Household child care choices and women's work behavior in Russia

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Abstract

The paper models the household demand for child care, mothers' labor force participation and working hours, in Russia. The model estimates the effects of the price of child care, mothers' wages, and household income on household behavior and well-being. The theoretical model yields several predictions. To test these, reduced-form equations of the discrete and continuous household choices are estimated jointly using the method of Semi-Parametric Full Information Maximum Likelihood. This method controls for the correlations of error terms across outcomes, and the correlation of error terms that can result when panel data are used. The results of this analysis indicate that the extent to which mothers participate in the labor force and for how many hours depends on the costs of child care and what level of hourly wages is available to them and to other members of their household. The simulations presented in this paper show that family allowances – intended as a means of reducing poverty – do not have a significant effect on the household choice of child care arrangements. Replacing family allowances with child care subsidies may have a strong positive effect on women's labor force participation and thus can be effective in reducing poverty.

JEL Classification: J21,O15
Key words: Labor Supply, Child Care, Semi-Parametric Maximum Likelihood, Russia

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1. Introduction

This paper examines the interdependency of the women's labor force activity and household child care choices in Russia.

In the days of the Soviet Union, more women participated in the labor force than in almost any other country in the industrialized world. In the 1980s about 90 percent of prime-age women were either employed or went to school (Lapidus, 1985). Women in the Soviet Union worked full-time the whole year round. There was very little part-time employment; less than one percent of the work force was employed under such arrangements.

Soviet women could not have been involved in the economy to such an extent if a wide range of government-subsidized child care programs, such as nurseries, preschool, kindergartens, and after-school programs, had not existed. The number and variety of state-provided child care facilities increased steadily throughout the Soviet era. By the late 1980s some 15 million children between one and six years of age (70 percent of children from that age group) were registered in public child care institutions (Matthews, 1986).

Reforms launched by the Russian government in early 1992 lead to a dramatic change in the socioeconomic environment in Russia and put a great strain on the existing system of social protection and state-subsidized institutions. A sharp decline in GNP in the 1990s resulted in an ever widening budget deficit, shrinking government-funded programs, and a dramatic decline in the number of state-run child care organizations. According to GosKomStat (the Russian government's national statistics agency), the proportion of children in preschool facilities dropped by more than 50 percent (GosKomStat, 1995) between the mid-1980s and the mid-1990s.

Not only has the number of kindergartens and nurseries decreased sharply, but the cost of sending children there has soared. In the days of the Soviet Union, families' child care costs were partly or totally covered by subsidies from the federal and local governments and/or by funding from employers. By now virtually all government child support programs in Russia have been eliminated and only a handful of companies can afford to pay for the daycare services for their employees' children. This affects all families with young children and low-income families in particular.

Thus, over the last decade, the situation in Russia has moved from one in which child care was provided by the government and almost all households with children had access to affordable and often free-of-charge child care facilities, to one in which the cost of day-care is becoming an important determinant of household labor supply decisions.

The research described in this paper is prompted by the complexity of the problems faced by families with children in the transitional economy and by the significant impact that the reform in the child care system has had on the political and economic environment in Russia.

This study appears significant in light of many contemporary economic theories of childbearing and female labor force participation. The availability and affordability of child care are significant factors in a mother's decision about whether to enter, reenter, or remain in the labor force, and on her consequent decisions about her fertility (Blau and Robins 1989; Leibowitz et al. 1988). In addition, the availability, convenience, or costs of child care may prevent some women from participating in the labor force or from getting a full-time job (Bloom and Steen 1990; Blau and Robins 1989; Floge 1985). Such constraints may be especially acute among less-educated women or unmarried mothers (Mincer and Ofek, 1982; Presser and Baldwin, 1980). To the extent that child

care represents yet another important mechanism in the process by which social inequality is disproportionately experienced by women and children, a better understanding of the child care choices and effects on children raised within different socio-economic groups will inform theoretical and policy discussions about the contexts in which economic changes enhance or compromise children's development.

In this paper, I model households' child care choices, the decisions that Russian mothers make about whether to participate in the labor force, and the number of hours that they work. Using a model of consumer demand for state-provided child care, I estimate how the price of child care, mothers' wages, and household income all affect households' behavior and welfare.

The econometric model that I use is derived from a theory described in the literature on the household decision-making about women's participation in the labor market and about child care. The theory has several testable predictions. I test the hypotheses implied by this economic theory by jointly estimating reduced-form models of both the discrete and continuous choices of households using the method of Semi-Parametric Full Information Maximum Likelihood (SPFIML). This method takes into account the error term correlations across outcomes, and correlation of the error terms that can result when panel data are used.

The estimation reveals that the decision that mothers make about participating in the labor force and about the number of hours they work are relatively sensitive to changes in hourly wages, and, to a lesser degree, to changes in the cost of child care. To examine how household behavior is affected by child care subsidies and hourly wage policies, I use simulations based on the paper's estimates. These simulations indicate that the payment of family allowances to households with children does not have a significant effect on whether or how much they use formal child care or whether and how much the mothers work. However, a decrease in child care cost has a strong positive effect on the labor activity of women with children and on the use of formal child care.

This is the first study to analyze the mothers' employment, mode choice, and demand for formal child care in Russia in a unified framework. I use this approach because of the simultaneity of the household decisions about modes of care, employment and demand for child care. Analyzing all these decisions together has enabled me to obtain consistent estimates of the effects of the child care prices and of the level of wages on the discrete and continuous outcomes.

Until lately, there has been little research on the economics of child care outside of the United States. Recently, a certain amount of research on child care has been conducted in the nations of Western Europe where (as in the US) growing numbers of women with young children have been entering the workforce (see, for example, Gustafsson and Stafford, 1992; Cleveland, Gunderson and Hyatt, 1996; Van Den Brink and Groot,1997). To date, there is only a very limited amount of research on child care and women's labor market activity in the developing countries. This includes a paper by Wong and Levine (1992) that focuses on child care and household time use by analyzing the effects of household composition on mothers' employment in Mexico. A paper by Connelly, DeGraph and Levison (1996) examines the effect of child care arrangements on the rate of women's participation in the labor force in Brasil. To my knowledge, there are no formal economic studies of child care in Russia.

This paper is based on recent progress in the theory of demand for child care and women's labor supply in the U.S. Methodologically, the paper follows the work of Blau and Robins (1988), Ribar (1992 and 1995), Conelly (1992), Michalopoulos, Robins, Garfinkel (1992), Kimmel (1995,

1996), Averet, Peters and Waldman (1997) all of whom jointly model households' decisions about child care and mothers' decisions about entering the workforce.

2. **Theoretical model**

The analysis applies to households with children under seven years of age. There are three forms of child care available to households in Russia: informal care provided by the mother, informal child care provided by other household members, and formal child care. For households with children and two parents, the husband is considered a potential provider of free child care. In a household with a single mother who has no relatives living with her, it is assumed that any informal child care is provided by children themselves or relatives who live outside the household.

The theoretical model used in this paper is based on the assumption that household members make choices about their consumption of child care quality, of market goods, and of leisure. A household's decisions as to the quality of child care it wishes to obtain, and about the amount of time each member of the household can work are motivated by the desire to achieve the highest level of household welfare. Household utility maximization occurs at the point where: (i) the ratio of the marginal utility of the market good consumption to the marginal utility of the quality of child care purchased on the market equals the ratio of their respective prices, and (ii) the loss in utility from an additional hour of work is offset by the gain in utility from the additional consumption of market goods that becomes possible due to the additional earnings and utility that are yielded when the household substitutes formal child care for in-house care.

This theoretical framework makes it possible to model a wide range of household child care choices and labor supply decisions that involve various combinations of formal and informal care that are typical of the extended household structure that is prevalent in Russia.

The model is made tractable through a number of simplifying assumptions. First, it is assumed that children require continuous care. Second, the household structure and the number of children are assumed to be exogenous. It seems reasonable to make this assumption, even though it has been shown (Blau, Robins, 1989) that household fertility decisions depend on the cost of child care, because of a relatively short time span covered by the three rounds of the survey and rapid changes that are occurring in the prices of child care. Third, the assumption is made that free child care is available for a mother during the entire time she is at work. The assumption is important to enable me to apply the same theoretical framework to households with different structure. Also, this assumption reflects the fact that the availability of acceptable options is a major influence on the mother's decision to work. Forth, it is assumed that household members derive utility from the quality of child care they choose. This utility is represented by the discounted value of a potential improvement in children resulting from a higher quality of child care or by the current utility of the family knowing that their children are in competent hands. Fifth, it is assumed that mothers spend all their free time on child care, i.e., that the mother's leisure time and time she spends caring for children are perfect substitutes. This, of course, is a simplifying assumption, but Blau and Robins have demonstrated (1989) that no new insights are achieved by separating the time that a mother spent on child care from her leisure time. Sixth, it is assumed that households can use all three types of child care at once, in which case the average quality of child care is the weighted sum of the quality provided by the different sources. In other words, it is assumed that there is a perfect substitution between the child care arrangements. In the model, the quality of child care provided by the mother and/or by the other members of the household is considered to be exogenous. However, the quality of market-provided care can be chosen by the household.

In the one-period utility maximization problem the household chooses its consumption of a Hicksian composite good G, the average per hour quality of child care Q, the leisure time of the mother L_m, and the leisure time of other household members L_0 subject to its budget and time constraints. The household utility function is assumed to be twice-continuously differentiable and quasi-concave:

$$Max\, U = U(L_m, L_0, G, Q). \quad (1.1)$$

The total quality of child care Q is the weighted sum of the exogenous quality of the child care provided by the mother Q_m, the quality of child care purchased on the market Q_p, and the exogenous quality of child care provided by relatives Q_0:

$$Q = Q_m L_m + Q_p (H_m - T_0) + Q_0 T_0. \quad (1.2)$$

The budget constraint includes total household expenditures on child care as a function of the number of children in the household, of the per unit quality price of child care, of the quality of formal care, and of the time spent by the children in care:

$$G = E + W_m H_m + W_0 H_0 - N\, P_q\, Q_p (H_m - T_0), \quad (1.3)$$

where E is the exogenous non-wage household income, H_m is the mother's actual work time, H_0 is the other household members' actual work time, N is the number of children in the household, P_q is the exogenous price of the unit of quality of formal child care, T_0 is the amount of time spent by other household members on child care, W_m is the market wage available to the mother, and W_0 indicates the market wage available to the other household members.

