MATERNAL EMPLOYMENT AND CHILD HEALTH: EVIDENCE FROM KYRGYZSTAN

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Abstract

In this study, I examine the effect of maternal labor supply on child health, using data on parents with at least one child below the age of 6 from the 'Life in Kyrgyzstan' survey from 2012–2013. Specifically, my focus is on the causal effect maternal hours of work per day have on her child's Body Mass Index and the probability of her child being underweight. I use an identification strategy with Instrumental Variables (IVs) to account for potential endogeneity that may arise in an Ordinary Least Squares regression framework; the two IVs I use are mother's career attitudes and employment status of child's father. To the extent the IV exogeneity requirements hold, my results indicate that maternal employment improves child BMI and leads to a reduction of the propensity of the child being overweight significant at 10% only when control variables included, driven by boys and young children. With respect to policy implications, these results suggest that it is recommended to support working mothers by promoting the father's role in childcare, investing in childcare facilities, and increasing health awareness among the population.

Keywords: maternal employment, child health, Body Mass Index

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1. Introduction

Child health is an acute topic for policymakers in Kyrgyzstan. According to UNICEF report (2018), the country has achieved a two-thirds reduction in infant mortality over the last decades, but the numbers from the current statistics are still alarming. More than three thousand children younger than 5 years old die each year in Kyrgyzstan (UN, 2015). The mortality rate for Kyrgyz children under 5 for 2019 was 18.3 per 1000 births. In comparison, neighboring Kazakhstan has a much lower rate of 10.5 deaths per 1000 live births, and the countries of Europe & Central Asia together show an average of 8 (WB, 2021). Among the surviving children, there are also problems with illness and developmental delays. Around 40 percent of children between 6 and 23 months do not receive minimum diet diversity, and 12 percent are suffering from stunting in Kyrgyzstan (UN, 2015).

Thus, part of the country's human potential is lost and worsened due to several factors, such as insufficient maternal nutrition and insufficient duration of breastfeeding (UN, 2015, where the WHO (2018) recommended period for breastfeeding is from at least 6 months to 2 years). Children suffering from underdevelopment in early childhood subsequently have a higher probability of early mortality, school dropout, having early pregnancy, difficulties in finding a job in the future, which are major socio-economic problems (UN, 2015). Thus, investments in children's health bring positive outcomes both on a personal and family level and on the macroeconomic level, such as higher cognitive development, college enrollment rate, and lower cost of medical care (Bell, Bustreo, & Preker, 2005).

There are various factors influencing child health ranging from parent's health indicators to environmental impact. Leibowitz (2003) emphasized nutritious food, immunization, household commodity, child time alone, and parental time with a child as a major factor determining child's health. The relationship between the time the mother spends with her child and the child well-being presents a contestable topic because it is connected to the

female labor force participation rate, public health, and has socioeconomic implications in terms of the design of early childhood interventions (Gregg & Waldfogel, 2005). Since mothers typically are the primary caretakers of children, the growth in maternal labor force participation has eventually led to concerns about the impact of the transition from being full-time at home to full-time paid work on child well-being (Gordon, Kaestner, & Korenman, 2003).

In Kyrgyzstan, female economic empowerment has serious challenges. First, the country is significantly lagging behind in economic development compared to other countries from post-Soviet space in the region, which is reflected in the 120 place in the HDI ranking (UNDP, 2020). The Kyrgyz Republic has been experiencing low economic growth for decades, and the number of people living in poverty prevails 30 percent (WB, 2021, where poverty is defined as living on less than US$1.90 per day (PPP)). Secondly, there is a problem with the management of human resources. The labor force participation rate has been decreasing since the 1990s from 66 percent to 58 percent in 2018 (WB, 2021). However, there are large gender differences in labor force participation: the LFPR for men did not change much from 74.57 percent in 1989 to 74.22 percent in 2018, while for women it dropped from 58 percent to 44 (WB, 2021).

The existing gender inequality issues exacerbate the problem of low female employment for women and especially for mothers. Poverty to the most extent hit women in Kyrgyzstan and they were worst impacted by a disproportionate decrease in employment opportunities besides an unequal income distribution (ADB, 2019). The government's denial of family support and childcare facilities undermines the opportunities for women of childbearing age to be employed in the formal sector (ADB, 2019). Women between 20-34 have a higher probability to drop out of employment because they are most likely to care for children. Thus,

the employment and income gaps are particularly significant for young and productive female workers due to an inefficient policy on parental leave and maternal employment.

According to the Labor Code of the Kyrgyz Republic, women can have from 126 to 140 days of paid maternity leave and up to three years of unpaid leave. It is noted that maternity leave is calculated in total and is provided to a woman in full, regardless of the number of days she actually has taken before childbirth (ILO, 2008). Women taking childbirth- related paid leave are entitled to receive their average earnings for the first 10 days, which is paid by the employer, and the rest is covered from the state budget in the amount of 1000 soms (or less than 10 euros per month) (ILO, 2008). This amount of financial support is certainly not sufficient to cover the living expenses of women raising a kid. Prior research suggests that the increase of unpaid leave duration does not affect the length of the taken parental leave, only with the adequate payment and job protection mother's propensity to stay home with a child might increase (Tanaka, 2005; Carneiro et al., 2015).

The duration of paid maternity leave also raises concerns since 2-4 months is a small amount of time for a woman to return to full-time work after delivery, interrupt breastfeeding, and decrease the quality time between mother and kid (Gregg & Waldfogel, 2005). From one point of view, some women want to stay at home and take care of their child are forced to work in order to keep their job and earn money for living. In this case, paid parental leave could improve the position of mothers and their children by ensuring sufficient funds for living, to the extent these gains are not outweighed by maternal work stress and pressure put on these women. From another point of view, some women who prefer to work and can afford to hire a nanny; for these mothers concerns regarding consequences of the lack of breastfeeding or lower quality of childcare arises, which may, in turn, negatively affect child health outcomes.

This paper is the first one to provide empirical evidence on the relationship between maternal employment during the first five years of her child's life and child health outcomes in Kyrgyzstan, where maternal employment is measured in hours that the mother spends at work and health is measured by the Body Mass Index (BMI). Ex-ante, the sign of the direction of the causal relationship is ambiguous. On the one hand, it can be negative due to the less time that the mother spends with her children since she is at work, shorter breastfeeding period, and possible work stress and anxiety transferred from the mother to the child (Khanam et al., 2016). On the other hand, the relationship may be positive to the extent that working mothers earn money and enjoy being employed, which positively relates to child development due to better maternal mental health and more market goods being available with higher family income (Dustmann & Schönberg, 2012).

To measure the causal impact of maternal work on child health, I use an Instrumental Variable (IV) identification strategy, using micro-level data for the population of Kyrgyzstan from the 'Life in Kyrgyzstan' survey for years 2012 and 2013. To deal with a potential endogeneity problem in an Ordinary Least Squares (OLS) regression model, I use two instruments: the mother's career attitudes and the father's employment status. The results suggest that maternal employment positively affects child health outcome, primarily driven by boys and children less than 4 years old.

