# Intergenerational Health Implications in the Labor Market: Exploring Parents' Health and Child's Subsequent Labor Outcome in Russia

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## Abstract

Understanding behavioral response to parental health provides valuable insight for predicting a labor market situation, especially in a developing and transitional economy. This paper provides an economic framework that incorporates labor supply, family economic linkage and health dynamics equations. Using the Russia Longitudinal Monitoring Study, empirical analysis shows that having an unhealthy father substantially reduces a daughter's future working probability in the labor market: the daughter's value from non-market labor increases with the father's poorer health status. In the process of reallocating roles or resources in response to a family member's poor health, women tend to be more specialized to non-market labor and men to market labor when relative return on market labor is significantly lower for women. This paper also highlights that where family members are linked economically to each other, it is plausible that those members' health conditions can play an even more significant role in determining one's future economic behavior in the labor market.

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## 1. Introduction

In recent decades, many studies have provided empirical evidence of intra- and inter-household economic transfer motivated by altruism and/or exchange [Lucas and Stark (1985), Cox (1987), Rosenzweig (1988), Parish and Willis (1993), Haider and McGarry (2005), etc.]. In the literature of health economics, we have increasing empirical studies on return to health [Almond (2003), Case, Fertig and Paxon (2003), Behrman and Rosenzweig (2004), Maccini and Yang (2006), etc.]. Despite such thriving empirical evidence on family economic linkage and return to health separately, few intensive studies frame an inter-relationship between health implications and family interaction in the labor market. If family members are pooling resources to a large extent, having an unhealthy family member – parent or sibling – significantly can affect one's own decision mechanisms in time allocation between market and non-market labor. Pitt and Rosenzweig (1990) suggest infant morbidity has no significant impact on a brother's but significant impact on a mother's and a sister's time allocation, reducing the mother's market labor and taking the sister away from school (i.e., in Indonesia). This implies that the incidence of illness among family members can be an important predictor of women's labor force participation.

Parents' health can also play a significant role in determining a child's schooling and economic behavior not only in the short term but also in the long term. Parish and Willis (1993) investigate parents' human capital investment in sons and daughters (i.e., in Taiwan) and suggest that, in a budget-strained family, human capital investment for the older daughter can be reduced by early marriage. Health status in parents' prime working age period might have even more significant and permanent impact on economic activity of children: the loss of family income due to parents' poor health is larger in their prime working years than in another period. Hence, all family members might encounter a substantial budget constraint, especially in a society without adequate social safety networks. Parents decide whether they will invest in children's higher

education during this period. Current family income in their prime working age, therefore, can more directly and significantly affect children's completed education level, which will remain an important determinant in children's subsequent labor market outcomes. And, decisions about the timing of children's marriage can also be related significantly to parental health during this period. As is established in labor literature, marriage is one of the most significant factors in determining labor supply, especially for women.

In this paper, I investigate the long-term consequences of a child's behavioral response to parental health. More specifically, I explore how parents' health conditions in their prime working years can impact their child's subsequent working probability in his/her adulthood, especially where there is a lack of external resources and credit market. Reducing working hours substantially due to health problems can be financially onerous, not only because of reduced labor income but also because of increased medical expense. Thus, family members have greater motivation to reallocate resources to mitigate such an economic hardship. In the course of resource reallocation, an individual might respond differently in the labor market depending on relative return of time allocation between market and non-market.

Introducing a behavioral equation to the intergenerational transfer, this paper frames the link between a parent's health and a child's subsequent labor outcome. To provide empirical evidence, I investigate Russia during the transition period by exploring Russia Longitudinal Monitoring Study II (1994-2004). Despite inefficient resource allocation during the Soviet period, basic needs such as food, housing, education and health services were provided for most people at low cost or free. Russia had full employment under Communism as well. When in late 1991 the Soviet Union dissolved, economic reform under the so-called shock-therapy led to dramatic change in the Russian labor market. First, Russia has experienced severe pervasive health problems during the economic reform period and men of prime working age have suffered most. Second, return to

schooling increased, especially among the younger, in which investment in a child's schooling could be an important strategy for future higher income for the (extended) family. Third, there were substantial fluctuations in the social safety network system and other government policies. In such a situation, Russian families were less likely to rely on government transfer in previewing future economic status; rather, they were likelier to use an informal network (e.g., family). Under the circumstances, parents' health in their prime working age can have long-term and persistent impact not only on their own labor market outcome but also on children's subsequent socioeconomic status.

This paper is organized thus**:** the second section provides background on the labor market, health conditions and family interactions in Russia by reviewing related literature. The third section frames an economic model to understand family economic linkage and intergenerational health impact in the labor market. The fourth section summarizes characteristics of the sample used for the empirical analysis. The fifth section discusses the estimate strategy. Finally, sections six and seven show estimate results of the association between parental health and a child's subsequent labor outcome.

## 2. Overview of Labor Market, Health and Family in Russia

This section presents an overview of the social and economic situation in Russia, with particular reference to labor market, health and family interaction, during the transition period (1991 to present). This focus is essential to interpret empirical results later with a specific economic condition in a general economic framework.

### A. Labor Market

Many studies of the Russian labor market have provided evidence on higher return to

schooling after the Soviet Union dissolved. Gorodnichenko and Peter (2005) provide comparative empirical evidence that, compared to Ukraine, which has a similar institutional and cultural background, return to schooling in Russia has increased enormously. Brainerd (1998) explored wage inequality between groups using a household survey and found that returns to education increased for both men and women over the course of the transition .

Another distinctive aspect during the economic reform period of Russia is a large gender gap in labor market outcome. Linz (1995, 1996) highlights that labor market gain is lower in women than in men**:** women are likelier to lose jobs and stay in unemployment more than eight months on average. She addressed that the level of educational attainment does not explain gender difference in occupation choice and labor income. Ogloblin (1999) investigates gender earnings differential using RLMS and finds that lower payment for females is attributable to occupational and industrial employment segregation by gender. Brainerd (1998) concludes that the winners during transition period are young well-educated men and the losers are the older and women, and Brainerd (2000) also indicates, compared to those in Eastern European countries, female relative wages in Russia have declined significantly.

### B. Health

Health problems in Russia during the early transition period, 1991-1995, have received considerable attention due to a sharp increase in the mortality rate. Becker and Bloom (1998) summarize studies on this demographic crisis. Life expectancy fell by around six years between 1992-1994 (- 6.1 years for men, - 3.3 years for women), concentrated disproportionately among prime working-age men. Brainerd and Cutler (2005) suggest that alcohol consumption and psychosocial stresses are the most important factors during this period. This is consistent with many earlier studies. Shkolnikov et al. (1998) highlight that psychological stress due to political

and economic instability during transition is mediated by excessive alcohol consumption, which increases cardiovascular diseases. In addition to deterioration of health, homicide and suicide increased dramatically in this period. Exploring the relationship between the suicide rate and macroeconomic conditions (e.g., unemployment and per capita income) as well as sociological conditions (e.g., divorce rate), Brainerd (2001) concludes that macroeconomic conditions are associated with the higher suicide rate, and the socioeconomic conditions also relates strongly to the health condition and the suicide rate. The fact that the suicide epidemic in Russia most affected men in their prime working ages is likely to be driven by the devaluation of the human capital of older workers during economic reform.

Researchers also aver that inefficient medical services might relate to severe health conditions in Russia. According to Shkolnikov et. al. (1998), Russia paid less attention to public health than did western nations during both the Soviet- and transition- periods. This lower level of public health service must have contributed to a poorer health condition of the population, which might also account for a relatively higher mortality rate during the early 1990s than suffered in other transition economies (e.g. Eastern Europe). In the economic reform period, in which many medical institutions were privatized, resulting higher costs of medicines and other medical materials impacted the poorer more severely. RLMS reports that, since 1994, lack of money has emerged clearly as the primary obstacle to obtaining prescribed medications. Inefficiency of medical service also contributes to higher cost: about 54% of those seeking medical attention reported they have paid “unofficial” monies or “gifts” for medical service.

### C. Economic hardship and family

When a society with lower per capita income lacks a social safety network, the informal sector - such as family, relatives and friends - can play important roles in coping with economic

hardship. Cox et al. (1997) and Kennedy et al. (1998) address that far more people in post-Soviet Russia rely on informal sources of support than on formal ones, to deal with their day-to-day problems, and that private transfers are widespread, large and persistent. Using RLMS, Jensen and Richter (2003) explore how Russian households cope with income shock arising from the pension crisis around 1996. They find that families experiencing pension arrears mitigate income shock by increasing total family labor supply and selling assets. In the study on risk-coping mechanism in Russia, Lokshin and Yentsov (2001) explore the Russian financial crisis around 1998. Focusing more on subjective information in RLMS, they conclude that men tend to seek supplementary jobs to compensate lowered family income, while women tend to reduce expenditure or to turn to relatives for help. They also highlight that social exclusion[1] was widespread in Russia during this period, and that these isolated groups (likely to be urban pensioners and the lesser educated) lack various risk-coping strategies, therefore tend to reduce mainly consumption amount in response to negative income shock.

## 3. A Framework for Intergenerational Health Implications in the Labor Market

Since Becker (1974) introduced altruism among family members in solving the individual utility maximization problem, extensive research works have established the model of intergenerational economic links [Becker and Tomes (1976), Tomes (1981), Kotlikoff and Summers (1981), Cox (1987), Laitner (1992), etc.]. Motivations for economic interaction among family members can be summarized thus: First, altruism among family members leads to financial or non-financial support to each other. Second, the family may increase the production possibility frontier by pooling family resources to some extent. Third, family members can provide to each other an insurance against income shock.

[1] "lack of meaningful ties to family, local or national community"

Many researchers focusing on developed countries assume one-sided altruism – altruistic parents, but not altruistic children – seeing intergenerational transfer in the form of inheritance. Such an assumption might explain the situation where parents are sufficiently well off in a stable economic condition. However, one-sided altruism cannot explain intra- and inter- household transfer in developing countries in which the larger population depends on labor intensive work, and labor productivity decreases significantly with aging. Therefore, the working-age span is shorter in developing countries than in developed countries. In other words, a parent's role as a primary family income contributor might not endure as long as it would in richer countries. Lee, Parish and Willis (1994) find married children provided net financial support for their parents during the rapid economic growth period of Taiwan where industrialization weakened parental power.

An informal economic network as an insurance might emerge more pervasively where the society has not established formal financial markets and other supporting safety networks. Moreover, if a society undergoes economic and political transition (or crisis)[2], it is difficult to rely on government support or the formal credit market over the long run. In a crisis of nationwide economic instability, disadvantaged people are the most desperate for insurance to mitigate the risk of losing basic needs such as housing, food, clothing and healthcare. Although such insurance demand increases, insurance supply decreases with nationwide economic crisis. Limited access to market resource then directs one to non-market channels such as family, relatives and friends to ameliorate income shock. Frankenberg, Lillard and Willis (2002) examine transfer behavior between adult children and their parents in Indonesia, and support the insurance motivation of transfer among family members. Exploring Philippine households, Yang and Choi (2006) provide evidence that roughly 60% of income decline is replaced by remittance inflows among households

[2] such as economic reform period of the former Soviet Union and the Asian financial crisis.

with overseas migrant member.

My main interest in this paper is to investigate intergenerational economic linkage – particularly, a child's subsequent employment status as a result of behavioral response to parental health when the family has limited external resources (e.g. government transfer, other social safety network and the formal credit market system). Parental health impact on a child's future labor market outcome can be bidirectional**:** if parents' poor health lowers family income significantly, the family has a stronger incentive to compensate it by increasing the child's labor income through increasing working hours in the labor market. Parents' poor health, however, can also decrease the child's subsequent working probability in that human capital attainment might be lower if the budget-constrained family decides to reduce investment in the child's schooling. Additionally, unhealthy parents might need constant assistance nearby, especially when they suffer severe health problem/s. In a situation where health service is not accessible easily and is expensive to obtain, the child tends to provide care-giving, and thus lower working probability in his/her adulthood by reduction of the child's available time in schooling and the labor market.

**A. Optimal Choice between Market-Intensive and Time-Intensive**

Based on the economic model in Becker (1965), I assume that the individual combines time and market commodity to produce final consumption goods/service. Here, I define two-consumption choices, time-intensive, $\tau$, and market-intensive, $m$. We can consider home-cooked meal and non-market care-giving as examples for time-intensive consumption, and eating at restaurant and market nursing/medical service as market-intensive. Then the quantity of final goods/services produced can be expressed:

$$\begin{aligned} Z_\tau &= f(T_\tau, C_\tau) \\ Z_m &= f(T_m, C_m) \end{aligned} \qquad (1)$$

$Z_\tau$ is time-intensive and $Z_m$ is market-intensive goods/services produced. $T_\tau$ and $C_\tau$ are time and market commodity used in the production of final time-intensive goods/services ($Z_\tau$). Accordingly, $T_m$ and $C_m$ are time and market commodity used in the production of final market-intensive goods/services ($Z_m$). We can also specify production function further as:

$$T_\tau = t_\tau Z_\tau,\ C_\tau = c_\tau Z_\tau$$
$$T_m = t_m Z_m,\ C_m = c_m Z_m \qquad (1)'$$

$t_\tau$ and $c_\tau$ are time and market commodity input per unit of time-intensive goods/services, and $t_m$ and $c_m$ are time and commodity input per unit of market-intensive goods/services. The final time- and market-intensive consumption ($Z_\tau, Z_m$) directly enter individual's utility:

Individual utility, then, can be expressed as:

$$U(Z_\tau, Z_m) \qquad (2)^3$$

I denote time used for market labor as $L$. Then, the time constraint can be written as

$$\overline{T} = T_\tau + T_m + L \qquad (3)$$

Budget constraint for market goods/services is

$$p_\tau C_\tau + p_m C_m = I = N + W \qquad (4)$$

$N$ is non-labor income and $W$ is market labor income. As in Becker 1965, the optimal choice will be made in two stages. First, the individual will maximize full resource, $R$. Second, the individual will choose optimal consumption between market-intensive and time-intensive given time and budget constraint under the full resource. Here, I assume that the full resource, $R$, will be obtained

[3] Note that final consumption includes not only consumption for himself / herself but also for other family members (e.g. parents); more specifically, the individual transfers a fraction of excess production (full resource – reservation consumption) to other family members. Such transfer amount, hence, is considered part of own consumption.

by maximizing the value of final consumption goods[4]. Combining time with market commodity, one can create extra value through non-market labor. The value of market-intensive consumption ( $Z_m$ ) will be obtained from i) market value of commodity used ( $p_m C_m$ ), *plus* ii) forgone-earnings of time spent, in the production of market-intensive goods/services. The value of time-intensive consumption ( $Z_\tau$ ), will be obtained from the value of market-intensive, that the time-intensive consumption substitutes (equivalently, market value of commodity, $p_\tau C_\tau$ , *plus* value-added through time, $V$ ). For example, if care-giving at home perfectly substitutes market nursing service, the value of care-giving at home will be the same as the market value of consuming nursing service. Here, I denote the market earning as $W$ and non-market labor value (value-added through time) as $V$ . Both value-added and earning also depend on $Z_\tau$ and $Z_m$ . Then, full resource can be expressed as:

$$R = N + \max\{W(Z_\tau, Z_m) + V(Z_\tau, Z_m)\} \qquad (5)$$

Once the full resource is defined, it will be spent on purchasing market commodity, or employing non-market labor (or time) to produce final goods/services, $Z_\tau$ and $Z_m$ . Then, the resource constraint can be expressed as:

$$R = p_\tau c_\tau Z_\tau + p_m c_m Z_m + \Psi(Z_\tau, Z_m) \qquad (6)$$

[4] In Becker (1965), full income is considered as full resource and specified as maximum money income achievable, which can be obtained from market income (non-labor or labor) *plus* total earnings forgone. This might be true in the situation where money income (from market labor) is always greater than value-added (from non-market labor). However, full income can understate full resource if value-added from non-market is greater than earnings forgone. For example, where maximum market income is below necessary consumption, one needs to replace market-intensive consumption with time-intensive consumption. The production possibility from non-market might be greater than from market labor. One might attempt to model this situation by treating time-intensive goods as inferior goods. This, however, can not explain the decrease in labor supply as income increase after certain income level. Individual with high income tends to reduce market-intensive consumption because he/she 'wants to' increase utility while individual with low income tends to *reduce* market-intensive consumption because he/she 'have to' relax constraints by substituting market-intensive consumption with time-intensive consumption.

