

LABOUR SUPPLY IN THE INFORMAL ECONOMY IN RUSSIA DURING TRANSITION

Alexandre Kolev

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Centre for Economic Policy Research
90–98 Goswell Rd
London EC1V 7DB
Tel: (44 171) 878 2900
Fax: (44 171) 878 2999
Email: cepr@cepr.org

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ABSTRACT

Labour Supply in the Informal Economy in Russia during Transition*

This paper investigates the informal labour market in Russia in late 1995 and estimates a labour supply function in the informal sector using nationally representative micro-data from the Russian Longitudinal Monitoring Survey, Round VI. The findings show that the informal economy constitutes a considerable source of additional income for many families, though it is associated with a large degree of wage and gender inequality. Informal job holding appears to be a safety valve for several individuals rationed in the regular labour market, either unemployed or experiencing compulsory periods of unpaid leave. At the same time, however, the data provides little support for the fact that wage arrears and low earnings from the regular economy increase the probability to join the informal sector. There are substantial gender differences in how demographic and market factors influence the attitudes towards informal activities. For men, the labour supply curve in the informal labour market is forward sloping, but the informal wage does not seem particularly significant for women.

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Alexandre Kolev
Department of Economics
European University Institute
Badia Fiesolana
Via dei Roccettini 9
50016 San Domenico di Fiesole
Florence
ITALY
Tel: (39 55) 46 85 733
Fax: (39 55) 46 85 202
Email: kolev@datacomm.iue.it

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NON-TECHNICAL SUMMARY

While not a phenomenon exclusive to the Russian labour market, informal employment was widespread in the Soviet Union and seems to have increased markedly during transition. At the same time, the incentive structure to join the informal economy is likely to have changed substantially alongside the dramatic social and economic changes of the past several years. A number of studies, largely based on emigré surveys, have documented the characteristics of the so-called 'second economy' in the USSR. Prior to the transition, nonetheless, the understanding of the phenomenon has suffered from the impossibility of accessing any nationally representative micro-data on the Soviet workforce. A limited number of recent studies have documented the rise in secondary employment in Russia and the changing characteristics of the second economy during transition. Limited attention has been paid to identifying the real motivations underlying informal job holding in the transition context, however.

A thorough understanding of informal employment appears to be essential to any meaningful analysis of the labour market in Russia and it may have important policy implications for growing concern about the size of the shadow economy. Indeed, if from a micro perspective, and in the current context of deep economic crisis, participation in the informal sector appears to be an important mechanism for coping with the new social and economic circumstances, it has some major drawbacks. First, the growing informal sector jeopardizes the ability of the state to regulate the economy by reducing its revenues. Second, with a large informal sector, aggregate indicators like unemployment, official labour force or income are not reliable and could lead to misleading policy recommendations.

The aim of this paper is to estimate the determinants of labour supply in the informal labour market in Russia during transition. A general belief is that the fall in formal wages and social benefits, widening wage and benefit arrears, increased rationing in regular employment and rising unemployment have all together contributed to push many individuals into the informal sector. Our research tries to investigate empirically a possible link between these factors and the decision to take an informal job.

The paper starts by presenting a theoretical model where individuals decide to take an informal job due to constraints in the regular labour market or because formal and informal jobs are heterogeneous. The data, along with the definitions and measures for labour participation in the informal sector are then presented. The data used in this paper are drawn from Round VI of the Russian Longitudinal Monitoring Survey (RLMS). We begin by estimating the

probability of taking an informal job and then we go on to estimate the number of hours spent in the informal labour market. These two models are estimated separately for men and women. The findings show that informal job holding appears to be a safety valve for several individuals rationed in the regular labour market, either unemployed or experiencing compulsory periods of unpaid leave. At the same time, however, the data provides little support for the fact that wage arrears and low earnings from the regular economy increase the probability to join the informal sector. There are substantial gender differences in how demographic and market factors influence the attitudes towards informal activities. For men, the labour supply curve in the informal labour market is forward sloping, but the informal wage does not seem particularly significant for women.

I Introduction

While not a phenomenon exclusive to the Russian labour market, informal employment was widespread in the Soviet Union and seems to have increased markedly during transition. At the same time, the incentives structure to join the informal economy is likely to have changed substantially alongside the dramatic social and economic changes of the past several years. A number of studies have documented the characteristics of the so-called "second economy" in the USSR, which emerged under Socialism as a safety valve for inadequate planning, easing survival for individuals, firms, and to some extent, the socialist state itself (Grossman 1977, Gabor 1979). A micro analysis of secondary employment has even been undertaken by Gaddy (1991), who estimates the determinants of Soviet labour supply in the second economy in the mid 1970s using individual data on Soviet emigrants to Israel. Prior to the transition, nonetheless, the understanding of the phenomenon has suffered from the impossibility of accessing any nationally representative micro-data on the Soviet workforce.

The liberalisation of the economy since 1991 has led to the appearance of a new informal sector, which differs from the old characterisation of the second economy in several ways. In particular, the collapse of state regulation and the inefficiencies of the current tax system lead to a marked increase in the demand for informal labour during transition in Russia. On the supply side, it is frequently argued that the fall in formal wages and social benefits, widening wage arrears, unpaid leave, and the rise in unemployment have all together contributed to push many individuals into the informal sector. Some recent studies have documented the rise in secondary employment in Russia (Khibovskaia, 1995), as well as the changing characteristics of the second economy and the appearance of a more western-style informal sector during transition (Braithwaite, 1994; Sik, 1992). However, limited attention has been paid to identifying the real motivations underlying informal job holding in the transition context.

A thorough understanding of informal employment appears to be essential to any meaningful analysis of the labour market in Russia and it may have important policy implications for growing concern about the size of the shadow economy. Indeed, if from a micro perspective, and in the current context of deep economic crisis, participation in the informal sector appears to be an important mechanism for coping with the new social and economic circumstances and for escaping from poverty (Klugman and Kolev 1998), it has some major drawbacks. First, the growing informal sector jeopardizes the ability of the state to regulate the economy by reducing its revenues. The government's difficulty in collecting taxes in turn decreases the extent of social welfare in the regular economy and hinders the capacity of the government to pay wages and pensions on time, which could provide additional incentives for firms and individuals to join the informal sector. Second, with a large informal sector, aggregate indicators like unemployment, official labour force, or income are not reliable and could lead to misleading policy recommendations.

The aim of this paper is to estimate the determinants of labour supply in the informal labour market in Russia in the mid 1990s using nationally representative micro-data from Round VI of the Russian Longitudinal Monitoring Survey (RLMS). More specifically, this

paper tries to investigate a possible link between informal job holding and a number of factors specific to the Russian labour market in transition, such as low formal wages and benefits, large hidden unemployment, and widening wage arrears.

The paper begins by describing briefly in Section 2 the main features of the shadow economy in the USSR and during transition. Section 3 outlines a simple theoretical model of labour supply in the informal economy where individuals are assumed to make regular and informal participation decisions sequentially. The statistical procedure used to assess the assumptions set out in the theoretical model is then presented in Section 4. Section 5 describes the RLMS Round VI data used for the empirical analysis and provides some descriptive evidence of the informal labour market. Section 6 presents the results for the estimates of the labour supply function in the informal sector. The final section of the paper summarises the most important findings.

2 The shadow economy in transition

The existence of an "unplanned" economy in the Former Soviet Union prior to the transition was established a long time ago by a number of studies and anecdotal evidence from soviet emigrants, and the term "second economy" has often been used to identify all activities that fell outside the direct control of the socialist state, whether these activities were undertaken outside or within the socialised sector (Gabor, 1979; Grossman, 1977). The second economy played a specific role in the Soviet Union. It began developing in the 1920s when administrative restrictions and even prohibitions of all kinds of activities were enforced. According to Khibovskaia (1995), secondary employment seems to have developed widely until 1959, that is, until the Council of Ministers issued a decree on the restriction of multiple job holding. Later on however, this form of employment continued to develop to some extent. During the 1970s, participation in the second economy was estimated by Trembl as 10.2% of the soviet workforce (cited by Dallago, 1990). At the same time, according to several emigré surveys cited by Sampson (1988), "illegal" earnings from the second economy added an average of 12% to family income. In the mid 1980s, the restrictive legislation towards multiple job holding has been softened and secondary employment has tended to rise accordingly.

More than a source of additional income, the "unplanned" economy provided a means of obtaining several scarce goods and services that were almost absent from the regular economy. Thus, by allowing a partial corrective to the rigidities of the system and its associated shortages, the second economy was instrumental in keeping the socialist system operating (Sik, 1992). But it also played a cultural and social role, maintaining a form of political protest (Charreyron, 1979).

The collapse of the centrally planned economy and the setting up of legal reforms expanding private activities have changed many specificities attached to the second economy. The informal sector, which is replacing the old characterisation of the second economy, differs from the latter since many activities that were illegal in the Soviet Union are now legal (Braithwaite, 1994). At the same time, the incentive structure to join the informal sector is

likely to have changed substantially alongside the sharp social and economic changes that have characterised the past several years of economic transition. In particular, the scope for moonlighting and unrecorded employment tend to have increased markedly.