The thesis is structured as follows. Chapter 2 is a review of the previous literature that examined the relationship between parental leave length and maternal employment with child health and development indicators. Chapter 3 describes the data, presents descriptive statistics and information on the data collection. Chapter 4 describes the econometric model specification and estimation methods. Chapter 5 presents and discusses the results of the econometric model. The thesis concludes with a summary of the work and policy recommendations.

2. Literature review

This part of the paper presents a review of the relevant literature on the relationship between maternal employment and children well-being. The majority of empirical works on the subject of interest are relatively new and have been published in the last two decades. I limit the discussion of the existing literature to the analysis of developed countries, primarily because developed countries have more developed labor institutions, higher female labor force participation, and more pieces of available empirical evidence.

The researchers conducted an empirical analysis using a variety of methods designed to answer their research questions. In sum, Tanaka (2005), Ruhm (2000), Khan (2020), Khanam, Nghiem, & Connelly (2016) and Waldfogel, Han, & Brooks-Gunn (2002) applied Fixed Effects and Random Effects models; Dustmann & Schönberg (2012), Beuchert, Humlum, & Vejlin (2016) and Baum (2003) used the method of IV (or Two-Staged Least Squares (2SLS); Gordon et al. (2003) applied pooled OLS, Anderson, Butcher & Levine (2002) estimated the likelihood of the child outcome by using a probit model, and Baker & Milligan (2010) do a cohort-based comparison with differential exposure to Canadian maternity leave policies; the framework of Marginal Treatment Effects (MTE) framework was applied by Cornelissen, Dustmann, Raute, and Schonberg (2018), while Havnes & Mogstad (2015) used a Difference-in-Differences identification framework, and Carneiro, Loken & Salvanes(2015) chose a Regression Discontinuity Design (RDD).

Ruhm (2000) was one of the first researchers to provide evidence that the mortality rates of infants and young children are affected by the terms of parental leave policies. By investigating macro-level data from 16 European countries from the early 1970s to the mid-1990s, the author found a negative relationship between parental leave duration and deaths of newborns and children from 1 to 5. The paper concluded with the insightful remark about the cost-effectiveness of increasing the length of paid parental leave as a method for

improving pediatric health (Ruhm, 2000). However, Ruhm's research did not account for other potential social policies that could impact the results of his research. Though this work does not discuss child health outcome such as BMI, it still focuses on the relationship between mother's time with children and child outcomes within the first 5 years.

Years later Tanaka (2005) published improved macro-level research, again for OECD countries but with the inclusion of the USA and Japan and controlling for other social policies that affected children. Her research focused not only on paid parental leave but also on unpaid one and concluded that without the provision of adequate payments propensity of parents to take leave would not be affected. In addition, Tanaka (2005) demonstrated the positive effect of parental leave duration on the infant death rates after controlling for the public spending on family services, which was also found to lower infant mortality rate. Similar results were also observed by Khan (2020) for the period between 1990 and 2016.

Despite the fact that Ruhm (2000) and Tanaka (2005) identified the links between parental leave expansions and child health outcomes for a long period of time across many countries, both of them noted that it would be better to carry out such studies using micro-level data. The researchers concluded that understanding the mechanisms through which children's health might be improved by parental time investments requires examining more individual characteristics such as child's gender, age, period of breastfeeding, health capital at birth, which data are available only at the micro-level. Therefore, I move to the discussion of what researchers found using micro-level data.

Universal interventions in early childhood are one of the disputed topics in social policy and are the subject of many empirical studies (Baker, 2011). Baker argued that the promotion of these interventions such as the provision of public child care and maternity/parental leave benefits on a universal level using the evidence obtained from interventions on a targeted level is problematic (2011). The author identified the following

reasons why universal interventions need an improved understanding of developmental paths. First, targeted interventions provided costly, differentiated treatment while universal interventions were less expensive and more general. Second, there was no evidence that treatment would affect advantaged and disadvantaged groups of children equally. Baker (2011) provided empirical analysis of the relationship between pre-school cognitive and behavioral development and school dropout and how early childhood problems differed by socioeconomic status in Canada. The findings indicated that children from high-income families had a higher probability to hold better cognitive outcomes and those from low-income were more likely to retain low cognitive outcomes, behavioral outcomes were equal for both groups, and pre-school cognitive lag was associated with school dropout and grade repetition (Baker, 2011). This work highlights the importance of treatment effect heterogeneity.

One of the examples of early childhood intervention is a change in maternity leave entitlements. Carneiro et al. (2015) examined the effects of an increase in maternity leave benefits on long-term children outcomes such as education and income in adulthood in Norway. The reform replaced 12 weeks of unpaid maternity leave with 16 weeks of paid leave and a year of unpaid leave. The findings of this research confirmed that the reform resulted in a decrease in the high school dropout rate by 2 percentage points and an increase in wages at the age of 30 by 5 percentage points through an increase in the time spent with the child (Carneiro et al., 2015). Additionally, the authors found the reform had a larger impact on the children whose mothers had a lower level of education. This study is valuable by its demonstration that leave policies can help to increase the time parents spend with their children during the first year of life, which in turn can have a positive effect on the children outcomes in adulthood.

Another study of universal early childhood interventions in Norway also concluded with a positive impact on long-term children outcomes (Havnes & Mogstad, 2015). The authors examined how the expansion of subsidized child care in Norwegian municipalities, which resulted in 18% higher child care coverage, influenced 3 to 6 years old children and their adult characteristics. No evidence was found on cognitive outcomes and educational attainment. The main findings concluded that this reform positively affected children from low and middle quintiles of earnings distribution but negatively those from a higher part of the income distribution (Havnes & Mogstad, 2015). The results implied that benefits from such a policy would less likely exceed the costs. Additionally, the results demonstrated that children with lower socioeconomic status accounted for the major benefit in earnings from this reform, while children from high-income families suffered from a decline in incomes (Havnes & Mogstad, 2015). The research also highlighted heterogeneous treatment effects and provided implications for designing universal child care policies.

Continuing the topic of the time that mothers devote to their kids in the first months after delivery, it is interesting to overview studies on US mothers and their children since there is no such law on a country level that provide job-protected leave for mothers (Berger, Hill, Waldfogel, 2005; Gordon et al., 2007). It was found that returning to full-time work within 12 weeks after delivery reduces the period of breastfeeding and the likelihood of a child to receive immunization and regular medical check-ups and raises the probability to have behavior-related issues when a child turns 4 (Berger et al, 2005). However, another study on US children aged 12 to 36 months did not prove causal relation between maternal employment and child health outcomes. Nevertheless, the authors demonstrated that children aged 12 to 24 months who spent more time in center-based care had a higher rate of respiratory infections (Gordon et al., 2007).

Using data for Australian children, Khanam et al. (2016) also investigated the impact of parental leave duration on child health indicators. Their results suggested that a child is 1.1 percentage point less likely to have asthma, 0.5 p.p less likely to have bronchiolitis, and more likely to be breastfed until one and six months if the mother had one more week of paid leave (Khanam et al, 2016). This paper showed that parental leave-taking is associated with many benefits for very young children.

