THE IMPACT OF DIFFERENT TYPES OF CHILD CARE ON MOTHERS' LABOR SUPPLY: THE CASE OF UKRAINE

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Abstract

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This work examines the impact of different types of child care on mothers' labor supply in Ukraine. A lot of researches have revealed that the lack of high-quality, accessible childcare services places significant constraints on female labor supply, and is among the key factors that weaken women's labor market attachment. This work examines the impact on mothers' labor supply of two most frequently used in Ukraine types of childcare – public (kindergartens) and informal (availability of grandparents to take care of grandchildren) childcare services. The estimations are based on the data from the Ukrainian Longitudinal Monitoring Survey 2012. The results show that the likelihood to work for young mothers who live in the same household with only grandfathers on retirement is negatively associated. Grandmothers who are not restricted by retirement eligibility is found to have positive effect. The availability of kindergartens in the region, according to the obtained results, appears to have no significant effect on mothers' labor supply.

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Chapter 1

INTRODUCTION

The essential element for stability and survival of any society is economic growth and development. The important part for improving economic growth is using its human capital in a most effective way. For the present time we have progressive population aging in developed countries, so the increasing labor force participation is a very important mission for all countries. And this is even more important about female labor force participation, which remains lower than men's in almost all countries. Increasing in female labor force participation will lead to narrowing of gender gap, which is a way for GDP growing over time and higher level of productivity. Weinstein (2017) reveals that for US increasing female labor force participation rate by 10% leads to a 5% increase in a median real wage for both men and women, likely due to increasing in overall productivity. While increase by the same 10% in male labor force participation rate is associated with 3% decrease in median real wages, mainly because of the shift of labor supply curve.

Child care policies have been in fact recognized as one of the most significant and effective policies to support the labor market participation decision of mothers as well as to reduce inequality among children from different backgrounds (Del Boca 2015). The impact of different types of childcare has not been studied in Ukraine yet. That's why, the main goal of this work is to show how different types of child care influence on mothers' labor supply in Ukraine.

Gender division of labor and women's disproportionate burden of unpaid labor as a caregiver are a systematic source of gender inequalities in the market

economy, including the gender employment gap, gender wage gap, vertical and horizontal gender segregation, women's lack of representation in politics and other social spheres, and the newest – gender gap in time use. A lot of researches have revealed that the lack of high-quality, accessible childcare services places significant constraints on female labor supply, and is among the key factors that weaken women's labor market attachment. The design of child care policies to increase the availability and reduce the costs of child care are crucial parts of the strategy of Europe 2020.

In Ukraine the problem of women participation in labor force is an essential issue. State Statistics Service (2017) reports about a substantial difference in labor force participation among men and women. In 2016 there were 31% economically inactive women and 9.4% of men at the age of 25-35 years – a childbearing age for women. According to the report the main reason for not participating in labor force for women 25-34 years old in Ukraine is family care (almost 90%), while for men of the same age family care is a reason for economic inactivity just in 30%. Such a shift in the unpaid family care work doesn't seem to be only the case of Ukraine. Stone (2004) showed that in US husbands were a key factor in two-thirds of women's decisions to quit the workforce, and the reason for this was that women had to fill a so-called parenting vacuum. Meanwhile, a recent analysis of European Institute for Gender Equality (2017) shows that a shift to a more equal distribution of unpaid care work is one of the main preconditions for realizing gender equality and will lead to an increase in fertility rates in the future. Over past decades lots of western countries have experienced the decline in fertility rates combined with the increase in female labor market participation. Nowadays the situation has changed, and many OECD countries show a positive correlation between birth rate and female employment – higher rates of female employment go together with the high birth rate.

Chevalier (2002) examines the causality between female labor force participation and the supply of childcare. The paper shows that a lack of childcare facilities would limit the participation of women in the labor force. So, we can conclude that the main task of the government for the country prosperity is to make women participate in labor force without choosing between work and family. The only one way to do it is to provide conditions for developing different types of childcare, which allow women to join labor force. All types of childcare services can be divided in 3 main groups:

- public childcare (kindergartens). In European Union a plan (Barcelona Targets) of accessing to public childcare are 33% till 3 years old and 90% from 3 till school age (European Commission, 2013). In Ukraine according to State Statistics Service the participation rate of preschool age children is only 55% of all children and occupancy in the kindergarten is 118 children for 100 places. The occupancy of kindergartens is lower in rural area where there can be less than 100 children for 100 places, but in a big cities occupancy can reach a number of 170 children for 100 places;

- informal childcare service - availability of grandparents to take care of grandchildren. A pension reform that push up the age of retirement and is not coupled with sufficient investment in public child care may further increase the already wide intergenerational and gender gaps in employment by reducing the employment of young women relative not only to older women but also to young men, who traditionally bear less of the child care burden;

- private childcare services – babysitters or private kindergartens. In Ukraine this type of childcare services is too expensive and in lot of regions it is even doesn't exist. So, for these reasons it is unavailable for most Ukrainian families.