Finally, the model specifies – under the assumption that children require constant care– the time constraints affecting the mother, the other household members, and the children:

$$L_m + H_m = L_0 + H_0 + T_0 = 1 \quad (1.4)$$

$$H_0 - T_0 \geq 0 \quad (1.5)$$

$$0 \leq T_0, H_0, L_0, L_m, H_m \leq 1 \quad (1.6)$$

Solving[2] the first-order conditions of the household utility maximization problem (1.1-1.6) with respect to L_m, L_0, T_0, and Q_p as a function of the exogenous variables, it is possible to show that there is no full interior solution for those situations when the household freely chooses all four variables: L_m, L_0, T_0, and Q_p, i.e., when the mother works, other household members work, child care is provided by the working mother when she does not work; by other working family members during periods when the mother works and they do not work; and by a formal child care provider during periods when both the mother and the other family members work[3]. There are, however, five

[2] For a formal derivation of the solution for the household utility maximization problem, for corner solutions maximization problems and for comparative statics results see Lokshin (1999).

[3] The existence of only corner solutions of the model (1.2-1.6) results from the two assumptions imposed on the model, i.e., the assumption about the perfect substitution between the modes of care and the assumption about the perfect substitution between the mother's time of leisure and time mother spend

meaningful corner solutions of the model that are presented in Table 1.

The household simultaneously solves the following two-part problem of its utility maximization. Assuming a given corner solution, the household optimizes the labor supply of its members and chooses the optimal quality of child care. Subsequently the household chooses the corner solution with the highest utility.

How the exogenous variables affect the probability that a household will choose a particular type of child care arrangement and will choose whether its members participate in the labor force can be determined by analyzing the first derivatives of the indirect utility functions for every corner solution with respect to the variables of interest.

An increase in the mother's wage W_m will increase the probability that the household will choose the states in which the mother is employed by raising the indirect utility values for states *1,2,3*, and *4*, and leaving the utility for state *0* unchanged. An increase in the per unit quality price of child care P_q does not affect the utility of choosing such states when no formal child care is purchased (states *0, 1,* and *2*). Such an increase would lower the utility of selecting the states where a household uses formal child care (states *3* and *4*). A increase in the wage rate of family members W_0 will increase the utility in states *1* and *3*. An increase in the quality of mother-provided child care Q_m will raise the utility in each state. However, because in states *1-4* $L_m<1$, the increase in utility will be the greatest in state *0*, i.e., when the mother does not work. An increase in Q_0 will raise household utility in those states in which other family members provide child care (states *1, 2*, and *4*) and thus increase the likelihood of a household selecting these states. In case of state 4, the time constraint and non-negativity condition result in $T_0<H_m$. Thus, the exogenous change in the quality of informal child care makes it more likely that households will choose states *1* and *2*, in which the household only uses informal care, than state *4*, in which household uses both formal and informal child care.

The first order condition of the household utility maximization problem (1.1-1.6) can also be used to determine how exogenous variables affect the number of hours that the mothers devote to employment and the number of hours children spend in paid care. If it is assumed that formal child care is a normal good, then an increase in the price of formal care is likely to decrease the number of hours of formal child care purchased by households. If the wages available to mothers increase, then this is likely to increase households' use of formal care. The effect of wages and the cost of child care on mothers' labor supply appears undeterminable by the theory.

3. Empirical model

The empirical model used in this paper consist of a discrete choice equation for the child care mode and mother's labor supply, an equation for a mother's hours at work, and an equation for children's hours in paid care.

For the discrete choice model, the utility that the *i*th household derives from the choice of the *j*th alternative at time t can be expressed in linearized form as:

$$\Omega_{ijt} = \overline{\Omega_{ijt}} + \varepsilon_{ijt} = X_{it}\beta + Z_{ijt}\gamma + \varepsilon_{ijt} \qquad j = 0,...,4 \qquad (2.1)$$

caring for children (Assumption 5 and 6). However, the relaxation of these restrictions, offers no new testable insights into the model. The empirical observations about the actual choices of child care and labor supply of Russian households confirm the validity of the chosen theoretical approach.

where Ω_{ijt} is an indirect utility function for household i choosing state j at time t, X_{it} is the vector of the household characteristics that affect the choice of the *i*th household at time t and that do not vary by state, Z_{ijt} is the vector of outcome-specific variables, β and γ are vectors of unknown parameters, and ϵ_{ij} is a random disturbance that reflects, among other things, unobservable attributes of the alternatives. The probability that the household i chooses state j at time t is then:

$$\begin{aligned} \Pr_{it}(j) &= \Pr[\boldsymbol{\Omega}_{j\,it} > \boldsymbol{\Omega}_{q\,it} && \text{for any } j \neq q] \\ &= \Pr[\boldsymbol{\varepsilon}_{j\,it} - \boldsymbol{\varepsilon}_{q\,it} > X(\boldsymbol{\beta}_{q\,it} - \boldsymbol{\beta}_{j\,it}) + Z(\gamma_{q\,it} - \gamma_{j\,it}) && \text{for any } j \neq q] \end{aligned}$$

The demand functions of a mother's hours at work and hours spent by children in formal care can be specified in a linear form as:

$$H_{it}^{\,k} = \boldsymbol{\alpha}^k X_{it} + \boldsymbol{\varphi}^k Z_{it} + \xi_{it}^{\,k}, \text{ where } k = 1,\ldots,K \qquad (2.2)$$

Here, $H_{it}^{\,k}$ is the continuous dependent variable k associated with household i in state j at time t. In the first continuous outcome equation, $H_{it}^{\,1}$ is the number of hours that a mother supplies to the labor market (if she works), and $H_{it}^{\,2}$ is the number of hours spent by children in formal child care facilities in those states where formal child care arrangements have been chosen. X_{it} and Z_{it} are the vectors of the variables defined above, φ^k and α^k are vectors of unknown parameters, and $\xi_{it}^{\,k}$ is an error term with mean zero.

The theoretical model assumes that a household makes simultaneous decisions about the mode of child care it wishes to use, the labor supply of each of its members, the amount of time that each family member spends on child care, and about the amount of time that their children spend in formal care. All of these decisions are determined by the exogenous characteristics of the family and individual family members, both observable and unobservable. It is possible to estimate discrete choice equation (2.1) and continuous variable equations (2.2) jointly.

There are several estimation issues that need to be discussed. First, the error terms in the discrete ϵ and continuous ξ^k equations may be correlated across states and among each other. The correlation across states is a correlation among disturbances in the state-specific indirect utility functions V_{ijt}'s. If, for instance, a mother's participation in the labor force is determined by, among the other factors, some unobservable taste for work, it is going to hold true for all of the states in which a mother works.

The same example of an unobservable preference for work can help to illustrate the possibility of a correlation among the errors terms of equations (2.1) and (2.2). In the continuous equation, the number of hours that a mother supplies on the labor market depends, among other things, on her taste for work. Women with a high preference for work can be expected to work longer hours and are more likely to be employed. This means that there may be a correlation between the disturbance in the equation for a household's choice of a discrete state and the equation for the amount of time that women supply on the labor market. Similar correlations can exist for the equations that determine the following: *(i)* labor supply decisions of the other family members, *(ii)* time spent on child care by the mother and the other family members, and *(iii)* household child care arrangements.

In addition, because panel data are used in the model, there exists the possibility of a correlation in the error terms among the multiple observations of the same family (correlation between ϵ_{ijt2} and ϵ_{ijt1}, $t_1 \neq t_2$ and correlations between $\xi_{it1}^{\,k}$ and $\xi_{it2}^{\,k}$, $t_1 \neq t_2$). Macro time effects (not

household-specific) in disturbances ϵ and ξ can be controlled by the introduction of time-specific dummy variables into equations (2.1) and (2.2).

If it is assumed that the errors are not correlated when in fact they are, then the point estimates will be biased and inconsistent. To account for such possible error correlations in a tractable way I impose a factor structure on the disturbances in equations (2.1) and (2.2):

$$\varepsilon_{ijt} = \mu_{ijt} + \rho_{j1} V_{1i} + \rho_{jt2} V_{2ti} \tag{3.1}$$

$$\xi^{A}_{it} = \lambda_{it} + \tau_1 V_{1i} + \tau_{t2} V_{2ti} \tag{3.2}$$

$$\xi^{B}_{it} = \gamma_{it} + \varsigma_1 V_{1i} + \varsigma_{t2} V_{2ti} \tag{3.3}$$

where μ_{ijt} is an independent extreme value and , λ_{it}, and γ_{it} are mutually-independent random variables that are assumed to be independent of the regressors in the model. V_1 is a permanent factor (the factor that remains the same for the household at any time point and is similar to the household-specific effect) while V_2 is a transitory factor (within a single household, the factor will be different at any two different points in time). These factors are unobservable variables that influence the choices made by households and that have no correlation with explanatory variables. ρ's, τ's, and ς's are factor loadings that represent the effect of a given factor in each equation.

We introduce a two-factor structure to account for the two major possible sources of heterogeneity in the disturbances – the inter-equation correlation of the error terms and the panel structure of data. The use of both time-invariant and transitory factors helps to take into account this potentially complex form of correlation. These assumptions about the structure of the error terms in the equations (2.1) and (2.2) are considerably more flexible than the common practice of imposing a specific functional form of the distributions of v's (see for example, Gourieroux and Monfort (1996) and Berry and Pakes (1990)).

The system of equations (2.1-2.2) with the error structure (3.1-3.3) can be estimated by the Semi-Parametric Full Information Maximum Likelihood (SPFIML) method developed by Liard (1978), and Heckman and Singer (1984), and applied to simultaneous equations by Mroz and Guilkey (1992), and Mroz (1999).