Cornelissen et al. (2018) also investigated the gains for 3 to 6 years old children from universal child care programs but in Germany. Their research was more focused on heterogeneous treatment effects to identify which child groups benefit from the policy the most and by finding that attempted to harmonize mixed evidence from targeted programs used in support of universal ones. The results showed the difference in the outcomes for children from disadvantaged and advantaged backgrounds: the first group has a lower probability to attend child care municipalities in comparison to the second one. However, disadvantaged children demonstrated greater treatment effects because their outcomes were much worse before attending child care (Cornelissen et al., 2018).

Anderson et al. (2003) provided evidence not on the parental leave duration, but on the length of maternal employment and its impact on the child's probability of being overweight. The researchers commented that child care institutions are likely to provide kids with non-nutritious food with high-caloric value which might lead to weight problems. In addition, parents who work were found to feed their children with high-caloric fast food (Anderson et al., 2003). The findings reported the negative relationship between maternal employment and child health outcome; the more hours a mother worked per week, the more likely her child had an overweight status (Anderson et al., 2003). This paper underscored the importance of the quality of nutrition for the health and development of the child and how it depends on the number of hours that mothers work.

Cognitive development is as critical to a child's development and depends on the time parents spend with their children as the indicators of a child's physical health discussed earlier. Waldfogel et al. (2002) and Baum II (2003) investigated how maternal employment in the early childhood affected cognition processes. Waldfogel et al. (2002) reported the negative relationship between the first-year mother's employment and positive relationship for the second- and third-year mother's employment on cognitive outcomes of her children. Baum II's research (2003) concluded with results suggesting that the mother's work in the first months of an infant's life is harmful for cognitive development of a child. The author interpreted findings that mothers who work intensively were subject to extreme tiredness, stress, and overburden. It is worth noting that the negative results were found to be partially mitigated by increases in family income (Baum II, 2003).

However, there is another group of evidence from prior literature that reveals a weak relationship or no effects at all between maternity leave and child health outcomes (Baker & Milligan, 2010; Beuchert et al., 2016; Dustmann & Schonberg, 2012). Thereby, Dustmann & Schönberg (2012) on the example of the changes in German maternity leave coverage program evaluated its impact on child's long-run outcomes. The research focused on children older than 18 months and their development progress by comparing children born before after the social policy was implemented. Dustmann & Schönberg (2012) found no effect on children's long-term educational outcomes from expansions in maternity leave coverage.

Another study by Beuchert et al. (2016) also examined the impact of 32-day expansion of paid parental leave in Denmark on the physical and psychological health of the family members such as hospital visits by a mother and her children and the likelihood of the mother to alleviate depression. The results revealed that the expansion of maternity leave only influenced mother's health and left child outcomes unaffected.

The two researchers, Baker & Milligan found no or weak effect on child health from maternal leave expansions (2008, 2010). First, in 2008 they researched how expansion in social policy relates to the propensity of mothers of returning to work after delivery, the duration of the breastfeeding period, and child health outcomes. Although the results on leave eligibility for mothers and the period of breastfeeding are significant and positive, further analysis found no impact on child health indicators (Baker & Milligan, 2008). A couple of years later, Baker & Milligan evaluated this expansion in maternity leave entitlements on child development indicators from 6 to 29 months. The findings suggest small and insignificant results of the increase in maternal care on the motor and social development of a child (Baker & Milligan, 2010).

In sum, it can be concluded that there is a variety of evidence on the effects of maternal employment and expansion in maternity leave entitlements on child health and development outcomes. Some papers found positive associations between a mother's prolonged care and a child's well-being, others found negative or no association at all. Given that there is no prior research on the relationship between child health outcomes and maternal employment in Kyrgyzstan (and in the region), this paper contributes to the aforementioned literature by providing new evidence on the impact of the length of maternal work on child health outcomes.

3. Data

3.1 Overview

The data for the present study is collected from the Life in Kyrgyzstan (LIK) Survey, held by the German Institute for Economic Research (DIW Berlin) in collaboration with Humboldt-University of Berlin, American University of Central Asia, Center for Social and Economic Research (Brück et al., 2014). The study represents micro-level data covering all regions of Kyrgyzstan and two main cities, Bishkek and Osh, for households and individuals from rural and urban areas. The LIK survey consists of various socioeconomic characteristics of population on education, employment, income, health, consumption patterns, migration and other social life issues. It covers around 3000 households and 8000 individuals, where individuals are representatives of the interviewed households from 2010 till 2013 and 2016 years. For this project, I use data from 2012 and 2013 because these waves have the relevant information on maternal working hours (my variable of interest).

In what follows, I briefly describe each variable; with respect to control variables, I also describe why they might be related to child BMI as well as potentially to the working propensity of the mother, substantiating the need for controlling for them.

The Body Mass Index (BMI). The first child health outcome variable is defined as a child's weight in kilograms divided by the square of his/her height in meters (kg/m^2) (WHO, 2020).

Underweight. The second child health outcome variable is defined according to the WHO (2006) standards for the interpretation of BMI by age and gender, measured as a dummy variable equal to 1 if a child is underweight and 0 otherwise.

Maternal employment. The variable of interest is measured in the number of hours that the mother works on a paid job per day on average over a week.

Control variables of personal characteristics: age, which corresponds to the age of the child, and *gender,* which stands for a dummy variable equal to 1 if the child is female and 0 if male, are included as control variables as they are the factors affecting BMI by its definition (WHO, 2020). *Vaccine* is also a dummy variable indicating 1 if a child follows the National immunization calendar, and 0 if otherwise. Vaccination is supposed to protect kids from various diseases and, thus, is associated with the well-being of a child that potentially affects her/his BMI.

Grandparent. It is a dummy variable equal to 1 for children who have grandparents present in the household and 0 for those who do not have grandparents present in the household. It is included because grandparents usually help to take care of the child and are associated with the child development, thus, possibly contributing to the child's BMI, as well as mothers' propensity to work.

Log of income. This continuous variable is the logarithm of total household income. Income positively relates to the child's BMI by allowing parents to buy the necessary food, medication, vitamins, etc. for a child. It is also associated with maternal employment: if the income is too low, a mother might need to work more and *vice versa*.

Hospital distance. This continuous variable captures the distance from the household's residence to the nearest hospital in kilometers (km). It is assumed that the nearer is a hospital, the less time it takes to reach it if needed, and thus the more likely the household is to receive proper medical care. A hospital located far away from the household might be a reason for infrequent and untimely doctor visits, which might result in a serious health issue and lower BMI.

Rural. It is a dummy variable equal to 1 for children living in households in the rural area and 0 for the urban area. Households located in the rural area have a lower variety of facilities such as food stores, provision of clean water, and drug stores. This potentially

lowers a child's BMI by restraining a child to receive necessities. Also, the absence of clean water in some rural areas in Kyrgyzstan raises the likelihood of having parasites that might lower the BMI of children. Similarly to above, the residence of a household in a rural area decreases the likelihood of a mother to work because in general rural areas lack job opportunities.

Number of children. It is the number of children aged 0-5 in the household. The more children there are in a household, the less time can be spent on each child, potentially negatively affecting an individual child and her/his BMI. In addition, maternal employment might also be negatively affected since parenting more than 1 child takes more time for caring and less for other activities.

Father's health. A dummy variable equal to 1 if a child's father does not have any chronic illnesses and 0 if he has any. This variable controls for genetic predisposition, which affects the individual metabolism and thus affects BMI. If the father of a child is the spouse of the mother, the mother might be engaged in caring after him and work less, or she might work more if she is the only person to earn money.

