0,04	0,06*	0,04	0,07*	0,04
10 - <= 15 years	0,01	0,04	0,02	0,04	0,02	0,04	0,04	0,04	0,02	0,04	0,03	0,04
15 - <= 20 years	0,06	0,04	0,07	0,04	0,07	0,04	0,08**	0,04	0,07*	0,04	0,07*	0,04
20 - <= 25 years	-0,01	0,06	-0,01	0,06	-0,01	0,06	0,01	0,06	0,00	0,06	-0,01	0,06
25 - <= 30 years	0,21**	0,09	0,21**	0,09	0,21**	0,09	0,22**	0,09	0,21**	0,09	0,19**	0,09

30 - <= 40 years	0,09	0,06	0,07	0,06	0,08	0,06	0,10*	0,06	0,10*	0,06	0,07	0,06
>40 years	0,10**	0,04	0,10**	0,04	0,11**	0,04	0,12**	0,04	0,12***	0,04	0,08*	0,04
Size(ln)	0,05***	0,01	0,05***	0,01	0,06***	0,01	0,05***	0,01	0,05***	0,01	0,04***	0,01
Years: (2009=ref.)												
2010	0,09***	0,02	0,07***	0,02	0,08***	0,02	0,07**	0,02	0,08***	0,02	0,09***	0,02
2011	0,03	0,02	0,02	0,02	0,02	0,02	0,01	0,02	0,02	0,02	0,03	0,02
Locality, Cities with population: (>1 million=ref.)												
500 thousand - 1 million	0,06**	0,02	0,07***	0,02	0,07***	0,02	0,06***	0,02	0,07***	0,02	0,05**	0,02
100 thousand -500 thousand	0,03	0,03	0,05*	0,03	0,06**	0,03	0,06**	0,03	0,06**	0,03	0,03	0,03
< 100 thousand	0,09***	0,03	0,10***	0,03	0,10***	0,03	0,11***	0,03	0,11***	0,03	0,08***	0,03
Sectors: (min- ing=ref.)												
Industry	0,01	0,03	0,01	0,03	0,00	0,03	0,01	0,03	0,01	0,03	0,00	0,03
Construction	0,08**	0,03	0,07**	0,03	0,07**	0,03	0,07**	0,03	0,06**	0,03	0,08**	0,03
Trade	-0,07**	0,03	-0,06**	0,03	-0,07**	0,03	-0,07**	0,03	-0,06**	0,03	-0,06**	0,03
Transport and Com- munications	-0,03	0,03	-0,03	0,03	-0,03	0,03	-0,03	0,03	-0,03	0,03	-0,03	0,03
Finance	-0,03	0,03	-0,02	0,03	-0,03	0,03	-0,02	0,03	0,01	0,04	0,00	0,03
Business Services	0,04	0,04	0,04	0,04	0,04	0,04	0,05	0,04	0,08*	0,05	0,06	0,04
Log pseudo likeli- hood	-1823,39		-1855,01		-1861,78		-1860,5		-1858,1		-1798,75	
Wald chi2	337,85***		296,25***		279,47***		283,18***		290,46***		384,43***	
Pseudo R2	0,09		0,08		0,07		0,08		0,08		0,11	
Correctly classified	71,74%		71,77%		71,42%		71,26%		72,04%		72,42%	
Number of observa- tion	3298		3298		3296		3298		3298		3296	

Note: Levels of significance: \* - 0.10%; \*\* - 0.05%; \*\*\* - 0.01%.

Table A.5. Intensity of fixed-term contracts (Tobit model)

Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	dy/dx	Std. Err.	dy/dx	Std. Err.	dy/dx	Std. Err.	dy/dx	Std. Err.	dy/dx	Std. Err.	dy/dx	Std. Err.
<i>Institutional Characteristics</i>												
Dismissal protection level (max=10)	1,63**	0,79									1,68**	0,79
Wage flexibility (1= yes)	-4,02***	0,58									-4,10***	0,58
Union Presence (1= yes)			1,72**	0,57							1,21**	0,58
State ownership (1= yes)					1,67**	0,76					1,45*	0,76
<i>Organizational Characteristics</i>												
Workers with tenure from 5 to 10 years (1=yes)							-2,48**	0,92			-2,43**	0,91
Workers with tenure >15 years (1= yes)							1,69	1,40			0,77	1,40
Blue color worker Force in Teams (1= yes)									2,91***	0,73	3,15***	0,73
<i>Control Variables</i>												
Female workers (1=yes)	0,77	0,84	0,99	0,84	0,99	0,84	1,01	0,84	1,12	0,84	0,71	0,84
Age Groups	yes		yes		yes		yes		yes		yes	
Size(ln)	0,62***	0,18	0,58***	0,18	0,68***	0,18	0,67***	0,18	0,65***	0,18	0,35*	0,18
Years: (2009=ref.)												
2010	2,55***	0,61	2,15***	0,61	2,29***	0,61	1,94***	0,62	2,16***	0,61	2,33***	0,62
2011	1,89***	0,62	1,62***	0,57	1,65***	0,56	1,39**	0,57	1,70***	0,56	1,78***	0,62
Locality, Cities with population: (>1 million=ref.)												
500 thousand - 1 million	0,67	0,56	0,95*	0,56	0,96*	0,56	0,88	0,56	0,92	0,56	0,59	0,56
100 thousand -500 thousand	0,66	0,73	1,12	0,74	1,31*	0,74	1,26*	0,74	1,24*	0,74	0,66	0,73
< 100 thousand	1,63**	0,71	2,03**	0,72	2,06***	0,72	2,12***	0,72	2,07***	0,72	1,56**	0,71

Sectors: (mining=ref.)												
Industry	-0,65	0,76	-0,70	0,77	-0,78	0,77	-0,65	0,77	-0,64	0,76	-0,83	0,76
Construction	2,54**	0,92	2,27**	0,91	2,21**	0,92	2,19**	0,91	2,23***	0,90	2,47**	0,91
Trade	-2,30**	0,87	-2,17**	0,88	-2,26**	0,88	-2,25***	0,87	-2,01**	0,87	-2,13***	0,87
Transport and Communications	-1,17	0,87	-1,21	0,87	-1,39	0,88	-1,25	0,87	-1,13	0,86	-1,39	0,86
Finance	-1,94**	0,94	-1,73*	0,94	-1,83**	0,95	-1,82**	0,94	-0,85	0,99	-1,00	0,98
Business Services	0,94	1,24	1,09	1,26	1,01	1,26	1,16	1,26	2,09	1,31	1,76	1,30
LR chi2(28)	190,9***		140,7***		136,6***		141,8***		147,5***		229,2***	
Log likelihood	-5908,87		-5933,98		-5930,88		-5933,42		-5930,59		-5884,63	
Number of observation	3298		3298		3296		3298		3298		3296	

Note: Levels of significance: \* - 0.10%; \*\* - 0.05%; \*\*\* - 0.01%.

Table A.6. Incidence of agency work contracts (Probit model)

Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	dy/dx	Std. Err.	dy/dx	Std. Err.	dy/dx	Std. Err.	dy/dx	Std. Err.	dy/dx	Std. Err.	dy/dx	Std. Err.
<i>Institutional Characteristics</i>												
Dismissal protection level (max=10)	0,011	0,010	0,012	0,010								
Wage flexibility (1= yes)	-0,023**	0,009	-0,023**	0,009								
Union Presence (1= yes)	0,006	0,008			0,004	0,008						
State ownership (1= yes)	-0,015	0,012					-0,015	0,012				
<i>Organizational Characteristics</i>												
Workers with tenure from 5 to 10 years (1=yes)	-0,008	0,013							-0,009	0,013		
Workers with tenure >15 years (1= yes)	-0,020	0,022							-0,018	0,022		
Blue color worker Force in Teams (1= yes)	-0,007	0,010									-0,008	0,010
<i>Control Variables</i>												
Female workers (1=yes)	-0,007	0,011	-0,007	0,011	-0,006	0,011	-0,006	0,011	-0,006	0,011	-0,006	0,010
Ln(Age)	0,002	0,003	0,000	0,003	0,000	0,003	0,002	0,003	0,002	0,003	0,001	0,003
Size(ln)	0,010***	0,002	0,010***	0,002	0,011***	0,002	0,012** *	0,002	0,011***	0,002	0,011***	0,002
Years: (2009=ref.)												
2010	-0,007	0,009	-0,005	0,009	-0,008	0,009	-0,009	0,009	-0,008	0,009	-0,008	0,009
2011	-0,005	0,009	-0,004	0,009	-0,007	0,009	-0,008	0,009	-0,008	0,009	-0,007	0,009
Locality, Cities with population: (>1 million=ref.)												
500 thousand - 1 million	0,002	0,008	0,002	0,008	0,003	0,008	0,003	0,008	0,003	0,008	0,003	0,008
100 thousand -500 thousand	-0,009	0,009	-0,009	0,009	-0,007	0,010	-0,007	0,010	-0,006	0,010	-0,006	0,010
< 100 thousand	0,004	0,011	0,004	0,011	0,005	0,011	0,006	0,011	0,006	0,011	0,006	0,011