Official estimates of irregular incomes attest unequivocally to the expansion of the size of the shadow economy, but estimates remain quite imprecise. In late 1996, Interfax news agency quoted former Prime Minister Victor Chernomyrdine as saying "The specialists cannot say exactly how much of the economy is in the grey zone. The spread is from 20 to 50 percent". A few months later, Vladimir Sokolin, the deputy chairman of Goskomstat, acknowledged that the Russian State Committee of Statistics had increased the share of the shadow economy from 20% in 1995 to 23% in 1996 in order to reflect growth in hidden wages. This methodological change followed a special study conducted by Goskomstat Rossii on the scope of the informal economy.¹ According to this study, and as reported in Table 1, informal wages in Russia as a proportion of GDP were respectively about 5% in 1993. They almost doubled to 9% in 1994 and then rose to 10% in 1995 and 11% in 1996²

Table 1: The scope of informal wages in Russia

Invisible wages:	1993	1994	1995	1996
in trillions rubles	9.1	52.0	170	250
in percent of GDP	5	9	10	11

Source: *Ekonomika i jizn*, 9 March 1997.

The apparent rise in informal activities during transition can be understood in the light of both demand and supply-side factors. From the enterprise level, the lack of legal protection and state control on business activities, together with the inadequacy of the tax system and the widening of barter transactions are likely to have pushed upward the scope for informal activities. It is for instance now common in Russia for an enterprise to exclude from its accounts part of the sales in cash and to declare only a minor share of the wage bill, the rest being paid in cash from a secret account.

From an individual perspective, and besides the public's (historic) mistrust of the government³ and the large disincentive effects of the current tax system⁴, the new conditions prevailing in the regular labour market are likely to have generated strong incentives to join the informal economy. Among these conditions, the sharp fall in the level of wages and benefits for recipients, together with widening wage and benefit arrears are expected to have played a key role, as these factors have increased the need for alternative incomes and the scope for

¹The method used by Goskomstat to estimate the importance of legally unrecorded wages was not made explicit.

²*Issledovanie Goskomstata Rossii o kolichestvennoy otsenke skritoy ekonomiki i eyo vliyaniye na makroekonomicheskuyu situatsiyu v stranice*, cited in *Ekonomika i jizn*, March 1997.

³The government's campaign to convince Russians that taxes are for the common good remains an uphill battle. For example, *Argumenty i Fakty* published the results of an investigation of the State Tax Service by the parliament's accounting chamber. It found that top tax officials spent over 1 million dollar of budget money to buy and renovate apartments for themselves.

⁴Though the wage tax system is intended to be progressive with a maximum tax rate of 35 percent, it turns out that wages closed to the median are heavily taxed.

corruption and crimes. Increased rationing in the regular job market, characterised more so by large hidden forms of unemployment, like labour hoarding, than by a rise in official unemployment, which increased relatively slightly from 4.8 percent in 1992 to 9.3 percent in 1996⁵, is another factor that may have led to a rise in informal job holding.

One may therefore identify a number of groups in the new informal economy. The informal use of labour may involve a priori those who could be relatively at ease in the regular job market, with high human capital and high market wage offers, but who are driven into the informal sector because of the disincentive effects of the tax system. At the other extreme, there are those who try to survive in the new circumstances and to cope with their low regular earnings: low paid and underemployed workers in the main economy, with a second job hidden from the tax service and performed after regular working hours, or during unpaid leave; the unemployed, who draw unemployment benefits if eligible and work for an undeclared income in addition rather than having a main paid job in the formal sector of the economy; housewives and pensioners with low pensions⁶, who are more likely to offer part-times services, either selling goods in the street, working at home, or as a domestic help; and "illegal" workers, the latter being not necessarily clandestine immigrants, like in Western Europe, but Russian workers, without the legal authorisation to work⁷.

3 Modelling labour supply in the informal economy

In this section, we present a simple model of labour supply in the informal economy. We start with a graphical exposition and then present a simple analytical treatment of the decision to supply labour in the informal sector. This gives us a labour supply function to be estimated with the data. The final part of the section discusses the econometric issues.

3.1 Theoretical framework

Various extensions of the standard model of labour supply have been proposed in the literature in order to get testable models of multiple job holding (Shishko and Rostker, 1976; Bell and all 1997; Conway and Kimmel, 1998), but less attention has been paid on the process of taking an informal job (Lemieux and all, 1994). A major difference between informal job holding and second job holding is that some informal job holders do not have any other jobs. The general model that we present here includes both "one" job holders and "two"

⁵According to the estimate in EBRD, transition report 1997.

⁶In Russia however, pensioners are not legally forbidden to undertake employment without giving up their regular status.

⁷Each individual in Russia is required to have a "propiska" like in the soviet period, which is a sort of residency document giving access to local social services and the local job market. It is almost impossible for an individual to seek a regular employment in a place different from the one in which the propiska was delivered. Though in principle it is possible to get a new propiska, in the main cities like Moscow and St-Petersburg, delivering of new propiska is practically limited to those who already have relatives there. Hence, many Russian workers who are attracted by the opportunities offered, for instance, by the local labour market of Moscow, are obliged to undertake informal jobs.

jobs holders among informal workers. This model recognises that individuals may take an informal job due to constraints on the regular labour market or because formal and informal jobs are heterogeneous. Starting with the traditional model of labour supply, the following extensions have been made. First, the labour market is assumed to be segmented in a formal and informal sector, the latter being characterised by fiscally unrecorded labour. Second, individuals are assumed to make formal and informal economy labour supply decisions sequentially and not simultaneously. Put slightly differently, formal labour market attributes are treated as exogenous variables⁸. Third, a typical individual can face four different situations in the formal labour market: unconstrained and holding a formal job, unconstrained and not participating, constrained and holding a formal job, constrained and not participating in the informal sector. These situations can be illustrated graphically with the traditional individual's budget set and indifference curve.

3.1.1 Graphical illustration

The first two situations where there is no rationing in the regular job market are illustrated in Figure 1. Consumption of leisure is represented along the horizontal axis and consumption of all other goods, along the vertical axis. The wage rate in the regular labour market is constant over hours and noted w_1 . There is some nonwage income Y_0 . The situation where our typical individual is working and satisfied with his situation is indicated by point E_a , the point of tangency between the indifference curve U_a and the wage line in the regular economy AB . At this point, the wage rate w_1 offered in the primary labour market is equal to the individual marginal rate of substitution between leisure and consumption. Working H^* hours of work allows this individual to reach the highest indifference curve attainable with his particular budget constraint and utility function U_a .

On the other hand, point B represents the case where our typical individual decides not to participate in the regular sector. In fact, with utility function U_b our representative individual could reach a higher indifference curve for $H = 0$. In this situation, the market wage w_1 is below the individual's reservation wage.

Our representative individual can however be rationed in the regular job market. As shown in Figure 2, the opportunities available to this individual can indeed be restricted to some H_0 hours of work. This constraint forces the individual to the indifference curve U'_a at point C . This individual can work only H_0 while he would have preferred to work $H^* - H_0$ additional hours of work. At the extreme, $H_0 = 0$ and the individual happens to be unemployed in the regular labour market but willing to work.

The opportunities available to the typical individual can change dramatically when we take the informal economy into account. The incentives to enter the informal labour market depend on the reservation wage of the individual and by the wage offered in the informal

⁸This is a strong but reasonable assumption. Assuming simultaneous decision process would lead to estimating jointly a labour supply function in the formal and informal sector. We choose to retain the hypothesis of sequential decision making because we believe that the willingness of the individual to join the informal sector is determined by its position in the formal job market and its related characteristics.

sector. In the first situation where the individual is working his desired hours of work H^* for a wage w_1 , the individual will provide additional hours of work in the informal job only if it pays a wage w_2 above w_1 ⁹. In fact, as shown in Figure 1, the wage premium in the informal sector allows the budget segment to be extended to the segment $A'E$ with slope w_2 which is steeper than the w_1 line, and the individual can therefore reach a higher indifference curve. Since the individual is assumed to maximise his utility, he/she will choose his/her additional hours of work in the irregular job in such a way as to reach the highest indifference curve attainable with his/her particular budget constraint. Such a situation in the figure is point E'_a . At that point, the individual will provide an additional $H'_1 - H^*$ hours in the informal economy. This implies however, that there is no rationing in the informal labour market, which might not be true. In fact, the general characteristics of informal jobs often limit the time spent in the informal economy.