Mother's health. A dummy variable equal to 1 if the mother does not have any chronic illnesses and 0 if she has some. This variable also controls for genes. Moreover, having a serious problem with her own health likely decreases the mother's propensity to work.

Mother's education. The years of mother's education at the date of interview. A more educated mother, on average, likely takes better care of herself and is also more likely to know how to take better care of her child which positively relates to the health outcome. In addition, higher levels of education are associated with a higher propensity to be employed.

Mother's age is the age of a child's mother. Older mothers, all else equal, might have less energy for caring for their children, but potentially be more mature and experienced in

that. The way mothers care for their kids affects their growth rate and thus BMI. Also, the older and thus the more experienced a mother is, the higher likelihood she will have to work.

Mother's unpaid work at the household. This variable is defined as the number of hours that a child's mother spends on work inside of the household (cooking, washing dishes, laundry, ironing, etc.). In some households, especially those in the rural areas, females have their household duties. This might negatively affect a child's BMI as a mother can get tired or have less time for caring her child and/ for working on a paid job.

Career, father's employment, and *childcare availability* are potential instrumental variables that will be discussed in the following chapter.

3.2 Descriptive statistics

My sample consists of 2,944 observations for the years 2012 and 2013. The panel is unbalanced panel since some households did not participate in 2013. In my empirical strategy, I control for year effects but do not explicitly exploit the panel nature of the data, given its unbalanced nature (30% of all households just have one year of data.) Observations with BMI records and hours of mother's work larger than 95th percentile were dropped as they had likely been incorrectly measured or recorded. Table 1. below shows summary statistics for the sample. The sample presents mostly children residing in rural (70%) households, aged from 0 to 6 years old, with an average household income of 20 thousand soms ($425), with an average distance to the hospital of 3+ kilometers. An average mother observed in the sample is around 29 years old, does not have chronic illnesses, spends on average more than 2 hours for paid work and 6 hours for unpaid work within the household, and has completed secondary education (according to the Kyrgyz educational system (Bruck & Esenaliev, 2017)). The children in the dataset represent female and male genders equally, the mean age is around 2.7 years old and they are mostly vaccinated against diseases.

The distribution of BMI in the dataset can be seen on the histogram in Figure 1. The BMI in the sample is almost normally distributed and range from very low 6.6 units to 25.5 units with the mean of 17, and the standard deviation of 2.87.

Table 1. Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
BMI	2944	17.05211	2.868437	6.60179	25.51985
underweight	2944	.0720109	.2585498	0	1
age	2944	2.775815	1.792501	0	6
female	2944	.4836957	.499819	0	1
vaccine	2944	.9714674	.166517	0	1
grandparent	2944	.6049592	.4889425	0	1
numberofch~n	2944	1.972826	.9826608	1	6
hospitaldi~e	2944	3.56375	6.433688	0	46
lninc	2944	9.408007	.8341419	0	11.87757
rural	2944	.7044837	.456352	0	1
fhealth	2944	.8519022	.3552573	0	1
femp	2944	.8675272	.3390617	0	1
mage	2944	29.5394	6.326957	16	57
status	2944	.9949049	.07121	0	1
meduc	2944	10.94145	2.258562	0	15
mhealth	2944	.8352582	.3710104	0	1
career	2944	2.269361	.9292682	0	4
mwork	2944	2.072045	3.390117	0	12
house1	2944	6.343071	2.445255	0	14
ccfacility	1381	.6517017	.4766037	0	1
dummy2012	2944	.4616168	.4986092	0	1

Figure 1. Body Mass index distribution

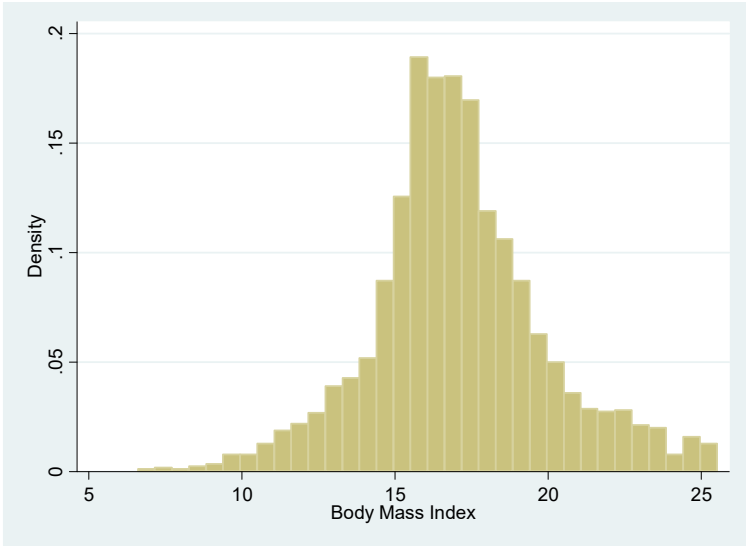
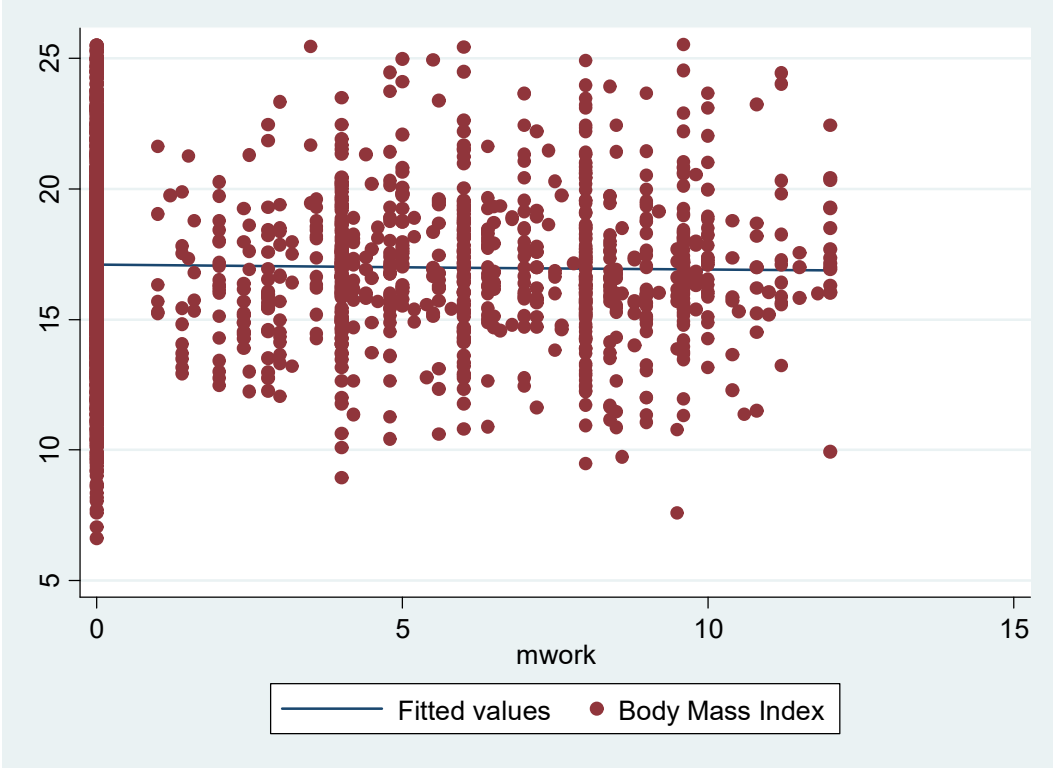


Figure 2. shows a scatter plot of child BMI on mother's paid work hours. The relationship is ambiguous. Further chapters will proceed with the data analysis.