The aim of this study is to explore the impact on mothers' labor supply of two most frequently used in Ukraine types of childcare – public and informal childcare services. In line with the literature we expect to see a positive effect of grandparents being on retirement and living in the same household on mother's labor supply – if there is a someone a woman can leave her child under 6 years old with, she will be more likely to join the labor force and work more hours. The positive effect is also expected from the availability of kindergartens nearby.

The remainder of the thesis is organized as follows. The second chapter gives a literature review on a different aspect of the impact of childcare services on mother's labor supply. The third chapter discusses the methodology. The fourth chapter provides description of the data. In the fifth chapter empirical results are presented. Chapter six concludes with a summary of the main findings and policy recommendations.

Chapter 2

LITERATURE REVIEW

The theme of the effect of child care services on maternal labor supply is widely presented in literature. There are general papers that analyze different types of child care on maternal availability to join labor force. The earliest papers dedicated to the time allocation of women between labor force participation and unpaid house work (Becker, 1965) argue that traditional gender division of labor (in which women are economically inactive and engaged in family duties) is more effective because of lower opportunity costs for women and their biological advantage in childcare. However, over the last decades economists have moved from this model to those, which take into account risks of divorce and premature death and come to a conclusion of economic benefits for women to be in the labor force.

The great impact for the development of the topic of childcare on mother's labor supply was made by Del Boca (2015). She analyzes 3 types of child care in developed countries: North Europe (childcare universal, highly subsidies), South Europe (mostly public but have low availability) and the UK, the US, Canada (Private, subsidized only for to low-income families). The comparison of the data and empirical results in the paper confirms that an universal, high quality child care (as in Northern Europe) seems to be the best policy aimed at reducing poverty and increasing mothers' labor market participation.

Kimmel and Kniesner (1998) show that due to having a higher fixed cost of employment (for a woman with child it will be the cost of childcare –

kindergarten) wage elasticity will be decreasing. So, a person will not probably work in a low-paid job.

Lovasz (2016) explores influence of childcare on female labor supply in post-socialist countries. Her research demonstrated that 'badly designed leave systems, the lack of flexible work forms, and unsupportive cultural attitudes may all constrain the effectiveness of childcare expansion in expanding maternal employment'. The first step in improving the situation must be reform encouraging fathers to share the duties of childcare and to make parental leave shorter but better paid.

The most papers are focused on some particular type of childcare and its effect in a precise country. As this thesis is going to estimate the effect of both public child care and grandparents' childcare, the literature review can be divided in two parts.

The impact of public childcare availability is highly variable from country to country. The first papers on this topic support the existence of the childcare effect (Connelly, 1992; Del Boca, 2002; Kimmel, 1992; Lokshin, 2004), while others find little or no significant impact (Chevalier and Viitanen, 2005).

Recent studies focus on the latest policy changes and related to this exogenous variation in childcare availability. Some find a significant positive impact (Baker et al., 2008; Bauernschuster et al., 2015), while others find no effect (Cascio, 2009).

Gelbach (2002) shows that in US public schooling has a significant effect on labor-market outcome among women, whose youngest child is 5. But there is no such effect for 3 or 4 years old children. In Spain the introduction of universal day care for 3-years old has substantial effects on employment (an 8% increase) and working hours (a 9% increase) of mothers, whose youngest child is 3 years old (Nollenberger, 2011). Cross-country comparisons also suggest that subsidized

childcare availability under the child's age of 3 is strongly correlated with maternal labor supply (Boeckmann et al., 2014).

A recent study of Lovasz et al. (2017) shows a cross-country analysis of quasi-experimental estimates from 7 countries (Austria, Czech Republic, France, Greece, Hungary, Italy, Slovakia) and comes to conclusion about CEE countries that may describe a situation in Ukraine too. He finds out that CEE countries generally have very low maternal participation rates below age 3 of children, but relatively high rates at older child ages. CEE countries provide rather long leaves to mothers (parents), with job protection and high amounts of cash benefits even at child's age of 3 years old. Family policies therefore, clearly encourage mothers to stay home until around this age. The low availability of part-time jobs is also not conducive to mothers' earlier return to work, and the informal childcare plays a relatively important role due to the presence of a large inactive elderly population.