In the second situation, when the individual is not willing to participate in the formal labour market, the only way for this individual to take an informal job is that it pays a wage above his reservation wage. But $w_2 > w_1$ is no longer a sufficient condition for participation in the informal sector. In Figure 1, we see indeed that the individual will decide to participate only if the informal wage is above \underline{w}_2 , where \underline{w}_2 is the slope of the wage line that would be tangent to the indifference curve U_b at point B . In other words, \underline{w}_2 is the marginal rate of substitution between leisure and consumption at point B , that is, the individual's reservation wage. With a "sufficiently" high informal wage, w'_2 in Figure 1, we see that the individual is able to maximise his utility at point E_b . At this point, this individual will not participate in the regular job market, but he will offer H'_2 hours of work in the informal sector.

In the third and fourth situations, when the individual is rationed in the regular job market and appears to be underemployed ($H_0 > 0$) or unemployed ($H_0 = 0$) - point C in Figure 2 - the individual will take an informal job as long as it pays a wage w_2 above \underline{w}'_2 , where \underline{w}'_2 is the slope of the wage line that would be tangent to the indifference curve U_c at point C . The total hours of work will be less than the desired hours of work H^* in the regular job if the wage offered in the irregular job w_2 lies between w_1 and this reservation wage. If w_2 lies above w_1 , then the time spent in the informal sector could be even bigger than $H^* - H_0$. We implicitly assume here that there is no rationing in the informal job market, so that the individual is able to adjust the hours spent in the informal sector in order to maximise his utility. If there were some rationing in the informal sector, the individual may still be able to reach a higher indifference curve by joining the informal sector, but his utility would not necessarily be maximised.

To sum up, the graphical exposition has shown that those individuals who are not rationed in the regular labour market, whether employed or not participating, will never accept to work in the informal sector for a wage rate below the market wage in the regular job market. Only rationed individuals in the regular sector may accept to work in the informal economy for a lower wage rate than the one offered in the regular job market, if this allows them

⁹This condition is far from unrealistic given that informal wages are associated by definition with tax evasion. In other words, in this specific case, the individual will take an informal job not because of constraints on his/her primary job, but because the two jobs are heterogeneous.

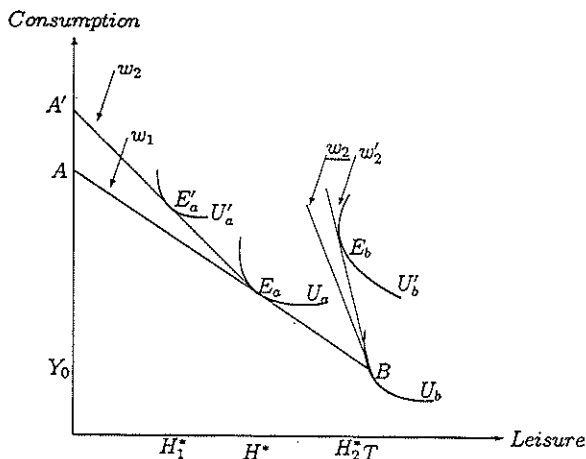


Figure 1: Utility maximisation with no rationing on the regular labour market

to increase their utility. The graphical exposition above is amenable to a simple analytical treatment.

3.1.2 The model

We consider a representative individual with a given position in the regular labour market. Let w_1 and h_1 be the wage rate and the hours of work in the regular job if the individual is employed in the official economy, u_1 the level of unemployment benefits if he/she is unemployed and eligible for benefit in the regular economy, p_1 the level of pensions for pensioners, and y non-earned income of the individual. Note that if our representative individual is working in the formal sector, he/she may at the same time receive a pension for retirement¹⁰. Suppose further that the wage rate in the informal sector is w_2 . This representative individual has a utility function defined on leisure l , a general consumption good c , and some socio-economic characteristics Z of both the individual, his/her family, and his/her situation in the regular economy:

$$U = U(c, l, Z) \quad (1)$$

where $U(\cdot)$ is a twice differentiable utility function with $U' > 0$ and $U'' < 0$. The individual is assumed to maximise utility subject to the following time and budget constraints:

¹⁰Individuals above working age in Russia are legally entitled to work while receiving their pensions.

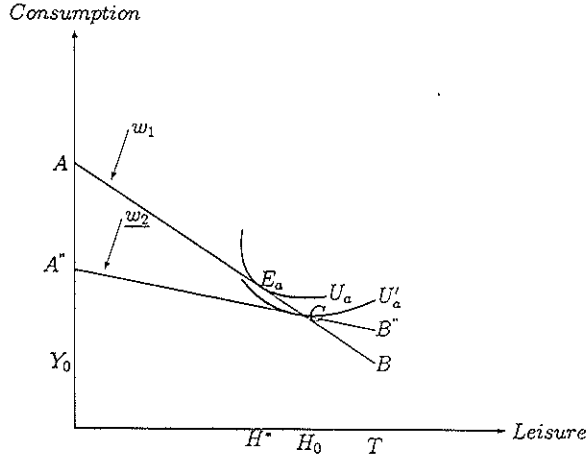


Figure 2: Utility maximisation with rationing on the regular labour market

$$\begin{aligned}
 T &= h_1 + h_2 + l \\
 c &= w_1 h_1 + w_2 h_2 + u_1 + p_1 + y \\
 h_1 &\geq 0 \\
 h_2 &\geq 0 \\
 u_1 &= 0 \text{ if } (h_1 > 0)
 \end{aligned} \tag{2}$$

where $T - h_1$ is the total time available for an informal job. The price of c is taken as the numeraire. Following the assumption of sequential decision making, all primary economy variables are treated as exogenous in this model. Substituting the above time and budget constraints in the utility function gives therefore the following utility maximisation problem:

$$\text{Max}_{h_2} U(w_1 h_1 + w_2 h_2 + u_1 + p_1 + y, T - h_1 - h_2, Z)$$

For those individuals supplying positive hours of work in the informal job, the solution of this program yields the labour supply function in the informal economy:

$$h_2^* = h_2(w_2, T - h_1, w_1, h_1, u_1, p_1, y, Z) \tag{3}$$

where h_2^* is the desired hours worked in the informal sector employment, assuming no rationing in the informal economy. The individual's willingness to participate in the informal economy depends in this model on the offered wage rate in the irregular job, the time available for an informal job, the earnings from the regular economy, the other sources of unearned income available to the individual, and the other characteristics specific to this individual, his/her family, and his/her position in the regular job market.

Under the assumption of sequential and independent formal and informal economy labour supply decisions, and as soon as leisure is a normal good, an increase in any earning sources from the regular economy decreases the labour supplied in the informal sector, in the same way as an increase in non-earned income. For those workers who participate in the regular labour market, an increase in the number of hours of work in the regular job will lead to lower hours spent in the informal job both directly through the time constraint effect, and indirectly through its impact on the regular monthly wage (treated here as an income effect). Lastly, the impact of an increase in the wage rate offered in the informal economy is more ambiguous, as the traditional income effect could offset the substitution effect if leisure is a normal good.

3.2 Statistical procedure

Estimation of the theoretical model displayed above raises two main problems that we shall discuss briefly. The first problem relates to the fact that the informal wage in equation (3) is observed only for individuals who have an informal job, while we want to estimate this equation for the whole sample of participants and non-participants in the informal sector. The second problem arises from the fact that estimating separately by ordinary least square an informal wage equation for those reporting such a wage in order to get a predicted wage for the whole sample that could then be used as a regressor in equation (3) may lead to the so-called sample selection bias, given that those individuals with an informal wage are not randomly selected, but are those individuals who already decided to join the informal sector. These problems are now well identified in the literature (Berndt, 1991) and a number of methods have been proposed to deal with them.

One procedure discussed by Heckman (1974) and that we followed here is to estimate jointly the wage equation and the probability of taking an informal job:

$$\begin{aligned} W_{2i} &= \alpha X_{1i} + \epsilon_i \\ \text{Pr}(H_{2i} > 0) &= F(aX_{1i} + bX_{2i}) + e_i \end{aligned} \quad (4)$$

where W_2 is the informal wage rate, H_2 is the hours worked in the informal sector, X_1 is a vector of explanatory variables of the wage, which affects at the same time the participation decision indirectly through the wage effect or directly, and X_2 is a vector of variables that affect only directly the participation decision but that are not relevant to the wage equation. In the participation equation, identification of the parameters is assured by the inclusion of X_2 . Assuming that the error terms ϵ_i and e_i are jointly normally distributed, the system of equations (4) can then be estimated using the full information maximum likelihood (FIML) simultaneous techniques. This method provides consistent and asymptotically efficient estimates of the parameters.

It should be noted however that this model is associated with interpretation problems. In the participation equation in (4), it is impossible to determine whether the vector of variables X_1 affect the participation decision directly, or indirectly through its impact on the wage. To recover the direct effect of some of the variables in X_1 - like education, age, location -

on the decision to labour supply net of their impact on the wage, we then go on to estimate a structural participation model of the form

$$\Pr(H_{2i} > 0) = F(c\widehat{W}_{2i} + dX_{3i}) + v_i \quad (5)$$

where \widehat{W}_2 is the predicted wage corrected for sample selection obtained from the Heckman simultaneous equation estimation procedure, and X_3 is a set of variables including X_2 and some of the variables in X_1 that are expected to have a direct impact on the participation decision. Assuming that the error term v_i follows a normal distribution, equation (5) can then be estimated by a probit model.