Figure 2. Scatter plot of Body Mass Index & maternal employment



4. Methodology

A simple univariate OLS regression model relating child health to maternal employment would likely be insufficient to measure the causal effect of maternal employment on child health, due to various sources of endogeneity, stemming from omitted variable bias and simultaneity. In general, estimating a simple regression model would lead to a biased regression coefficient estimate on the maternal employment variable (i.e., the variable of interest), when the error term and the variable of interest are correlated (conditional on the control variables included). First, there is potentially omitted variable bias due to exclusion of a relevant control variable; with respect to my research question, for instance, parenting skills and health awareness are potential omitted variables, which can be only partially controlled for by the level of maternal education. Moreover, mothers may choose to work less because the child might be in worse health, thus, a simultaneity problem arises.

One[1] solution to the aforementioned problem is to use a valid instrumental variable (IV) for maternal employment. Hours spent on work by the mother can be instrumented with a valid instrument that is strongly correlated with maternal employment but is not directly related to the child health outcome, only through the maternal employment channel. If these two assumptions hold, then the effect of maternal employment on child health can be identified in an IV (or Two-Staged Least Squares) regression model. Potentially, the mother's attitudes toward career objectives, employment status of the child's father, and childcare availability could be used as instruments. The estimation equation would be then:

The first-stage model: $mwork_i = \beta_0 + \beta_1 * IV_i + \beta_2 * X_i + \varepsilon_i$,

where *mwork* is the mother's working hours, IV_i is the vector of instrumental variables, X_i is the vector of control variables, and $\mathcal{E}i$ is the unobserved error term.

[1] Another approach was supposed to be panel data analysis, namely fixed effects method. With a panel model one can control for all time-invariant characteristics of a household, mitigating the problem of omitted variables remaining in the error term. However, there is not enough panel variation in the dataset, namely just a subset of the sample has 2 observations per child, and even 2 observations per child might not lead to enough variation in maternal employment and child health.

The second-stage model is: $BMI_i = \gamma_0 + \gamma_1 * mwork_i + \gamma_2 * X_i + \upsilon_i$,

where BMIi is the Body Mass Index of a child i, Xi is a vector of control variables, while υi is the unobserved error term; alternatively, I use underweight as the outcome variable.

The potential instrumental variables are[2]:

Career attitudes - categorical variable defined as a sum of yes-or-no answers on statements regarding career attitudes and role of career and family for women such as the following:

"A man's job is to earn money; a woman's job is to look after the home and family."
"A working woman can establish just as warm and secure relationship with her children as a mother who does not work.
"A husband's career should be more important to the wife than her own."
"Both the husband and the wife should contribute to the household income."

The answers were binary, agree or disagree. "1" was assigned if a woman answered in support of career for women, and "0" if otherwise. There are 5 categories ranging from 0, which are associated with mothers who are less likely to work, to 4 - those who are more likely to work.

For it to be a valid instrument, it has to be the case that mother's career attitudes do not affect her child health directly, only through the number of hours she works; if, in addition, mother's career attitudes represent the reason why mother works (being highly correlated with a number of working hours), then it is a valid IV for maternal employment. It would fail to be a valid IV if it has a low correlation with the number of hours mother works because her employment is driven more by other reasons, such as lack of money or husband's opinion/ cultural perception about women employment or if career attitudes do correlate with

[2] I have been also thinking about childcare availability as a potential IV for maternal employment, which I measured as a dummy variable being equal to 1 if there is an adequate childcare available, 0 if otherwise (no childcare at all, or it is too expensive, or it is of bad quality).This variable might indicate whether a mother is less likely to work because there is no option to replace her role of caregiver during the time she spends at work. For it to be a valid instrument, it has to be the case that the childcare availability does not affect child health outcome directly, only through the maternal employment. Additionally, childcare availability has to be highly correlated with the number of mother's working hours to be a valid instrument. It would fail to be a valid IV if it has low correlation with the number of hours mother works because her employment is driven more by other reasons or if childcare availability affects child health through other channels. For example, when childcare availability depends on wealth of the neighborhood it affects child health outcome through the wealth status of the household. This potential concern can be partially controlled for by the level of household income. However, the results of the first-stage regression model as IV for maternal employment showed that it is not strong enough to serve as a valid IV.

child health through other channels. For example, if a mother values career more than maternity and regrets having children, then she might lack the attention and proper care for the child, not necessarily through absenteeism as a mother due to her work, but because of her psychological state. This is unlikely to happen for most mothers, given during pregnancy and after child delivery, women are granted special hormones for ensuring the caring attitude towards the child for the sake of his/her well-being (Feldman, 2017).

Father's employment status - dummy variable equal to 1 if the child's father is employed, 0 if otherwise. For it to be a valid instrument, it has to be the case that the father's employment does not impact his child health directly, only through the length of maternal employment. If, in addition, the father's employment status influences the actual amount of time that the mother works (being highly correlated with a number of working hours), then it is a valid IV for maternal employment. It would fail to be a valid IV if it has a low correlation with the number of hours the mother works because her employment is driven more by other reasons or if father's employment correlates with child health through other channels. For example, fathers who work may be well-educated and know that spending some quality time with the children contributes to their health outcomes. This is a potential concern, but perhaps more relevant with respect to the cognitive and behavioral outcomes of children rather than physical ones such as weight, since it is mostly mothers who feed kids in the first 3 to 24 months of life. Moreover, in the Kyrgyz patriarchal society fathers are very unlikely to interact with kids under 5, especially in rural areas where child-caring is the prerogative of mothers (ILO, 2008). On the contrary, father's employment may negatively affect BMI if the father meets occupational hazards such as being exposed to work at dangerous for life places, like chemical factories, from where harmful elements might be transmitted to a child when the father returns from work. That said, such workplaces are required to have special protocols to ensure safety measures.

5. Results and discussion

5.1 OLS results

The results for the first OLS regressions are presented in Table 2. below. The coefficient estimates of interest on the hours of maternal work are statistically insignificant for both BMI and underweight dependent variables, with and without including control variables. All else equal, a longer mother's work per day is associated with 0.0144 units lower BMI, on average (Table 2, Column 1). Holding the list of control variables constant, on average, maternal employment longer by one hour is related to 0.00174 units higher BMI, all else equal (Table 2, Column 2). The probability of a child being underweight is associated to be higher by 0.0000934 percentage points, on average, for mothers who work one hour more than others, all else equal (Table 2, Column 3). With the inclusion of control variables, a child whose mother's employment is longer by one hour is likely to have on average 0.00176 percentage points higher probability of being underweight (Table 2, Column 4).