The total cost of time is denoted as $\Psi$. Then, maximization problem is

$$\mathcal{L} = U(Z_\tau, Z_m) + \lambda[R - p_\tau c_\tau Z_\tau - p_m c_m Z_m - \Psi(Z_\tau, Z_m)] \quad (7)$$

The following condition holds in the optimal choice between time and market-intensive.

$$\frac{U_\tau}{U_m} = \frac{p_\tau c_\tau + \Psi_\tau(Z_\tau^*, Z_m^*)}{p_m c_m + \Psi_m(Z_\tau^*, Z_m^*)} \quad (8)$$

**B. Parental Health Impact on Optimal Consumption between Market- and Time-Intensive**

For simplicity, I begin with an assumption**:** only two agents (parents and child), and two periods (current and future); parents are in their adulthood in the current period and seniors in future, and child is in his or her young adulthood in the current period and adulthood in the future period. Assuming altruism among family members, parents and child will transfer a fraction of excess resource to each other. I define excess resource as full resource minus reservation consumption amount. Parents are initially healthy and work in the labor market, and transfer pecuniary and non-pecuniary goods/services to children. Assuming there is no external resource, transfer from parents will be equal to child's non-labor income, $N$.

$$N = \gamma\{R^P - \underline{Z}_\tau^P - \underline{Z}_m^P\} \quad \text{where } 0 < \gamma \leq 1 \text{ if } R^P > \underline{Z}_\tau^P + \underline{Z}_m^P, \ \gamma = 0 \text{ otherwise} \quad (9)^5$$

$P$ denotes parents. $\underline{Z}_\tau^P$ and $\underline{Z}_m^P$ are parents' reservation consumption on time-intensive and market-intensive. With parental illness, child's full resource will be altered for two reasons. First, child becomes poorer (i.e. lower $N$) due to the decrease of transfer from parents. The direct impact of non-labor income loss could be the same between market-intensive and time-intensive. However, lower $N$ also changes the value of time-intensive consumption as it substitutes market

[5] Child also transfers fraction of excess resource, $\gamma\{R - \underline{Z}_\tau - \underline{Z}_m\}$, to parents. I treat this transfer as part of child's consumption, as mentioned earlier.

consumption due to market budget constraint. With binding market budget constraint, the individual might not even be able to afford all necessary goods/services through market-intensive goods/services, but can replace some with time-intensive ones. In turn, it will increase non-market labor value (value-added through time) because the value of time-intensive consumption is calculated from the value of the market-intensive consumption that it substitutes. Second, now consumption choice set changes after the incidence of parental illness because of care-giving/medical need for unhealthy parents. The consumption of market-intensive care-giving (such as nursing home) will crowd-out the market-intensive goods/services previously consumed. However, the value of time-intensive consumption increases as it substitutes more market-intensive consumption to ameliorate resource constraint. Suppose market-care service is a lump sum, and expensive. Then, one might not buy market-care service at all due to market budget constraint, but can manage to produce time-intensive care-giving.

Figure 1 describes the parental health impact on change in resource constraint. Overall, with the incidence of parental illness, child's consumption possibility declines, but relatively less in time-intensive consumption compared to market-intensive consumption.

Son *vs*. Daughter

I assume that son and daughter have same preference between time-intensive and market-intensive, and face same market price ( $p_\tau$ and $p_m$ ) and have same productivity (same $c_\tau$, $c_m$, $t_\tau$ and $t_m$ ). Suppose earning from market labor is greater for son. Then, son has greater full resource possibility than has daughter. However, the gap between son's and daughter's full resource associated with market earning difference will decrease as more time-intensive goods/services are consumed, because the value of time-intensive good/services will be measured not by market earning but by the market value of what it substitutes. Figure 2 describes the optimal consumption choice with parents' poor health. For son, the choice will change from $S$

to $S'$ and, for daughter, from $D$ to $D'$.

Mother *vs.* Father

Note that income loss from father is greater than from mother. Father's illness will reduce the child's non-labor income ( $N$ ) more. Budget-constrained child, then, substitutes market-intensive consumption with time-intensive consumption, which will increase the value of time-intensive consumption. As in figure 3, with father's illness, one is likely to increase time-intensive consumption due to greater income loss.

**C. Adult Child's Labor Supply**

Focusing on child's labor supply, we have the following condition from (1)' and (3).

$$L = \overline{T} - t_\tau Z_\tau - t_m Z_m \qquad (10)^6$$

Therefore, child's labor supply can be expressed as a function of optimal consumption level, $Z_\tau^*$ and $Z_m^*$ given full resource:

$$L_2 = L(Z_{\tau 2}^*, Z_{m2}^*; R) \qquad (11)$$

2 denotes future period. $L_2$, therefore, is child' future labor supply. From full resource equation (5) and optimal choice (7), the equation (11) can be reduced to:

$$L_2 = L(W_2, V_2, W_2^P, V_2^P, \underline{Z}^P; c_\tau, c_m, t_\tau, t_m, p_\tau, p_m, \gamma) \qquad (12)$$

$W_2$ is child's future labor income (or/and foregone labor income) and $V_2$ is value-added from

[6] This implies market labor supply *decreases* with parental health problem if 'increase in $Z_\tau$ 'is greater than 'decrease in $Z_m$ ' times $\frac{t_m}{t_\tau}$.

non-market labor. $W_2^P$ and $V_2^P$ are parents' future labor income and value-added. $\underline{Z}^P$[7] is parents' reservation consumption amount.

Note that the main interest of this paper is to investigate the link between parental health in current period and child labor outcome in future period. To achieve this purpose, first, I introduce labor income, value added and reservation consumption as a function of health status, and second, I incorporate these with health dynamic equation so that eventually I can obtain a long term relationship between parents' health and child labor outcome.

Labor Income Equation

I define that labor income is a function of one's own health status as well as of demographic characteristics and schooling.

$$W_2 = W(X_2, \overset{-}{H_2}, \overset{+}{S}) \qquad \text{(13-A)}$$

$X_2$ is individual characteristics (such as gender), $H_2$ denotes health status in the future period. Higher value of $H_2$ means poorer health. $S$ is schooling completed. I assume that both parents and child complete schooling before adulthood; in other words, parents complete schooling before the current period and child completes it before the future period. With better health condition and higher level of schooling, labor income will be higher ($\partial W_2 / \partial H_2 < 0,\ \partial W_2 / \partial S > 0$). Equivalently, parents' labor income equation can be expressed as:

$$W_2^P = W(X_2^P, \overset{-}{H_2^P}, \overset{+}{S^P}) \qquad \text{(13-B)}$$

[7] $\underline{Z}^P = \underline{Z}_\tau^P + \underline{Z}_m^P$

Value-added Equation

I define that value-added through time is a function of one's own demographic characteristics and health status.

$$V_2 = V(X_2, \bar{H}_2) \qquad \text{(14-A)}^8$$

With better health condition, value-added in commodity through time will be higher ($\partial V_2 / \partial H_2 < 0$). Equivalently, parents' value-added equation can be expressed as**:**

$$V_2^P = V(X_2^P, \bar{H}_2^P) \qquad \text{(14-B)}$$

Reservation Consumption Equation

We also can write parents' reservation consumption level as a function of individual characteristics and health status**:**

$$\underline{Z}^P = \underline{Z}(X_2^P, \overset{+}{H}_2^P) \qquad (15)$$

Reservation consumption level increases as health status worsens, since parents in poor health encounter higher medical cost ($\partial \underline{Z}^P / \partial H_2^P > 0$).

Health Dynamics Equation

I assume that health stock declines with some persistency as one becomes older. I, then, express future health status as a linear equation of current health status for simplicity**:**

$$H_2^P = \delta^H H_1^P + \varepsilon_2^H \qquad \text{(16-A)}$$

[8] Note that schooling is not determinant of non-market labor value.

$\delta^H$ is a discount factor that has value between 0 and 1. Likewise, child's health dynamic equation is**:**

$$H_2 = \delta^H H_1 + \varepsilon_2^H \qquad \text{(16-B)}$$

**4. Data and Sample**

To investigate the intergenerational health implications in the labor market, I explore the transition period of Russia, which conveys various important characteristics. More specifically, first, prime working-age men are a major group who suffered most from severe health problems - mentally and physically. Second, although government transfer has increased recently, the social safety network in Russia is far from sufficient. In such a case, illness can cause a substantial financial burden to the family. Third, return to schooling among the younger generation has increased while return to human capital of the older generation has decreased substantially in the labor market. Therefore, parents' health problems can induce an intergenerational poverty trap if investment for child's higher education is frustrated due to budget constraint. Fourth, as addressed in many studies, there is a large gender gap in market income in Russia. The behavioral response to parental health can be different between son and daughter. If they pool resources and specialize in market- or non-market labor based on relative return, gender labor division will be more distinctive.

The Russia Longitudinal Monitoring Study – RLMS Phase II is the most plausible for exploring long-term health impact on employment status in Russia. RLMS surveyed some 4,000 households during 1994-2004. It is a longitudinal study of populations of dwelling units. Relating to general health assessment, it asks 'How would you evaluate health –Very Good, Good, Average, Bad or Very Bad?' Regarding employment status, it asks 'Do you now work?' For the earning

variable, RLMS questions 'How much money in the last 30 days did you receive from your primary place of work after taxes?' This paper explores the relationship between parents' health status in 1994 and child's working status in 2004. My estimate sample includes those (i) whose mothers were aged 35 - 55 in 1994, (ii) who were aged 13-29 in 1994, (iii) who lived with both parents in 1994 and (iv) who lived in the same dwelling unit in 1994 and in 2004.

Table 1 summarizes sample characteristics of children corresponding to each additional sample restriction: Based on information about women, I can obtain the number of children that each woman gave birth to and are still alive. We have 2,970 children of women aged 35-55. Additionally, I impose children's age restriction of age 13-29, in order to include mostly those who had completed schooling by 2004. This leads to 2,159 children[9]. As seen in column (3) in Table1, once we restrict the sample to those who lived with both parents, we have only 882 children. In addition, after restriction to those who stayed in the same dwelling unit between 1994 and 2004, there are 385 children for the final analysis. Column (4) in Table 1 shows that 48% of children had obtained higher education[10] by the 2004 interview year. Fifty-one percent of children are below the poverty line in 1994 but 14% are in 2004. Regarding health status, only 3.1% in 1994 and 2.9% in 2004 reported their own health status as bad or very bad.

Table 2A provides summary statistics of children by gender. In daughters there is a greater fraction (64%) of those with higher education than in sons (34%) in the 2004 interview year. About 59% of sons and 49% of daughters believe that they are in at least good health in 1994. Thirty-eight percent of sons and 23% of daughters are working at the time of the 1994 interview. In the 2004 survey, overall 71% of sons and 68% of daughters have jobs. Among never married adult children, 54% of sons are working while 72% of daughters are working in 2004. However,

[9] Note that we do not know age for those who left mother's dwelling unit. I calculate this sample observation by weighting with the probability of being in each age category for missing children.

[10] Higher education indicator is assigned if individual graduate from Institute/university/academy or higher.

among married children, 78% of sons are working while 66% of daughters are working. Regarding poverty indicator, the son's health status in 2004 seems significantly related to whether he is below the poverty line.

Table 2B provides summary statistics of parents in the final sample. In 1994, mother's average age is around 43 and father's around 45. We have a greater fraction of those with schooling higher than 13 years in mothers (47% in 1994, 55% in 2004) than in fathers (32% in 1994, 41% in 2004) in the 1994 interview year. Only 10% of mothers and 23% of fathers report they are in at least good health in 1994. Eighty percent of mothers and 84% of fathers are working at the time of the 1994 interview. Correlation of indicators between working and health suggests that both mother and father in bad health are less likely to work. Bad health of parents is also related significantly to child's poverty.

Note that RLMS does not track information for people who moved out. In the analysis linking parental health status in 1994 to adult child's labor outcome in 2004 we have sample attrition of those who left the dwelling unit after 1994 (in addition to the sample attrition in the initial year). Figure 4 presents the moving-out pattern in four categories – stay, individual mover, household mover and death. Overall, more than 50% of the sample moved out of the initial dwelling unit by 2003. Although parents' migration after 1994 does not affect sample attrition in the final analysis, it might affect the child's behavior in the labor market. As seen in Figure 5, more fathers leave the sample than do mothers, due to higher mortality among men.