Sectors: (mining=ref.)												
Industry	0,014*	0,008	0,012	0,008	0,012	0,008	0,013*	0,008	0,013*	0,008	0,012	0,008
Construction	0,016	0,010	0,016	0,010	0,014	0,010	0,014	0,010	0,013	0,010	0,014	0,010
Trade	0,033**	0,012	0,034**	0,012	0,035**	0,012	0,035** *	0,012	0,034**	0,012	0,034**	0,012
Transport and Communications	0,022**	0,011	0,021**	0,011	0,021**	0,011	0,023**	0,011	0,021*	0,011	0,021*	0,011
Finance	0,016	0,012	0,020*	0,012	0,021*	0,012	0,020*	0,012	0,019	0,012	0,018	0,012
Business Services	0,018	0,016	0,020	0,017	0,022	0,018	0,023	0,018	0,021	0,017	0,019	0,017
Log pseudo likelihood	-415,159		-417,071		-421,443		-420,602		-421,076		-421,315	
Wald chi2	43,82***		41,27***		34,1***		35,72** *		35,43***		34,11***	
Pseudo R2	0,056		0,051		0,041		0,043		0,042		0,042	
Correctly classified	96,98%		96,98%		96,98%		96,98%		96,98%		96,98%	
Number of observation	3248		3250		3250		3248		3250		3250	

Note: Levels of significance: \* - 0.10%; \*\* - 0.05%; \*\*\* - 0.01%.

Table A.7. Intensity of agency work contracts (Tobit model)

Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	dy/dx	Std. Err.	dy/dx	Std. Err.	dy/dx	Std. Err.	dy/dx	Std. Err.	dy/dx	Std. Err.	dy/dx	Std. Err.
<i>Institutional Characteristics</i>												
Dismissal protection level (max=10)	0,543	0,843	0,581	0,845								
Wage flexibility (1= yes)	-1,658**	0,653	-1,689**	0,655								
Union Presence (1= yes)	0,426	0,575			0,319	0,567						
State ownership (1= yes)	-0,992	0,836					-0,981	0,846				
<i>Organizational Characteristics</i>												
Workers with tenure from 5 to 10 years (1=yes)	-0,738	0,910							-0,842	0,920		
Workers with tenure >15 years (1= yes)	-1,576	1,586							-1,403	1,572		
Blue color worker Force in Teams (1= yes)	-0,236	0,742									-0,343	0,744
<i>Control Variables</i>												
Female workers (1=yes)	-0,534	0,850	-0,525	0,852	-0,457	0,856	-0,452	0,857	-0,459	0,855	-0,453	0,856
Ln(Age)	0,125	0,251	-0,006	0,229	-0,003	0,234	0,073	0,236	0,122	0,246	0,020	0,231
Size(ln)	0,631***	0,181	0,642***	0,175	0,664***	0,181	0,713***	0,179	0,673***	0,177	0,692***	0,178
Years: (2009=ref.)												
2010	-0,682	0,657	-0,544	0,644	-0,666	0,643	-0,734	0,648	-0,732	0,649	-0,653	0,644
2011	-0,437	0,670	-0,360	0,663	-0,472	0,599	-0,517	0,601	-0,528	0,604	-0,482	0,599
Locality, Cities with population: (>1 million=ref.)												
500 thousand - 1 million	0,043	0,562	0,055	0,562	0,119	0,566	0,130	0,566	0,150	0,564	0,141	0,566
100 thousand -500 thousand	-0,124	0,760	-0,080	0,762	0,096	0,774	0,095	0,773	0,128	0,772	0,131	0,774
< 100 thousand	0,086	0,706	0,105	0,705	0,169	0,717	0,220	0,718	0,201	0,714	0,203	0,716