According to the literature dedicated to grandparent's impact on mother's labor supply a lot of papers find a strong link between grandparental childcare and mother's labor force participation. The OECD defines such type of childcare as informal childcare and estimated that in 2014 about one of four children between zero and five years of age in OECD countries were recipients of informal childcare arrangements during a typical week (Zanella, 2017). But there is a different impact from different relatives.

Bratti et al. (2017) show that those women, whose own mothers are retirement eligible, have a 11 percent higher probability of being in the labor force than those, whose mothers are ineligible. The pension eligibility of maternal grandfathers and paternal grandparents, however, has no significant effect on the women's labor force participation.

It is not a common thought that there is only positive effect of grandparents' availability for a childcare. Recent works has shown that such a comfortable condition makes women less job mobile (because they want to live not far from parents) and decrease their level of wages (Garcıa-Mor´an, 2016).

There are insufficient number of economic papers about the impact of child care services on female labor force participation in Ukraine. In general, motherhood has a negative impact on female wages. According to the study of Nizalova et al. (2013) the wage penalty is approximately 6.5% per one child and 13.2% for two or more children.

Galustyan (2017) finds out that the major barrier for women with small children to join labor force is the lack of public child care facilities and their inflexible hours of work – kindergartens usually work till 5am, while in almost all full-time positions working day finishes at 6 am. The problem of the lack of distance work and work with flexible hours are named second.

In my thesis I intend to combine different approaches and ways of estimating two main types of childcare – public and informal - to figure out which one has the most impact on mother's labor supply in Ukraine.

Chapter 3

METHODOLOGY

There are different approaches to estimate the effect of different types of childcare on mother's labor supply. Connelly (1992) suggested the conceptual framework of estimating that summarize all identification issues. The main idea is in mother's decision about participating in labor force which is modeled as the outcome of maximizing her utility. Mother's utility function is defined as $U=(X_m, Q, t_L)$, where X_m is goods consumption, Q is a measure of child quality, and t_L is leisure time with the subject to the budget, mother's time and child's time constraints. So, we have such problem:

$$max\ U = U(X_m, Q, t_L)$$

subject to

– a child-quality production function: $Q = Q(t_Q, t_{CC}q, N, A)$, where t_Q and t_{CC} are time that child spent with mother or in external childcare, respectively, while q is the average quality of the external (formal or informal) child care available to the mother, which is assumed to be exogenous. The quality of maternal child care is normalized to one, and we assume that $Q_1, Q_2 > 0$ and $Q_{11}, Q_{22} < 0$. N is the number of children in the family and A is an age structure of the children;

– the budget constraint $t_m*W + V = X_m + P_{CC}*t_{CC}$, where t_m is the time the mother works in the market, W is her wage, V is her nonlabor income, and P_{cc} is the price of external child care;

– the mother's time constraint: $t_m + t_Q + t_L = 1$;

– the child's time constraint: $t_Q + t_{CC} = 1$.

And first order condition of this maximizing problem gives us:

$$U_L/U_X = W = (U_Q/U_X)(Q_1 - Q_2q^*) + P_{CC}^*$$

From this equation we can get:

$$W - P_{CC}^* = (U_Q/U_X)(Q_1 - Q_2q^*)$$

which indicates that at optimum, the difference between mother's market wage and the price of external child care, which can be identified as mother's cost for devoting one additional hour to child care must be equal to the net benefit in terms of the child care quality provided, which depends in turn on the productivity differential between maternal and external child. This brings us to the idea that while having available a free grandparent childcare has a big impact on mother's choice of join a job market. And it has several effects in our equation – decrease the price of external child care and so increasing the cost of spending time with a child, and if grandparent's childcare is considered by mother like that having a higher quality than formal external, it also reduces benefits of maternal child care. So, this reason brings us to the idea that while having grandparents that can take care of a child, mothers may lower the time spent with children and increase working hours.

For estimating availability of grandparents, we use the method suggested by Bratti et al. (2017). The authors take into account all parents and in-laws depending on their retirement status in order to measure their availability for spending time with their grandchildren. Therefore, we check relationship between the mothers' labor supply and their parents' and in-laws' potential availability for child care, rather than directly relating women's employment to grandparental child care. Besides, we also estimate the impact of kindergartens on mothers' labor supply.

The main probit model for estimation the impact of two different types of childcare – formal and informal - on mother's labor supply. has the following form:

$$Y_i = \beta_0 + \beta_1 * GP_i + \beta_2 *KG_i + \beta_3 *KGP_i + \beta_4 *Kids\_15_i + \beta_5 *Age_i +$$
$$+ \beta_6 *Married_i + \beta_7 *Income_i + \beta_8 *Education_i + \beta_9 *Settlement +$$
$$+ \beta_{10} *Region_i + u_i \qquad (1)$$

where Y – probability of women's employment.