**5. Discussion of Estimation Strategy**

In this chapter, I discuss estimation strategies in the empirical analysis for parental health impact on child's future labor outcome. According to the economic framework provided in chapter 3, the parental health impact on child's labor supply can be bidirectional depending on

relative consumption chosen between market- and time-intensive. From equation (12) through (16), child's labor supply in the future period can be expressed in the following reduced form:

$$L_2 = L(X_2, H_1, S;\ X_2^P, H_1^P, S^P;\ \gamma, \delta^H, \varepsilon_2^H;\ c_\tau, c_m, t_\tau, t_m, p_\tau, p_m) \qquad (17)$$

Equation (17) tells us that child's future labor supply comprises observable components ($X_2, H_1, S;\ X_2^P, H_1^P, S^P$), and unobservable components ($\gamma, \delta^H, \varepsilon_2^H;\ c_\tau, c_m, t_\tau, t_m, p_\tau, p_m$). It is plausible that parental health status and unobservable components correlate with each other. Interpreting $\gamma$ as how family members tie to each other financially, it is likely to be lower as parents' own health deteriorates. The health depreciation term, $\delta^H$, is also likely related to the parental health condition in the current period. For instance, if unhealthy parents earn less and cannot access medical service promptly for the health problem, the subsequent health condition can decline more sharply.

This paper investigates child's labor outcome resulting from behavioral response to parents' health status, which is a confound health impact partly driven by direct response ($\partial L_2 / \partial H_1^P$), and partly by indirect response $(\partial L_2 / \partial \gamma) * (d\gamma / dH_1^P)$ and $(\partial L_2 / \partial \delta^H) * (d\delta^H / dH_1^P)$.

To obtain such a health impact, we need to be concerned about other unobservable factors. Parental health in the current period can be positively related also to health shock ($\varepsilon_2^H$) in the future period if one's health condition is related to local environments. In particular, those living in poor regions tend to be unhealthier and, at the same time, exposed to more dangerous environments (such as communities with higher crime and accident rates). To control for the channel through local environments in the link between parental health and child's employment status, I consider including region dummies in covariates.

One also can argue that initial health status has been driven mainly by the initial economic

condition, which also affects the future socio-economic condition of family members. In other words, due to poverty, family members are unhealthy and less educated, which leads to child's poor performance in the labor market later. To measure parental health impact on child's subsequent labor outcome, I include the poverty information at the initial period in the estimate equation.[11] Regarding child's schooling, I do not include it as a control variable in the baseline specification concerning endogeneity, but I explore whether and how schooling plays a significant role in the link between parents' health and child's future labor outcome later.[12]

**Sample Selection**

A major concern remaining for empirical analysis is the potential sample selection bias. As described in the previous section, focusing on couples' children, around 44% of sample attrition of children occurred because children were not in the same household with parents in 1994 and 31% because children had moved out of the initial dwelling unit for the following years. In sum, around 75% of children aged 13-29 in 1994 have dropped out of the analysis in the final sample. In particular, I can observe employment status only if the individuals lived with parents in 1994 and lived in the same dwelling unit in 1994 and 2004. I can describe this as:

Sample Selection: $Y^* = \alpha_Y H + \varepsilon_Y$, $Y = 1$ if individual in the household, 0 otherwise (18)

Employment Status: $L^* = \alpha_L H + \varepsilon_L$, $L = 1$ if individual working, 0 otherwise (19)

Important questions regarding sample selection are i) whether/how parents' health status is

[11] One might propose controlling for initial health status or estimating health change. However, it does not provide necessary health variation because major health deterioration in Russia occurred 1991- 1994. Note that RLMS-Phase II provides data only starting from 1994. I cannot control previous years (e.g. 1991), and change from 1994 does not give enough variation in health status.

[12] One might also argue that child's productivity ( $c_\tau, c_m, t_\tau, t_m$ ) is related to parental health. However, the sign of relationship is not clear, so it is treated as independent of parental health in this paper. The market price of commodity ( $p_\tau$ , $p_m$ ) is exogenous to parental health.

related to the sample selection and ii) whether residual terms ($\varepsilon_Y, \varepsilon_L$) in two equations are significantly related to each other. For example, if children tend to move out for jobs regardless of parents' health ($\alpha_Y = 0,\ \rho_{Y,L} < 0$), sample attrition would not harm the consistency in the coefficient of a parent's health in the employment equation. However, if children tend to leave the household to find jobs due to parent's poor health ($\alpha_Y < 0,\ \rho_{Y,L} < 0$), ignoring sample selection can lead to an underestimation of the coefficient of a parent's health in the employment equation (i.e., overstate the magnitude of parent's negative health impact). Sample attrition associated with sample design has been discussed in recent research papers, which suggest useful methodologies for empirical studies [Altonji, Elder and Taber 2005, David S. Lee 2005, Dinardo, McCrary and Sanbonmatsu 2006].

To implement useful methodologies to diagnose and correct potential bias, it is essential to know baseline characteristics for full sample (such as demographic and parental information for non-coresident children as well as coresident). Fortunately, RLMS asks women how many children were ever born to them and are still alive and what is each child's gender. Using this, I can construct information of children on parental health, parental education and own sex regardless of coresidency restriction. To obtain age information for non-coresident children, it is necessary to use another supplementary survey, namely 'Social Stratification in Eastern Europe After 1989: General Population Survey (SSEE)'. The SSEE surveyed about 5,000 individuals in Russia in 1993[13]. First, I keep only children of women respondents and then categorize child's age in 9 groups[14]. Second, using multinomial logit, I estimate coefficients of mother's age and mother's schooling. Finally, using these coefficients from SSEE, I obtain the predicted probabilities that each child's age is in each age category and impute this for those with missing

[13] The information on the number of population and structure of settlement was based upon the data of 1989 census.

[14] Age 1-12, 13-17, 18-23, 24-29, 30-35, 36-41, 42-47, 48-53, 54-61

age category values (i.e. children not in the same dwelling unit with mother) in the final sample from RLMS. In my empirical analysis, I will use this sample selection data for sensitivity check by examining the coefficients of parental health by varying the correlation of error terms in selection and employment equations.

## 6. Estimation Results of Parental Health Impact on Child's Subsequent Working Probability

Table 3 summarizes estimate results of the relationship between health and child's future working status[15]. A father's health plays a significant role in determining a daughter's subsequent working status**:** a father in poorer health in 1994 reduces a daughter's working probability in 2004 (coefficient: -0.965, $dP/dX$ = -0.366)[16]. I do not find any significant parental health impact on a son's future working status. Interestingly, his or her own health status for both son and daughter is not a significant determinant in own working probability after controlling for parental health as well as other covariates.

As discussed in the previous section, there might be sample selection bias that leads to this result. For example, if children had to find jobs to compensate family income loss due to parental poor health and had to leave parents for the jobs, it would exaggerate the negative health impact on daughters by using only those remained in the sample. Using children whose mother cohabited with father, we have 1,597 children for selection sample for the equation (19). To check the sensitivity in the coefficient of the parental health impact, I summarize coefficients of parents' health in Table 4A for selection equation and Table 4B for employment equation corresponding to various correlations between -0.75 and 0.75. First of all, the father' health coefficient in the selection equation is not significant for all range of correlation and for both son and daughter.

[15] See appendix 1 for estimate results from using latent health variable
[16] See appendix 2 for estimates on child's working in other years (1995-2003).

Regarding estimates in employment equation, there is no significant parental health impact for a son in the full range of correlation. However, we find negative coefficient in father's health indicator in most correlation ranges (-0.5 and higher) for daughters. This suggests that father's health impact for a daughter is significant unless most daughters who left the household are working in the market.

Although I cannot directly investigate employment status of children who have moved out from the final analysis sample, I can speculate overall characteristics of those aged 13-29 in 1994 who live with parent compared to those who do not live with parent in RLMS. As summarized in Table 5A, men who live with parents are less likely to work after controlling for their own age, poverty indicator and regions. However, a woman coresident with a parent is more likely to work. Interestingly, once we control for marital status, the relationship between working status and co-residence indicator becomes insignificant for both men and women, which shows marriage is highly related with whether individuals are moving out from parents' dwelling unit. As described in Table 5B, after controlling for age and poverty, marriage plays a significant negative factor of being in the same dwelling unit with parents for both adult son and daughter. In sum, it seems that both men and women tend to move out from parents' dwelling unit as they marry. In addition, men tend to work in labor market while women tend not to work with marriage. Taking account of marriage, it is more plausible to have positive correlation of residual terms between selection and employment equations for women, but negative for men. In other words, it is unlikely that the negative impact of the father's poor health on the daughter's future working status is driven by only sample selection bias.

### 7. Schooling / Family Resource Allocation

The baseline economic model in chapter 3 shows that behavioral response to the parental

health problem in the labor market can depend on relative resource available between market and non-market. Although individuals have stronger incentive to increase subsequent labor supply to compensate lowered family income due to parental illness, child's future working probability might decrease if non-market labor value (i.e. value-added through time) is greater than market labor value(i.e. labor income or forgone earning). One can conjecture that daughter has reduced market labor supply since her non-market labor (such as care-giving) has been appreciated more as it substitutes market consumption, which is not plausible due to market budget constraint.

Note that schooling is an important determinant for market labor income but not for non-market labor. If daughter's schooling has been interrupted due to father's poor health, the market labor income will decrease while non-market labor value is not affected by schooling.

In addition, family composition can also contribute to shaping behavioral response to parental illness in the course of allocation of family role: having sibling or spouse might allow one to be specialized in producing market or non-market goods/services, which will enhance the gender labor division between market vs. non-market based on relative return in labor income. In this chapter, I will examine these potential channels by exploring the analysis sample further.

**A. Child's Schooling**

To check whether there is negative impact of parents' poor health on child's schooling and, further, whether there is gender difference, I estimate parental health impact on higher education. As summarized in Table 6, poorer father's health significantly reduces the probability that daughter obtains higher education (coefficient = - 0.923, $dP/dX$ = - 0.355), but does not have significant impact on son. One might conjecture that parents tend to invest on son's schooling because the return to schooling might be greater for son than for daughter. Despite many studies providing empirical evidence that men's wage is significantly higher than women's during

economic reform in Russia, gender difference in return to schooling in Russia is relatively unexplored. Table 7 summarizes estimates on gender gap in return to education in terms of i) working status and ii) monthly labor income in 2004. Overall, son has higher labor outcome than daughter in their adulthood (in 2004). However, empirical results find no significant gender gap in return to higher education after controlling for gender as well as other covariates. This empirical evidence does not support the hypothesis that family reduces the investment for daughter's education based on return to higher education.

An important question is to what extent the education explains the father's negative health impact on daughter's working probability. To see this, I estimate again the coefficient of parental health, but now including adult child's education attainment as summarized in Table 8. Although the magnitude of coefficient becomes smaller (from -0.965 to -0.776)[17] after controlling for higher education indicator, we still find a significant negative relationship between the father's poor health and the daughter's future working status.

**B. Family Labor Division (Market *vs*. Non-Market Labor)**

As discussed in chapter 3, value-added through time (non-market labor) increases as budget strained child substitutes market-intensive consumption with time-intensive. Adult child tends to allocate more time to non-market labor if return of market labor is lower (or if opportunity cost of market labor is higher).

Figure 6 presents box graphs of monthly labor income among daughter, mother, son and father. Using final analysis sample (in Figure 6A), in the 1994 survey year, daughter is likely to earn lowest, and son tends to earn higher than mother but lower than father. Therefore, when father is in poor health, son or mother is likelier to work in a market sector while daughter in non-market

[17] $from\ dP/dX = -0.366\ to\ dP/dX = -0.290$

sector. Adult daughter earns less than adult son in 2004 as well. Examining same age population group, it seems consistent with overall labor market condition as seen in Figure 6B. In Figure 7, I also present the monthly labor income by education, in addition to by gender. Overall labor income increases with higher education for both son and daughter. However, gender gap is large in that women with higher education are likely to earn less than men without higher education overall. As already seen in Table 7, son has more return from market labor in terms of both working probability and monthly labor income even after controlling for family background: son is more likely to have a job than daughter, by 0.37 ($dP/dX = 0.13$), and son tends to earn more, by 2,106 rubles in 2004.

Further questions arise from different impact between parental health and child's working probability: Why has father's health a significantly negative impact, while mother's health does not? Table 9 summarizes the relationship between parent's own health and own working status. After controlling for own age, education attainment and regions, there is significant health impact on his own working status for father, but not for mother. In addition, as seen Table 2, both total and hourly labor income are higher in father than in mother, also, which suggests that loss of father's income source might have more severe negative impact on (permanent) family income than might loss of mother's[18]. To double check whether a child's behavioral response to parental illness depends on parents' financial situation, it is useful to explore children with single mother. To be consistent, in a case of a single mother, one should expect that unhealthy mother reduces daughter's working probability. As seen in Table 10, single mother's health problem increases son's future working probability and reduces daughter's future working probability overall.

Specialization to non-market labor can not be disentangled from other labor determinants such

[18] Further investigation on occupational distribution and chronical disease associated with self-reported-health-status indicates that the gender difference in health impact on own working status is driven by occupational distribution.

as education and marital status. If a specialization in non-market labor reduces daughter's schooling and/or leads to daughter's early marriage, it can lower even further the likelihood of working in the market in her adulthood. Due to sample limitation, I cannot directly investigate child's behavioral response to parental health based on self-reported health information for non-coresident child in the initial year. RLMS, however, surveyed on time-use for 1994-1997, and asked whether parents are older than 50 years and need help[19] for daily activity. Using this, I can explore the relationship between whether parents need help and whether the child is working, for non-coresidents, which shows that woman with father who needs help for daily activity in 1994 is less likely to work in the labor market in 1996 as presented in Table 11. This indicates father's negative health impact on daughter's subsequent working probability might not be limited to coresident children[20].

## 8. Concluding Remarks

Exploring the link between parents' health and a child's subsequent labor outcome, this paper provides evidence that health conditions in one's prime working age can have a long-term, intergenerational implication in the labor market. The positive or negative direction of parents' health impact on a child's labor outcome can be determined based on the relative return on market labor. Despite the stronger incentive to increased work in the labor market to mitigate the economic burden because of a parent's poor health, a child's subsequent market labor supply might decrease i) if a child's schooling attainment is lowered, hence reducing the return on market labor, and ii) if the relative value of a child's non-market activity (such as care-giving and other home productions) is higher.

[19] "Does he/she need help, for example, getting dressed or eating?"

[20] To see if non-coresident married child still helps his/her parent(s), I explore 'Survey on Russian Marriages, 1996'. 66%(N=451) of non-coresident married children report they meet the need of elderly (4% reports another household member does and 30% are not applicable.)