Sectors: (mining=ref.)												
Industry	1,259	0,780	1,160	0,775	1,133	0,782	1,265*	0,785	1,176	0,782	1,160	0,783
Construction	1,646*	0,894	1,653*	0,897	1,531*	0,897	1,562*	0,894	1,467*	0,894	1,531*	0,899
Trade	2,253**	0,923	2,294**	0,924	2,345**	0,934	2,362**	0,930	2,266**	0,929	2,296**	0,936
Transport and Communications	1,582*	0,902	1,533*	0,897	1,539*	0,901	1,673*	0,908	1,532*	0,899	1,545*	0,904
Finance	1,396	1,000	1,563	0,975	1,640*	0,984	1,646*	0,979	1,538	0,980	1,508	1,015
Business Services	1,804	1,281	1,888	1,265	2,007	1,281	2,098*	1,284	1,937	1,278	1,898	1,299
LR chi2(28)	36,310**		32,930**		24,760**		25,940**		25,850**		24,660**	
Log likelihood	-781,726		-783,475		-787,559		-786,911		-787,016		-787,609	
Number of observation	3248		3250		3250		3248		3250		3250	

Note: Levels of significance: \* - 0.10%; \*\* - 0.05%; \*\*\* - 0.01%.

Table A.8. Incidence of agency work contracts in 2009-2011 (Probit model)

Variables	2009		2010		2011	
	dy/dx	Std. Err.	dy/dx	Std. Err.	dy/dx	Std. Err.
<i>Institutional Characteristics</i>						
Dismissal protection level (max=10)	0,009	0,018	0,029**	0,014	-0,108**	0,040
Wage flexibility (1= yes)	-0,008	0,012	-0,019	0,014	-0,041**	0,019
Union Presence (1= yes)	0,025	0,016	-0,008	0,015	0,004	0,012
State ownership (1= yes)	-0,008	0,021	-0,027	0,025	-0,017	0,018
<i>Organizational Characteristics</i>						
Workers with tenure from 5 to 10 years (1=yes)	-0,003	0,014	0,025	0,033	-0,028	0,028
Workers with tenure >15 years (1= yes)	-0,051	0,042	0,013	0,035	-0,026	0,040
Blue color worker Force in Teams (1= yes)	-0,026**	0,014	0,025	0,021	-0,011	0,019
<i>Control Variables</i>						
Female workers (1=yes)	-0,016	0,016	0,002	0,021	-0,003	0,016
Ln(Age)	0,001	0,004	0,009**	0,005	-0,003	0,005
Size(ln)	0,005	0,003	0,011**	0,004	0,015** *	0,004
Locality, Cities with population: (>1 million=ref.)						
500 thousand - 1 million	0,045	0,034	-0,020	0,013	0,010	0,011
100 thousand -500 thousand	0,010	0,020	-0,029**	0,013	-0,006	0,014
< 100 thousand	0,009	0,015	-0,007	0,025	0,016	0,017
Sectors: (mining=ref.)	yes		yes		yes	
Log pseudo likelihood	-103,353		-123,534		-168,221	
Wald chi2	57,73***		83,08***		49,38***	
Pseudo R2	0,091		0,118		0,090	
Correctly classified, %	97,6		96,6		96,7	
Number of observation	1018		951		1279	

Note: Levels of significance: \* - 0.10%; \*\* - 0.05%; \*\*\* - 0.01%.

Table A.9. Intensity of agency work contracts in 2009-2011 (Tobit model)