- *GP* – is a categorial variable to measure the availability of grandparents (both mothers' parents and in-laws) in the household. It has value 1 if grandparents do not live in the same household with the mother of a child (reference group); a value of 2 if grandmother lives in the same household, both with or without grandfather; and a value of 3 if only grandfather live in the same household. The division between grandmothers and grandfathers is done to capture different effects of older household members on mothers' labor supply which stem from different roles of women and men in taking care of children, on the one hand, and from a greater need to take additional care of older men, on the other hand. Bratti et al. (2017) found that only grandmothers have significant impact on mothers' labor supply, while grandfathers don't have significant influence on it.

- *KG* and *KGP* are two variables to measure the kindergarten's availability and costs. Namely, *KG* is a measure of availability of kindergartens, proxied in our study with the average child care coverage in the area where a household lives.

KGP measures households' expenses on kindergartens, school classes, interest circles, sections etc.

- *Kids_15* is the number of kids under 15 years old.

- *Age* is the age of mother.

- *Married* is a dummy variable that indicates whether a woman lives with the husband or partner.

- *Income* is the equivalized household income. One of the most common ways of calculating the equivalized income (OECD, 2010) is a square root scale that divides household income by the square root of the household size. In order to minimize the endogeneity issue, we deduct woman's individual income from total household income.

- *Education* is a categorical variable that has a primary education and below as a reference category, and three other categories for secondary, incomplete tertiary and tertiary education of mothers, respectively.

- *Settlement* is a categorical variable measuring the type of settlement where a household lives: villages or a small urban settlement is the reference category, towns with up to 100,000 of residents and cities with more than 100,000 of residents, are the other two categories.

- *Region* indicates the macroregion of Ukraine where a household lives, including Kyiv city (the reference category), West, East, South, North and Center.

Probit model is a non-linear model with standard normal distribution and to determine the effects on the response probability Pr $(y = 1|x)$ resulting from a change in one of the explanatory variables we evaluate marginal effects. As in the

data we have a lot of mothers who is not working, to provide a consistent estimation, we will use Tobit model, that will add information about hours of work.

The independent variables will remain the same as in (1), but dependent variable will indicate the hours of employment during the last week. As in the sample we have women that don't work, and so their hours of work will be zero, our data is left censored, indicating if woman is not employed, and observations are defined in the following way:

$$Y = \begin{cases} Y^* \text{ if } Y^* > 0 \\ 0 \text{ if } Y^* = 0 \end{cases} \qquad (2)$$

The Tobit model uses all information including censored to provide a consistent information. As well as the Probit model, it is nonlinear and is estimated using maximum likelihood estimation techniques.

So, in this chapter we have provided methodology that will be used in our estimations, the next chapter provides a description of the data which will be used to explore the effect of different types of childcare on mother's labor supply.

Chapter 4

DATA DESCRIPTION

To examine the impact of different types of childcare on mother's labor supply we use the data from the Ukrainian Longitudinal Monitoring Survey - 2012 and the State Statistics Service Report (2013). The ULMS is a representative longitudinal household survey that provides information about households and their members (individual survey) on a wide range of socioeconomic and demographic characteristics. The ULMS was conducted in 3 waves from 2003 till 2012. In this work we used the last one – from 2012.

As our study is focused on the analysis of mothers' labor supply, the main sample covers only households with at least one child under 6 years old. In general, ULMS - 2012 consists of 3142 households, and there are 581 households with 752 children under 6 years old. Figure 1 shows the majority of these households (429 households or 57 %) have only one child under 6 years old. About a quarter of the households in our sample (135 households or 23%) have two children under 6 years old.