Empirical results using RLMS show that having an unhealthy father in her young adulthood reduces a daughter's working probability significantly in her adulthood. Although a father's poor health lowers education attainment for a daughter, and in turn reduces the likelihood of working in the future, such a lowered schooling cannot explain all the negative impact of father's poor health on daughter' s subsequent working status in the labor market. This directs a researcher's attention to other non-market activities such as a care-giver role or other home production among the poor. In the process of reallocating roles or resources in response to family member's poor health, women tend to be more specialized to non-market labor and men to market labor when relative return on market labor is significantly lower for women. This paper also highlights that where family members are linked economically to each other, it is plausible that other family members' health conditions can play an even more significant role in determining one's future economic behavior in the labor market. This has further implication on the importance of non-market economic linkage, which requires close, physical, residential location, and discussion on related sample attrition will contribute to survey design. Understanding family coping mechanisms can provide valuable insight for framing policies on poverty as well. Especially when a society experiences a sharp decline of social safety networks (medical care, pension, etc.) and limited access to financial markets (banks, insurance, etc.), those without an informal network can be most vulnerable.

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Figure1: Parental Health Impact on Consumption Possibility
between Market-intensive and Time-intensive Consumption

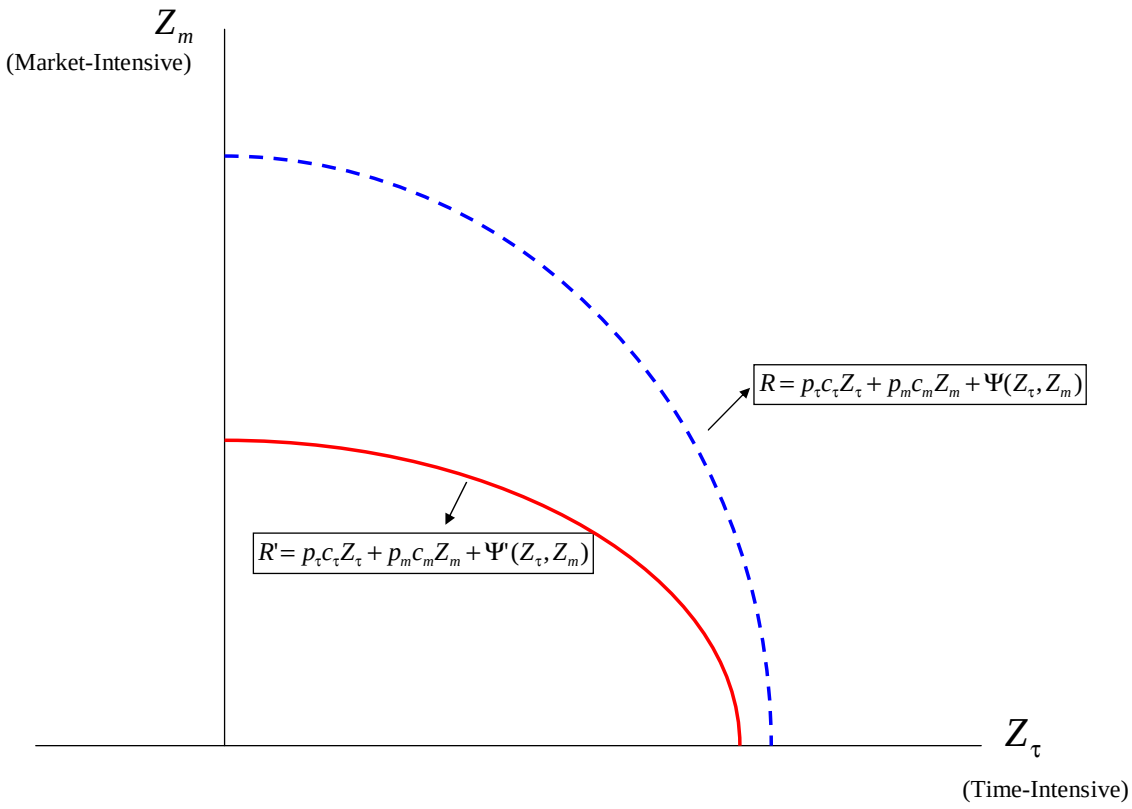


Figure2: Parental Health Impact on Child's Optimal Choice
between Market-intensive and Time-intensive
**(Son *vs.* Daughter)**

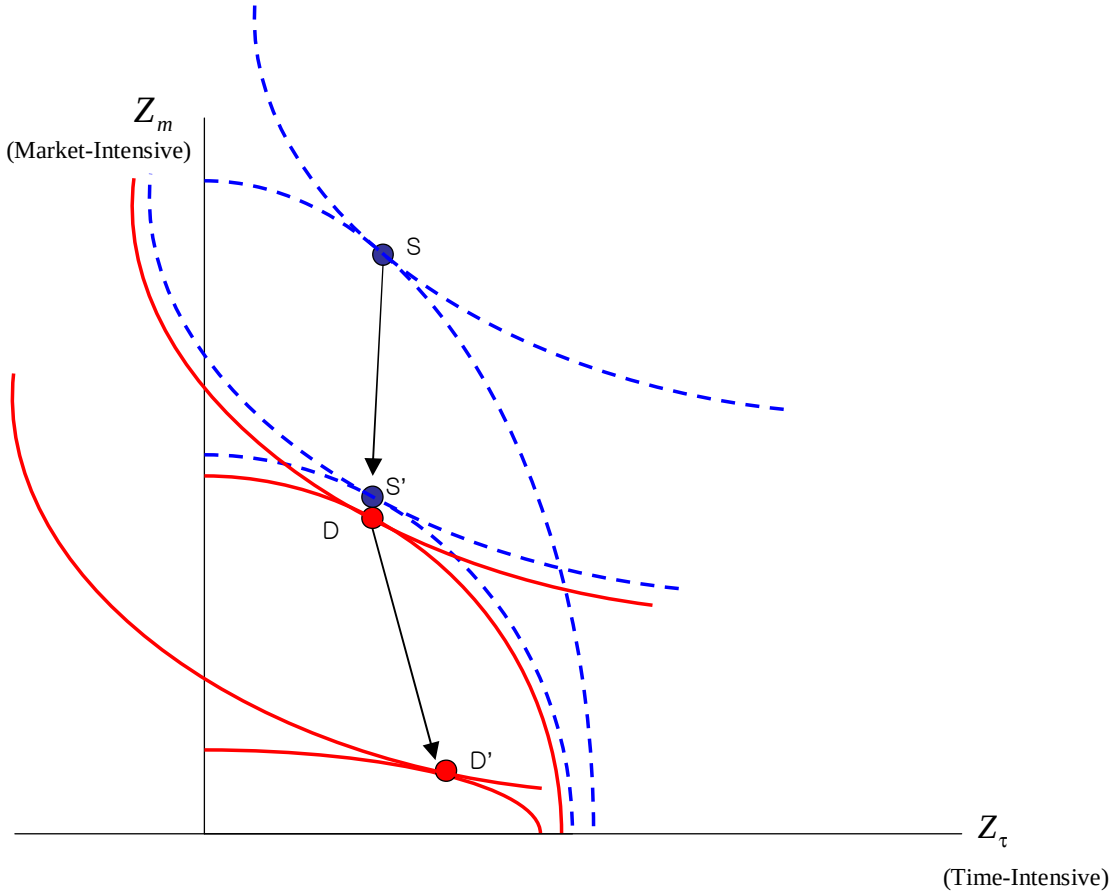


Figure3: Parental Health Impact on Child's Optimal Choice
between Market-intensive and Time-intensive
**(Mother *vs.* Father)**

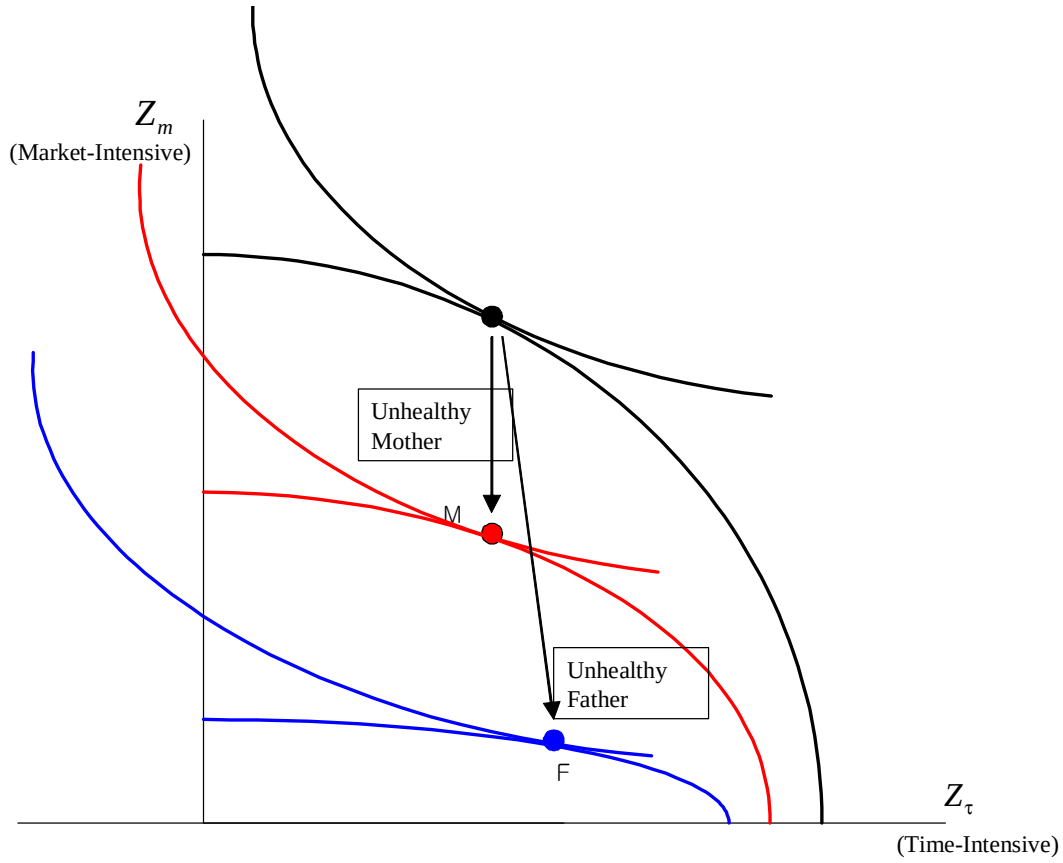


Table 1: Sample Summary – **Children**

| | Child's age[21] in 1994:13-29 | | Stay with both parents in 1994 | Stay in the same HH in 2004 | |
|---|---|---|---|---|---|
| | Women's | Couple's | | | |
| | (1) N=2,159 | (2) N=1,569 | (3) N=882 | (4) N=385 | |
| Mean of | 1994 value | 1994 value | 1994 value | 1994 value | 2004 value |
| Age | - | - | 17.8 | 17.7 | 27.7 |
| Sex (Men=1) | 0.49 | 0.49 | 0.52 | 0.52 | 0.52 |
| Marital Status (Ever Married = 1) | - | - | 0.15 | 0.15 | 0.71 |
| Men | | | 0.15 | 0.15 | 0.69 |
| Women | | | 0.15 | 0.15 | 0.73 |
| Yeas of education (year>=15) | - | - | - | - | 0.48 |
| Health Status, % | | | | | |
| Very Good/Good | - | - | 54.2 | 54.0 | 48.6 |
| Average | | | 42.6 | 42.9 | 48.6 |
| Bad/Very Bad | | | 3.1 | 3.1 | 2.9 |
| Below Poverty*[22] | 0.43 | 0.41 | 0.41 | 0.51 | 0.14 |

Note: Years of education assigned as follows:
11.5 yrs if PTU with secondary education, technical trade school/ 13 yrs if Technical community college, medical, music, pedagogical, art training school/ 15 yrs if Institute, university, academy/18 yrs if Graduate school, residency.

[21] Age information for children not in household is estimated based on SSEE data by doing multinomial logit.
[22] Developed by Russian officials and researchers and UNC-CH researchers, and they reflect the average cost of food items in a Russian food basket for low-income persons. RLMS adjusted poverty lines, like the official poverty line, reflect the cost of living for low income persons.

Table 2A: Sample Summary - **Son *vs.* Daughter**

| | Son | | Daughter | |
|---|---|---|---|---|
| | (1) 1994 Year | (2) 2004 Year | (3) 1994 Year | (4) 2004 Year |
| Mean of | N=199 | N=199 | N=185 | N=185 |
| Age | 18.2 | 28.2 | 17.2 | 27.2 |
| Higher Education (year>=15) | - | 0.34 | - | 0.64 |
| Indicator of married | - | 0.69 | - | 0.73 |
| Health, % | | | | |
| Very Good/Good | 59.3 | 53.0 | 48.6 | 43.4 |
| Average | 39.2 | 45.0 | 46.5 | 52.7 |
| Bad/Very Bad | 1.5 | 2.0 | 4.9 | 3.8 |
| Working Indicator | 0.38 | 0.71 | 0.23 | 0.68 |
| among Never Married | - | 0.54 | - | 0.72 |
| among Married | - | 0.78 | - | 0.66 |
| Labor income for last month, rubles[23] (dollars) | 188,190 | 6,584 | 137,459 | 4,173 |
| Hourly labor income, rubles[24] (dollars) | 1,516 | 36.4 | 1,202 | 33.5 |
| [25]Correlation between Poorer Health[26] and below Poverty Line | -0.067 (0.35) | 0.207*** (0.00) | 0.001 (0.47) | -0.02 (0.77) |
| Co-residence with, % | | | | |
| Both Mother and Father | 100 | 68.3 | 100 | 73.0 |
| Mother only | 0 | 21.6 | 0 | 20.0 |
| Father only | 0 | 4.0 | 0 | 2.2 |

Note: Years of education assigned as follows:
11.5 yrs if PTU with secondary education, technical trade school/ 13 yrs if Technical community college, medical, music, pedagogical, art training school/ 15 yrs if Institute, university, academy/18 yrs if Graduate school, residency.