Variables	2009		2010		2011	
	dy/dx	Std. Err.	dy/dx	Std. Err.	dy/dx	Std. Err.
<i>Institutional Characteristics</i>						
Dismissal protection level (max=10)	0,990	2,544	0,812	0,505	-7,916**	3,138
Wage flexibility (1= yes)	-1,214	1,556	-0,463	0,504	-2,777**	1,364
Union Presence (1= yes)	3,530*	1,986	-0,348	0,456	0,087	0,849
State ownership (1= yes)	-0,904	2,428	-0,815	0,754	-0,953	1,214
<i>Organizational Characteristics</i>						
Workers with tenure from 5 to 10 years (1=yes)	-0,519	1,824	1,211	0,939	-2,359	1,764
Workers with tenure >15 years (1= yes)	-7,059	7,604	0,420	1,299	-1,591	2,237
Blue color worker Force in Teams (1= yes)	-2,839	2,009	0,977	0,696	-0,283	1,207
<i>Control Variables</i>						
Female workers (1=yes)	-1,730	2,313	-0,010	0,786	-0,342	1,276
Ln(Age)	0,001	0,741	0,286	0,223	-0,135	0,370
Size(ln)	0,526	0,536	0,349	0,150**	0,794**	0,287
Locality, Cities with population: (>1 million=ref.)						
500 thousand - 1 million	3,109	3,024	-0,745	0,466	0,603	0,763
100 thousand -500 thousand	1,852	2,372	-1,171	0,652*	0,538	1,159
< 100 thousand	0,846	1,814	-0,285	0,713	0,936	1,097
Sectors: (mining=ref.)	yes		yes		yes	
LR chi2						
	18.67		29.38**		29.42*	
Log likelihood						
	-203.02		-220.14		-325.55	
Number of observation						
	1018		951		1279	

Note: Levels of significance: \* - 0.10%; \*\* - 0.05%; \*\*\* - 0.01%.

## Published Working Papers

- WP 09/2016:** The importance of institutional and organizational characteristics for the use of fixed-term and agency work contracts in Russia
- WP 08/2016:** A Structural Decomposition Analysis of Global and National Energy Intensity Trends
- WP 07/2016:** Natural Disasters and Macroeconomic Performance
- WP 06/2016:** Education, lifetime labor supply, and longevity improvements
- WP 05/2016:** The Gender Gap in Mortality: How Much Is Explained by Behavior?
- WP 04/2016:** The implications of automation for economic growth and the labor share of income
- WP 03/2016:** Higher education and the fall and rise of inequality
- WP 02/2016:** Medical Care within an OLG economy with realistic demography
- WP 01/2016:** The Quest for Status and R&D-based Growth
- WP 04/2015:** Modelling the interaction between flooding events and economic growth
- WP 03/2015:** Revisiting the Lucas Model
- WP 02/2015:** The contribution of female health to economic development
- WP 01/2015:** Population Structure and Consumption Growth: Evidence from National Transfer Accounts
- WP 02/2014:** Economic Dependency Ratios: Present Situation and Future Scenarios
- WP 01/2014:** Longevity and technological change
- WP 02/2013:** Saving the public from the private? Incentives and outcomes in dual practice
- WP 01/2013:** The Age-Productivity Pattern: Do Location and Sector Affiliation Matter?
- WP 05/2012:** The Public Reallocation of Resources across Age: A Comparison of Austria and Sweden
- WP 04/2012:** Quantifying the role of alternative pension reforms on the Austrian economy
- WP 03/2012:** Growth and welfare effects of health care in knowledge based economies
- WP 02/2012:** Public education and economic prosperity: semi-endogenous growth revisited
- WP 01/2012:** Optimal choice of health and retirement in a life-cycle model
- WP 04/2011:** R&D-based Growth in the Post-modern Era
- WP 03/2011:** Ageing, productivity and wages in Austria
- WP 02/2011:** Ageing, Productivity and Wages in Austria: evidence from a matched employer-employee data set at the sector level
- WP 01/2011:** A Matched Employer-Employee Panel Data Set for Austria: 2002 - 2005

Please cite working papers from the ECON WPS like this example:

Freund, I., B. Mahlberg and A. Prskawetz. 2011. "A Matched Employer-Employee Panel Data Set for Austria: 2002-2005." *ECON WPS 01/2011*. Institute of Mathematical Methods in Economics, Vienna University of Technology.

**The Series “Vienna University of Technology Working Papers  
in Economic Theory and Policy” is published by the**

Research Group Economics  
Institute of Statistics and Mathematical Methods in Economics  
Vienna University of Technology

## Contact

Research Group Economics  
Institute of Statistics and Mathematical Methods in Economics  
Vienna University of Technology

Wiedner Hauptstraße 8-10  
1040 Vienna  
Austria

## Editorial Board

Alexia Fürnkranz-Prskawetz  
Hardy Hanappi  
Franz Hof

Phone: +43-1-58801-1053- 1  
Fax: +43-1-58801-1053-99  
E-mail: [wps@econ.tuwien.ac.at](mailto:wps@econ.tuwien.ac.at)