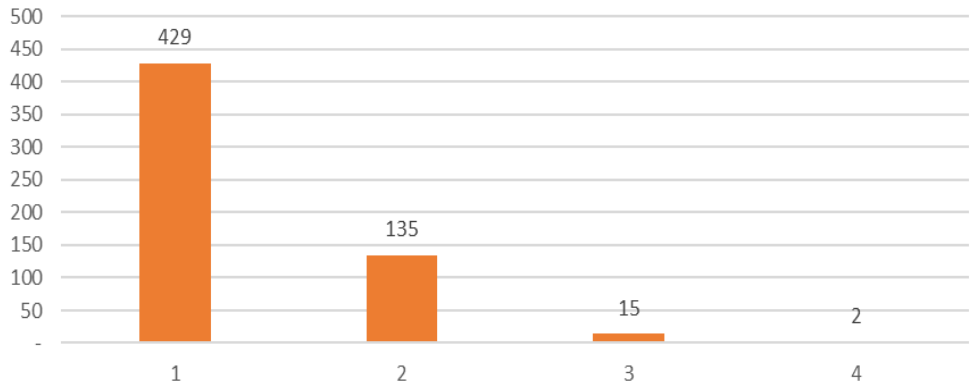

Figure 1. Households by number of children under 6 y.o. Source: ULMS-2012

For estimating the impact of grandparents and their availability we use the description of households. It is important to notice that the following information is for the households, where at least one child under 6 years old lives. Figure 2 depicts the number of members in one household. The range is from 2 (child lives with mother only) to 11 members. Most households consist of 4 members (164 households). The situation when there are only 2 members (only mother and child under 6 years old) is very rare – in our sample there are only 5 such households.

Figure 2. Number of members in one household. Source: ULMS-2012

All findings about the age and employment of the household members by gender are in Table 1. In the sample, which includes a household with a child under 6 years old the number of women is 200 more than men. It can be explained by several reasons: higher life expectancy for women, the fact that there are more single mothers than single fathers and that men at young age are much more likely to go to study or live out of parent's house in compared with women. This sample shows the employment gap between men and women. Among women only every third is employed. The main reason for not being in a labor force is doing the housework (including childcare) – almost every second women. Men are not so opened in their response to the question of the possible reasons for unemployment (less than half gave the answer). The main reason for a man to be unemployed is retirement.

Table 1. Description of members of households with children under 6 y.o.

	Female	**Male**
Age 15+	1005	805
15-24	180	114
25-59	712	616
60+	113	75
Employed	312	453
Not employed	693	352
Reasons:	646	129
retired	23%	66%
housework	45%	7%
not working /planning to work	9%	27%
student	22%	0%
ill, disability	1%	0%

Source: ULMS-2012

In the data there are 632 women, who have at least one child under 6 years old. Table 2 gives a description of them. Most mothers are between 23 and 30 years old (53%). Almost all of them have a partner and 76% are in a registered marriage. By the category 'work' we count women working for at least an hour for a wage or salary in cash or in kind during the last week for someone, who is not a member of her household, or for profit or family gain in a business enterprise belonging to someone in the household, or if a woman has some permanent work but was temporary off job. According to the data less than 50% of mothers work and from those, who do almost 60% have a 40-hours working week. At least one grandparent (mothers parents or in-laws) live in 40% of households, where a woman with a child under 6 years old live. Almost half of the households in our sample live in the rural area (47%).

Table 2. Description of the sample of mothers with a child under 6 y.o.

Variable	Value, %
Age:	
<23	11%
23-30	53%
31-40	32%
41+	4%
Have a partner	81 %
Work	47 %
<40 hours	9%
40 hours	28%
>40 hours	10%
Have more than 1 child under 6 y.o.	16%
Have more than 1 child under 15 y.o.	43%
Grandparents live in the same household	40%
1	19,8%
2	19,6%
3	0,2%
4	0,4%
Settlement	
Village	47%
Town (<99th.)	17%
City (>100th.)	36%
Kindergarten availability:	
<100 children on 100 places	35%
>100 children on 100 places	65%

Source: ULMS-2012, State Statistic Service Report (2013)

Other important dimension is the availability of places in kindergartens. The variable of availability of kindergartens is taken from the State Statistics Service Report (2013) considering the occupancy of public child care services in town with the population over 100,000 people and for rural areas in oblast. According to these data only 35% of mothers live in an area, where there are less than 100 children for 100 places in kindergarten. In several regions this number is even more than 150 children for 100 places. Such a complicated situation with overcrowded kindergarten is more typical for big cities. For example, in Ternopil there are 173 children for 100 places in kindergarten.

The next chapter provides the empirical results of the models that estimate the effect of different types of childcare on mother's labor supply.

Chapter 5

EMPIRICAL RESULTS

Our main model is the probit model (1) that shows how strong different variables influence on the availability for mother to work.

To make robustness check we are going to examine different specifications (with different controls) and in addition run the regression with all women in our data, who are under 55 years old. Such a restriction is made because of the general age of pension eligibility for women in 2012 was 55 years old.

The results of the probit model with marginal effects that show the availability of women to join labor force are provided in Table 3. We have four specifications:

- Specification 1 is a base model. It includes mothers with child under 6 years old Independent variables of this specification are Number of kids under 15 years old; Age; Married status; Income; Education; Settlement and Region of Ukraine. So, we include all variables except the variables of our main interest – that estimates the impact of grandparents and kindergartens.