[23] Not comparable between 1994 and 2004 labor income
[24] Not comparable between 1994 and 2004 hourly labor income
[25] P-value in ( )
[26] Average/Bad/Very Bad

Table 2B: Sample Summary - **Parents**[27]

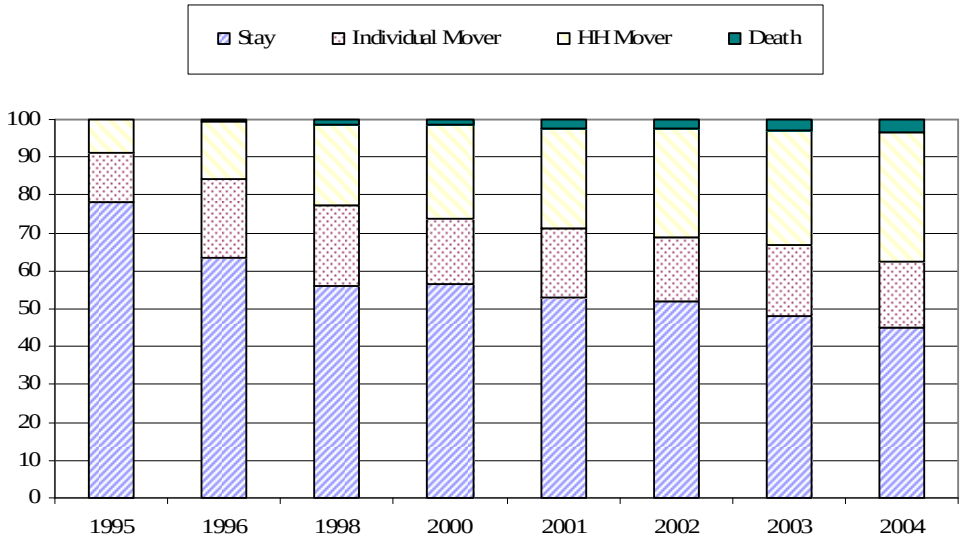
| | Mother | | Father | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| | 1994 Year | 2004 Year | 1994 Year | 2004 Year |
| Mean of | N=384 | N=302 | N=384 | N=238 |
| Age | 42.9 | 52.9 | 44.9 | 54.7 |
| Yeas of Education (year>=13) | 0.47 | 0.55 | 0.32 | 0.41 |
| Health, % | | | | |
| Very Good/Good | 9.9 | 11.0 | 22.7 | 19.3 |
| Average | 75.0 | 71.2 | 69.0 | 63.2 |
| Bad/Very Bad | 15.1 | 17.7 | 8.3 | 17.5 |
| Working indicator | 0.80 | 0.57 | 0.84 | 0.63 |
| Labor Income for last month, rubles[28] | 201,660 | 3,931 | 263,353 | 5,913 |
| Hourly labor income, rubles[29] | 1,574 | 27 | 1,804 | 41 |
| [30]Correlation between Bad Health 1994 and | | | | |
| Working indicator | -0.104** (0.04) | -0.208*** (0.000) | -0.260*** (0.000) | -0.283*** (0.000) |
| Children below Poverty Line | 0.097* (0.061) | 0.168** (0.005) | 0.093*** (0.073) | 0.155*** (0.022) |

Note: Years of education assigned as follows:
11.5 yrs if PTU with secondary education, technical trade school/ 13 yrs if Technical community college, medical, music, pedagogical, art training school/ 15 yrs if Institute, university, academy/18 yrs if Graduate school, residency.

[27] Conditional on children who live in the same household in 1994 and in 2004
[28] Not comparable between 1994 and 2004 labor income
[29] Not comparable between 1994 and 2004 hourly labor income
[30] P-value in ( )

Figure 4: Sample Attrition – **Children**

A. Son (N=461)




B. Daughter (N=421)

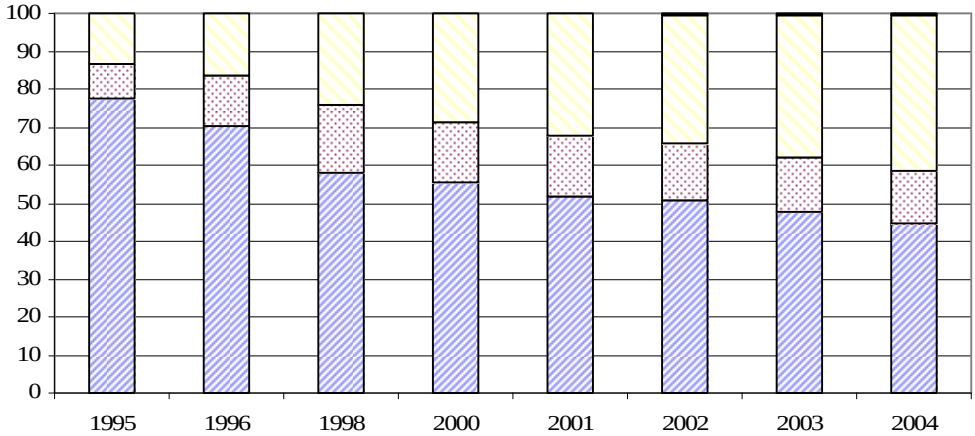
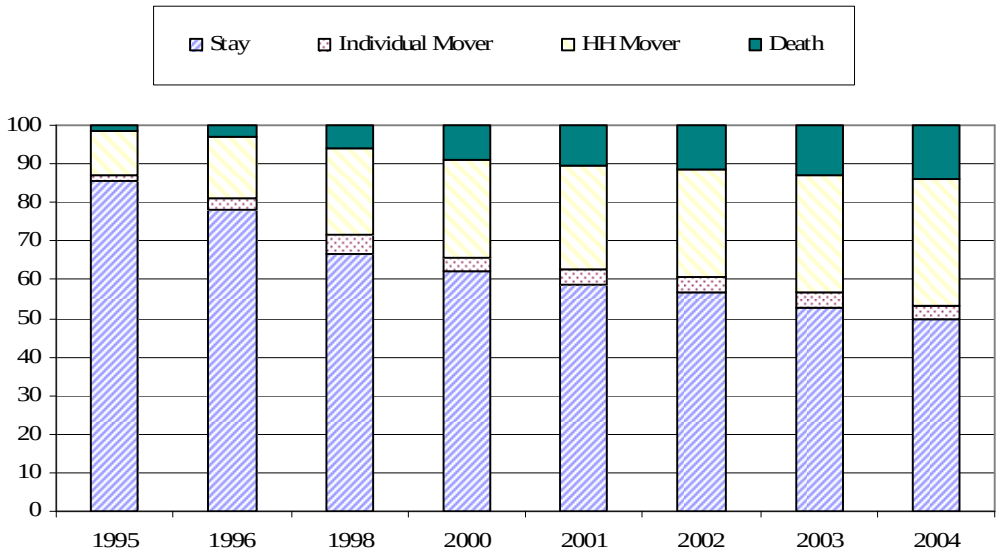


Figure 5: Sample Attrition – **Parents**

A. Father (N=882)




B. Mother (N=882)

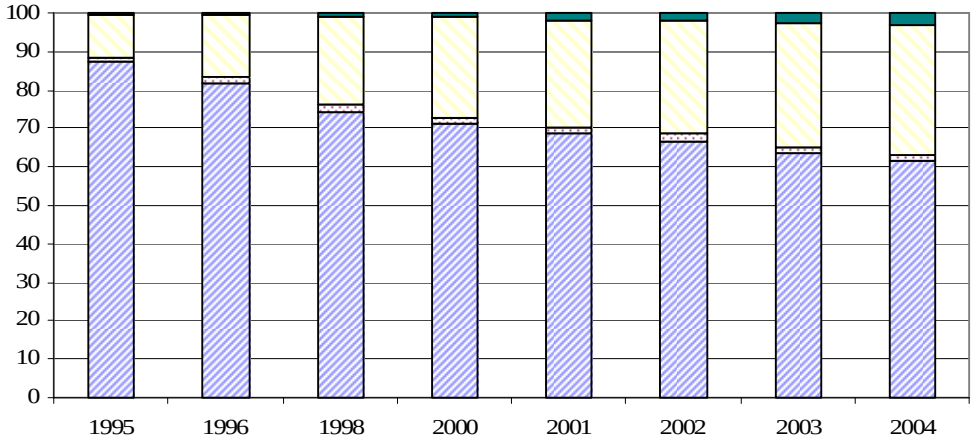


Table 3: Estimates on Child's Working (2004) – Probit

| | Outcome Variable: Child's Working Indicator in 2004 | | | |
|---|---|---|---|---|
| | Son (N=195) | | Daughter (N=180) | |
| | (1) | (2) | (3) | (4) |
| Mother's Education in 1994 (year>=13) | 0.139 | 0.160 | 0.413* | 0.388* |
| | (0.233) | (0.239) | (0.220) | (0.219) |
| Father's Education in 1994 (year>=13) | 0.161 | 0.163 | -0.251 | -0.281 |
| | (0.282) | (0.281) | (0.218) | (0.218) |
| Mother's Health Status in 1994 (Bad/Very Bad=1) | 0.008 | 0.003 | -0.092 | -0.130 |
| | (0.296) | (0.293) | (0.269) | (0.271) |
| Father's Health Status in 1994 (Bad/Very Bad=1) | 0.141 | 0.121 | -0.954** | -0.965** |
| | (0.394) | (0.398) | (0.397) | (0.393) |
| Own Health Status in 1994 (Average/Bad/Very Bad=1) | | 0.173 | | 0.231 |
| | | (0.241) | | (0.207) |
| Own Age 18-23 | 0.326 | 0.335 | 0.504** | 0.477** |
| | (0.245) | (0.246) | (0.235) | (0.238) |
| Own Age 24-29 | -0.485 | -0.499 | 0.516 | 0.480 |
| | (0.360) | (0.358) | (0.518) | (0.516) |
| Predicted Probability[31] | | | | |
| Father' Health= | | | | |
| Very Good/Good/Average | 0.74 | 0.74 | 0.71 | 0.71 |
| Bad/Very Bad | 0.78 | 0.78 | 0.34 | 0.34 |

Note1: Years of education assigned as follows:
11.5 yrs if PTU with secondary education, technical trade school/ 13 yrs if Technical community college, medical, music, pedagogical, art training school/ 15 yrs if Institute, university, academy/18 yrs if Graduate school, residency.
Note 2: Geographic regions are controlled by including eight indicator variables in the equation.
(1. Metropolitan area, 2.Northern and North Western, 3.Central and Central Black-Earth, 4.Volga-Vaytski and Volga Basin, 5. North Caucasian, 6. Ural, 7.Western Siberian and 8.Eastern Siberian and Far Eastern).
Note 3: Poverty indicator in 1994 is controlled[32].
Note 4: Left-out age indicator is for age 13-17.
Note 5: Significance:'*'=10%; '**'=5%; '***'=1%.

[31] Evaluated at mean value.
[32] Controlling for poverty indicator hardly changes parents' health coefficients.

Table 4A: Robustness Check- **Selection Equation**
(Outcome variable=1 if Selected)

- Son (N=783) -

| | Correlation between selection and employment equations ($\rho_{y,h}$)= | | | | | | |
|---|---|---|---|---|---|---|---|
| | -0.75 | -0.50 | -0.25 | 0 | 0.25 | 0.50 | 0.75 |
| Mother's Health Status in 1994 (Bad/Very Bad=1) | -0.256 (0.156) | -0.254 (0.155) | -0.257 * (0.155) | -0.256 * (0.155) | -0.255 (0.156) | -0.264 * (0.156) | -0.265 * (0.156) |
| Father's Health Status in 1994 (Bad/Very Bad=1) | -0.155 (0.181) | -0.158 (0.181) | -0.161 (0.182) | -0.163 (0.182) | -0.164 (0.183) | -0.166 (0.183) | -0.168 (0.184) |

- Daughter (N=813) -

| | Correlation between selection and employment equations ($\rho_{y,h}$)= | | | | | | |
|---|---|---|---|---|---|---|---|
| | -0.75 | -0.50 | -0.25 | 0 | 0.25 | 0.50 | 0.75 |
| Mother's Health Status in 1994 (Bad/Very Bad=1) | -0.037 (0.153) | -0.036 (0.153) | -0.036 (0.153) | -0.038 (0.153) | -0.035 (0.153) | -0.032 (0.153) | -0.033 (0.153) |
| Father's Health Status in 1994 (Bad/Very Bad=1) | -0.280 (0.196) | -0.277 (0.195) | -0.277 (0.195) | -0.278 (0.195) | -0.277 (0.195) | -0.277 (0.195) | -0.278 (0.195) |

Note 1: Same covariates are used for both selection and employment equation (parental education in 1994, parental health in 1994, child's age, poverty indicator in 1994, region in 1994)
Note 2: Asymptotic standard errors in parentheses, Significance:'*'=10%; '**'=5%; '***'=1%.

Table 4B: Robustness Check- **Employment Equation**
(Outcome variable=1 if Working in 2004)

- Son -

| | Correlation between selection and employment equations ($\rho_{y,h}$)= | | | | | | |
|---|---|---|---|---|---|---|---|
| | -0.75 | -0.50 | -0.25 | 0 | 0.25 | 0.50 | 0.75 |
| Mother's Health Status in 1994 (Bad/Very Bad=1) | 0.119 (0.366) | 0.075 (0.412) | 0.046 (0.436) | -0.010 (0.438) | -0.061 (0.423) | -0.094 (0.388) | -0.138 (0.324) |
| Father's Health Status in 1994 (Bad/Very Bad=1) | 0.198 (0.399) | 0.180 (0.440) | 0.160 (0.460) | 0.132 (0.461) | 0.111 (0.446) | 0.079 (0.409) | 0.040 (0.345) |

- Daughter -

| | Correlation between selection and employment equations ($\rho_{y,h}$)= | | | | | | |
|---|---|---|---|---|---|---|---|
| | -0.75 | -0.50 | -0.25 | 0 | 0.25 | 0.50 | 0.75 |
| Mother's Health Status in 1994 (Bad/Very Bad=1) | -0.061 (0.284) | -0.075 (0.319) | -0.084 (0.336) | -0.083 (0.340) | -0.097 (0.331) | -0.098 (0.306) | -0.088 (0.260) |
| Father's Health Status in 1994 (Bad/Very Bad=1) | -0.567 (0.375) | -0.753 * (0.438) | -0.879 * (0.474) | -0.962 ** (0.489) | -0.981 ** (0.481) | -0.960 ** (0.451) | -0.868 ** (0.391) |

Note: Same covariates are used for both selection and employment equation (parental education in 1994, parental health in 1994, child's age, poverty indicator in 1994, region in 1994)
Note: Asymptotic standard errors in parentheses, Significance:'*'=10%; '**'=5%; '***'=1%.