Table 2. The Effect of Maternal Employment on Child Health; Results for OLS Model, For All Children

	(1)	(2)	(3)	(4)
Variables	BMI	BMI	underweight	underweight
Maternal employment (hours/day)	-0.0144	0.00174	0.0000934	0.00176
	(0.0151)	(0.0168)	(0.00141)	(0.00156)
dummy2012	-0.176*	-0.275**	9.90e-05	-0.00331
	(0.106)	(0.111)	(0.00958)	(0.0103)
Constant	17.16***	14.54***	0.0718***	0.348**
	(0.0789)	(1.280)	(0.00697)	(0.143)
Observations	2,944	2,944	2,944	2,944
R-squared	0.001	0.034	0.000	0.032

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: Column (2) and (4) in addition control for control variables listed in Chapter 3.

5.2 First-stage results

Table 3. reports the results of the IV first-stage regression models, for mother's career attitudes and father's employment status as IVs for maternal employment. Both coefficients

are statistically significant at the 1% level, with a t-statistics above 7. The F-statistics of the joint F-test results (both above 50) suggest that these two variables are strong enough jointly, therefore satisfy the IV strength identification requirement. The first column reports that, all else equal, one unit higher score in career attitudes is associated with, on average, 0.675 more hours (40 minutes) that the mother spends on paid work. The second column shows that holding the list of control variables constant, on average, mothers work 0.448 hours more (27 minutes) for a unit higher career attitudes. In addition, mothers work on 0.87 more hours, on average (or additional 52 minutes) if the father of their child works relative to the unemployed fathers, all else equal (Table 3, Column 1). Accounting for control variables, on average, mothers work on 0.576 hours more (35 minutes) if their child's father is employed, all else equal (Table 3, Column 2).

Table 3. The Effect of Maternal Employment on Child Health; IV Model: Results of the First-stage Relationship Between Maternal Employment and the Two Instrumental Variables, For All Children

	(1)	(2)
Variables	Maternal employment (hours/day)	Maternal employment (hours/day)
Career attitudes	0.675***	0.448***
	(0.0685)	(0.0619)
Father's employment status	0.870***	0.576***
	(0.156)	(0.141)
dummy2012	0.766***	0.746***
	(0.124)	(0.116)
Constant	-0.569***	-4.812***
	(0.192)	(1.000)
Value of F-statistics	67.699	51.666
Observations	2,944	2,944
R-squared	0.061	0.243

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: Column (2) in addition control for control variables listed in Chapter 3.

5.3 Second-stage results

Table 4 below shows results for the 2nd-stage regression of child health outcomes on maternal employment. Column (1) reports that, to the extent the IV exogeneity requirements hold, hours of mother's work positively affects child BMI, where the coefficient estimate is statistically significant at the 1% level. An additional hour of maternal work leads to a 0.166 unit increase in child BMI, on average, all else equal. This coefficient estimate is 0.97% of the average BMI in the sample. In column (2) I account for control variables listed in chapter 3 and find that the inclusion of these controls slightly increases the coefficient estimate of interest to 0.215, that remains significant at the 10% level only. Holding the list of control variables constant, all else equal, an increase in maternal employment by 1 hour increases BMI by 0.215 units (or 1.26% of the average BMI in the sample), on average.

Column (3) shows that a mother's hours of work negatively affect the likelihood of her child being underweight (to the extent the IV exogeneity requirements hold). All else equal, an increase in maternal employment by one hour, on average, decreases the probability of a child being underweight by 0.0215 percentage points, which is 30% of the mean share of underweight children in the sample.With the inclusion of control variables listed in chapter 3, the estimate decreases to 0.018, which remains significant at the 10% level (Table 4, Column 4). Holding the list of control variables constant, all else equal, one additional hour of mother's work decreases the probability of her child to be underweight by an average of 0.018 percentage points that is 25% of the mean share of underweight children in the sample.

Table 4. The Effect of Maternal Employment on Child Health; IV Model: Results of the Second-stage Relationship, For All Children

	(1)	(2)	(3)	(4)
Variables	BMI	BMI	underweight	underweight
Maternal employment (hours/day)	0.166**	0.215*	-0.0215***	-0.0180*
	(0.0829)	(0.127)	(0.00724)	(0.0108)
dummy2012	-0.346***	-0.454***	0.0205**	0.0133
	(0.104)	(0.134)	(0.0103)	(0.0125)

Constant	16.87***	15.30***	0.107***	0.277*
	(0.158)	(1.529)	(0.0145)	(0.162)
Observations	2,944	2,944	2,944	2,944

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: Column (2) and (4) in addition control for control variables listed in Chapter 3.

I perform heterogeneity analysis on the probability of being underweight holding the list of control variables constant, by the child's gender, the child's age, and the mother's education (low- versus high-educated, where low-educated is defined as less than 10 years of schooling, which is an equivalent to completed secondary education in the Kyrgyz educational system). The results are presented in Table 5. According to column (1), there is a negative relationship between maternal employment and child health outcome for boys at the 10% significance level. All else equal, an additional hour spent on paid work by a mother decreases the probability of a male child being underweight by 0.0262 percentage points, which is 37% of the mean share of underweight boys in the sample. Column (2) reports the insignificant coefficient for girls: all else equal, one more hour of mother's work decreases the probability of girls being underweight by 0.0104 percentage points that is 15% of the mean share of underweight girls in the sample.

In addition, according to the results presented in column(3), there is also a negative relationship between maternal employment and the likelihood of a child to be underweight at 10% level for children from 0 to 3 years old. All else equal, a child aged 0-3 is 0.0374 percentage points less likely to be underweight if the mother works 1 more hour, on average, which is 53% of the mean share of underweight children aged 0-3. Column (4) presents negative but insignificant results on the effects of maternal employment on children from the subgroup aged 4-6. On average, a child from 4 to 6 years old is 0.00325 percentage points less likely to be underweight if the mother increases her working time by one hour, all else equal. This coefficient estimate is 4.6% of the mean share of underweight children aged 4-6.

Columns (5) and (6) in Table 4 indicate negative but insignificant effects of maternal employment on the child's likelihood of being underweight for both subgroups of low- and high-educated mothers. All else equal, a child is 0.387 percentage points less likely to be underweight if the mother's work increases by one hour, on average, for children with low-educated mothers. Similarly, a child is 0.00993 less likely to be underweight if the maternal employment increases by one hour, one average, for children with high-educated mothers.

5.4 Heterogeneity analysis

Table 5. The Effect of Maternal Employment on Child Health; IV Model: Results of the Second-stage Relationship, For Boys and Girls, Children from 0 to 3 years and from 4 to 6 years, Children with low-educated and high-educated mothers

	(1)	(2)	(3)	(4)	(5)	(6)
	Boys	Girls	Aged 0-3	Aged 4-6	Low-educated	High-educated
Variables	Under weight	Under weight	Under weight	Under weight	Under weight	Under weight
Maternal employment	-0.0262*	-0.0104	-0.0374*	-0.00325	-0.387	-0.00993
	(0.0140)	(0.0172)	(0.0200)	(0.0106)	(0.268)	(0.0101)
dummy2012	0.0153	0.0111	0.0301	-0.00152	0.125	0.00944
	(0.0162)	(0.0199)	(0.0211)	(0.0170)	(0.113)	(0.0129)
Constant	0.364*	0.157	0.0661	0.621***	-0.505	0.290*
	(0.199)	(0.275)	(0.205)	(0.220)	(0.775)	(0.162)
Observations	1,520	1,424	1,837	1,107	361	2,583
R-squared		0.015		0.052		0.016

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: Columns (1)-(6) control for control variables listed in Chapter 3.