Assuming the independent, extreme-value distribution of ϵ, the contribution of the discrete outcome part of the model to the likelihood function has the form of a multinominal logit, conditional on V's. Assuming that the error terms of the continuos outcome equations are normally and independently distributed, these equations contribute to the likelihood function in the form of normal regressions. I assume that the distributions of the v's in equations (2.1-2.2) may be approximated by the following step functions:

$$\Pr(V_1 = v_{1m}) = P_m,\ P \geq 0 \ and \ \sum_{m=1}^{M} P_m = 1 \tag{4.1}$$

$$\Pr(V_2 = v_{2k}) = \pi_k,\ \pi \geq 0 \ and \ \sum_{k=1}^{K} \pi_k = 1 \tag{4.2}$$

where v's are the points of support in the distribution of the factors 1 and 2, P and π are the probability that the factors take value v, and M and K are the numbers of points of support of the distribution of each V.

The above specification implies that each household has an access to all possible child care arrangements and all potential employment outcomes. However, a significant proportion of Russian families have no access to formal child care facilities. Also, Russian legislation specifies that only children older than 18 months of age can be accepted by formal care institutions. For these groups of families the conditional contribution of the discrete outcome equation to the likelihood function is calculated based on a restricted set of possible forms of care, i.e., that there are no formal care arrangements available in the choice set of these households:

Households with access to all forms of care

$$\Pr(Y_{it}=j|v_{1m},v_{2k})^{A}=\frac{e^{\beta_j x_{it}+\rho_{j1}v_{1m}+\rho_{jt2}v_{2m}}}{1+\sum_{k=1}^{4}e^{\beta_k x_i+\rho_{k1}v_{1k}+\rho_{kt2}v_{2m}}} \quad for\ j=1,\ldots,4$$

$$\Pr(Y_{it}=0|v_{1m},v_{2k})^{A}=\frac{1}{1+\sum_{k=1}^{4}e^{\beta_k x_i+\rho_{k1}v_{1k}+\rho_{kt2}v_{2m}}}$$

Households with no access to formal care or households with children younger 18 months

$$\Pr(Y_{it}=j|v_{1m},v_{2k})^{NA}=\frac{e^{\beta_j x_i+\rho_{k1}v_{1m}+\rho_{kt2}v_{2k}}}{1+\sum_{k=1}^{2}e^{\beta_k x_i+\rho_{k1}v_{1m}+\rho_{kt2}v_{2k}}} \quad for\ j=1,2$$

$$\Pr(Y_{it}=0|v_{1m},v_{2k})^{NA}=\frac{1}{1+\sum_{k=1}^{2}e^{\beta_k x_i+\rho_{k1}v_{1m}+\rho_{kt2}v_{2k}}} \qquad (5)$$

where $\Pr(Y_{it}=j|v_{1m},v_{2k})^{A}$ is the probability that household i (which has an access to formal child care facilities) chooses state j at time t conditional on the realization of factors V_1 and V_2, and $\Pr(Y_{it}=j|v_{1m},v_{2k})^{NA}$ is the same probability for those households with no access to the formal child care.

For the continuous outcome equations (2.2), the conditional on the v's probabilities are:

$$\Pr(H_{it}^{1}|v_{1m},v_{2k})=\frac{1}{\sigma^{1}_{it}}\varphi\left(\frac{H_{it}{}^{1}-x_{it}{}^{1}\alpha^{1}-z_{it}{}^{1}\gamma^{1}-\tau_1 v_{1m}-\tau_2 v_{2k}}{\sigma^{1}_{it}}\right) \qquad (6.1)$$

$$\Pr(H_{it}^{2}|v_{1m},v_{2k})=\frac{1}{\sigma^{2}_{it}}\varphi\left(\frac{H_{it}{}^{2}-x_{it}{}^{2}\alpha^{2}-z_{it}{}^{2}\gamma^{2}-\varsigma_1 v_{1m}-\varsigma_2 v_{2k}}{\sigma^{2}_{it}}\right) \qquad (6.2)$$

where H_{it1} and H_{it2} are the dependent variables in the continuous outcome equations (2.2), ϕ is the probability density function of standard normal distribution, and σ^{1}_{it} and σ^{2}_{it} are the square roots of the variances of the error terms in equations (2.2).

Thus, the semi-parametric log-likelihood function for the system of equations (2.1-2.2) with the error structure (3.1-3.3) is:

$$\Im=\sum_{i=1}^{N}\ln\left(\sum_{m=1}^{M}P_m\left[\prod_{t=1}^{T}\sum_{k=1}^{K}\pi_k \Pr(Y_{it}=j|v_{1m},v_{2k})^{A}\Pr(Y_{it}=j|v_{1m},v_{2k})^{NA}\Pr(H_{it}{}^{1}|v_{1m},v_{2k})\Pr(H_{it}{}^{2}|v_{1m},v_{2k})\right]\right) \qquad (7)$$

where N is a number of households in the sample, T is the number of times that a household appears in the sample (the total number of observations in the sample is T*N), M is the number of points of support for the first factor, P_m are probability weights associated with the first, time-invariant factor, K is the number of points of support for the second, transitory factor, π_k are probability weights associated with the second factor, v_{1m} and v_{2k} are the points of support of the distribution of factors

V_1 and V_2.

Choosing a priori numbers of points of support M and K, the log-likelihood function $\mathfrak{L}$ is maximized over α's, β's, γ's, τ's, ς's, P's, π's, and v's. For identification purposes, the two points of support for both factors are normalized to equal *0* and *1*, respectively[4]. The number of points of support is increased until the difference in the log-likelihoods of consequent maximizations satisfies the convergence criteria.[5]

The joint distribution of the error terms (3.1-3.3) is unknown, so the sample statistics of the estimates cannot be derived analytically. It is feasible to estimate the covariance matrix Θ of the coefficients in the model (2.1-2.2) by inverting the Hessian matrix of the second derivatives of the log-likelihood function $\mathfrak{L}$. However, the numerical approximation of the Hessian matrix can be difficult to obtain when the values of certain estimates by far exceed the rest of the coefficients, or when the function becomes flat near the optimum. In the paper I use method of bootstrapping to determine the correct standard errors for the estimated coefficients.

Let $S_i=S_i(Y_{it}^*,H^1_{it}^*,H^2_{it}^*,X_{it}^*,Z_{it}^*)$, *i=1,...,n* be a randomly drawn with replacement sample from the empirical distribution. It follows from the model (2.1-2.2) that $H^1_{it}^*$, $H^2_{it}^*$, Y_{it}^*, are functions of X_{it}^* ,Z_{it}^* and the error terms. Let β_i^* denote a vector of the bootstrap estimates obtained from a maximization of the log-likelihood function $\mathfrak{L}$ on the sample S_i. This process can be repeated B times to yield bootstrap estimates β_1^*... β_B^*. The bootstrap estimator of the asymptotic covariance matrix Θ is given then by

$$\Theta = \frac{n}{B}\sum_{j=1}^{B}(\beta_j^* - \overline{\beta}^*)(\beta_j^* - \overline{\beta}^*)' \quad where \quad \overline{\beta}^* = \frac{1}{B}\sum_{j=1}^{B}\beta_j^*.$$

The estimates of the base sample coefficients are used as starting points for the bootstrap optimization in order to speed up the convergence. The covariance matrix Θ is estimated based on B=*500* bootstrap repetitions of the log-likelihood maximization, which should provide a suitable level of accuracy for the estimated standard errors (D. Andres, M. Buchinsky).

4. Data and Variables

[4] The functional form for the normalization of probability weights, the points of support for the likelihood faction (6) and the estimated parameters are given in the Appendix

[5] As a convergence criteria I use Akaike's information criteria, recommended by Gritz (1993). According to this method the full model is estimated with an increasing number of points of support, until the improvement in the value of the log-likelihood function $\mathfrak{L}$ is less than the number of additional parameters estimated. In the case of two-factor model, this method is applied first to determine the number of points of support for the permanent factor V_1. Then, keeping the number of points of support of the permanent factor constant, the "optimal" number of points of support for the time-variant factor V_2 is determined by increasing the number of points of support for that factor until additional point of support fail to produce any significant improvement in the value of log-likelihood function.

This research is based on the data from the Russian Longitudinal Monitoring Survey (RLMS)[6], the first and only nationally representative sample of households in the Russian Federation. The survey comprised seven rounds conducted in (I) September 1992, (II) February 1993, (III) August 1993, (IV) November 1993, (V) December 1994, (VI) October 1995 and (VII) October 1996. Rounds I-IV surveyed over six thousand households while Rounds V, VI and VII surveyed a different panel of approximately four thousand households. The data were weighted across the rounds for comparability and to ensure that the survey was representative on the national scale.

In this analysis, I use a pooled sample of households with children younger than 7 years old based on the results of the last three rounds of the survey. The data on the first four rounds of the survey (1992-93) gathered no information on the availability of child care facilities, which makes it impossible to apply the model of child care choice and labor market behavior to the households covered in the first four rounds.

The initial sample of households for rounds V, VI, and VII of the survey was identified from a stratified three-stage cluster sample of residential addresses. Cities as well as urban and rural portions of *rayons* (political and geographic units about the size of counties in the United States) were the area units selected in the first stage. These 38 *rayons* were stratified by the eight regions and by the percentage of the urban population within each region. Within each area chosen in the first stage, a sample of voting districts (primary population points) was randomly chosen from a geographically ordered list of voting districts falling in that area.

There are 1,262 households with children under the age of seven in the pooled sample of rounds V, VI, and VII, and these households are represented by 2,162 observations (an average of 1.77 observations per household). The data set includes information on the individual members of these households, household-specific information and data on the community level. It also contains information on the modes of child care arrangements made for each child in the household, the amount of time each child spent in formal and informal child care, and the amount of money paid for formal child care during the week of the survey. The part of the questionnaire that was administered to each individual household member yielded data on how much time each household member spent looking after children and was active at the labor market, as well as information on their monthly wages. The part of the questionnaire that was administered to one respondent per household on matters that affected the household collectively yielded information on any non-wage household income and on the household's composition. The part of the questionnaire that was administered to a group of respondents who represented the whole local community yielded data about the availability of different forms of child care, and this information was collected for each of the 160 primary population points.

4.1 Dependent variables

[6] The weights and a range of issues related to the sample design and collection of these data are explained in depth in the documents that can be found in the home page of the RLMS. The data sets can be obtained free through the home page: www.cpc.unc.edu/projects/rlms/rlms_home.html. Lokshin and Popkin (1999), and Lokshin, Popkin, Harris (1999) give additional information on the sample and data set.