Table 5A: The Association between Working Status and Co-residence (1994) – Probit
Using Individuals age 13 – 29 in 1994

| | Outcome Variable: Working Indicator in 1994 | | | |
|---|---|---|---|---|
| | Men | | Women | |
| | (1) N=1,143 | (2) N=1,089 | (3) N=1,223 | (4) N=1,180 |
| Co-resident with parent | -0.317*** (0.098) | -0.026 (0.115) | 0.152* (0.089) | -0.000 (0.103) |
| Married | | 0.671*** (0.124) | | -0.351*** (0.114) |
| Own Age 18-23 | 1.633*** (0.121) | 1.485*** (0.131) | 1.485*** (0.141) | 1.630*** (0.154) |
| Own Age 24-29 | 2.048*** (0.133) | 1.698*** (0.152) | 2.031*** (0.148) | 2.233*** (0.167) |
| Poverty in 1994 (Below Poverty=1) | -0.476*** (0.090) | -0.523*** (0.094) | -0.221*** (0.083) | -0.213** (0.084) |

Table 5B: The Association between Co-residence and Marital Status (1994) – Probit
Using Individuals age 13 – 29 in 1994

| | Outcome Variable: Co-resident in 1994 | |
|---|---|---|
| | Men | Women |
| | N=1,141 | N=1,238 |
| Married | -1.487*** (0.114) | -1.506*** (0.102) |
| Own Age 18-23 | -0.573*** (0.140) | -0.612*** (0.131) |
| Own Age 24-29 | -0.851*** (0.154) | -0.936*** (0.143) |
| Poverty in 1994 (Below Poverty=1) | 0.186** (0.094) | 0.146 (0.089) |

Note 1: Geographic regions are controlled by including eight indicator variables in the equation.
(1. Metropolitan area, 2.Northern and North Western, 3.Central and Central Black-Earth, 4.Volga-Vaytski and Volga Basin, 5. North Caucasian, 6. Ural, 7.Western Siberian and 8.Eastern Siberian and Far Eastern)
Note 2: Left-out age indicator is for age 13-17.
Note 3: Significance:'*'=10%; '**'=5%; '***'=1%.

Table 6: Estimates on Child's Higher Education (2004) – Probit

| | Outcome Variable: Years of Schooling of Child in 2004 >=15 | | | |
|---|---|---|---|---|
| | Son (N=195) | | Daughter (N=185) | |
| | (1) | (2) | (3) | (4) |
| Mother's Education in 1994 (year>=13) | 0.597*** (0.214) | 0.615*** (0.216) | 0.553** (0.234) | 0.559** (0.236) |
| Father's Education in 1994 (year>=13) | 0.473** (0.239) | 0.466* (0.239) | 0.730*** (0.232) | 0.742*** (0.237) |
| Mother's Health Status in 1994 (Bad/Very Bad=1) | -0.074 (0.304) | -0.078 (0.309) | 0.106 (0.301) | 0.127 (0.299) |
| Father's Health Status in 1994 (Bad/Very Bad=1) | 0.071 (0.329) | 0.051 (0.329) | -0.927** (0.410) | -0.923** (0.408) |
| Own Health Status in 1994 (Average/Bad/Very Bad=1) | | 0.124 (0.219) | | -0.091 (0.222) |
| Own Age 18-23 | 0.087 (0.224) | 0.092 (0.224) | -0.217 (0.243) | -0.208 (0.247) |
| Own Age 24-29 | -0.395 (0.366) | -0.401 (0.370) | 0.242 (0.371) | 0.254 (0.371) |
| Predicted Probability[33] | | | | |
| Father' Health= | | | | |
| Very Good/Good/Average | 0.32 | 0.32 | 0.70 | 0.70 |
| Bad/Very Bad | 0.34 | 0.34 | 0.35 | 0.35 |

Note1: Years of education assigned as follows:
11.5 yrs if PTU with secondary education, technical trade school/ 13 yrs if Technical community college, medical, music, pedagogical, art training school/ 15 yrs if Institute, university, academy/18 yrs if Graduate school, residency.
Note 2: Geographic regions are controlled by including eight indicator variables in the equation.
(1. Metropolitan area, 2.Northern and North Western, 3.Central and Central Black-Earth, 4.Volga-Vaytski and Volga Basin, 5. North Caucasian, 6. Ural, 7.Western Siberian and 8.Eastern Siberian and Far Eastern)
Note 3: Poverty indicator in 1994 is controlled[34].
Note 4: Left-out age indicator is for age 13-17.
Note 5: Significance:'*'=10%; '**'=5%; '***'=1%.

[33] Evaluated at mean value.
[34] Controlling for poverty indicator hardly changes parents' health coefficients.

Table 7: Gender Difference in Labor Outcome (2004)

| | Working Probability (Probit) | | Monthly Labor Income (OLS) | |
|---|---|---|---|---|
| | (1) N=511 | (2) N=375 | (3) N=323 | (4) N=234 |
| Mother's Education in 1994 (year>=13) | | 0.12 (0.16) | | -1,108 (713) |
| Father's Education in 1994 (year>=13) | | -0.23 (0.18) | | 1,139 (994) |
| Mother's Health Status in 1994 | | -0.02 (0.20) | | -116 (875) |
| Father's Health Status in 1994 | | -0.25 (0.30) | | -1,387* (769) |
| Male | 0.38** (0.16) | 0.37* (0.21) | 2,027*** (669) | 2,106** (978) |
| Own Age 18-23 | 0.20 (0.14) | 0.48*** (0.16) | 156 (566) | -96 (662) |
| Own Age 24 - 29 | -0.32 (0.20) | -0.22 (0.27) | -802 (671) | -702 (902) |
| Own Health Status in 1994 | 0.12 (0.13) | 0.21 (0.16) | -957* (494) | -1,220* (673) |
| Own Education in 2004 (year>=15) | 0.68*** (0.18) | 0.83*** (0.23) | 1,119* (587) | 1,475* (832) |
| Male * Own Education in 2004 | -0.10 (0.26) | -0.09 (0.32) | 769 (1,032) | 3 (1,246) |
| Constant | 0.25 (0.29) | 0.47 (0.38) | 8,338*** (1,245) | 7,370*** (1,978) |

Note 1: Values in column (1) and column (2) mean the change in probability responding to marginal change of each independent variable (dF/dX).
Note 2: Geographic regions are controlled by including eight indicator variables in the equation.
(1. Metropolitan area, 2.Northern and North Western, 3.Central and Central Black-Earth, 4.Volga-Vaytski and Volga Basin, 5. North Caucasian, 6. Ural, 7.Western Siberian and 8.Eastern Siberian and Far Eastern)
Note 3: Poverty indicator in 1994 is controlled[35].
Note 4: Left-out age indicator is for age 13-17.
Note 5: Significance:'*'=10%; '**'=5%; '***'=1%.

[35] Controlling for poverty indicator hardly changes parents' health coefficients.

Table 8: Estimates on Child's Working (2004) – **Controlling for Child's Own Education**

| | Outcome Variable: Working Indicator in 2004 | | | |
|---|---|---|---|---|
| | Son (N=195) | | Daughter (N=180) | |
| | (1) | (2) | (3) | (4) |
| Mother's Education in 1994 (year>=13) | 0.003 (0.235) | 0.023 (0.241) | 0.292 (0.229) | 0.256 (0.227) |
| Father's Education in 1994 (year>=13) | 0.095 (0.289) | 0.096 (0.289) | -0.476** (0.229) | -0.519** (0.230) |
| Mother's Health Status in 1994 (Bad/Very Bad=1) | 0.008 (0.302) | -0.003 (0.299) | -0.139 (0.274) | -0.188 (0.274) |
| Father's Health Status in 1994 (Bad/Very Bad=1) | 0.200 (0.430) | 0.190 (0.430) | -0.758* (0.400) | -0.776** (0.395) |
| Own Health Status in 1994 (Average/Bad/Very Bad=1) | | 0.179 (0.245) | | 0.293 (0.211) |
| Own Education in 2004 (year>=15) | 0.759*** (0.281) | 0.764*** (0.283) | 0.845*** (0.244) | 0.870*** (0.245) |
| Own Age 18-23 in 1994 | 0.405 (0.246) | 0.417* (0.247) | 0.620*** (0.236) | 0.595** (0.240) |
| Own Age 24-29 in 1994 | -0.378 (0.376) | -0.395 (0.371) | 0.477 (0.526) | 0.426 (0.519) |
| Predicted Probability of Working[36] | | | | |
| Father' Health= | | | | |
| Very Good/Good/Average | 0.75 | 0.75 | 0.72 | 0.72 |
| Bad/Very Bad | 0.81 | 0.81 | 0.43 | 0.42 |

Note1: Years of education assigned as follows:
11.5 yrs if PTU with secondary education, technical trade school/ 13 yrs if Technical community college, medical, music, pedagogical, art training school/ 15 yrs if Institute, university, academy/18 yrs if Graduate school, residency.
Note 2: Geographic regions are controlled by including eight indicator variables in the equation.
(1. Metropolitan area, 2.Northern and North Western, 3.Central and Central Black-Earth, 4.Volga-Vaytski and Volga Basin, 5. North Caucasian, 6. Ural, 7.Western Siberian and 8.Eastern Siberian and Far Eastern)
Note 3: Poverty indicator in 1994 is controlled[37].
Note 4: Left-out age indicator is for age 13-17.
Note 5: Significance:'*'=10%; '**'=5%; '***'=1%.

[36] Evaluated at mean value.
[37] Controlling for poverty indicator hardly changes parents' health coefficients.

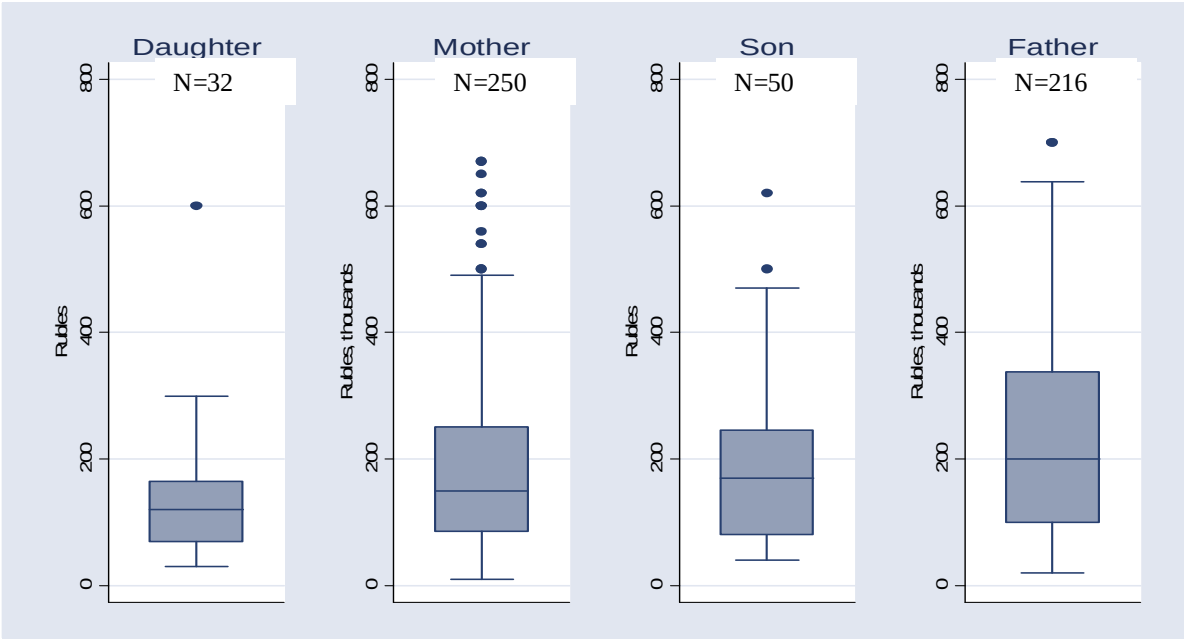
Table 9: Estimates on Parents' Working (1994) – Probit

| | Outcome Variable: Parents' Working Indicator in 1994 | | | |
|---|---|---|---|---|
| | Mother | | Father | |
| | (1) N=882 | (2) N=882 | (3) N=882 | (4) N=882 |
| Own (Mother/Father) Age | -0.030*** (0.011) | -0.030*** (0.011) | -0.027*** (0.010) | -0.027*** (0.010) |
| Mother's Education in 1994 (year>=13) | 0.776*** (0.129) | 0.778*** (0.129) | 0.324** (0.143) | 0.323** (0.142) |
| Father's Education in 1994 (year>=13) | -0.290** (0.133) | -0.296** (0.133) | 0.003 (0.147) | 0.007 (0.147) |
| Mother's Health Status in 1994 (Bad/Very Bad=1) | -0.105 (0.153) | -0.120 (0.153) | 0.241 (0.176) | 0.253 (0.178) |
| Father's Health Status in 1994 (Bad/Very Bad=1) | 0.247 (0.193) | 0.242 (0.193) | -0.802*** (0.185) | -0.799*** (0.186) |
| Child Health Status in 1994 (Average/Bad/Very Bad=1) | | 0.112 (0.108) | | -0.091 (0.116) |

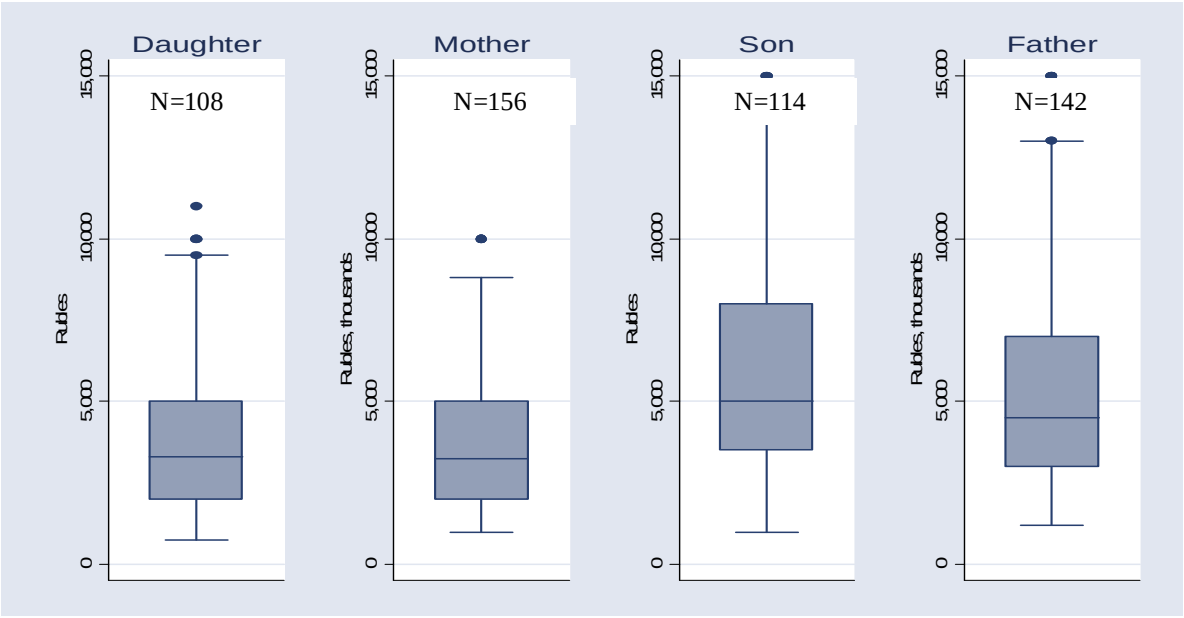
Note1: Years of education assigned as follows:
11.5 yrs if PTU with secondary education, technical trade school/ 13 yrs if Technical community college, medical, music, pedagogical, art training school/ 15 yrs if Institute, university, academy/18 yrs if Graduate school, residency.
Note 2: Geographic regions are controlled by including eight indicator variables in the equation.
(1. Metropolitan area, 2.Northern and North Western, 3.Central and Central Black-Earth, 4.Volga-Vaytski and Volga Basin, 5. North Caucasian, 6. Ural, 7.Western Siberian and 8.Eastern Siberian and Far Eastern).
Note 3: Significance:'*'=10%; '**'=5%; '***'=1%.