Lastly, as we also want to take into account the quantity of work that is performed in the informal sector, and not simply whether an individual holds an informal job, the same method is applied to estimate the number of hours worked in the informal sector using tobit regression techniques:

$$H_{2i} = c'\widehat{W}_{2i} + d'X_{3i} + \psi_i \quad (6)$$

Remember that the tobit model does not distinguish between the decision to participate and the decision of how many hours to supply, once a person has decided to participate, and the coefficients should be interpreted accordingly. The decision to participate and the time spent in the informal sector could be nonetheless generated by two different processes, an issue that we do not investigate here.

4 The data

A thorough understanding of the main concepts, methods, and source of the data used on the informal economy is essential to any meaningful analysis of such data. After presenting the sample characteristics and defining labour participation in the informal economy, this section discusses the reliability of the data on informal jobs and examines the characteristics of the informal sector.

4.1 The RLMS data, Round VI

The data used in this paper are drawn from Round VI of the Russian Longitudinal Monitoring Survey (RLMS). This survey is intended to be representative of the whole Russian population and contains detailed information at the individual and household level. Round VI was conducted among 3781 households in the last quarter of 1995: 77% were interviewed in October and 23% in November. Given large regional price variations, all monetary variables were adjusted to Moscow December 1995 prices, using regional price indices for 38 geographical areas covered by the RLMS¹¹. Along with information on expenditures and incomes collected on households, the data also contain extensive information on labour force activities at the individual level. While a major problem in estimating the participation in the informal economy has been the difficulty in finding an appropriate data base, the RLMS

¹¹The regional price indices were constructed by Kitty Stewart from a basket of 19 goods.

data Round VI has the advantage of containing, in addition to standard questions on socio-economic background of respondents and their labour market status in the main economy, a battery of questions on second jobs as well as other kinds of work performed by individuals who do not report working in the main economy.

The data could have been however more comprehensive in many ways. In particular, the sector of activity for those employed in the main economy was not available at the time we started this study. Another restriction in our sample is imposed by missing information or gross inconsistencies in responses filled in by the individuals. A total of 993 observations on the individuals have been dropped out because information was missing or inconsistent on at least one included explanatory variable. After the exclusions described above, the sample was further restricted to individuals age between 16 and 75, excluding those employed on temporary leave to take care for children and disabled individuals. This left us with a subsample of 6492 observations.

4.2 Definitions and measures for informal jobs

Since there is no internationally accepted definition of an "irregular" job, any analysis of the labour supply in the informal economy requires an explanation of the definitions and measures used. In the data, individuals were asked to describe their "main" occupation. Those who reported "working" as their "main" occupation were then asked whether they were engaged in an "additional" job, and those not working as their "main" occupation were asked whether they had any "other kind of work". Following this self-classification, we decided to classify an "informal" job as any paid activity reported by the surveyed individuals in addition to the work they performed as their main occupation (additional job) as well as any other kind of paid work reported by individuals that do not declare working as their main occupation (other job). In turn, we classify a job as a regular or first job if it is declared in the survey as the main occupation. The reference period for an informal job is the last 30 days preceding the interview.

We classify an informal job in such a way because we believe that this notion of "main" occupation is likely to be understood by the respondents as "formal" occupation, while the other questions on additional jobs and other types of work are likely to be interpreted by the respondents as the "right" place to report what they consider themselves as "non-formal" form of employment, if they have one and wish to report them. Thus these notions of second and other jobs are likely to be identified with tax evasion and legally unrecorded economic activity. Of course, one can argue that several second jobs could be legally recorded, but anecdotal evidence for Russia suggests that very few second job holders do in fact register their secondary employments with fiscal or social security authorities, so that it seems reasonable to treat them as informal jobs.

We need however to clarify a number of points regarding this definition of an informal job. First, it is important to recall that this concept of informal job, which is likely to be what covers these notions of additional and other kind of work, do not necessarily overlap

with "illegal" or "hidden" jobs. The latter are in fact by nature or by definition not reported in labour force surveys, for reasons, for instance, such as the fear that the information could be used by legal authorities¹². Second, though our definition of informal jobs is likely to cover exclusively legally unrecorded activity, it does not necessarily mean that all of them are reported accordingly. Some of the activities reported as the "main" occupation may in fact correspond to legally unrecorded activities. For instance, the self-employed, who are generally likely to be identified with tax evasion, are not classified as informal job holders if they report working as their "main" occupation. Similarly the self-production of food and other agricultural products by household members is not considered as an informal job, unless it is reported as a paid work that does not constitute the individual's "main" occupation.

Lastly, the self-classification criteria that we adopt in this paper to define an informal job may raise some identification problems. For instance, many above working age individuals (women above 54 years old and men above 59) that continue to work while receiving a pension define their main occupation as employed and not retired (presumably because it is legal to do so in Russia), where one could expect this activity to be classified as an informal job. However, if pensioners have decided to report their work as their "main" occupation, it may well be because they continue to work and to be legally registered in their former employment, and therefore, they should not be considered as informal job holders. Conversely, those pensioners who classified themselves as "retired" in the main economy with another kind of work are likely to have given up their previous employment and are unlikely to be still officially registered somewhere as employed.

From the practical of measurement for labour participation in the informal economy, the sample provides two possible indicators. The choice of a particular indicator depends on whether we are interested in understanding the decision to participate in the informal economy, or whether we want to take into account the quantity of work that is performed together with the participation decision. In the first case, an immediate measure is to consider the binary participation variable, whether or not an individual holds an informal job. In the second case, one has to consider the hours worked in informal jobs. In what follows, we start to use the first measure and then go on to estimate the number of hours spent in the informal sector in order to capture those potential factors affecting the time spent in the informal economy.

4.3 Reliability of data on the informal economy

Any interpretation of data from the informal economy needs a particular attention and we address here two types of problems. A first problem is concerned with the internal validity of the data on informal jobs. Our survey contains independent information on monthly hours of work in the informal economy, the monthly wage from informal jobs and the binary participation variable in the informal economy. Each of these variables can provide a basis to estimate the participation rates in the informal economy. However, because of a number of inconsistencies observed among these variables, the choice of one of these variables can

¹²As pointed out in a recent OECD report (1998, p15), there is a general confusion in the terms informal, hidden, black, or illegal economy, while these notions may not necessarily overlap.

lead to slightly different estimates of the participation rates in the informal economy. For example, individuals can report in the same time a positive wage from an informal activity but zero hours worked in this informal activity and/or that they have an informal job but work zero hours. Therefore, we decided to construct a new participation variable based on *paid* informal jobs with positive hours of work, which is our interest.

Informal wages were computed as total monthly earnings from second and additional jobs as described above. Hours of labour supply in the informal economy was computed as the sum of hours spent in second and additional jobs. The informal wage rate was then constructed by dividing the monthly wage by the monthly hours spent in the informal job. We then used this wage rate as an indicator for our new participation variable. In other words, this variable considers that one is engaged in the informal sector if he/she has both a positive wage and works positive hours in this informal job.

Despite the efforts made to eliminate a number of inconsistencies among the data on the informal economy, a second problem arises since hours and wages from informal jobs are likely to be reported with substantial errors. As we said earlier, those engaged in irregular or criminal activities were hardly willing to give a straightforward account of their activities. Consequently, our estimates of the informal sector may ignore a whole share of illegal activities and illegal earnings (from corruption and bribery for instance). Moreover, informal wages and hours of work, when reported, are likely to be understated, as individuals may be keen to minimise the extent of fiscally unrecorded activities and earnings. The figures presented in this paper provide therefore only a very small fraction of the informal sector in Russia. As a general remark, under-reported income is a common problem in the RLMS data: about 66% of surveyed families in round VI have expenditures (including savings) above their income (including borrowing). The distribution of under-reporting behaviour also shows that the share of families reporting higher expenditures than income increases as recorded family income decreases.

Table 2 reports the mean and the standard deviation of wages and hours worked in both the regular and the informal economy. The average monthly hours and monthly wages are respectively 178% and 42% higher in the regular sector than in the irregular economy, but the wage rate is considerably higher in the informal sector: more than 3 times the average wage rate in the regular economy. In this respect, the informal economy appears much more lucrative than the primary sector which pays relatively too low wages. The high returns relative to the regular economy may also illustrate that informal activities undertaken in the hope of a large income have to be well paid for those involved in order to cover the increased risk and higher transaction costs. The standard deviation of hours worked is also higher in informal jobs than in the main economy, indicating more flexibility in informal than in formal employment. Finally, the larger standard deviations of the monthly and hourly wages in the informal economy relative to the regular sector suggests that wages are measured with more noise in the informal economy.