To the extent the IV exogeneity requirements hold, my results indicate that maternal employment improves child BMI and leads to a reduction of the propensity of the child being overweight (significant at 10% only when control variables included), driven by boys and young children. Given that the OLS model estimates did not reveal a significant

relationship between maternal employment and child health, it seems important to account for the potential endogeneity of mothers' propensity to work.

6. Conclusion

This study contributes to the understanding of the importance of maternal employment in ensuring better child health outcomes. To understand the effects of the duration of a mother's work on child growth measured by the Body Mass Index, I applied an Instrumental Variable (IV) identification strategy, using micro-level data for the population of Kyrgyzstan from the 'Life in Kyrgyzstan' survey for years 2012 and 2013. To deal with a potential endogeneity problem in an Ordinary Least Squares (OLS) regression model, I applied two instruments: the mother's career attitudes and the father's employment status. The results suggest that maternal employment positively affects child health, raises BMI, and decreases the likelihood of a child being underweight. These results were confirmed in the heterogeneity analysis for boys and children below 4.

The following are the limitations of the current paper. Although these results have implied that child well-being may benefit from mothers working, these results examine only a small number of negative child outcomes mostly for children from rural areas, where around 70 percent of mothers do not work at a paid job. Thus, more research may be needed to determine the relation of maternal labor supply on child health in a more contemporary, representative, and differentiated sample. In addition, early maternal employment might have additional long-term effects on children, such as on their cognitive and behavioral developments as well as on future incomes and school dropout rate. Finally, it would be interesting to investigate the effects of a mother's work a few months after the child was born. To conduct such a study, more information is needed on the duration of breastfeeding and the length of leave taken by mothers.

7. Policy Recommendations

Children and their mothers are part of the vulnerable population and protecting them by developing effective policies will ensure their well-being. Policymakers are recommended to find a way to allow mothers to work more and ensure that children receive proper care while their mothers are at work. In what follows, I summarize the key policy recommendations of this thesis.

Introduce appropriate working conditions for childcare and breastfeeding for working mothers. The previous studies revealed the importance of breastfeeding duration and quality time spent with the child. Mothers need to have the ability to work and care about their children including breastfeeding during a workday. A special room in the office space would help mothers to take short breaks when other caregivers bring the child to her.

Promote child caring performed by fathers. Today there is no policy providing an ability for fathers to take paid parental leave for Kyrgyz citizens. Nevertheless, fathers also play a significant role in child development and can significantly contribute to the mother's propensity to work. Given that in Kyrgyzstan, males are perceived as the primary earners in the family and they work intensively, the absence of such policy restrains fathers to care of their children full-time.

Invest in childcare institutions. Increasing the number and quality of childcare institutions for pre-school children like daycare for infants and toddlers, preschools and schools would benefit children as well. The less crowded are childcare facilities, the less likely it that children spread infections between each other. Moreover, childcare availability might contribute to the likelihood of a mother being employed.

Decrease gender inequality. It is recommended to empower females and promote gender equality and career opportunities in rural areas, especially. By persuading mothers that they can work, can have a job-secured paid leave, can return to work and entrust their child to

another person, there might be a positive change in the labor supply and potentially in child health indicators.

Increase health awareness in the population. Parenting skills and health awareness are not taught at schools or higher education facilities in Kyrgyzstan. However, these are crucial questions to support the well-being of children and their mothers. First, caring a child is not dependent on gender, meaning that both mothers and fathers need to know how to look after the child from the first days after delivery. Second, considering the huge flow of information that exists today, it is difficult for mothers to navigate in the pool of recommendations on proper childcare. Thus, it is necessary for the government officials to disseminate information on proper childcare, confirmed by WHO and adapted to country specificities and/ incorporate it to the curriculum. Knowing how to care of children may be as important as knowing the history of the state. Third, since genetic endowment is a strong factor determining the future well-being of the child implies that people who want to raise kids are recommended to increase their health awareness and lead a healthy lifestyle.

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Appendix

Table 1. The Effect of Maternal Employment on Child Health; Results for OLS Model, For All Children

VARIABLES	(1) BMI	(2) BMI	(3) underweight	(4) underweight
Maternal employment	-0.0144	0.00174	9.34e-05	0.00176
	(0.0151)	(0.0168)	(0.00141)	(0.00156)
Age		-0.216***		-0.0120***
		(0.0318)		(0.00293)
Gender		-0.173*		0.00268
		(0.105)		(0.00942)
Grandparent		-0.268**		0.0271**
		(0.126)		(0.0108)
Number of children		-0.00872		-0.00419
		(0.0580)		(0.00582)
Vaccine		0.973***		0.0388
		(0.309)		(0.0254)
Hospital distance		-0.0211**		0.00234**
		(0.00968)		(0.000972)
Log of income		-0.0217		0.00659
		(0.0664)		(0.00575)
Rural		-0.0883		0.0172
		(0.123)		(0.0105)
Father's health		0.274*		-0.0167
		(0.164)		(0.0144)
Mother's age		-0.000754		0.000665
		(0.0100)		(0.000849)
Mother's marital status		2.641***		-0.316**
		(1.011)		(0.124)
Mother's education		-0.00511		-0.00554***
		(0.0238)		(0.00208)
Mother's health		0.168		-0.0119
		(0.158)		(0.0140)
Mother's unpaid work at the household		-0.00135		0.000244
		(0.0241)		(0.00228)
Dummy2012	-0.176*	-0.275**	9.90e-05	-0.00331
	(0.106)	(0.111)	(0.00958)	(0.0103)
Dummy_meduc		-0.481		0.0931***
		(0.349)		(0.0343)
Dummy_lninc		-0.168		0.00966
		(0.447)		(0.0346)
Dummy_hospitaldistance		3.264		-0.0856***
		(2.434)		(0.0116)
Constant	17.16***	14.54***	0.0718***	0.348**
	(0.0789)	(1.280)	(0.00697)	(0.143)

Observations	2,944	2,944	2,944	2,944
R-squared	0.001	0.034	0.000	0.032
Robust standard errors in parentheses				

*** p<0.01, ** p<0.05, * p<0.1

Table 2. The Effect of Maternal Employment on Child Health; IV Model: Results of the First-stage Relationship Between Maternal Employment and the Two Instrumental Variables, For All Children

VARIABLES	(1) mwork	(2) mwork
Career	0.675***	0.448***
	(0.0685)	(0.0619)
Father's employment	0.870***	0.576***
	(0.156)	(0.141)
Age		0.253***
		(0.0326)
Female		-0.0765
		(0.109)
Grandparent		-0.0951
		(0.144)
Number o fchildren		-0.327***
		(0.0522)
Vaccine		0.700***
		(0.229)
Hospital distance		0.0143*
		(0.00807)
Log of income		0.322***
		(0.0646)
Rural		0.938***
		(0.121)
Father's health		-0.169
		(0.161)
Mother's age		0.0604***
		(0.0116)
Mother's marital status		-0.164
		(0.670)
Mother's education		0.131***
		(0.0250)
Mother's health		0.324**
		(0.150)
Mother's unpaid work at the household		-0.403***
		(0.0280)
dummy2012	0.766***	0.746***