The dependent variable for the discrete outcome equation is defined according to the possible combinations of a mother's employment status and the mode of child care, which are shown in Table 1. These combinations are: (*0*) – the mother does not work and stays at home with her children; (*1*) –the mother works, the other household members also work, informal child care arrangements are used; (*2*) – the mother works, the other household members do not work, informal child care arrangements are used; (*3*) –the mother works, the other household members work, formal child care is used; (*4*) –the mother works, the other household members do not work, both formal and informal care arrangements are employed. The distribution of households by the mothers' labor force participation and by the mode of child care is presented in Table 2.

More than 45 percent of households with young children have non-working mothers. The percentage of mothers who stayed at home with their children increased slightly from 1994 to 1996. Among the households that use other types of care, the largest single group is formed by families using household members other than the child's mother as child care providers. A third of the households with a working mother use this type of care. A relatively high share of the families, 8 percent, used only formal facilities for child care. And a small minority of Russian households uses both formal and informal child care.

Table 3 illustrates the distribution of the dependent variables for continuous outcome equations, i.e., the time that mothers spent working and the time that children spent in formal care. Both continuous outcomes are observed only among the sample of working mothers or on the sample of children in formal care.

4.2 Explanatory variables

The definitions and descriptive statistics for the explanatory variables in the system of equations (2.1-2.2) are presented in Table 3. Several key variables of interest are discussed in details below.

Price per quality unit of child care (P_q): In the RLMS, households reported their weekly expenditures on child care and the time that their children spent in a formal child care facility during the week of the survey. There is no direct way to relate such information to the quality of child care provided as no data were collected on the regional characteristics of child care facilities (such as the sizes of groups of children in pre-school establishments, quality of personnel, etc.). Like Blau and Robins (1988), I assume that the quality of formal child care is uniform within a population point[7] and I use the average local per hour price of care as a proxy for the child care price.

Mother's offered wage (W_m): The wage rates available to each mother have been imputed using Mincer's (1974) type earning function regression with a control for selectivity (standard Heckman correction)[8] run on a sub-sample of working women for whom hourly wage data were available. The hourly wage has been calculated as a ratio of the women's monthly earning and the

[7] The average prices of child care are calculated for 30 population points in the sample. Each population point includes about 40 households with children.

[8] Regression coefficients for the wage equations are shown in the Appendix 2. For identification in the selection equation I use the standard set of household characteristics that can influence the mother's labor force participation decision, but are uncorrelated with the potential wage rate.

total number of hours they worked during the month the survey has been administered. In the absence of data on the total amount of time a mother had worked during the preceding month, the imputations were made based on the number of hours worked during the week of the survey.

In the wage regression, the following explanatory variables have been used to predict mothers' hourly earning – the mother's educational level, her age, details on the region she lived, the type of settlement where she lived (urban-rural), the number of children she had (as a proxy for work experience), her marital status, and the amount of time she had been in her current main job. Imputations are made based on the women's predicted hourly wages with the job tenure of non-working mothers being equal to zero. Here the offered wage is assumed to be a wage that a mother could earn if she were to start a new job.

Offered wages of other household members (W_0): The wage rates available to other household members are calculated in a similar way to the wage rates available to mothers. Different regressions were run to predict wages for household members of different ages or genders. After the imputations two methods were used to obtain the wage W_0. Under the first specification the offered wage of other household members is equal to the lowest wage earned by any household member except the mother. The second specification uses the average wage of all working household members as an explanatory variable in the model.

Non-wage household income (E): Non-wage income is measured as the household monthly income from all sources other than the wage income. This may have included social security transfers, private transfers, in-kind income, and income from home production. The structure of household income changed over the rounds of the survey and certain adjustments were made to ensure compatibility of the income data across all of the survey rounds.

Other explanatory variables include some individual characteristics of the mother such as her age and level of education, household demographics and size, the number of children in the household and their ages, the number of pensioners in the household, and the household's geographical characteristics.

5. Results

5.1 Estimated coefficients

The results of the estimation of the system of simultaneous equations (2.1-2.2) are presented for the specification with four points of support for the permanent factor V_1 and four points of support for the transitory factor V_2. A further increase in the numbers of points of support M and K failed to result in a significant increase in the value of the likelihood function[9]. The estimated coefficients are shown for the model estimated with ($V_1>0$ and $V_2>0$) and without ($V_1=0$ and $V_2=0$) adjusting for unobservable heterogeneity. The estimation of the model without adjusting for a possible correlation in the error terms between equations (2.1-2.2) is essentially a joint yet independent estimation of the

[9] Using more than four points of support for each factor lead to a significant increase in the time of convergence for the optimization procedure. The bootstrap technique that uses multiple optimizations of the log-likelihood function would require a prohibitively long time for the estimation of the standard errors in that case.

modified multinominal logit (MNL) of the form (4) for the discrete outcome and two ordinary least square (OLS) estimations of continuous outcome equations.

According to the likelihood-ratio test criterion, the MNL/OLS specification is rejected in favor of the SPFIML estimation. The log-likelihood value for the independent MNL/OLS estimates is -9650.50 based on 164 parameters. The log-likelihood value for the SPFIML estimate is -9362.65 based on 182 parameters. This is an increase of 287.85 in the log-likelihood value for 18 additional parameters. This means that using the model that does not control for any correlation in the error terms may have biased the estimated coefficients and introduce inefficiencies in terms of the size of the standard errors.

Tables 4a and 4b present the estimated coefficients of the discrete outcome equation for both specifications. The effect of mothers' wage rates on the discrete outcomes was much stronger when SPFIML was used than it would have been if it had been assumed that the error terms for all states were independent. For example the coefficient on the log of mothers' wages for state *1* estimated by MNL is one third of the value estimated under SPFIML specification. The effects of the child care prices on household discrete outcome choices are also stronger if the model is estimated by SPFIML. While both methods produce estimates consistent with the predictions of the economic theory, using SPFIML yields more accurate estimates.

Estimates of the continuous outcome equations are shown in Table 5. The estimated coefficients of the independent equation of the hours of work are consistent with the coefficients of the model estimated with the selectivity bias correction. However, the latter yields significantly more precise estimates. The standard errors of the SPFIML estimation are on average 50 percent lower than the standard errors obtained from the OLS estimation. Both estimations show that increases in the prices of child care have a strong negative effect on the number of hours that the mothers work, while increases in wages available to mothers have a significant positive effect on their participation in the labor market.

The estimation of the equation of the demand for child care indicates that the correlation of the error terms reduces the effects of mothers' offered wages and the price of child care on the number of hours during which households use formal care facilities.

5.2 Simulations

To examine the effects of the estimates summarized above on the model (2.1-2.2) I simulate how households would respond to changes in the specific parameters used in the model. In a given simulation, the same values for all of parameters of interest are assigned to all the households in the sample. The simulated probabilities for the discrete model outcomes and simulations for the continuous models are generated for each household at every time point by integrating over the estimated heterogeneity distribution and then averaging the probabilities across the sample.

5.2.a Discrete outcome model of the household's child care mode and the mother's labor supply

The simulated distributions of the probabilities for the discrete outcome equation are shown in Table 6.

Price of child care: I estimate the impact that subsidizing the prices of child care would

have on the probability, that households choose a particular child care/labor supply mode, make a particular decision about the labor supply of the mothers, and about the amount of time children stay in formal care[10]. As predicted by the theoretical model, these simulations show that an increase in the per hour price of care discourages households from choosing formal child care arrangements (mode *3* and *4*), and also discourages mothers from working.

If formal child care were fully subsidized (in other words, the price was zero) as opposed to the current situation in which the average child care price is 5.6 rubles per hour, this would result in an 11.3 percent increase in the rate of mothers' labor force participation. It also would result in a 10.5 percent increase in the use of formal care facilities. On the other hand, increasing the prices of child care would discourage other household members from working. Doubling the cost of child care would decrease by 9.6 percent the proportion of households where other members work. A negative effect of child care prices on the states where only informal care is used can be attributed to the existence of a shadow price of the time other household members spend taking care of children, which can be correlated with the actual market price of child care. Alternatively, this negative effect of child care prices can be attributed to monetary transactions between the members of a household.

Mothers' offered wage rate: The potential wages that a mother could earn if she works have a strong and positive effect on the probability of her participation in the labor market. A higher wage offer will increase the opportunity cost of her staying at home and, therefore, will increase mother's propensity to work. Simulated changes in the probability that various types of child care arrangements would be chosen and that mothers would participate in the labor force in response to changes in the level of offered wages are presented in Table 6.

The doubling of a mother's offered wage rate (from 10 to 20 rubles per hour) would increase the number of households with working mothers by 24 percent . At the same time, the proportion of households with non-working mothers would decline from 50.5 percent of the sample to 40.7 percent. This change in the offered wage rate would also affect the distribution of households with working mothers, particularly in those where other household members also have jobs. The proportion of such households would decline by 17 percent relative to the initial state. The doubling of the offered wage of the mother would also increase by 19.1 percent the use of paid care facilities.

Offered wage rate of other household members: An increase in the wage rate of the other household members reduces the probability that the households will choose to keep members other than the mother from working (states *2* and *4*). The third row in Table 6 demonstrates the impact of an increase in the wage rate available to other household members by 100 percent (from 10 to 20 rubles per hour[11]) – a 14.6 percent increase in the proportion of households where other household members work. The slight decrease in the number of non-working mothers can be attributed to imperfect substitution between the maternal and other forms of care. An increase in the wage rates

[10] The changes in the price of care have no effect on the behavior of those households that had no access to the formal care facilities. These households, however, are included in the sample and all the results are obtained by averaging the predicted probabilities over the whole sample.

[11] The use 10 ruble wage subsidies and 5.6 ruble child care subsidies is arbitrary. Following Blau (1999) I assume that the relative cost-effectiveness of the two types of subsidies is not very sensitive to the specific magnitudes of the subsidies.

of other household members would increase total household income, thus (according to the theoretical model) discouraging mothers from working. However, as household income grew and formal care became more affordable, households would switch from the maternal to formal care mode and the number of working women with children would increase.