Table 2: Mean and standard deviation of wages and hours worked in the regular and informal economy

Variables (> 0)	Mean(Standard deviation)	
	Regular economy	Informal economy
Monthly hours	167.3 (62.4)	60.5 (69.5)
Monthly wage	682.8 (711.1)	480.9 (760.8)
Hourly wage	4.9 (10.5)	17.1 (33.2)

Source: RLMS Round VI. Wages are in thousand roubles and adjusted for regional price variations.

4.4 Summary statistics on the informal labour market

Descriptive information relating to informal labour force participation rates, the distribution of hours spent in informal employment, earnings from the informal sector, and the profile of informal job holders are presented in Tables 3 to 6 and in the Appendix Table 2 and Figures 2 to 4.

4.4.1 Labour force participation rates

The participation rates in the informal economy estimated according to three different definitions are presented in Table 3. The first definition is the one retained in the present analysis and refers to the share of individuals engaged in paid informal activities (that is, reporting positive wages from informal jobs) and providing positive hours of work in the informal sector. The two other measures are less demanding and refer only to those with positive hours spent in an informal job (2nd definition) and those reporting such a job (3rd definition). According to these estimates, about 7.5% to 9.6% of the individuals in the selected sub-sample report participating in the informal economy in late 1995.

As explained earlier, these participation rates are likely to be downward biased and appear relatively small compared with the official estimates of the informal sector presented earlier. However, the figures presented in Table 3 are somewhat higher than similar estimates derived from an earlier round of the RLMS. Based on RLMS data, Round I, and using a similar definition for informal jobs, Braithwaite (1994) estimates the participation in the informal sector in 1992 at nearly 3.4% of survey respondents holding a second job and 2.3% engaged in an individual activity. Table 3 also shows that women have much lower participation rates than men.

Table 3: Participation rates in the informal labour market (in percent)

	All	Men	Women
1 st definition	7.5	9.7	5.7
2 nd definition	8.6	11.1	6.6
3 rd definition	9.6	11.6	7.1

Note: N=6492 individuals aged 16-75. *Source:* RLMS, Round VI

The participation rates (1st definition) in the informal labour market broken down by the labour market status in the main economy is given in Table 4. At first glance, one can see that the groups with the highest rates are those who report that being unemployed and looking for a job was their main labour market status, then followed by those who were not participating in the official economy. In this respect, the data confirm that official labour market indicators like unemployment and labour force are likely misleading. The share of unemployed and non-participants in the regular economy engaged in the informal sector is also much higher among men than women. The low rate of double jobholders among retired people should be treated with caution because of the self-classification issue discussed earlier. In the table, retired individuals refer to above working age adults who did not work in the regular economy. Those who considered themselves as working in the main economy are classified as "working".

As also shown in Table 4, double job holding in late 1995 embraced 7.6% of the total workforce. This compares well with a study conducted by the Russian Federal Employment Service which estimates the overall size of secondary employment in mid 1994 at nearly 8% of the total employed population. However, other estimates for Russia give even higher percentage rates of second job holding. According to the data of several VTSIOM surveys, 13% of the workforce reported holding a second job in 1989 and from 14 to 20% during the period 1993-94 (Khibovskaia, 1995). Seasonal differences could however explain part of the variation observed in these figures. The estimates for Russia tend to be high compared with a 1979 study on EC countries and the USA. The share of employed individuals holding a second job in 1979 was indeed 1.7% in Germany, 2.0% in Italy, 2.1% in Belgium, and 4.9% in the USA (Alden and Spooner, 1982). On the other hand, a more recent study by Bell and all (1997) based on the *British Household Panel Study* estimates the share of second job holders in the UK at around 10.5 percent in the period 1991-95, which is higher than the Russian figures derived from the RLMS.

Table 4: Share of informal job holders by primary labour market status

Status in main economy	Overall share in sample			Percentage holding an informal job		
	All	Men	Women	All	Men	Women
Working	58.1	65.6	51.9	7.6	9.4	5.7
Unemployed	8.2	9.7	6.9	22.5	26.9	17.5
Retired not working	23.4	16.3	29.2	1.9	1.5	2.1
Not participating	4.2	1.5	6.5	13.4	27.3	10.8
Student	6.1	6.9	5.5	4.3	4.5	4.1

Note: N=6492 individuals aged 16-75. *Source:* RLMS, Round VI

4.4.2 Hours spent in the informal sector

The distribution of weekly hours spent in the informal sector is reported in Appendix Figures 4 to 6 for all informal job holders, for those with both a regular and an informal job (second job holders), and for those with only an informal job. The average weekly hours spent in the informal sector was respectively 14.1 hours a week among women, and 15.9 for men. Not

surprisingly, second job holders tend to work fewer hours in the informal economy than those with only an informal job: male and female second job holders worked indeed an average of 13.8 and 12.6 hours per week in the informal economy, compared with 19.4 and 15.9 hours for male and female informal workers with no regular jobs. We can see from Appendix Figures 4 to 6 that the major share of informal job holders were working fewer than 5 hours a week in the informal sector. However, for both sexes, there is still a substantial percentage of individuals (about 22-25 percent for female and male second job holders and 25-38 percent for female and male informal workers with no regular job) that spend more than 20 hours in this type of job.

4.4.3 Earnings from the informal sector

Table 5 provides information on hourly wages received by those engaged in the informal economy. For men, the wage rate in the informal sector is the highest for those already employed in the regular economy. Among women, the difference between the informal wage rates are less marked than among men and the highest informal wage rates are observed for those non-participants or those already employed in the main economy. The unemployed and pensioners without formal sector employment seem to be at a significant disadvantage in the informal sector for both sexes, presumably because these individuals are likely to be rationed in the regular job market, and would thus be expected to accept a work in the informal sector for a wage rate below the wage offered in the regular economy. Table 5 also indicates the existence of a large gender gap in the informal economy, with female hourly wage rates nearly twice below those of men. This gender gap in the informal sector was already observed by Braithwaite (1994) in the RLMS, Round I.

Table 5: Informal hourly wage and primary labour market status (in thousand roubles)

Status in main economy:	All	Men	Women
All sample	17.7	22.0	12.0
Working	22.4	27.9	12.9
Unemployed	11.1	11.4	10.4
Retired not participating	7.8	6.9	8.1
Not participating	14.0	12.0	14.9
Student	15.0	18.1	10.7

Note: N=6492 individuals aged 16-75. *Source:* RLMS, Round VI

Table 6 presents a comparison of formal and informal hourly wages for second job holders, that is those with a primary and an informal employment. On average, second job holders receive a higher wage rate from their secondary employment and the differential between the primary and secondary wage rate is particularly marked for men. The major share of second job holders have in fact a higher wage in the informal sector: about 80% of all second job holders, 83.2% for men and 71.7% for women. It is interesting to note here that the share of individuals that have accepted to work for a lower wage rate in the informal sector is higher among women. Following our earlier theoretical discussion, this could indicate that women are more likely than men to be rationed in their primary employment.

Table 6: Wage differential between formal and informal sector

	Hourly formal wage (W1)	Hourly informal wage (W2)	Percentage with (W1 ≥ W2)	Percentage with (W1 < W2)
All	5.8	23.8	21.1	78.9
Men	7.1	30.5	16.8	83.2
Women	3.6	12.5	28.4	71.6

Note: N=199 individuals aged 16-75 with both a formal and an informal job. Source: RLMS, Round VI

We have seen so far that the informal sector was providing high returns relative to the regular economy for those individuals engaged in both a regular and an informal employment. At the same time, these high returns to informal job holding at the individual level tend to have an important impact in terms of family income. In late 1995, informal wages represented indeed an average of 7.1% of total income for all families, and more than 36.5 % for those families with at least one member holding an informal job. The importance of informal wages as a source of labour income is however associated with substantial wage inequalities in the informal labour market. In Appendix Figure 1, which reports the Lorenz curves for regular and informal hourly wages, we can see that the distribution of informal wages lies below the distribution of regular wages, indicating more inequalities in the informal sector. The Gini coefficients were in fact respectively 0.505 for regular hourly wage and 0.594 for informal hourly wage.

4.4.4 A profile of informal job holders

The mean values of all the variables included as explanatory variables for the wage equation and the labour supply equations are presented in Appendix Table 1 for both men and women who did and did not hold an informal job. There seem to be substantial differences in the human capital variables (age and education) between the two groups for both men and women. Informal job holders tend to be younger and more educated than informal sector nonparticipants.

As regards the presence of children in the family, there is a difference between individuals who did and did not work in the informal sector, but the difference is asymmetric between males and females. Female informal job holders have fewer young children, while the reverse is true for male. The primary job variables show that men and women with a second informal job tend to work fewer hours in the first job than do those without a second job. The number of days spent on compulsory unpaid leave for those who have experienced such unpaid leave is also higher among informal job holders.

In terms of earnings, women with a second job have a lower primary wage than nonparticipants in the informal sector, but the reverse trend is observed for men. Another important difference between the participants and the nonparticipants in the informal sector concerns the regular labour market status variables. For both men and women, the share of unemployed is substantially higher for those who hold an informal job. Finally, the geographical data show that for both males and females, the share of informal job holders is higher in

urban areas, in the region of Moscow and St-Petersburg, as well as in the North Caucasian region.