Figure 6A: Box Plot[38] of Monthly Labor Income – Final Sample

-1994 Year[39]-




-2004 Year-

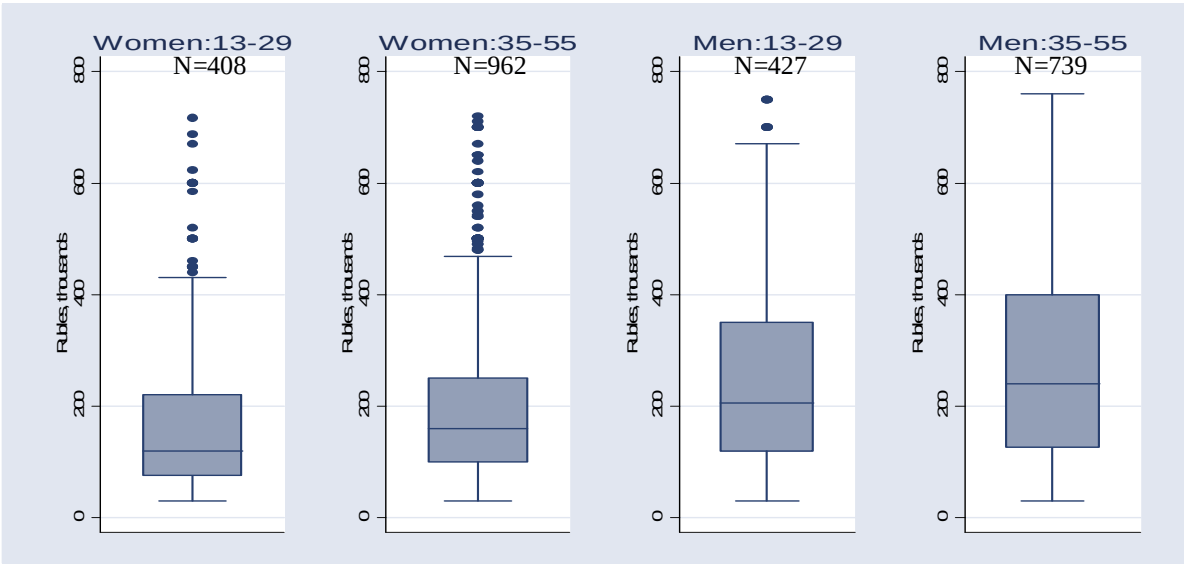



[38] The box plot is a graphical representation of data that displays box (es) bordered at the 25th and 75th percentiles of the y-variable with a median line at the 50th percentile. Whiskers extend from the box to the upper and lower adjacent values and are capped with an adjacent line. The upper adjacent value is the largest data value that is less than or equal to the third quartile plus 1.5 X IQR and the lower adjacent value is the smallest data value that is greater than or equal to the first quartile minus 1.5 X IQR.

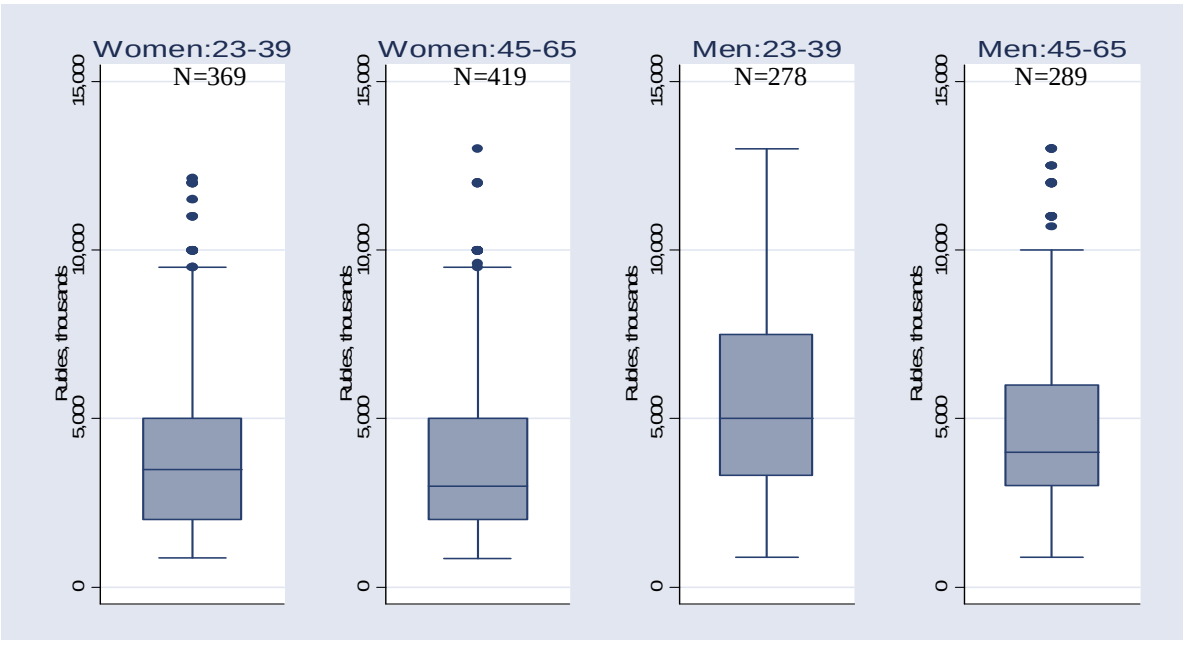
[39] The monthly labor income is divided by 1000 for 1994.

Figure 6B: Box Plot[40] of Monthly Labor Income –Population

- 1994 Year -



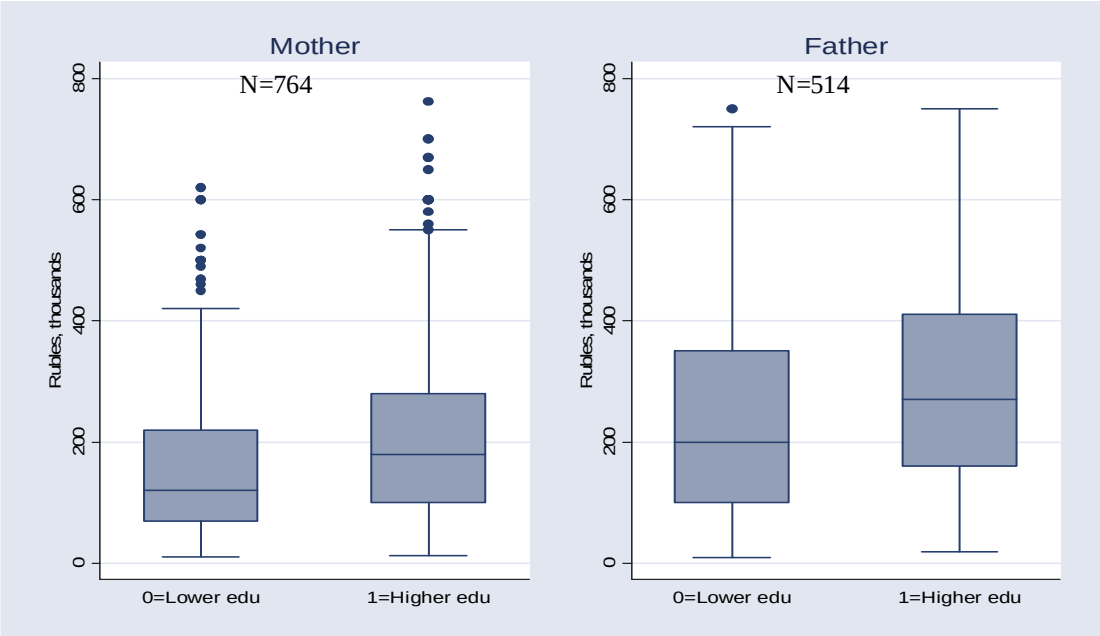

- 2004 Year-



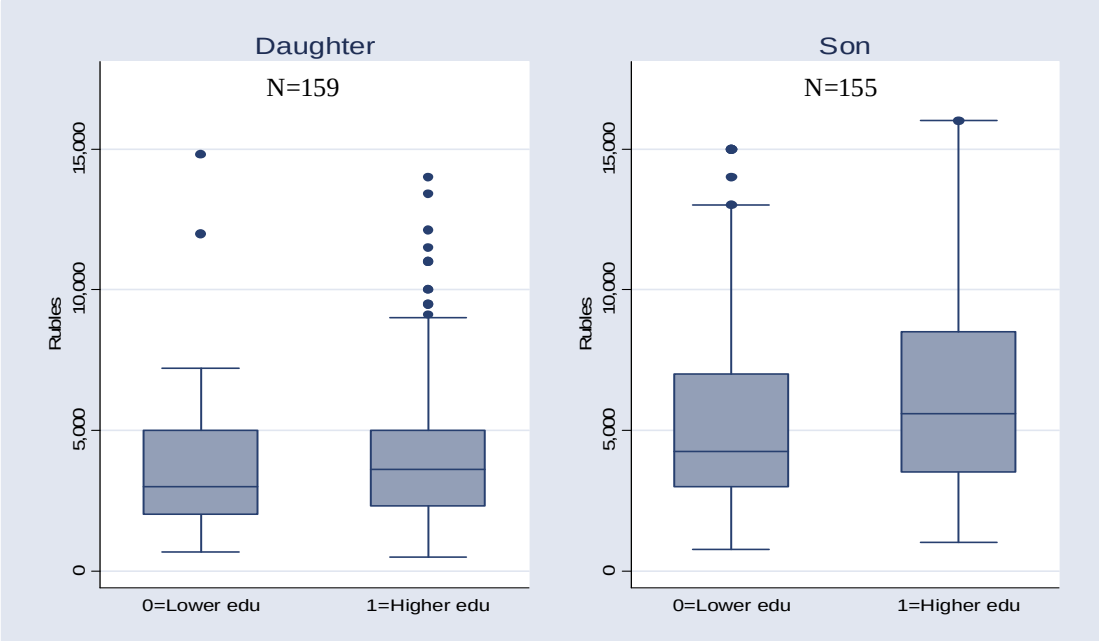

[40] The box plot is a graphical representation of data that displays box (es) bordered at the 25th and 75th percentiles of the y-variable with a median line at the 50th percentile. Whiskers extend from the box to the upper and lower adjacent values and are capped with an adjacent line. The upper adjacent value is the largest data value that is less than or equal to the third quartile plus 1.5 X IQR and the lower adjacent value is the smallest data value that is greater than or equal to the first quartile minus 1.5 X IQR.

Figure 7: Box Plot[41] of Monthly Labor Income – by Gender and Education

Parents (1994 Year)




Children (2004 Year)




[41] The box plot is a graphical representation of data that displays box(es) bordered at the 25th and 75th percentiles of the y-variable with a median line at the 50th percentile. Whiskers extend from the box to the upper and lower adjacent values and are capped with an adjacent line. The upper adjacent value is the largest data value that is less than or equal to the third quartile plus 1.5 X IQR and the lower adjacent value is the smallest data value that is greater than or equal to the first quartile minus 1.5 X IQR.

Table 10: Estimates on Child's Working between 1994 – 2004
- Sample: **Children of Single Mother**, age 13-29 in 1994 -

- Son -

| | Working Indicator at Year | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1994 | 1995 | 1996 | 1998 | 2000 | 2001 | 2002 | 2003 | 2004 |
| Mother's Health Status in 1994 (Bad/Very Bad=1) | -0.068 (0.282) | 0.198 (0.313) | 0.321 (0.327) | 0.456 (0.337) | 0.147 (0.370) | 0.660* (0.394) | 0.950** (0.452) | -0.220 (0.393) | 1.148** (0.452) |
| Own Health Status in 1994 (Average/Bad/Very Bad=1) | -0.172 (0.224) | -0.100 (0.254) | -0.033 (0.251) | -0.051 (0.326) | -0.129 (0.353) | -0.574 (0.368) | -0.051 (0.371) | -0.035 (0.361) | -0.601 (0.400) |
| N = | 173 | 124 | 117 | 91 | 80 | 81 | 80 | 83 | 77 |

- Daughter -

| | Working Indicator at Year | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1994 | 1995 | 1996 | 1998 | 2000 | 2001 | 2002 | 2003 | 2004 |
| Mother's Health Status in 1994 (Bad/Very Bad=1) | -0.813** (0.343) | -0.894*** (0.301) | -0.275 (0.304) | -0.592* (0.313) | -1.006*** (0.345) | -0.419 (0.311) | -0.572 (0.353) | -0.824** (0.377) | -1.089*** (0.402) |
| Own Health Status in 1994 (Average/Bad/Very Bad=1) | -0.173 (0.221) | -0.128 (0.244) | -0.112 (0.284) | 0.247 (0.262) | 0.507* (0.305) | 0.207 (0.302) | 0.218 (0.329) | 0.654* (0.354) | 0.076 (0.383) |
| N = | 175 | 134 | 116 | 106 | 96 | 93 | 89 | 86 | 66 |

Note: Other covariates - Parental education 1994, child's age, poverty indicator in 1994, region in 1994
Note: Significance:'*'=10%; '**'=5%; '***'=1%.