Demographic and geographical variables: Table 7 presents simulations that summarize the effects of several demographic variables on the discrete outcomes. Households with children under the age of three are significantly less likely to choose to put themselves in states where the mothers of these children work. The probability that those households with children younger than 18 months will have a working mother is 50.4 percent lower than the probability that households with older children will have a working mother. Younger children require more intensive care and, therefore, have a strongest impact on the likelihood that their mothers will be employed.

This estimation shows that household non-wage income has no significant effect on the household's choice of a type of child care. However, the household's structure does appears to be an important determinant of its choice of child care. The availability of grandparents and other family members in households encourages these households to use informal types of child care and may minimize their propensity to use formal care. The presence in the household of children between the ages of seven and twelve years of age and of teenagers has a positive effect on mothers' labor force participation in all states of child care arrangements. Households in the rural areas of Russia are more likely to have working mothers than families in the urban or metropolitan areas of the country.

A mother's educational level can be regarded as a proxy for the quality of maternal child care. Theory would suggest that the mother's educational level would have a negative effect on her labor force participation, in part because better-educated mothers are likely to provide higher quality care. However, the estimation fails to show any such pattern and instead indicates that mothers who are high school graduates are 13.2 percent less likely to choose formal child care arrangements than mothers with higher levels of education.

Maternal employment and the use of paid care are both higher in single-parent households than in two-parent households. Such households are more likely to use formal child care, and single mothers are 10.3 percent more likely to work than married women with children.

5.2.b Continuous outcome models for women's time spent working and children's time spent in formal care

Women's time spent working: A simulation of the effects of the exogenous variables on the mothers' hours of work model confirms the predictions of the theoretical model. An increase in mothers' wages has a positive effect on the number of hours that mothers spend at work, while an increase in the costs of child care has a negative effect on their work hours. An increase in the cost of child care lowers mothers' "effective" wages, which, in turn, makes them work shorter hours. The effect of child care costs on labor hours is weaker than the effect of wages. The wage rate of other household members seems to have no significant effect on mothers' work hours. The higher the household's non-wage income, the less time mothers work. Of the demographic variables, the presence of small children in a household decreases the mother's labor activity. On the average, single mothers work 20 hours more per week than married women with children. Younger and less-educated mothers tend to work longer hours. Mothers in the metropolitan areas of Russia tent

to work shorter hours than mothers in rural areas.

Children's time spent in formal care: The theoretical model offers no predictions about how the prices of child care affect the number of hours that children spend in formal care. However, assuming that formal care is a normal good, a negative child care cost coefficient of the hours of care regression could be expected. Indeed, simulations show that an increase in the average price of child care within a given population point decreases the number of hours that children spend in formal care. The mothers'wage rate has a positive and significant effect on the use of formal care, while the presence in the household of children under the age of 18 months reduces the household's use of formal care. The estimations fail to reveal any significant differences in children's attendance at formal care facilities among different regions of Russia. Better-educated mothers use formal care more often than less-educated mothers.

6. Robustness

The robustness of these results can be tested by evaluating some of the alternative specifications of the model (2.1-2.2). Table A3 in the Appendix shows the SPFIML estimation coefficients for the discrete and continuous outcomes equations where the regressor is the minimum wage rate of the household members other than the mother. These estimations suggest that using this specification makes little difference in the effects of the key policy variables compared to when the regressor is the average wage rate of the household members other than the mother.

The "average wage" estimation results are more consistent with the prediction of the theoretical model in terms of how the wage rates of the other household members affect their employment. For those states with the working household members (other than the mother) (states *1* and *3*), an increase in the "average wage" variable has a positive effect on their level of labor force participation. However, in state *1* (households in which the mother and other members work but only informal child care is used), the "minimum wage" specification results in a negative significant coefficient for this parameter.

In the continuous outcome equations for the hours of mothers' employment and the demand for formal care the estimation of "minimum wage" specification shows that the wage rates of other household members have a weaker impact on the outcomes in both equations. The effects of the other parameters are not different from the predictions of the "average wage" model estimation.

7. Policy implications

This analysis demonstrates that the price of child care and the wage rates of mothers and other household members have a strong effect on the maternal employment and on the use of formal child care. When allocating limited budget funds, policy-makers need to decide what policies are most likely to improve the well-being of Russian families. The three key policies in this area are wage rate subsidies, child care subsidies and direct government transfers to the households with children. These instruments can affect the welfare of Russian households by increasing their income and/or improving the developmental and educational outcomes of young children.

The discussion in this section provides the information that the Russian government needs to determine the costs and benefits of accomplishing a given policy objective and to identify the

tradeoffs involved in attempting to achieve multiple objectives.

The empirical analysis of the model (2.1-2.2) indicates that wage and child care subsidies have the biggest positive impact on the employment rate of women with children. Wage subsidies make having a job more attractive than not working. Child care subsidies can affect the utility derived from working and from using formal care. They tend to increase maternal employment by inducing certain households to switch from a state where the mother stays at home with her children to states where the mother works. Child care subsidies also affect households with working mothers by prompting them to change from informal to formal child care. However, these subsidies do not in any way affect the level of maternal employment in households with working mothers. Wage subsidies are paid to all working women with children and thus the net increase in employment will be reduced by the amount paid to women who already have a job.

The effectiveness and distributional impact of child care and wage subsidies can be determined through simulations. Suppose, similar to the results in Table 7, the government were to introduce child care subsidies that make the child care free. These subsidies are available only to the families that use paid child care. The child care subsidies will induce some non-working mothers to enter the labor market, and may induce households with working mothers to use more formal care. The results of this simulation are presented in Table 8. The total government expenditure on fully subsidized care would consist of its subsidies to those households that were using the formal care before the new subsidy policy was implemented plus the subsidies to those households that switch from using informal care to using formal care because of the new subsidized price. This policy measure would result in a 11.2 percent growth in the number of working mothers[12] and would affect 471.9 households with children in the sample.

An alternative approach for the government to take would be to introduce wage subsidies for the women with children. Suppose the Russian government wants to spend the same amount of money as it spent on child care subsidies on wage subsidies. All households with working mothers would be eligible for such subsidies. This increase in the hourly wage rate would induce some mothers who previously did not work to enter the labor market. Also, those mothers who were employed before the policy was implemented would work longer hours. The number of households that use formal care would also go up. The magnitudes of these changes can be determined by solving equation (8):

$$E = N_b \cdot \partial W + N_a \cdot (W_b + \partial W), \qquad (8)$$

where N_b is the number of the households where the mother works before the wage subsidies, N_a is the number of households where the mother enters the labor market after the increase in hourly wages, ∂W is the change in wage rates due to the subsidies, W_b is the wage rates before the subsidies, and E is the government expenditure. The fixed-point solution of equation (8) with respect to N_b, N_a, and ∂W yields a 5.6 percent growth in women's labor force participation rate under this policy. If the wage subsidy were equal to the amount of money that the government would otherwise have spent on child care subsidies, this would increase mother's wage rates by 2.06 rubles per hour, and

[12] When child care subsidies lead to a raise in the demand for formal care, this can also result in the increase in the demand for the labor of prime age women, as most of the staff in the child care facilities are women.

1044.1 households would benefit from this policy.

Child care subsidies would increase maternal employment by almost twice as much as wage subsidies. Both measures would increase the total household incomes of the eligible households. In the case of those households that were using formal child care before the child care subsidies were introduced, this increase in income would be a result of a decrease in the amount of money that they previously spent on child care and an increase in the mothers' wage income because she would be working longer hours. In the case of those households that start using market care because of the lower prices, and as a result of which the mother enters the labor market, the increase in their income is generated by the wage income that the newly-employed mother brings into the household budget.

The wage subsidies would increase total household income by increasing the household's earned incomes because of the additional time that mothers who were already in the labor force would spend at work and because of the additional wage that mothers who had not previously been working would bring into the household budget after they became employed.

A third policy measure that may influence the welfare of Russian households with children is a family allowance transfer. Assume again that the government wants to spend the same amount of money on family transfers as it spent on the first two policies. According to the model, this would result in a slight drop in the level of labor force participation of mothers, but would increase the total household income by increasing households' non-wage income. All households with children would benefit from this policy.

These simulations indicate that child care subsidies are substantially more effective than wage subsidies at increasing employment per ruble of government expenditure. They would also be more effective in inducing households to use formal child care.

Comparing the effects of the above three policies on the income levels of Russian households with children reveals that the child care subsidies would produce the largest increase in the family income both for the beneficiaries, and, if averaged out, for the whole sample. Wage subsidies would produce the next biggest increase, following by family allowances transfers. Households that use payed care would experience on the average a 20 percent increase in their incomes as a result of the fully subsidized child care. The effect of the wage subsidies would be significantly smaller (yielding a 7.5 percent increase in total household income), although it would affects more families. The uniform family allowances would increase the income level of all households with children by only 3.4 percent.

8. Conclusion

Estimating the joint model of households' child care choices, mothers' labor supply decision, and household demand for formal child care confirm the predictions of the theoretical model developed in this paper. The estimations indicate that economic incentives have a powerful effect on the work behavior of women with children in Russia. The level of wages available to them and the costs of child care can both be expected to affect women's labor force participation and labor supply decisions. Child care costs affect which child care arrangement households choose. When the costs of care are high, this discourages households from using formal child care and increases the number of households that rely only on informal care.

Government subsidies on child care may increase the number of mothers who work, thus

increasing the incomes of poor households and lifting some families out of poverty. The simulations in this paper have shown that measures such as subsidies aimed at reducing the costs of market child care are more effective than measures that increase women's wages in increasing the number of mothers who work and the number of hours that they work.

Simulations indicate that family allowances – intended as a means of reducing poverty – do not significantly affect which child care arrangements households choose. Therefore, substituting child care subsidies for family allowances would have a strong positive effect on level of labor force participation of women with children and thus may be effective in reducing poverty.

A significant proportion of Russian households with children use a network of family members to provide most of their child care. Those families in which some members do not work are unlikely to use paid care as informal care is available from those family members. It would appear that in Russia this kind of informal care has substituted for the care that used to be provided by the Soviet government, which would explain the fact that there is still a relatively high level of participation by women in the labor force despite the sharp drop in the number of kindergartens and nurseries in the last 10 years.