5 Results of the regression analysis

The preceding section have discussed the characteristics of the informal sector in Russia, as observed from late 1995 data. In this section, we go on to investigate the determinants of labour supply in the informal labour market. We start by discussing the result of the reduced form equation, and then we go on to look at the structural form models, which recover the direct effect of the informal wage rate and other factors on the participation decision, net of their impact on the wage. All these estimations are conducted on a sample of 3565 women and 2927 men, in which respectively 204 and 286 respondents were identified with both positive hours and wages from informal jobs.

5.1 The full maximum likelihood simultaneous estimates

Appendix Tables 2 and 3 summarise the results obtained from the estimation of separate wage and participation equations for males and females. Whatever specifications we tried, use of t-tests revealed significant correlation between the wage and the participation equations for male, suggesting the presence of a selection bias problem in the data. For women, the selectivity bias variable (ρ) was never significant. In other words, without using Heckman selection models, we would have mismeasured the expected informal wage for men, but not for women.

5.1.1 Estimates for informal wages

The explanatory variables included in the wage equations are quite traditional and refer to human capital variables, ethnicity, demographic characteristics, and location. The location variables were expected to capture local labour market conditions. The absence in the data of any reliable information on job experience leads us to use the individuals' age as a proxy for their work experience. The dependent variable is the logarithm of hourly wages in the informal economy so that the model is of the Mincerian type.

All the coefficients in the wage equations have the expected signs for males, but the results are especially poor for women. For men, informal earnings are concave in age, as was expected from human capital theory, and are estimated to peak at 38 years. Men with a university education are expected to earn a wage premium in the informal economy of respectively 40% relative to men with a secondary or less education. There seems to be no significant return to a vocational diploma.

The absence of return to schooling in informal job earnings for women may reflect their considerably disadvantageous situation in the informal labour market, with women concentrated in low paid informal jobs, whatever their skills are. Informal wage rates for women were in fact less than half of men's. Similarly, there were little variation in women wage rates broken down by the primary labour market status. The results also indicate that both

for men and women, being married relative to divorced or single individuals increases the estimated wages from informal employment by more than 37%. But the actual causal effect is difficult to interpret and the married effect could proxy something else. Finally, residing in a urban settlement raises men earnings by 49% but has no effect on women's informal wage. The region dummies seem to have a little impact on the wage equation, presumably because our dependent variable is already adjusted for regional price variations.

5.1.2 The reduced-form participation equation

The incidence of the transition-specific factors that we discussed earlier was tested by introducing in the reduced-form probit participation equation individual earnings from the regular economy (wage from first economy job, pensions, unemployment benefits) and other household members' labour and non-labour earnings, labour market status in the regular job market (unemployed, student, pensioners not working in the main economy, and other not participating, the comparison group being those employed in the regular sector), a dummy for wage arrears, and the number of days spent on compulsory unpaid leaves in the year preceding the interview, the latter being a proxy for underemployment. Other variables assumed to affect the individual's preference, his/her time constraints, or the local labour market conditions, such as age and education, the number and age of children, other regular job characteristics, the hours of work spent in the main economy, urban and other regional dummies were included as controlled variables. Since our final motivation is to recover the impact of all the explanatory variables for the participation decision net of the wage effect, we will reserve the discussion of most of the variables that affect both the wage and the participation decision for the structural model.

The estimates provide little evidence for the hypothesis that low earnings from the regular economy and low family income affect unequivocally the decision to enter the informal sector. In particular, the monthly wage in the regular sector is not significant and only for men do the level of pensions reduce the probability of their taking an informal job. Hence, despite possible measurement problems with the income variables, the results tend to confirm that both poor and rich individuals could have strong incentives to join the informal sector: while for the former, it could be a way to supplement a low income, for the latter, it could be a way to avoid taxes and to make additional money, using their privileged situation in the regular economy.

Likewise, there seems to be little support for a positive association between wage arrears and the decision to enter the informal sector. This is surprising but not unexpected: many workers who do not receive their wages continue in fact to work hard in their regular job in order to avoid the closure of the enterprise and have thus little additional time to moonlight. Some workers who report wage arrears may also expect to be paid soon. On the other hand, for male workers, the data confirm that there is a positive association between the number of days spent on a compulsory unpaid leave in the regular job and the decision to enter the informal sector: each day of unpaid leave is estimated to raise the probability of taking an informal job by 1%. Hence, the current phenomenon of labour hoarding seems to have some non-negligible effects in terms of individual behaviour.

Similarly, unemployment seems to have a strong incidence on informal job holding for both men and women. Compared with individuals working in the regular economy, male and female unemployed in the primary labour market and looking for a job are respectively 14 and 7 percent more likely to join the informal sector. Those individuals not participating in the regular job market have also a probability of taking an informal job increased by 20% for men and 4% for women.

As far as the other controlled variables are concerned, one can see that for women, having young children exert a significant negative impact on the probability of their getting an informal job, presumably because these factors affect positively the value of leisure for women. For instance, an additional child is expected to decrease the probability of taking an informal job for women by 3% if the child is 2 years old or less, and by 2% if the child is between 2 and 5 years old. For men, the presence of young children seems to have an asymmetric effect: as the presence of young children increases the need for an additional income, it also tends to increase for men the probability of getting an informal job.

For males employed in the main economy, the results indicate that holding a primary job in a private firm, compared with employees in state firms, increases labour participation in the informal sector by 4%. Private sector male workers, who receive at the same time higher wages than workers in the public sector¹³, could be in fact more capable to adapt to the new economic circumstances and ready to join the informal sector than are employees remaining in the former socialised sector. They also may have more contacts to enter the informal economy.

It is also important to note that for both male and female individuals working in the main economy, the regular-sector hours have a significant negative effect on moonlighting, which seems to be a standard result in most studies on Western countries. Lastly, these estimates indicate that there are significant regional differences in the informal labour market. In particular, for both males and females, the probability of joining the informal sector was higher in Moscow and St-Petersburg, in the North Caucasian, in East Siberia and in the Far East.

5.2 The structural form equations

Table 7 reports the informal predicted log wage corrected for sample selection and derived from the previous wage equation. As we can see from this table, for both men and women, participants in the informal sector faced a higher predicted informal wage rate than non participants. This wage rate was then incorporated as a regressor in the structural probit and tobit equations, in order to recover the impact of several factors on the participation decision, net of their impact on the wage. After trying several specifications, we decided to include in the structural participation equations the informal wage rate in the logarithm form, but we excluded the urban and the ethnic dummies, which appeared to have a rather weak

¹³In late 1995, the wage rate among private sector employees was about 40 percent higher than among public sector employees.

direct impact on the participation decision. All the other explanatory variables included in the reduce-form model were kept as regressors in the structural equation. The estimates of the probit and tobit structural models are reported in Appendix Tables 4 and 5 respectively.

**Table 7: Predicted logarithm of informal wage rates
(in thousand roubles)**

	Participated in informal sector	
	Yes	No
Men	8.3	7.8
Women	8.0	7.7

5.2.1 The probit participation equation

In order to ease the interpretation of the structural probit estimates, in Appendix Table 4 we have reported the marginal probabilities for each explanatory variables computed at the mean values of all the other explanatory variables instead of the coefficients. The probit estimates indicate significant gender differences. For women, the predicted wage rate does not appear significant in the chosen specification, but its inclusion makes the age square variable and the dummy for university education no more significant. Hence, controlling for the wage effect, age seems to have a linear and positive impact on labour participation. In other words, older women are more likely to enter the informal economy. At the same time, married women, relative to divorced or single women, were less likely to take an informal job.

For men, the predicted informal wage rate has a positive and significant impact on participation, whatever the specification chosen is. Moreover, with the inclusion of the wage rate, age and age square are no more significant. As we said earlier, for men, these variables were capturing job experience and they have certainly played the role of proxies in the reduced-form model. An other interesting result in the structural probit equation is that the educational level variables become practically not significant. This suggests that for males, education tends to increase the probability of taking an informal job mainly through its positive effect on the predicted wage.

It is interesting to compare the results regarding the impact of the informal wage rate with a study on the second economy in the USSR in the late 1970s by Gaddy (1991). Using micro data on soviet emigrants to Israel, this author found a positive correlation between the expected wage in the second economy and the hours spent in a second job for both males and females. Other studies on moonlighting in the US by Shishko and Rostker (1976) and by Conway and Kimmel (1998) and in the UK by Bell and All (1997) found a similar pattern. However, a study of the decision to join the underground sector in Canada by Lemieux & Al (1994) found a negative correlation between the informal wage rate and the hours worked in the underground sector.

5.2.2 The tobit labour supplied equation

So far, we have discussed the determinants of participation in the informal labour market, ignoring the quantity of work that is supplied. Our final task is now to examine the

determinants of labour supply in terms of hours of work. To do so, our last regression was conducted on the same explanatory variables as for the probit structural equation, but the dependent variable was the hours of work spent per month in the informal labour market.