Table 11A: Association between **Father's Need of Help** and Child's Employment Status

Sample: **Non-coresident** with father, age 23-39 in 1994

| | Outcome Variable: Working Indicator in 1996 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Men | | | | Women | | | |
| | (1) N=424 | (2) N=337 | (3) N=301 | (4) N=301 | (5) N=488 | (6) N=392 | (7) N=350 | (8) N=350 |
| Age | 0.024 | 0.029 | 0.027 | 0.026 | 0.051*** | 0.050*** | 0.056*** | 0.055*** |
| | (0.017) | (0.020) | (0.021) | (0.021) | (0.015) | (0.017) | (0.018) | (0.018) |
| Married Indicator | 0.268 | 0.533 | 0.607 | 0.608 | -0.301 | -0.177 | -0.170 | -0.166 |
| | (0.366) | (0.392) | (0.393) | (0.393) | (0.312) | (0.360) | (0.370) | (0.370) |
| Own Education in 1994 | | | | 0.036 | | | | 0.030 |
| | | | | (0.187) | | | | (0.155) |
| Own Health Status in 1994 (Average/Bad/Very Bad=1) | -0.194 | -0.286 | -0.295 | -0.294 | 0.048 | 0.086 | -0.020 | -0.015 |
| | (0.152) | (0.177) | (0.190) | (0.190) | (0.144) | (0.166) | (0.180) | (0.181) |
| Farther's Need-Help Indicator 1994 | 0.086 | -0.041 | -0.122 | -0.125 | -0.808*** | -0.795** | -0.683* | -0.679* |
| | (0.315) | (0.352) | (0.383) | (0.383) | (0.279) | (0.333) | (0.366) | (0.367) |
| Farther's Need-Help Indicator 1995 | | -0.407 | 0.326 | 0.326 | | 0.117 | 0.286 | 0.284 |
| | | (0.379) | (0.608) | (0.607) | | (0.407) | (0.438) | (0.438) |
| Farther's Need-Help Indicator 1996 | | | -0.811 | -0.810 | | | -0.470 | -0.474 |
| | | | (0.560) | (0.560) | | | (0.389) | (0.390) |

Note 1: Geographic regions are controlled by including eight indicator variables in the equation.
(1. Metropolitan area, 2.Northern and North Western, 3.Central and Central Black-Earth, 4.Volga-Vaytski and Volga Basin, 5. North Caucasian, 6. Ural, 7.Western Siberian and 8.Eastern Siberian and Far Eastern)

Note 2: Significance:'*'=10%; '**'=5%; '***'=1%.

Table 11B: Association between **Mother's Need** of Help and Child's Employment Status

Sample: **Non-coresident** with mother, age 23-39 in 1994

| | Outcome Variable: Working Indicator in 1996 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Men | | | | Women | | | |
| | (1) N=553 | (2) N=480 | (3) N=441 | (4) N=441 | (5) N=646 | (6) N=559 | (7) N=522 | (8) N=522 |
| Age | 0.025 (0.015) | 0.022 (0.017) | 0.029* (0.018) | 0.029 (0.018) | 0.057*** (0.013) | 0.062*** (0.014) | 0.061*** (0.015) | 0.060*** (0.015) |
| Married Indicator | 0.594* (0.317) | 0.627* (0.339) | 0.546 (0.354) | 0.545 (0.354) | -0.234 (0.306) | -0.204 (0.337) | -0.165 (0.344) | -0.162 (0.344) |
| Own Education in 1994 | | | | 0.008 (0.151) | | | | 0.090 (0.128) |
| Own Health Status in 1994 (Average/Bad/Very Bad=1) | -0.046 (0.132) | -0.132 (0.147) | -0.215 (0.157) | -0.214 (0.158) | 0.158 (0.132) | 0.032 (0.148) | 0.006 (0.158) | 0.021 (0.160) |
| Mother's Need-Help Indicator 1994 | -0.057 (0.273) | 0.048 (0.315) | 0.017 (0.349) | 0.018 (0.350) | -0.030 (0.231) | -0.222 (0.270) | -0.204 (0.285) | -0.197 (0.285) |
| Mother's Need-Help Indicator 1995 | | -0.484* (0.281) | -0.353 (0.302) | -0.353 (0.302) | | 0.104 (0.291) | 0.067 (0.320) | 0.060 (0.320) |
| Mother's Need-Help Indicator 1996 | | | -0.160 (0.322) | -0.160 (0.322) | | | 0.289 (0.275) | 0.285 (0.276) |

Note 1: Geographic regions are controlled by including eight indicator variables in the equation.
(1. Metropolitan area, 2.Northern and North Western, 3.Central and Central Black-Earth, 4.Volga-Vaytski and Volga Basin, 5. North Caucasian, 6. Ural, 7.Western Siberian and 8.Eastern Siberian and Far Eastern)

Note 2: Significance:'*'=10%; '**'=5%; '***'=1%.

Appendix 1: Estimates on Child's Working (2004) – Using **Latent Health**

| | Outcome Variable: Working Indicator in 2004 | | | | | |
|---|---|---|---|---|---|---|
| | Son (N=195) | | | Daughter (N=180) | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Mother's Education in 1994 (year>=13) | 0.143 (0.230) | 0.125 (0.231) | -0.000 (0.235) | 0.386* (0.223) | 0.387* (0.223) | 0.274 (0.229) |
| Father's Education in 1994 (year>=13) | 0.193 (0.284) | 0.180 (0.284) | 0.113 (0.292) | -0.241 (0.221) | -0.250 (0.225) | -0.465** (0.234) |
| Mother's Health Status in 1994 (Continuous) | 0.103 (0.126) | 0.119 (0.128) | 0.092 (0.127) | 0.040 (0.140) | 0.044 (0.141) | 0.013 (0.146) |
| Father's Health Status in 1994 (Continuous) | 0.157 (0.121) | 0.159 (0.121) | 0.128 (0.124) | -0.275** (0.131) | -0.276** (0.131) | -0.211[42] (0.131) |
| Own Health Status in 1994 (Continuous) | | -0.055 (0.050) | -0.054 (0.060) | | -0.003 (0.009) | -0.000 (0.008) |
| Own Education in 2004 (year>=15) | | | 0.702** (0.281) | | | 0.859*** (0.240) |
| Own Age 18-23 | 0.275 (0.240) | 0.308 (0.245) | 0.400 (0.244) | 0.528** (0.229) | 0.534** (0.230) | 0.646*** (0.234) |
| Own Age 24-29 | -0.492 (0.363) | -0.492 (0.359) | -0.374 (0.370) | 0.431 (0.494) | 0.419 (0.491) | 0.379 (0.499) |
| Poverty in 1994 (Below Poverty=1) | -0.729*** (0.226) | -0.711*** (0.226) | -0.701*** (0.229) | -0.252 (0.210) | -0.250 (0.211) | -0.097 (0.222) |

Note1: Years of education assigned as follows:
11.5 yrs if PTU with secondary education, technical trade school/ 13 yrs if Technical community college, medical, music, pedagogical, art training school/ 15 yrs if Institute, university, academy/18 yrs if Graduate school, residency.
Note 2: Geographic regions are controlled by including eight indicator variables in the equation.
(1. Metropolitan area, 2.Northern and North Western, 3.Central and Central Black-Earth, 4.Volga-Vaytski and Volga Basin, 5. North Caucasian, 6. Ural, 7.Western Siberian and 8.Eastern Siberian and Far Eastern)
Note 3: Left-out age indicator is for age 13-17.
Note 4: Significance:'*'=10%; '**'=5%; '***'=1%.

[42] Significant at 10.07%

Appendix 2: Estimates on Child's Working between 1994 - 2004

- Son -

| | Working Indicator at Year | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1994 | 1995 | 1996 | 1998 | 2000 | 2001 | 2002 | 2003 | 2004 |
| Mother's Health Status in 1994 (Bad/Very Bad=1) | -0.191 | -0.531* | -0.359 | -0.065 | -0.597** | -0.555** | -0.444 | -0.069 | 0.003 |
| | (0.252) | (0.286) | (0.321) | (0.268) | (0.297) | (0.278) | (0.297) | (0.279) | (0.293) |
| Father's Health Status in 1994 (Bad/Very Bad=1) | 0.087 | 0.599 | -0.006 | 0.151 | 0.259 | 0.113 | 0.236 | 0.100 | 0.121 |
| | (0.330) | (0.385) | (0.367) | (0.393) | (0.449) | (0.392) | (0.412) | (0.366) | (0.398) |
| Child's Own Health in 1994 (Average/Bad/Very Bad=1) | 0.082 | 0.036 | 0.025 | -0.338* | 0.092 | 0.090 | 0.160 | -0.063 | 0.173 |
| | (0.207) | (0.199) | (0.216) | (0.193) | (0.213) | (0.211) | (0.208) | (0.211) | (0.241) |

- Daughter -

| | Working Indicator at Year | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1994 | 1995 | 1996 | 1998 | 2000 | 2001 | 2002 | 2003 | 2004 |
| Mother's Health Status in 1994 (Bad/Very Bad=1) | -0.353 | -0.266 | -0.022 | -0.487 | 0.168 | -0.047 | -0.029 | 0.208 | -0.130 |
| | (0.370) | (0.308) | (0.309) | (0.323) | (0.308) | (0.322) | (0.284) | (0.290) | (0.271) |
| Father's Health Status in 1994 (Bad/Very Bad=1) | 0.593* | 0.097 | -0.614* | -0.834*** | -0.705* | -0.648* | -1.290*** | -0.711** | -0.965** |
| | (0.360) | (0.346) | (0.369) | (0.321) | (0.417) | (0.386) | (0.357) | (0.346) | (0.393) |
| Child's Own Health in 1994 (Average/Bad/Very Bad=1) | 0.259 | 0.440** | -0.191 | -0.092 | -0.088 | 0.015 | -0.020 | 0.055 | 0.231 |
| | (0.241) | (0.214) | (0.238) | (0.220) | (0.210) | (0.212) | (0.204) | (0.205) | (0.207) |

Note: Other covariates - Parental education 1994, child's age, poverty indicator in 1994, region in 1994
Note: Significance:'*'=10%; '**'=5%; '***'=1%.

Appendix 3: Estimates on Child's Working (2004)

**- Including Health Status in 2004 -**

| | Outcome Variable: Working Indicator in 2004 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Son | | | | Daughter | | | |
| | (1) N=135 | (2) N=134 | (3) N=133 | (4) N=132 | (5) N=131 | (6) N=131 | (7) N=130 | (8) N=130 |
| Mother's Health Status in 2004 (Bad/Very Bad=1) | 0.125 (0.397) | 0.140 (0.396) | 0.078 (0.441) | 0.118 (0.458) | -0.146 (0.366) | -0.129 (0.371) | -0.028 (0.390) | 0.003 (0.396) |
| Father's Health Status in 2004 (Bad/Very Bad=1) | -0.443 (0.380) | -0.422 (0.385) | -0.413 (0.388) | -0.404 (0.398) | -0.489 (0.339) | -0.584* (0.337) | -0.293 (0.346) | -0.351 (0.351) |
| Own Health Status in 2004 (Average/Bad/Very Bad=1) | | -0.215 (0.296) | | -0.264 (0.305) | | 0.235 (0.259) | | 0.205 (0.272) |
| Mother's Health Status in 1994 (Bad/Very Bad=1) | | | 0.178 (0.432) | 0.185 (0.431) | | | 0.058 (0.336) | -0.029 (0.338) |
| Father's Health Status in 1994 (Bad/Very Bad=1) | | | 0.098 (0.502) | 0.116 (0.533) | | | -1.027** (0.475) | -1.008** (0.483) |
| Own Health Status in 1994 (Average/Bad/Very Bad=1) | | | | 0.089 (0.322) | | | | 0.195 (0.250) |

Note 1: Other covariates – Parental education, child's own age, poverty in 1994, region in 1994.
Note 2: Years of education assigned as follows:
11.5 yrs if PTU with secondary education, technical trade school/ 13 yrs if Technical community college, medical, music, pedagogical, art training school/ 15 yrs if Institute, university, academy/18 yrs if Graduate school, residency.
Note 3: Geographic regions are controlled by including eight indicator variables in the equation.
(1. Metropolitan area, 2.Northern and North Western, 3.Central and Central Black-Earth, 4.Volga-Vaytski and Volga Basin, 5. North Caucasian, 6. Ural, 7.Western Siberian and 8.Eastern Siberian and Far Eastern).
Note 4: Significance:'*'=10%; '**'=5%; '***'=1%.

Appendix 4: Association between 1994 Health and Subsequent Health Status of Parent[43]

- Mother -

| | Outcome Variable: Health at Year - | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1995 | 1996 | 1998 | 2000 | 2001 | 2002 | 2003 | 2004 |
| Health Status in 1994 (Bad/Very Bad=1) | 1.245*** (0.137) | 1.232*** (0.146) | 0.984*** (0.146) | 0.768*** (0.159) | 0.847*** (0.159) | 0.597*** (0.170) | 0.650*** (0.169) | 0.913*** (0.169) |
| Own Age | 0.007 (0.011) | 0.012 (0.011) | 0.006 (0.011) | 0.017 (0.012) | 0.027** (0.012) | 0.018 (0.012) | 0.047*** (0.012) | 0.035*** (0.012) |
| Obs | 758 | 707 | 637 | 606 | 588 | 569 | 541 | 523 |

- Father -

| | Outcome Variable: Health at Year - | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1995 | 1996 | 1998 | 2000 | 2001 | 2002 | 2003 | 2004 |
| Health Status in 1994 (Bad/Very Bad=1) | 1.805*** (0.211) | 1.195*** (0.205) | 1.489*** (0.222) | 0.946*** (0.222) | 1.331*** (0.244) | 1.012*** (0.237) | 1.058*** (0.250) | 0.762*** (0.263) |
| Own Age | 0.033** (0.014) | 0.034*** (0.012) | 0.018 (0.013) | 0.013 (0.012) | 0.027** (0.013) | 0.010 (0.013) | 0.011 (0.013) | 0.052*** (0.013) |
| Obs | 557 | 510 | 442 | 402 | 378 | 372 | 341 | 320 |

Note1: Other covariates - poverty indicator in 1994, region in 1994
Note2: Significance:'*'=10%; '**'=5%; '***'=1%.

[43] Using parents of children in the final analysis sample