- Specification 2 - to the independent variables that are included in Specification 1 we add the variables of our key interest – Grandparents on retirement, Kindergarten availability and Payment for kindergarten.

- Specification 3 – this specification will show the influence of all grandparents living in the same household not only those who are on retirement. Other independent variables remain the same as in Specification 2.

Table 3. Probit model results with marginal effects

	Females with child under 6 y.o. (1)	Females with child under 6 y.o. (2)	Females with child under 6 y.o. (3)	Females under 55 y.o. (4)
Grandparents on retirement ref. No grandparents				
Grandmother		0.0955 [0.0803]		0.0607 * [0.0287]
Grandfather only		- 0.2364 * [0.1098]		- 0.1123 [0.0645]
Grandparents ref. No grandparents				
Grandmother			0.0915 * [0.0424]	
Grandfather only			- 0.0341 [0.1232]	
Kindergarten		- 0.0115 [0.0484]	- 0.0223 [0.0484]	- 0.0183 [0.0149]
Payment for kindergarten		0.0290 *** [0.0075]	0.0294 *** [0.0075]	0.0149 ** [0.0048]
Number of kids under 15 y.o.	- 0.0517 * [0.0147]	- 0.0761 ** [0.0276]	- 0.0751 ** [0.0278]	- 0.0215 [0.0130]
Age	0.0169 *** [0.0035]	0.0147 *** [0.0035]	0.0164 *** [0.0035]	0.0077 *** [0.0008]
Married	0.0593 [0.0489]	0.0621 [0.0482]	0.1019 [0.0532]	0.0326 [0.0203]
Income	- 0.0536 *** [0.0146]	- 0.0568 *** [0.0145]	- 0.0584 *** [0.0146]	- 0.0463 *** [0.0069]
Education ref. Primary				
Secondary	- 0.0517 [0.0940]	- 0.0531 [0.0938]	- 0.0675 [0.0951]	0.1836*** [0.0359]
Incomplete tertiary	0.1230 [0.0999]	0.1049 [0.0996]	0.0855 [0.1009]	0.2969 *** [0.0393]
Tertiary	0.1909 [0.0985]	0.1801 [0.0982]	0.1544 [0.0998]	0.4430*** [0.0368]
Settlement ref. Village				
Town (up to 100th)	0.0548 [0.0528]	0.0503 [0.0554]	0.0626 [0.0561]	0.0613 * [0.0284]
City	0.0643 [0.0474]	0.0542 [0.0574]	0.0592 [0.0577]	0.0716 ** [0.0268]
Region of Ukraine ref. Kyiv city				
West	- 0.0215 [0.1019]	0.0138 [0.0970]	0.0167 [0.0967]	- 0.1010 * [0.0493]
East	0.1297 [0.0749]	0.1587 [0.0957]	0.1669 [0.0953]	- 0.0243 [0.0467]

Table 3 - Continued

	Females with child under 6 y.o. (1)	Females with child under 6 y.o. (2)	Females with child under 6 y.o. (3)	Females under 55 y.o. (4)
South	0.0749 [0.1023]	0.0919 [0.0972]	0.1013 [0.0966]	- 0.0333 [0.0479]
North	0.1032 [0.1151]	0.1486 [0.1125]	0.1440 [0.1110]	- 0.0230 [0.0527]
Central	0.0659 [0.1027]	0.1125 [0.0981]	0.1164 [0.0973]	- 0.0755 [0.0489]
Pseudo R^2	0.1109	0.1319	0.1319	0.1241
Number of observations	632	632	632	2747

Notes: Standard errors in parentheses. * if p-value < 0.05, ** if p-value < 0.01, *** p < 0.001.

- Specification 4 – is a control group. The sample of this estimation includes all women of working age (up to 55 years old). Independent variables are the same as in the Specification 2.

The variables of our primary interest are grandparents and kindergarten. Results of the estimation of Specification 2 show that the Grandparent on retirement variable is insignificant for households where grandmothers live but is marginally significant and has a negative effect in households where only grandfathers live. The likelihood to work for young mothers, who live in the same household with only grandfathers, who are on retirement is decreasing by 0.24. Checking variable Grandparents in Specification 3 gives us reverse effect – it is insignificant for household where only grandfathers live but is marginally significant and has positive effect in households where grandmothers live ($p<0.01$). So, a positive effect of grandparents on mothers' probability of employment has grandmothers, who are not restricted by retirement eligibility. Living with grandmothers in this case have a small (0.09) positive effect. This can be explained by the fact that when young mother lives only with grandfathers, who are on retirement, she has

to take care not only after her child, but also after grandfathers, who live in the same household. In Ukraine disability-adjusted life expectancy for men is low – 55 years old, so it is even less than the age of retirement eligibility – 60 years old (Lekhan et al., 2015). For women in Ukraine disability-adjusted life expectancy is 64 years and retirement eligibility age is 55 years old. So, when there is a grandmother living in a household, she may not be helpful to a young mother with her child, but she may well take care about grandfathers, so the effect is not negative.