Further research is needed in several areas. First, this paper has assumed the perfect elasticity of the labor market with respect to an increase in women's labor supply. However, given Russia's shrinking economy, it seems unlikely that the market could actually accept a significant influx of women without any wage adjustments. An increase in the women's labor supply might lead to a drop in real wages, which would mean that the actual effects of the policies simulated in this paper would be quite different. This may also be true of the child care market where an increase in the demand for the formal care might cause the market prices of child care to increase.

The next question that needs further research is the distributional impact of the various potential government policies. Even if the child care subsidies produce, on average, the largest increase in the household income (compared to subsidizing wage rates or having a system of family allowances), it is unclear which households would benefit most from these subsidies. The poorest households with children in Russia may not benefit from this kind of subsidies, which means that other policy measures would be needed to improve the well-being of such families.

The serious limitation in the present analysis is the lack of direct information on the quality attributes of care provided under different arrangements and at different facilities. While the data used in this paper are averaged by population point, center-specific information would be more appropriate. Further work should also consider marriage and fertility decisions of the households as factors that may influence households' choices of child care arrangements and its members' labor supply decisions.

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Appendix

In the SPFIML estimation the following functional forms were assumed in estimating the probability weights π and P, and the points of support V_1 and V_2:

$$\pi_{mn} = \frac{\exp(b_{mn})}{1+\sum_{1}^{N-1}\exp(b_{mn})} \qquad n = 1,\ldots,N-1 \qquad\qquad \pi_{mN} = \frac{1}{1+\sum_{1}^{N-1}\exp(b_{mn})}$$

$$v_{mn} = \frac{\exp(a_{mn})}{1+\exp(a_{mn})} \qquad n = 2,\ldots,N-1 \qquad\qquad v_{m1} = 0; \;\; v_{mN} = 1$$

Table A1.1 Points of support, probability weights and factor loading for the SPFIML estimation with 3 points of support for both transitory and permanent factors

		Permanent factor	**Transitory factor**
Point of support			
	V(1)	0.0000	0.0000
	V(2)	0.0453	0.3576
	V(3)	1.0000	1.0000
Probabilities			
	P(1)	0.3244	0.4073
	P(2)	0.6743	0.5772
	P(3)	0.0012	0.0153
Factor loadings			
Discrete outcome equation			
	ρ(1)	0.0000	0.0000
	ρ(2)	90.6366	-10.2445
	ρ(3)	107.6548	-77.1019
	ρ(4)	169.2239	15.0137
	ρ(5)	171.8540	10.0019
continuous outcome equation			
Hours of work ρ		17.5526	9.6144

Table A2: Selectivity corrected wage regression estimation for different age/gender groups

	Women < 25		Men < 25		Women 25-54		Men 25-59		Women >55		Men > 60	
	Coeff.	**Std. Err**	**Coeff.**	**Std. Err**	**Coeff.**	**Std. Err**	**Coeff.**	**Std. Err**	**Coeff.**	**Std. Err**	**Coeff.**	**Std. Err**
Age	8.779	*11.928*	10.808	*10.044*	0.147	*0.115*	-0.168	*0.123*	1.658	*2.924*	2.726	*2.399*
Age squared	-0.400	*0.563*	-0.510	*0.474*	-0.004	*0.003*	0.005	*0.003*	-0.029	*0.045*	-0.040	*0.037*
Age cubed	0.006	*0.009*	0.008	*0.007*	0.000	*0.000*	0.000	*0.000*	0.000	*0.000*	0.000	*0.000*
Education												
High school	Reference											
Technical/Vocational	0.467	*1.160*	-1.084	*1.061*	-0.497	*0.190*	-0.189	*0.198*	2.209	*1.559*	-3.381	*1.507*
University	1.540	*3.169*	2.138	*3.175*	0.104	*0.212*	0.057	*0.212*	-0.220	*1.457*	-3.328	*1.343*
Location												
Rural areas of Russia	-0.736	*0.576*	-0.586	*0.456*	-0.112	*0.177*	-0.189	*0.195*	-0.524	*0.446*	-0.864	*0.466*
Urban areas of Russia	-0.338	*0.561*	-0.133	*0.461*	0.384	*0.179*	0.414	*0.195*	-0.505	*0.444*	-0.581	*0.467*
Metropolitan areas	Reference											
Interactions												
Age/vocational	-0.033	*0.053*	0.050	*0.047*	0.013	*0.004*	0.005	*0.004*	-0.039	*0.024*	0.052	*0.024*
Age/university	-0.059	*0.139*	-0.071	*0.137*	0.006	*0.005*	0.002	*0.005*	0.007	*0.024*	0.059	*0.022*
Rurual/vocational	0.493	*0.349*	-0.143	*0.295*	0.223	*0.122*	0.095	*0.137*	0.365	*0.333*	0.933	*0.388*
Rural/university	0.343	*0.595*	-1.312	*0.974*	0.366	*0.141*	0.323	*0.152*	0.358	*0.287*	-0.363	*0.474*
Other urban/vocational	0.437	*0.279*	-0.012	*0.251*	0.082	*0.108*	0.048	*0.123*	0.588	*0.271*	0.689	*0.348*
Other urban/university	0.085	*0.368*	-0.618	*0.403*	0.043	*0.111*	0.156	*0.112*	0.477	*0.215*	0.268	*0.299*
Time dummies												
Round 5	Reference											
Round 6	-0.374	*0.108*	-0.191	*0.098*	-0.184	*0.033*	-0.230	*0.037*	-0.165	*0.085*	-0.402	*0.093*
Round 7	-0.236	*0.112*	-0.091	*0.104*	-0.111	*0.034*	-0.200	*0.038*	-0.097	*0.089*	-0.255	*0.096*
PSU characteristics												
Average wage 94/10000	0.109	*0.028*	0.019	*0.017*	0.022	*0.006*	0.021	*0.007*	-0.024	*0.026*	0.047	*0.017*
Average wage 95/10000	-0.069	*0.030*	0.020	*0.018*	0.016	*0.007*	0.014	*0.008*	0.054	*0.026*	-0.016	*0.019*
Average wage 96/10000	-0.363	*0.489*	0.794	*0.436*	-0.293	*0.146*	-0.612	*0.165*	-0.133	*0.378*	-0.247	*0.411*
entni94	0.007	*0.899*	-0.933	*0.745*	0.600	*0.259*	1.094	*0.292*	0.393	*0.695*	-0.476	*0.655*

Table A2: (Continues)

	Women < 25		Men < 25		Women 25-54		Men 25-59		Women >55		Men > 60	
	Coeff.	**Std. Err**	**Coeff.**	**Std. Err**	**Coeff.**	**Std. Err**	**Coeff.**	**Std. Err**	**Coeff.**	**Std. Err**	**Coeff.**	**Std. Err**
Unemployment rate 93	3.896	*4.805*	8.600	*4.171*	8.296	*1.386*	8.175	*1.592*	-1.077	*3.800*	10.508	*3.865*
Unemployment rate 94	-4.239	*6.955*	-3.457	*5.802*	-0.914	*1.912*	-1.744	*2.131*	-9.342	*5.406*	4.316	*6.350*
Unemployment rate 95	0.028	*3.980*	-0.805	*3.589*	-3.332	*1.121*	-4.129	*1.232*	6.254	*3.417*	-9.507	*3.537*
percent of loss making enterprises	-0.520	*0.800*	-0.640	*0.660*	0.000	*0.210*	0.290	*0.240*	-0.700	*0.560*	-0.790	*0.630*
percent of profit to previous year	-0.059	*0.066*	0.007	*0.058*	0.008	*0.020*	0.059	*0.022*	0.055	*0.052*	0.076	*0.055*
Long term credit per worker percent to previous year	1.825	*1.880*	1.580	*1.639*	-0.505	*0.538*	-0.189	*0.637*	-1.203	*1.662*	-0.465	*1.645*
Short term credit per worker percent to previous year	0.070	*0.126*	-0.082	*0.102*	-0.034	*0.033*	-0.066	*0.038*	0.199	*0.113*	-0.265	*0.129*
Constant	-62.097	*83.817*	-73.735	*70.626*	-0.523	*1.496*	3.544	*1.580*	-28.597	*62.740*	-56.721	*52.225*

Table A3: Discrete outcome SPFIML model estimation with heterogeneity, specification with the minimum wage for the other household members.

	Mode of child care and household labor supply arrangement. Case when the mother does not work is used as a reference.							
	Other work Informal child care		Other do not work Informal child care		Other work Formal child care		Other do not work Informal & formal child care	
	Coef.	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
Presence of children								
younger than 18 months	-2.52	0.48	-3.23	0.68	-5.38	1.00	-5.80	1.00
1.5-3 years old	-1.30	0.42	-1.90	0.58	-3.98	0.82	-4.18	0.97
3-7 years old	0.33	0.43	0.28	0.61	-0.32	0.86	0.27	1.04
7-12 years old	0.99	0.37	0.79	0.52	0.77	0.48	0.14	0.59
12-18 years old	1.34	0.46	0.46	0.61	3.20	0.57	2.69	0.66
Family size	6.54	1.37	-2.60	1.94	3.86	1.73	-5.32	1.97
Number of children in the household	-8.40	2.34	3.49	3.55	-16.23	2.56	-0.95	2.93
Number of pensioners	-3.96	1.99	1.86	2.81	-14.36	2.39	-14.35	2.84
Single mother household	-0.64	0.48	1.15	0.61	0.98	0.53	2.56	0.59
Households with two parents	*Reference*							
Household incomes								
Household non-wage income	-0.58	1.38	1.45	1.61	-0.57	1.53	0.15	1.74
Log wage rate of others	-2.51	1.77	-8.10	2.00	0.72	2.49	-11.03	2.45
Log of average cost of child care	-2.32	1.05	-2.49	1.39	-2.53	1.20	-4.04	1.54
Household regional dummies								
Other urban areas of Russia	-0.25	0.34	-0.10	0.45	-2.49	0.46	-2.16	0.52
Moscow and St. Petersburg	-1.27	0.62	-1.41	0.84	-0.69	0.78	0.76	0.98
North and North-West	-1.32	0.58	-2.13	0.76	3.05	0.62	4.21	0.76
Central and Central Chernozem	0.41	0.49	-0.22	0.68	2.74	0.58	3.39	0.73
Volgo-Vyatskiy	-0.59	0.51	-1.55	0.69	2.56	0.55	2.81	0.73
North Caucasis	0.01	0.46	-0.72	0.68	1.41	0.60	1.70	0.78
Ural	-0.18	0.50	-1.08	0.66	3.35	0.56	4.16	0.71
Western Siberia	-0.18	0.51	-1.05	0.72	1.48	0.65	2.47	0.81
Eastern Siberia	*Reference*							
Time dummies								
Round 5	0.09	0.30	-0.03	0.41	-0.76	0.37	-1.20	0.49
Round 6	0.27	0.31	0.12	0.43	-0.77	0.36	-0.85	0.46
Round 7	*Reference*							
Characteristics of the mother								
Mother's age in years	1.25	1.17	0.65	1.42	-1.79	1.65	-3.18	1.99
High school completed	-0.51	0.39	-0.40	0.53	-1.35	0.49	-1.02	0.59
Technical/vocational school	0.23	0.36	-0.28	0.49	-0.02	0.46	0.08	0.55
University	*Reference*							
Log of mother's wage	12.75	3.15	10.80	4.35	19.69	3.55	21.72	3.03
Constant	-4.83	1.17	-1.56	1.74	-31.08	2.14	-28.01	2.17

