THE EFFECTS OF GRANDPARENTAL CHILDCARE ON MOTHERS' LABOR FORCE PARTICIPATION IN GERMANY

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Abstract

In this thesis I estimate the effects of childcare provision from maternal grandmothers on mothers' labor market decisions. I use an instrumental variables approach on the data from the first and second waves of the Generations and Gender Survey, taking advantage of the exogenous variation in the grandmothers availability. Multiple instruments are included in the first stage equation: a proximity dummy to the mother, pension eligibility, and the number of sisters alive. I find that help from the maternal grandmother has significant effects on the extensive margin, but not on the intensive one. It increases the participation of mothers on the labor market by 31 percentage points, and the probability of working of those who are already on the labor market by 54 percentage points.

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1 Introduction

An important goal of the Europe 2020 Strategy is to reach an employment rate of 75% in the 20-64 age group (Vuri, 2016). Pignatti (2016) also urges changes to incorporate females better in the labor market as labor force already decreases due to declining fertility rates and ageing societies. However, according to Vuri (2016) reaching this goal will hardly work without improving the labor force participation of mothers. She argues that a good way to approach this problem would be to increase the "accessibility, affordability, and quality" of the formal childcare facilities (p. 1), especially for mothers with a small child. However, she points out, by summing up several studies conducted in different countries, that these improvements were not always that effective. Both Givord and Marbot (2015) and Bettendorf and his co-authors (2015 as cited in Vuri, 2016) believe that the lack of big increases can be explained by mainly a shift from informal childcare to formal on the part of mothers who are already working, instead of inactive mothers joining the labor force. Altogether, it seems like extensive research was done on the effects of formal childcare on maternal labor supply (Lovász & Szabó-Morvai, 2019), but there are less studies focusing on how informal childcare, especially grandparental childcare can have a causal effect on it (Posadas & Vidal-Fernandez, 2013).

In today's changing societies researching how grandparental childcare affects mothers' labor force participation is an interesting question for several reasons. Firstly, we might experience a transformation in the way grandparental childcare is used resulting from the increasing number of people moving far away or migrating abroad (Mulder, 2007 as cited in Isengard, 2013), and in general due to the increased mobility of some social groups (Isengard, 2013), which affects the strength of family ties as well (Hank, 2007). Unlike financial help, caregiving would require the grandparents to live in close proximity to their grandchildren (Isengard, 2013). Secondly, European countries in general experienced an ageing population and will continue to do so (United Nations, 2015). Even amongst these countries, Germany stands out

with its extremely high percentage of population over 60: it had the third highest rate both in 2000 and 2015 with 23.1% and 27.6% respectively, and it is expected to have an even higher rate of 36.1% in 2030 (United Nations, 2015 as cited in United Nations, 2015, p.29). To offset the problem of the declining working age population and thus to increase tax revenues rising retirement ages are introduced (Posadas & Vidal-Fernandez, 2013), which might hold grandparents back from childcare provision (Arpino, Pronzato & Tavares, 2014).

In this thesis I estimate the effect of grandparental childcare on mothers' labor market decisions in Germany. I show that childcare provision from the maternal grandmother significantly increases the mother's probability of entering the labor force and finding a job, but has no significant effect on the extensive margin, that is to work fulltime instead of part-time. Also, due to differences in institutional and socio-cultural factors I find that mothers from East Germany are more likely to actively participate in the labor market, and that grandparental childcare is more important there. If a significant trade-off really exists between working grandparents and working mothers, policies aiming to increase retirement age might be reconsidered, because they not necessarily increase the active population, but might cause the younger and thus probably more productive women to exit the market (Posadas & Vidal-Fernandez, 2013). Moreover, if mothers fall out of the labor market completely, or they are just not able to work to their full potential, it might have long term effects on their willingness and potential to return. Kelle, Simonson and Gordo (2017) for instance shows by using Cox regressions on German data that mothers who are likely to have given birth after the reunification in 1990, are more likely to transition into part-time jobs than the mothers born before them were. However, they find that the chances of East German mothers to then transit to fulltime jobs have decreased. Moreover, staying out of the labor market after giving birth can affect their pension and saving as well later (Meyer & Parker, 2011).

The rest of this paper proceeds in the following way. In chapter 2 I give an overview of the relevant institutional settings and socio-cultural factors related to mothers' labor force participation and differences between East and West Germany. Then in chapter 3, in the literature review section, I explain why it is difficult to estimate the effects of grandparental childcare, what are the methods researchers used in previous studies to overcome these problems, and I also summarize their findings. In chapter 4 I provide a quick description of the data from the Generations and Gender survey I use, followed by the methodology section, chapter 5, dedicated to the identification strategy using instrumental variables approach. Then, in chapter 6 after some basic descriptive statistics I explain the results of the IV estimations both on the extensive and intensive margin, followed by a robustness check and heterogeneity analysis. Finally, I draw on some limitations that arise from the data, and in chapter 7 I conclude.