The tobit estimates reported in Appendix Table 6 are consistent with the probit structural estimates. Regular sector hours gain in significance, indicating a stronger negative correlation with the time spent in the informal job more so than with the probability to take such a job. The predicted informal wage variable remains almost not significant for women and highly significant for men. This provides evidence that for men, the informal wage exerts a positive impact on the hours spent in the informal sector, the estimate for the wage elasticity taken at the mean value of positive hours being 0.84. It is also interesting to note that though the regular economy earnings variables are not particularly significant - except for pensions among men - they have the negative expected sign on the time spent in an informal job.

6 Conclusion

This paper has drawn attention to the Russian informal labour market and has tried to identify the determinants of labour supply in the informal economy in Russia during transition, using nationally representative micro data from late 1995. The results presented here may appear somehow tentative given the difficulty of finding adequate data on the informal sector. The RLMS survey used for this empirical analysis provides only imperfect and probably understated estimates of participation in the informal economy. Moreover, these estimates depend strongly on the definitions and the measures chosen to characterize informal jobs. Lastly, our theoretical model assumes a sequential decision making, though a model in which decisions are taken simultaneously could be addressed in future research. Notwithstanding these limitations, the findings provides some interesting insights into the informal labour market and they may have important implications for growing concern about the size of the shadow economy.

Based on the RLMS data, we have estimated the size of the informal labour market in Russia at about 7.5% of the adult population and 7.6% of the employed. In late 1995, informal wages represented an average of 7% of family income for all families, and more than 36% for families engaged in the informal sector. The high returns observed in the informal economy relative to the regular sector were however associated with a large degree of wage and gender inequalities.

A general belief was that the rise in unemployment and increased rationing in regular employments, along with the fall in traditional income sources and the widening of wage arrears, has been one of the major factors contributing to the rise in the informal labour market. The data provide some support for these hypotheses, though men and women tend to have different attitudes towards the informal labour market. For men, unemployment and rationing in the regular job market in the form of compulsory unpaid leave increase both the probability of taking an informal job and the time spent in the informal sector. For women, the unemployment variable exerts a significant impact, but the days spent on compulsory

unpaid leave are not statistically significant.

Perhaps the most surprising result is the fact that wage arrears, first economy earnings and other family income variables were not particularly significant in explaining the decision to join the informal economy. But this result casts some additional light on the informal economy. Informal job holding is not solely a safety valve for low paid rationed individuals in the regular labour market. It seems to be also a way for well paid individuals and the "nouveaux riches" to use their privileged position in the main economy and to make additional money.

Finally, the decision to participate and the quantity of work performed in the informal economy are negatively related to the length of time worked in the regular sector for both males and females, and positively responsive to a change in the informal wage rate for men. That is, the men labour supply curve in the informal economy appears to be forward sloping.

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Appendix

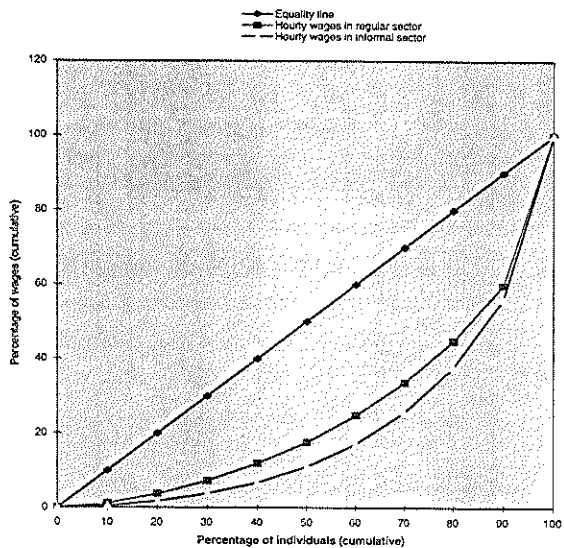


Figure3: Lorenz curves for regular and informal wage rates

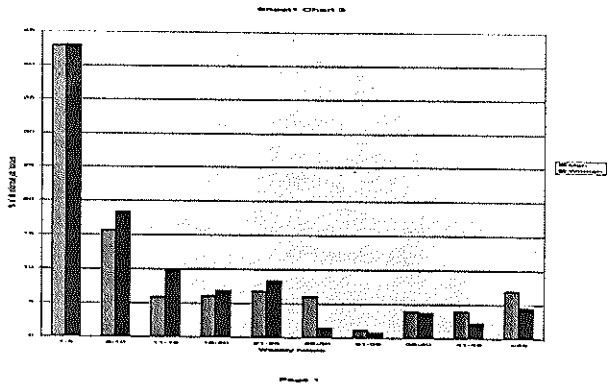


Figure 4: Distribution of hours in informal sector for all informal job holders

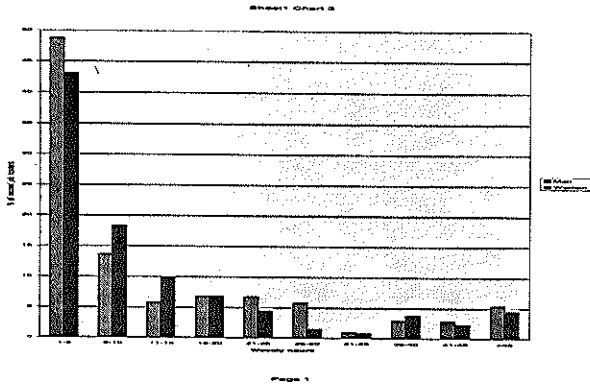


Figure 5: Distribution of hours in informal sector for second job holders

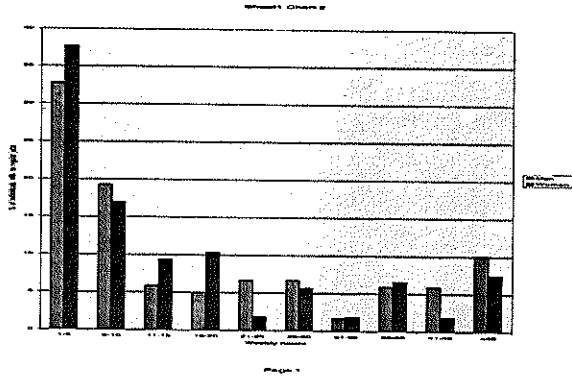


Figure 6: Distribution of hours in informal sector for those with no regular jobs

Appendix Table 2: Means of variables for men and women

Variables	Participate in the informal sector			
	Men		Women	
	Yes (N=286)	No (N=2641)	Yes (N=204)	No (N=3361)
Personnal characteristics				
age	37.2	41.4	39.4	44.9
university education	0.26	0.20	0.29	0.20
vocational education	0.53	0.42	0.43	0.42
married	0.75	0.74	0.57	0.61
slavic	0.93	0.90	0.91	0.91
baltic	0.02	0.04	0.03	0.03
caucasian	0.02	0.03	0.03	0.03
central asiatic	0.03	0.03	0.03	0.03
Family characteristics				
children aged 0-2	0.13	0.10	0.03	0.06
children aged 3-5	0.18	0.11	0.07	0.12
children aged 6-15	0.60	0.53	0.61	0.51
Main economy hours and earnings				
regular sector monthly hours (> 0)	163.1	181.3	145.0	155.4
regular sector monthly wage (> 0)	849.3	839.8	515.1	535.6
pensions(> 0)	285.1	346.1	254.4	271.5
unemployment benefits(> 0)	302.8	152.7	79.1	128.6
Other family income				
labour income	678.1	777.8	917.7	1028.2
other non-labour income	265.2	295.0	298.6	267.1
Primary labour market status				
working	0.63	0.66	0.52	0.52
unemployed searching	0.27	0.08	0.21	0.06
student	0.03	0.07	0.04	0.05
retired not working	0.03	0.18	0.11	0.31
not willing to work	0.04	0.01	0.12	0.06
Main job characteristics				
days of unpaid leave in regular job(> 0)	60.5	33.4	69.1	56.0
individual reports wage arrears	26.6	27.9	23.0	19.5
regular job in private firm	0.45	0.32	32	0.27
Location				
urban	0.82	0.75	0.83	0.76
Moscow, St. Petersburg	0.14	0.08	0.16	0.09
Northern and North Western	0.06	0.06	0.04	0.06
Central and Central Black-Earth	0.17	0.19	0.18	0.20
Volga-Vaytski and Volga Basin	0.15	0.19	0.11	0.19
North Caucasian	0.16	0.11	0.15	0.10
Ural	0.12	0.16	0.13	0.16
Western Siberia	0.08	0.10	0.09	0.10
Eastern Siberia and Far East	0.12	0.11	0.14	0.10