	(0.124)	(0.116)
dmeduc		0.282
		(0.239)
dlninc		-0.0188
		(0.455)
dhospitaldistance		0.546
		(0.775)
Constant	-0.569***	-4.812***
	(0.192)	(1.000)
F-statistics	67.699	51.666
Observations	2,944	2,944
R-squared	0.061	0.243

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3. The Effect of Maternal Employment on Child Health; IV Model: Results of the Second-stage Relationship, For All Children

VARIABLES	(1) BMI	(2) BMI	(3) underweight	(4) underweight
Maternal employment	0.166**	0.215*	-0.0215***	-0.0180*
	(0.0829)	(0.127)	(0.00724)	(0.0108)
Age		-0.271***		-0.00684
		(0.0499)		(0.00422)
Gender		-0.158		0.00125
		(0.132)		(0.0113)
Grandparent		-0.242		0.0246*
		(0.158)		(0.0131)
Number of children		0.0695		-0.0115
		(0.0835)		(0.00819)
Vaccine		0.817**		0.0533*
		(0.345)		(0.0278)
Hospital distance		-0.0234**		0.00255**
		(0.0115)		(0.00108)
Log of income		-0.0909		0.0130*
		(0.0834)		(0.00734)
Rural		-0.281		0.0350**
		(0.187)		(0.0160)
Father's health		0.305*		-0.0196
		(0.176)		(0.0149)
Mother's age		-0.0136		0.00186*
		(0.0144)		(0.00110)
Mother's marital status		2.658**		-0.318**
		(1.175)		(0.137)
Mother's education		-0.0394		-0.00236
		(0.0345)		(0.00287)

Mother's health		0.0997		-0.00557
		(0.163)		(0.0144)
Mother's unpaid work at the household		0.0880		-0.00806
		(0.0569)		(0.00497)
dmeduc		-0.476		0.0926**
		(0.358)		(0.0366)
dlninc		-0.148		0.00781
		(0.449)		(0.0354)
dhospitaldistance		3.128		-0.0730***
		(2.277)		(0.0223)
dummy2012	-0.346***	-0.454***	0.0205**	0.0133
	(0.104)	(0.134)	(0.0103)	(0.0125)
Constant	16.87***	15.30***	0.107***	0.277*
	(0.158)	(1.529)	(0.0145)	(0.162)
Observations	2,944	2,944	2,944	2,944
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Table 4. The Effect of Maternal Employment on Child Health; IV Model: Results of the Second-stage Relationship, For Boys and Girls, Children from 0 to 3 years and from 4 to 6 years, Children with low-educated and high-educated mothers

VARIABLES	(1) Under weight	(2) Under weight	(3) Under weight	(4) Under weight	(5) Under weight	(6) Under weight
Maternal employment	-0.0262*	-0.0104	-0.0374*	-0.00325	-0.387	-0.00993
	(0.0140)	(0.0172)	(0.0200)	(0.0106)	(0.268)	(0.0101)
Age	-0.000337	-0.0123**	-0.0133	-0.0294***	-0.000113	-0.0101**
	(0.00604)	(0.00593)	(0.0096)	(0.0103)	(0.0256)	(0.00447)
Gender			0.00129	-0.02934	-0.06969	-0.03211*
			(0.0144)	(0.01026)	(0.1104)	(0.0176)
Grandparent	0.0552***	0.000136	0.0343**	0.0180	0.150	0.0248*
	(0.0189)	(0.0185)	(0.0169)	(0.0192)	(0.140)	(0.0139)
Number of children	-0.0312***	0.00846	-0.0133	-0.00424	-0.00814	-0.00589
	(0.0103)	(0.0128)	(0.00974)	(0.0115)	(0.0437)	(0.00884)
Vaccine	0.0421	0.0799**	0.0786**	-0.0186	-0.199	0.0553*
	(0.0403)	(0.0376)	(0.0309)	(0.0704)	(0.296)	(0.0306)
Hospital distance	0.00317*	0.00177	0.00276*	0.00230	-0.00880	0.00253**
	(0.00171)	(0.00136)	(0.00146)	(0.00143)	(0.0166)	(0.00108)
Log of income	0.0124	0.0110	0.00893	0.0163*	0.106	0.0123

	(0.00941)	(0.0114)	(0.00985)	(0.00973)	(0.0907)	(0.00759)
Rural	0.0325	0.0362	0.0539**	0.0180	0.146	0.0231
	(0.0223)	(0.0233)	(0.0241)	(0.0182)	(0.141)	(0.0175)
Father's health	-0.0540**	0.0108	-0.0104	-0.0312	-0.509	-0.0120
	(0.0237)	(0.0190)	(0.0206)	(0.0216)	(0.383)	(0.0151)
Mother's age	0.00135	0.00271*	0.00330*	0.00182	0.0256	0.00139
	(0.00155)	(0.00157)	(0.00198)	(0.00134)	(0.0192)	(0.00106)
Mother's marital status	-0.345**	-0.251	-0.141	-0.509***		-0.318**
	(0.168)	(0.240)	(0.156)	(0.185)		(0.137)
Mother's education	0.00253	-0.00756*	0.00153	-0.00814**	-0.0310	-0.00434
	(0.00379)	(0.00432)	(0.00392)	(0.00394)	(0.0341)	(0.00290)
Mother's health	-0.0150	0.00111	-0.00681	0.00487	-0.123	-0.0106
	(0.0216)	(0.0194)	(0.0221)	(0.0184)	(0.180)	(0.0155)
Mother's unpaid work at the household	-0.0125*	-0.00366	-0.0128*	-0.00122	-0.0205	-0.00510
	(0.00664)	(0.00764)	(0.00731)	(0.00609)	(0.0237)	(0.00517)
dmeduc	0.140**	0.0444	0.121***	0.0289		0.0911**
	(0.0578)	(0.0428)	(0.0462)	(0.0445)		(0.0364)
dlninc	0.0174	0.0103	0.00638	-0.0258	-0.472	-0.00464
	(0.0555)	(0.0444)	(0.0508)	(0.0300)	(0.513)	(0.0338)
dhospitaldistance	-0.101***	-0.0780	-0.0383			-0.0852***
	(0.0240)	(0.0541)	(0.0491)			(0.0192)
dummy2012	0.0153	0.0111	0.0301	-0.00152	0.125	0.00944
	(0.0162)	(0.0199)	(0.0211)	(0.0170)	(0.113)	(0.0129)
Constant	0.364*	0.157	0.0661	0.621***	-0.505	0.290*
	(0.199)	(0.275)	(0.205)	(0.220)	(0.775)	(0.162)
Observations	1,520	1,424	1,837	1,107	361	2,583
R-squared		0.015		0.052		0.016
Robust standard errors in parentheses						

*** p<0.01, ** p<0.05, * p<0.1