Table A4: Continuous outcome SPFIML model estimations with a control for heterogeneity

	Hours of work		Hours in formal care	
	Coef.	**Std. Err.**	**Coef.**	**Std. Err.**
Presence of children				
younger than 18 months	-7.29	1.30	-13.19	2.09
1.5-3 years old	-14.29	1.13	1.36	1.85
3-7 years old	-8.50	1.14	2.99	1.91
7-12 years old	-4.43	1.08	-12.79	1.28
12-18 years old	-6.19	1.02	-11.76	1.37
Family size/10	43.18	1.39	-2.14	2.84
Number of children in the household/10	8.92	1.11	120.11	5.84
Number of pensioners /10	9.11	1.15	0.01	2.49
Single mother household	19.86	1.05	0.17	1.36
Households with two parents		*Reference*		
Household incomes				
Household non-wage income/10000	-40.70	1.41	-3.54	1.74
Log wage rate of others /10	7.52	2.43	4.70	3.94
Log of average cost of child care/10	-18.85	1.04	-3.94	1.43
Household regional dummies				
Other urban areas of Russia	0.16	1.08	1.04	1.01
Moscow and St. Petersburg	-22.29	1.14	1.03	1.55
North and North-West	-22.27	1.05	2.41	1.35
Central and Central Chernozem	-15.92	1.09	-0.45	1.23
Volgo-Vyatskiy	-2.46	1.02	-4.21	1.32
North Caucasis	-7.45	1.21	-2.62	1.47
Ural	-20.53	1.13	-0.25	1.24
Western Siberia	-20.85	1.02	-0.88	1.41
Eastern Siberia		*Reference*		
Time dummies				
Round 5	-11.80	1.04	-0.12	1.06
Round 6	3.20	1.03	-1.64	1.06
Round 7		*Reference*		
Characteristics of the mother				
Mother's age in years /100	5.63	1.07	1.83	2.59
High school completed	14.52	1.03	-1.04	1.11
Technical/vocational school	18.53	1.03	-2.50	1.03
University		*Reference*		
Log of mother's wage/10	58.79	2.34	-5.21	5.04
Constant	121.59	1.05	-3.38	3.12

Table 1: Solutions of the household utility maximization problem

	Mother works $1\text{-}L_m>0$	Other household members work $H_0>0$	Informal child care $T_0>0$	Formal child care $1\text{-}L_m\text{-}T_0>0$
0	No	...	...	...
1	Yes	Yes	Yes	No
2	Yes	No	Yes	No
3	Yes	Yes	No	Yes
4	Yes	No	Yes	Yes

Table 2: Distribution of households with children 0-7 years old by the choice of child care arrangements RLMS Rounds I-VII, 1992-96.

	Rounds of survey		
Child care mode	**V, 12/94**	**VI, 10/95**	**VII, 10/96**
Mother does not work	45.0	46.2	47.3
Others do not work, informal care only	22.7	23.2	18.5
Others work, informal care only	8.0	8.6	8.8
Others work, formal care only	19.7	15.8	18.8
Others don't work, formal and informal care	4.5	6.2	6.6
Total number of households	796	695	670

Table 3: Summary statistics for the explanatory variables, the means and standard deviations. Pooled sample, rounds V-VII, RLMS.

Explanatory variables	**Mean**	**Standard Deviation**
Log of mother's imputed hourly wage	2.43	0.42
Log of the other household members imputed hourly wage (average)	2.43	0.83
Log of the other household members imputed hourly wage (minimum)	2.34	0.85
Log of the average cost of child care	1.80	1.08
Mother's work hours per week	36.67	13.87
Hours per week children spend in formal child care facilities	41.09	22.28
Non-wage household income	3300.88	855.1
Presence of children 0-18 months	0.19	
Presence of children 18 month - 3 years old	0.22	
Presence of children 3 - 7 years old	0.67	
Presence of children 7-12 years old	0.26	
Presence of children 12-18 years old	0.17	
Mother's age in months (years)	367.6 (30.6)	94.7 (7.9)
Total number of children 18 years old and younger	1.68	0.89
Number of pensioners in the household	0.17	0.42
Mother's years of education	12.3	3.6
Single parent family living alone indicator	0.05	
Single parent living with grandparents indicator	0.06	
Other households with single parent	0.04	
Nuclear family living alone	0.54	
Nuclear family living with grandparents	0.16	
Other households with nuclear family	0.06	
Other households with children	0.09	
Metropolitan areas indicator	0.09	
Other urban areas indicator	0.66	
Rural areas indicator	0.25	
Sample size	2169	

Table 4a: Discrete outcome SPFIML model estimation with heterogeneity

	Mode of child care and household labor supply arrangement. Case when the mother does not work is used as a reference.							
	Other work Informal child care		Other do not work Informal child care		Other work Formal child care		Other do not work Informal & formal child care	
	Coef.	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
Presence of children								
younger than 18 months	-3.12	*0.49*	-3.64	*0.70*	-5.38	*1.00*	-5.80	*1.00*
1.5-3 years old	-1.45	*0.45*	-1.89	*0.62*	-4.13	*0.91*	-4.73	*1.22*
3-7 years old	0.55	*0.45*	0.73	*0.64*	-0.80	*0.93*	-0.90	*1.30*
7-12 years old	0.97	*0.40*	0.81	*0.54*	0.32	*0.54*	-0.16	*0.67*
12-18 years old	1.27	*0.47*	0.43	*0.64*	2.43	*0.62*	1.95	*0.76*
Family size	7.45	*1.44*	-0.40	*1.90*	2.31	*2.04*	-3.57	*2.34*
Number of children in the household	-8.87	*2.41*	1.43	*3.29*	-10.98	*3.77*	-0.05	*4.50*
Number of pensioners	-3.84	*2.23*	1.70	*3.07*	-12.01	*2.88*	-10.54	*3.84*
Single mother household	-0.33	*0.50*	1.36	*0.62*	0.64	*0.53*	1.92	*0.62*
Households with two parents				*Reference*				
Household incomes								
Household non-wage income	-0.15	*1.94*	2.50	*2.43*	-0.96	*2.10*	-0.06	*2.56*
Log wage rate of others	0.25	*2.21*	-8.09	*2.66*	7.26	*3.26*	-6.36	*3.09*
Log of average cost of child care	-3.19	*1.16*	-3.39	*1.52*	-2.93	*1.36*	-4.45	*1.73*
Household regional dummies								
Other urban areas of Russia	-0.36	*0.36*	-0.04	*0.47*	-2.23	*0.50*	-1.70	*0.56*
Moscow and St. Petersburg	-1.54	*0.67*	-1.52	*0.88*	-1.15	*0.87*	0.24	*1.19*
North and North-West	-1.29	*0.63*	-2.12	*0.80*	2.54	*0.71*	3.38	*0.94*
Central and Central Chernozem	0.65	*0.53*	-0.10	*0.70*	2.83	*0.73*	3.17	*0.90*
Volgo-Vyatskiy	-0.44	*0.56*	-1.51	*0.72*	2.34	*0.70*	2.29	*0.91*
North Caucasis	0.40	*0.52*	-0.30	*0.71*	1.78	*0.79*	1.80	*1.00*
Ural	-0.12	*0.57*	-1.13	*0.73*	3.05	*0.72*	3.49	*0.90*
Western Siberia	-0.14	*0.55*	-1.10	*0.73*	1.30	*0.75*	2.11	*0.96*
Eastern Siberia				*Reference*				
Time dummies								
Round 5	0.03	*0.29*	-0.06	*0.39*	-0.81	*0.37*	-1.19	*0.50*
Round 6	0.35	*0.30*	0.21	*0.39*	-0.63	*0.37*	-0.66	*0.46*
Round 7				*Reference*				
Characteristics of the mother								
Mother's age in years	1.60	*1.35*	1.05	*1.86*	-0.70	*1.83*	-1.49	*2.10*
High school completed	-0.46	*0.42*	-0.28	*0.55*	-1.31	*0.57*	-1.08	*0.69*
Technical/vocational school	0.26	*0.38*	-0.19	*0.50*	-0.17	*0.51*	-0.17	*0.63*
University				*Reference*				
Log of mother's wage	14.18	*4.37*	13.24	*6.11*	17.98	*6.15*	19.67	*6.02*
Constant	-6.82	*1.44*	-3.65	*1.82*	-14.86	*2.40*	-11.05	*2.41*