Appendix Table 3: FIML simultaneous estimates

Variables for the wage equation	Women		Men	
	Coeff.	t-stat.	Coeff.	t-stat.
Personnal characteristics				
age	0.058	(1.23)	0.159	(3.77)
age square/1000	-0.986	(-1.69)	-2.15	(-4.09)
university education	0.086	(0.40)	0.402	(1.76)
vocational education	-0.196	(-1.01)	0.195	(0.99)
married	0.395	(2.23)	0.374	(2.09)
ethnic Slavic	-0.188	(-0.71)	0.267	(0.93)
Location				
urban	0.084	(0.36)	0.499	(2.49)
Northern and North Western	0.062	(0.13)	0.222	(0.61)
Central and Central Black-Earth	0.040	(0.14)	0.268	(1.01)
Volga-Vaytski and Volga Basin	-0.222	(-0.67)	0.180	(0.65)
North Caucasian	0.344	(0.18)	0.574	(2.10)
Ural	-0.325	(-1.05)	-0.264	(-0.89)
Western Siberia	-0.209	(-0.63)	-0.053	(-0.16)
Eastern Siberia and Far East	-0.412	(-1.38)	0.448	(1.57)
Constant	7.405	(5.6)	4.279	(4.09)
rho	0.35	(1.31)	0.503	(3.32)
number of observations	204		286	

Appendix Table 4: FIML simultaneous estimates

Variables for the participation equation	Women		Men	
	Coeff.	t-stat.	Coeff.	t-stat.
Personal characteristics				
age	0.110	(5.27)	0.059	(2.80)
age square/1000	-1.384	(-5.26)	-0.716	(-2.71)
university education	0.178	(1.65)	0.356	(3.39)
vocational education	0.010	(0.11)	0.321	(3.68)
married	-0.323	(-3.90)	0.030	(0.31)
ethnic Slavic	-0.119	(-0.95)	0.214	(1.62)
Family characteristics				
children aged 0-2	-0.368	(-2.07)	0.144	(1.48)
children aged 3-5	-0.312	(-2.48)	0.229	(2.63)
children aged 6-15	-0.066	(-1.27)	0.012	(0.26)
Main economy hours and earnings				
regular-sector hours/1000	-1.456	(-2.06)	-0.868	(-1.81)
regular-sector monthly wage/10 ⁶	-0.102	(-0.99)	-0.036	(-0.69)
pensions/10 ⁶	-0.693	(-1.32)	-1.54	(-2.57)
unemployment benefits/10 ⁶	-1.480	(-0.69)	0.431	(0.23)
Other family income				
labour income/10 ⁹	31.6	(0.86)	-5.44	(-0.11)
other non-labour income/10 ⁹	0.329	(0.00)	-75.8	(-1.48)
Primary labour market status				
unemployed searching	0.576	(3.58)	0.767	(6.00)
student	-0.146	(-0.61)	-0.163	(-0.80)
retired not working	0.072	(0.32)	-0.042	(-0.17)
not willing to work	0.323	(1.78)	0.883	(3.89)
Main job characteristics				
days spent on unpaid leave in regular job	0.000	(0.41)	0.006	(2.51)
individual reports wage arrears	0.133	(1.28)	0.045	(0.53)
regular job in private firm	0.075	(0.69)	0.190	(2.12)
Location				
urban	0.102	(1.01)	0.187	(1.96)
Northern and North Western	-0.405	(-2.01)	-0.318	(-1.81)
Central and Central Black-Earth	-0.247	(-1.86)	-0.280	(-2.13)
Volga-Vaytski and Volga Basin	-0.412	(-2.85)	-0.412	(-2.99)
North Caucasian	-0.019	(-0.12)	-0.012	(-0.08)
Ural	-0.329	(-2.30)	-0.481	(-3.39)
Western Siberia	-0.280	(-1.76)	-0.298	(-1.91)
Eastern Siberia and Far East	-0.057	(-0.40)	-0.117	(-0.80)
number of observations	3565		2927	

Appendix Table 5: Structural probit estimates

Variables	Women		Men	
	$\frac{\partial \Pr(y=1)}{\partial X_m}$	t-stat.	$\frac{\partial \Pr(y=1)}{\partial X_m}$	t-stat.
Predicted log of informal wage rate	0.063	(1.35)	0.051	(2.25)
Personal characteristics				
age	0.005	(1.70)	-0.001	(-0.25)
age square/1000	-0.053	(-1.04)	0.024	(0.41)
university education	0.010	(1.02)	0.026	(1.37)
vocational education	0.014	(0.14)	0.031	(2.45)
married	-0.060	(-2.60)	-0.014	(-0.90)
Family characteristics				
children aged 0-2	-0.033	(-2.24)	0.013	(0.99)
children aged 3-5	-0.026	(-2.56)	0.025	(2.12)
children aged 6-15	-0.005	(-1.38)	0.001	(0.20)
Main economy hours and earnings				
regular-sector hours/1000	-0.104	(-1.80)	-0.111	(-1.74)
regular-sector monthly wage/10 ⁶	-0.008	(-0.96)	-0.003	(-0.52)
pensions/10 ⁶	-0.064	(-1.34)	-0.206	(-2.57)
unemployment benefits/10 ⁶	-0.129	(-0.75)	0.002	(0.11)
Other family income				
labour income/10 ⁹	2.590	(0.85)	-0.298	(-0.05)
other non-labour income/10 ⁹	0.548	(0.14)	-7.620	(-1.19)
Primary labour market status				
unemployed searching	0.077	(3.72)	0.148	(5.72)
student	-0.006	(-0.34)	-0.022	(-0.85)
retired not working	-0.010	(-0.55)	-0.020	(-0.53)
not willing to work	0.044	(2.33)	0.201	(3.78)
Main job characteristics				
days spent on unpaid leave in regular job	0.000	(0.66)	0.001	(3.08)
individual reports wage arrears	0.011	(1.21)	0.003	(0.29)
regular job in private firm	0.008	(0.91)	0.039	(3.07)
Location				
Northern and North Western	-0.026	(-2.26)	-0.039	(-2.24)
Central and Central Black-Earth	-0.020	(-2.11)	-0.041	(-2.77)
Volga-Vaytski and Volga Basin	-0.017	(-1.31)	-0.049	(-3.44)
North Caucasian	-0.019	(-1.25)	-0.026	(-1.50)
Ural	-0.006	(-0.35)	-0.040	(-2.43)
Western Siberia	-0.009	(-0.63)	-0.029	(-1.70)
Eastern Siberia and Far East	0.025	(0.39)	-0.030	(-1.77)
number of observations	3565		2927	

Appendix Table 6: Structural tobit estimates

Variables	Women		Men	
	Coeff.	t-stat.	Coeff.	t-stat.
Predicted log of informal wage rate	100.5	(1.57)	55.61	(2.57)
Personal characteristics				
age	6.19	(1.38)	-3.983	(-0.92)
age square	-0.051	(-0.72)	0.057	(1.00)
university education	21.63	(1.62)	20.10	(1.23)
vocational education	25.42	(1.55)	22.29	(1.90)
married	-81.42	(-2.97)	-17.49	(-1.20)
Family characteristics				
children aged 0-2	-53.29	(-2.55)	5.703	(0.45)
children aged 3-5	-38.07	(-2.66)	25.64	(2.34)
children aged 6-15	-5.389	(-0.92)	-0.330	(-0.05)
Main economy hours and earnings				
regular-sector hours	-0.162	(-2.07)	-0.137	(-2.28)
regular-sector monthly wage/10 ⁴	-0.153	(-1.29)	-0.046	(-0.71)
pensions/10 ⁴	-0.883	(-1.47)	-2.137	(-2.83)
unemployment benefits/10 ⁴	-0.278	(-1.07)	-0.196	(-0.08)
Other family income				
labour income/10 ⁶	0.909	(0.21)	4.080	(0.74)
other non-labour income/10 ⁶	3.67	(0.79)	-5.180	(-0.91)
Primary labour market status				
unemployed searching	72.91	(3.95)	88.73	(5.51)
student	-26.91	(-1.00)	-51.89	(-2.02)
retired not working	7.45	(0.29)	-11.84	(-0.39)
not willing to work	45.31	(2.31)	126.2	(4.57)
Main job characteristics				
days spent in unpaid leave in regular job	0.154	(1.15)	0.814	(2.71)
wage arrears	19.53	(1.66)	6.035	(0.56)
regular job in private firm	21.93	(1.82)	20.67	(1.91)
Location				
Northern and North Western	-60.66	(-2.55)	-39.74	(-1.93)
Central and Central Black-Earth	-21.69	(-1.45)	-52.10	(-3.14)
Volga-Vaytski and Volga Basin	-29.61	(-1.37)	-63.01	(-3.78)
North Caucasian	-38.52	(-1.45)	-35.62	(-1.88)
Ural	1.506	(0.05)	-50.19	(-2.69)
Western Siberia	-13.68	(-0.59)	-31.32	(-1.67)
Eastern Siberia and Far East	37.17	(1.15)	-43.98	(-2.29)
number of uncensored observations	236		324	