Availability of kindergartens are insignificant in all specifications, but expenses for kindergarten and other additional children classes have a strong significant positive effect ($p<0.001$) in all four specifications. This leads to the conclusion that in our sample and available data of kindergarten occupancy, overoccupied kindergartens has no effect on mother's likelihood to be in labor force – if a family can afford payments their child can be taken in a kindergarten without consideration of availability of places there. But this result is only about our not very big sample. Also, the availability of kindergartens was taken on the rayon level which maybe not enough detailed, as in our sample 47% of households with a child under 6 years old live in a rural area.

In all specifications the number of kids under 15 years old decreases the likelihood of mother's employment – this variable is statistically significant and has a negative impact for every additional child.

The variable age of women has expected a very strong effect on mother's labor supply. Each additional year increases likelihood of women to join labor force. In all specifications married status of women is not significant, so it doesn't effect on the likelihood of mother's employment.

All specifications show that the income coefficient has a strong significant impact on mother's labor supply ($p<0.001$). It has a negative sign – it means that with increasing the income of the household, the probability of women employment declines. As in this work for a proper estimation we consider a household income as the total household income excluding the woman's individual income. This finding of income variable negatively influences on the likelihood of mothers' employment and suggests that women in Ukraine should be more interested not in joining labor force and taking care of her family if a household income is high enough for her to afford it.

Education variable is the one that was supposed to be significant. Muench (2009) estimated female labor force participation in 23 EU countries over the period of 1995-2008 and found out that tertiary education has a strong significant and positive effect on participation rates in all age-groups. Our estimations for Specifications 1-3 show that for women with at least one child under 6 years old education is insignificant – any level of education has no effect on mother's probability of employment. In control group education has a strong significance with a positive effect – the higher is the level of education the higher is the likelihood of women to join labor force. This suggests that opportunity cost be lower for young mothers. One of the reasons may be the age of mothers – 64% of females in our sample are under 30 years old, so they have some lack of experience to have a highly-paid job even if they have tertiary education.

The type of settlement, where women, live has a significant effect only in the control group. Such a result is quite predictable – in big cities there are usually more job offers. For young mothers with child under 6 years old even opportunities, which are provided by big cities, have no effect on the probability of employment, that's why in Specifications 1-3 the type of settlement is not significant.

The Region of Ukraine has no significant effect on the probability of employment of women with a child under 6 years old. Only in Specification 4, where all women under 55 years old are in the sample, for those who live in the West Ukraine region there is a weak evidence of decreasing women's likelihood to work.

To estimate hours that young mothers can dedicate to work we also use the Tobit model, which will add information about hours of work. The results of the Tobit model for the same four types of specifications that was used in estimating the Probit model are provided in Table 4.

The results are pretty the same as in the Probit model – the same significance of variables and signs. The Grandparent variable in Specification 2 indicates that in the household, where a grandfather in retirement lives, a woman is likely to work more than 30 hours less. A positive effect of grandparents on mothers' probability of employment has grandmothers, who are not restricted by retirement eligibility (Specification 3). Living with grandmothers in this case increases working hours of a mother with a child under 6 years old by 8 hours.

A positive effect has expenses for kindergarten, which brings more than two hours of work for a woman with children under 6 years old, and slightly smaller, but still statistically significant effect on the control group.