Table 4b: Discrete outcome SPFIML model estimation without heterogeneity

	Mode of child care and household labor supply arrangement. Case when the mother does not work is used as a reference.							
	Other work Informal child care		Other do not work Informal child care		Other work Formal child care		Other do not work Informal & formal child care	
	Coef.	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
Presence of children								
younger than 18 months	-1.74	*0.27*	-1.73	*0.38*	-5.38	*1.40*	-5.80	*2.31*
1.5-3 years old	-0.87	*0.25*	-1.10	*0.34*	-2.01	*0.49*	-2.02	*0.72*
3-7 years old	0.06	*0.25*	0.45	*0.35*	-0.09	*0.54*	-0.05	*0.81*
7-12 years old	0.68	*0.20*	0.48	*0.26*	0.18	*0.25*	-0.08	*0.34*
12-18 years old	0.97	*0.24*	0.56	*0.33*	1.14	*0.28*	1.05	*0.38*
Family size	4.83	*0.69*	-2.53	*0.95*	2.27	*0.92*	-2.81	*1.15*
Number of children in the household	-6.57	*1.38*	2.95	*1.81*	-6.09	*1.76*	1.96	*1.32*
Number of pensioners	-2.05	*1.12*	2.60	*1.32*	-5.05	*1.38*	-3.08	*1.41*
Single mother household	-0.27	*0.26*	1.37	*0.25*	0.28	*0.31*	1.54	*0.35*
Households with two parents	*Reference*							
Household incomes								
Household non-wage income	-0.15	*0.96*	1.66	*1.09*	-0.39	*1.16*	0.35	*1.06*
Log wage rate of others	2.28	*1.23*	-3.29	*1.16*	7.46	*1.92*	-3.37	*1.49*
Log of average cost of child care	-1.27	*0.64*	-1.07	*0.87*	-1.31	*0.77*	-3.08	*1.19*
Household regional dummies								
Other urban areas of Russia	-0.18	*0.17*	0.02	*0.23*	-0.75	*0.21*	-0.29	*0.34*
Moscow and St. Petersburg	-1.03	*0.35*	-0.61	*0.45*	-1.00	*0.46*	0.16	*0.69*
North and North-West	-0.55	*0.32*	-0.85	*0.43*	0.70	*0.38*	1.10	*0.55*
Central and Central Chernozem	0.19	*0.27*	-0.13	*0.35*	0.90	*0.36*	0.67	*0.56*
Volgo-Vyatskiy	-0.32	*0.28*	-0.72	*0.35*	0.78	*0.37*	0.02	*0.57*
North Caucasis	-0.02	*0.27*	-0.29	*0.35*	0.34	*0.39*	0.00	*0.60*
Ural	0.03	*0.29*	-0.17	*0.36*	1.34	*0.36*	1.26	*0.54*
Western Siberia	-0.32	*0.28*	-0.68	*0.37*	0.16	*0.36*	0.49	*0.55*
Eastern Siberia	*Reference*							
Time dummies								
Round 5	0.14	*0.16*	0.03	*0.21*	-0.14	*0.19*	-0.35	*0.32*
Round 6	0.23	*0.16*	0.02	*0.21*	-0.02	*0.19*	0.04	*0.30*
Round 7	*Reference*							
Characteristics of the mother								
Mother's age in years	0.64	*0.98*	-1.80	*0.98*	-0.50	*0.98*	-1.32	*0.98*
High school completed	-0.48	*0.77*	-0.59	*0.82*	-0.63	*0.85*	-0.77	*0.97*
Technical/vocational school	0.12	*0.65*	-0.48	*0.84*	-0.02	*0.81*	-0.28	*0.94*
University								
Log of mother's wage	3.82	*0.99*	0.49	*0.99*	3.68	*0.99*	0.40	*0.99*
Constant	-2.88	*0.83*	0.73	*0.84*	-2.46	*0.84*	0.72	*0.86*

Table 5: Continuous outcome SPFIML model estimations with and without heterogeneity

	Hours of work				Hours in formal care			
	No heterogeneity		Heterogeneity		No heterogeneity		Heterogeneity	
	Coef.	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
Presence of children								
younger than 18 months	-9.02	*10.51*	-6.57	*4.60*	-25.02	*3.71*	-13.90	2.44
1.5-3 years old	-10.99	*8.34*	-14.03	*4.06*	0.28	*3.29*	1.93	2.31
3-7 years old	-4.66	*8.10*	-8.15	*4.27*	6.83	*3.59*	0.61	2.44
7-12 years old	-4.03	*6.12*	-4.50	*3.04*	-18.36	*2.82*	-13.83	1.59
12-18 years old	-4.59	*7.08*	-7.31	*2.21*	-12.63	*3.23*	-11.71	1.70
Family size/10	42.9	*2.51*	40.86	*3.26*	-1.72	*1.16*	-3.59	4.72
Number of children in the household/10	15.8	*4.68*	14.58	*4.16*	12.33	*2.08*	13.13	1.67
Number of pensioners /10	12.5	*4.04*	10.99	*2.11*	1.32	*1.94*	-0.42	5.69
Single mother household	20.72	*6.75*	22.27	*2.53*	0.86	*3.22*	-0.54	1.54
Households with two parents				*Reference*				
Household incomes								
Household non-wage income/10000	-39.39	*31.05*	-32.06	*4.97*	-1.96	*1.29*	-4.10	6.27
Log wage rate of others /10	25.92	*31.6*	25.12	*3.20*	8.87	*14.61*	2.33	5.45
Log of average cost of child care/10	-22.71	*17.7*	-19.56	*1.44*	-14.7	*8.34*	-3.53	3.95
Household regional dummies								
Other urban areas of Russia	0.17	*4.68*	0.85	*2.48*	0.37	*2.17*	0.29	1.19
Moscow and St. Petersburg	-20.80	*9.86*	-22.44	*1.70*	1.43	*4.48*	-0.43	2.51
North and North-West	-16.63	*8.48*	-21.13	*1.91*	3.49	*3.76*	1.72	1.97
Central and Central Chernozem	-12.00	*7.80*	-16.08	*3.32*	4.11	*3.76*	-0.28	2.03
Volgo-Vyatskiy	1.73	*8.44*	-2.19	*2.35*	4.14	*3.99*	-3.71	2.07
North Caucasis	0.42	*8.50*	-7.20	*2.68*	1.73	*4.10*	-2.93	2.23
Ural	-15.46	*7.96*	-19.72	*2.06*	8.22	*3.73*	0.11	1.94
Western Siberia	-12.38	*7.94*	-20.24	*2.38*	4.28	*3.75*	-1.62	2.01
Eastern Siberia				*Reference*				
Time dummies								
Round 5	-11.78	*4.43*	-11.66	*2.14*	-0.03	*2.02*	-0.08	1.18
Round 6	3.96	*4.51*	3.24	*2.05*	1.25	*2.03*	-2.03	1.24
Round 7				*Reference*				
Characteristics of the mother								
Mother's age in years /100	6.67	*2.76*	10.31	*2.31*	0.72	*1.21*	1.99	4.51
High school completed	10.24	*6.22*	13.93	*1.50*	3.08	*2.84*	-0.91	1.42
Technical/vocational school	14.34	*5.36*	17.91	*1.44*	1.86	*2.50*	-1.87	1.30
University				*Reference*				
Log of mother's wage/10	46.6	*80.2*	33.18	*3.20*	55.2	*34.8*	11.89	8.97
Constant	116.55	*26.23*	121.55	*4.32*	-0.03	*2.02*	-2.22	4.00

Table 6: Simulation of the effects of various policies on the household choices of child care mode and mother's labor supply

	Mother does not work	Mother works			
		other work, informal care	other do not work, informal care	other work, formal care	other do not work, formal and informal care
Change in price of child care from 5.6 rubles per hour to 0	-5.7 (11.9)	2.5 (12.8)	1.0 (10.1)	0.8 (4.9)	1.4 (29.2)
Change in offered mother's wage from 10 to 20 rubles per hour	-9.8 (24.0)	4.1 (17.3)	0.7 (7.5)	3.5 (18.4)	2.5 (21.2)
Change in offered other household members' wage from 10 to 20 rubles per hour	-0.6 (1.3)	1.8 (8.2)	-2.8 (39.1)	4.2 (21.6)	-2.5 (77.0)

Table 7: Effect of the demographic variables on the household choice of child care mode and mother's labor supply

	Mother does not work	Mother works			
		other work, informal care	other do not work, informal care	other work, formal care	other do not work, formal and informal care
Single mother relative to the married mother	-4.8 (10.8)	-9.8 (83.0)	9.2 (53.1)	-0.01 (5.9)	6.3 (59.0)
Moscow and St. Petersburg relative to other regions of Russia	10.8 (18.9)	-7.1 (51.0)	-2.0 (27.3)	-5.8 (50.8)	3.9 (42.7)
Mother with a high school education relative to the other mothers	13.2 (6.9)	-1.5 (7.5)	0.3 (3.7)	-5.2 (38.9)	-0.6 (14.1)
Presence of children 0-18 months of age	40.2 (50.4)	-11.6 (103.1)	-6.1 (114.5)	-16.7 (449.1)	-5.7 (560.7)
Presence of children 1.5-3 years old	25.2 (37.7)	-2.3 (12.4)	-3.5 (52.6)	-14.3 (239.1)	-5.1 (314.5)
Presence of children 3-7 years old	-0.5 (0.97)	-3.4 (15.6)	1.5 (16.4)	-3.07 (19.6)	-1.5 (28.4)
Presence of children 7-12 years old	-5.9 (13.7)	6.1 (24.2)	0.3 (3.2)	0.8 (4.8)	-1.23 (27.1)

Table 8: Simulation of the three possible scenarios of the government support for the households with children.

	Percentage change				**Cost for the government, 1992 rubles per month**	**Total increase in income from the change in LFP and hours of work**	**Change in total hhold income, per eligible hhold**	**Who is eligible, # of eligible hholds**
Policy instrument	**mother's labor supply**	**mother's hours of work**	**formal care use**	**formal care hours**				
Child care subsidy 5.6-0.0 rubles/hour	11.9	2.6	10.1	2.2	396,702	198,555	1,261.2	Formal child care users 471.9
Wage subsidy 10-12.06 rubles/hour	5.7	1.2	6.2	1.0	396,702	96,332	472.2	Working mothers 1044.1
Family allowances transfer	-0.2	-0.01	-0.01	-0.01	396,702	(0)	198.5	All households 1999