Table 4. Tobit model results with marginal effects

	Females with child under 6 y.o. (1)	Females with child under 6 y.o. (2)	Females with child under 6 y.o. (3)	Females under 55 y.o. (4)
Grandparents on retirement ref. No grandparents				
Grandmother		7.924 [6.702]		3.157 [2.390]
Grandfather only		- 32.100 * [15.192]		- 8.379 [5.471]
Grandparents ref. No grandparents				
Grandmother			8.368 * [3.868]	
Grandfather only			- 7.001 [11.316]	
Kindergarten		1.224 [4.475]	0.469 [4.500]	0.122 [1.938]
Payment for kindergarten		2.560 *** [0.696]	2.616 *** [0.699]	1.111 ** [0.376]
Number of kids under 15 y.o.	- 6.775 * [2.688]	- 8.063 ** [2.683]	- 7.995 ** [2.687]	- 2.760* [1.082]
Age	1.542 *** [0.317]	1.362 *** [0.317]	1.500 *** [0.317]	0.622 *** [0.069]
Married	6.235 [4.486]	6.833 [4.434]	10.341 * [4.821]	4.594 ** [1.601]
Income	- 5.915 *** [1.373]	- 6.285 *** [1.368]	- 6.455 *** [1.374]	- 3.928 *** [0.532]
Education ref. Primary				
Secondary	-2.522 [9.161]	- 2.363 [9.058]	- 3.695 [9.093]	17.960*** [3.333]
Incomplete tertiary	13.103 [9.457]	11.885 [9.344]	10.169 [9.337]	25.395*** [3.498]
Tertiary	15.166 [9.366]	14.395 [9.264]	12.065 [9.337]	32.467*** [3.435]
Settlement ref. Village				
Town (up to 100th)	5.894 [4.890]	4.656 [5.139]	5.646 [5.181]	5.959 ** [2.286]
City	5.489 [4.152]	3.046 [5.137]	3.412 [5.158]	6.916 *** [2.082]
Region of Ukraine ref. Kyiv city				
West	- 8.561 [9.231]	-6.168 [9.242]	-5.938 [9.238]	- 8.044 * [3.874]
East	3.467 [8.842]	6.210 [8.836]	7.195 [8.833]	-1.999 [3.638]

Table 4 - Continued

	Females with child under 6 y.o. (1)	Females with child under 6 y.o. (2)	Females with child under 6 y.o. (3)	Females under 55 y.o. (4)
South	3.481 [9.105]	4.885 [9.027]	5.690 [9.024]	0.144 [3.753]
North	1.965 [10.236]	6.424 [10.166]	5.859 [10.159]	-3.277 [4.171]
Central	3.133 [9.166]	7.291 [9.170]	7.894 [9.164]	-5.001 [3.840]
Number of observations	632	632	632	2747

Notes: Standard errors in parentheses. * if p-value < 0.05, ** if p-value < 0.01, *** p < 0.001.

The number of kids under 15 years old has a negative effect on mothers' hours of work in all Specifications. Every kid decreases mothers' hours of work by more than 6 hours for mothers with a child under 6 years old and by almost 3 hours in the control group. The age variable has a marginally significant positive effect. Each additional year increases working hours for women.

The biggest negative impact in all estimations has income – the more is the household income without a woman personal income the less likely the woman will work more hours.

In the results of the Tobit model the Married variable has a positive significant effect. In the Specification 4 married women or those who live with a partner tend to work 4,5 hours longer.

Education is insignificant as well as in the probit model for females with a child under 6 years old, but is strongly significant in the control group where we estimate the sample with all women under 55 years old. The next level of education brings more working hours. Women, who have secondary education,

work on average 18 hours longer than those who have only primary education; women with incomplete tertiary education work 25 hours more; and women with tertiary level of education work on average 32 hours longer than women with primary education.

The type of settlement has a significant effect only in the control group. Living in a bigger settlement increases working hours of female under 55 years old. The same as in the probit model the Region of Ukraine has no effect, except a marginally significant negative effect in the West region for the sample of all women under 55 years old.

Chapter 6

CONCLUSIONS

The availability of women to join labor force without choosing between work and family is among the main tasks for the counties development. This can be achieved by implementing and developing different types of childcare.

There is a strong theoretical evidence of significance of public child care (kindergarten) and informal child care (availability of grandparents to take care of children) on mother's labor supply. This research estimates the effect of these types of childcare on the probability of a mother with a child under 6 years old to join labor force, using Ukrainian Longitudinal Monitoring Survey 2012.

The results for Ukraine are figured to be different from those that were predicted by the literature – grandparents in retirement tend to have more negative effect. The likelihood to work for young mothers, who live in the same household with only grandfathers on retirement, is decreasing by 0.24. A positive effect of grandparents on mothers' probability of employment has grandmothers, who are not restricted by retirement eligibility. Living with grandmothers in this case have a small positive effect on mother's labor supply.

The estimation results indicate that availability of kindergartens nearby has no effect. The only one thing that really matters is the amount of payment that family can provide for attending kindergartens – the bigger it is the more is the likelihood of a mother to join labor market, even if the kindergarten is overcrowded.

The household income is very important in mothers' decision to join labor force. If a family income is high enough females with young children tend to spend their time taking care of children and housework rather than in labor force participation. And variables that are usually important in labor force estimation – such as education and settlement – are insignificant.

In order to increase mothers' labor supply in Ukraine it is not enough only to improve availability of childcare services. According to obtained results a lot of attention need to be dedicated to the impact of care services to older members of households on female labor supply. To make grandparents really helpful to young mothers in taking care of grandchildren, healthcare system of Ukraine must be improved.

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