2 Institutional Background

According to Leitner, Ostner, and Schmitt (2008) the two parts of Germany, West (FRG) and East (GDR), used to differ a lot in their institutional setting and socio-cultural factors related to working women and mothers, as well as family policy in more general. It is important to have an overview of these historical differences as well as recent trends, because path dependency can play a key part in explaining behavior on the labor market (Pfau-Effinger & Smidt, 2011). Although, after the reunification in 1990, the German family policy initially relied heavily on the heritage of the former Federal Republic of Germany in creating a 'sustainable' family policy model for all parts of Germany (Ostner, 2006 as cited in Leitner, Ostner, and Schmitt, 2008), during the 2000s they rather shifted to East German family policies (Pfau-Effinger & Smidt, 2011). However, Leitner, Ostner, and Schmitt (2008) argue that some of the historical differences still remained. In addition to this, according to Bujard (2011), there can be significant differences in implementations between different states and regions within East and West Germany.

Before unification the West was following a male breadwinner model whereas the East was following a dual earner model (Leitner, Ostner and Schmitt, 2008). Thus, to enable women to fulfill their "duties" not only as mothers but also as working women, in East Germany they were provided with an extensive childcare system. It not only included a daycare provision but significant subsidies, holiday facilities, etc. On the contrary, in West Germany mothers faced a hard time placing their children in childcare facilities, because formal childcare for children under 3 years was hardly available, and most kindergartens and schools were operating only for a half-day (Bujard, 2011).

According to Leitner, Ostner and Schmitt (calculated from statistics of Statistiches Bundesamt, 2004, p.190) in 2002 there were enormous differences between West and East Germany in terms of childcare coverage rates for children younger than 3, which were 2.7% and 37%

respectively, and full-time childcare coverage rates for the same age group were only slightly smaller. Although for the next age group, children between 3 and 6 and a half year old, the general coverage rate is very high for both parts, the fulltime rate is only 21.3% in the West, whereas it is over 100% in the East. The gap is also huge for children between 6 and a half and 12 years old, where the coverage rates are 4.5% and 40.8% respectively, whereas the fulltime coverage rates are 3.7% and 28.6%.

Realizing the inadequate level of formal childcare facilities, the government introduced several new policies targeting the extension of it beginning in 2003 (Bujard, 2011). First, opening hours of some schools were lengthened to fulltime (Bujard, 2011). Then, in 2004 the aim was to increase the places for children under 3 (Leitner, Ostner and Schmitt, 2008), and under the Daycare Expansion Act they made it more affordable for families in need (German Parliament, 2004 as cited in Schober and Stahl, 2014). As a final step, in 2008 the government promised a place for every children older than 1 year from August 1, 2013 (Bertelsmann Stifftung, 2012 as cited in Schober and Stahl, 2014).

Regarding the quality of childcare facilities using the Families in Germany Survey (2010-2011) and the German Socioeconomic Panel Study (2010-2011) Schober and Spiess (2015) show that based on structural quality data, more specifically, on child-teacher ratio, group size and teacher education West Germany performs better in the former two aspects, whereas East Germany in the latter one, in case of providing childcare for the smallest ones, children between 1 and 2. Although in case of providing for children over 3 up to school age East Germany does better in the number of children per group situation as well, they found that mothers pay less attention to these details when their children are older.

Though there might have been improvements in the availability of formal childcare, there were no initiatives considering grandparental childcare, which might decrease. Because of the ageing society in 2007 they passed a new law according to which the standard retirement age will

increase step-wise to 67 years from 65 starting in 2011 (Börsch-Supan & Jürges, 2012, p. 284), so grandparents might be less available for help.

Regarding parental leave, before reunification in East Germany mothers only received benefits for one year (Leitner, Ostner and Schmitt, 2008), whereas in West Germany parental leave was quite lengthy with its 3 years duration, however parents only received a benefit during the first two years, and only the low amount of 300 euros a month, but their jobs were secured for the whole 3 years (Kaufmann, 1995 as cited in Pfau-Effinger & Smidt, 2011). This western tradition of parental leave was basically brought to the unified Germany without major changes (Pfau-Effinger & Smidt, 2011). In 2006 the parental leave benefit was changed to be income-related with a maximum of 1800 euro a month provided only for 14 months to encourage a quicker reentry into the workforce, out of which 2 only could be taken by the father (Bujard, 2011).

It is worth noting, that as Pfau-Effinger and Smidt (2011) show, the two parts of Germany differed in the preferences of women towards parttime and fulltime jobs: mothers from Western Germany preferring the former, whereas mothers from Eastern Germany the latter. These preferences partly go back to the fact that under the socialist German regime women on the East did not really have the option not to work or only work parttime, as families would not have been able to make ends meet otherwise (Obertreis, 1986 as cited in Pfau-Effinger & Smidt, 2011). Moreover, Pfau-Effinger and Smidt find that it is strongly related to the preferences towards childcare, that is mothers from West Germany like to take care of their children themselves, and only working part-time allows them to do it at least partially. Thanks to a new law implemented in 2000, parents with a child under 9 are ensured to only work part-time (Pfau-Effinger & Smidt, 2011), thus Eastern mothers can spend more time with their children easily. The tax policy also encourages that mothers, or broadly wives stay at home or

work only part-time (Pfau-Effinger & Smidt, 2011), as tax splitting is in force for married couples (Bujard, 2011).

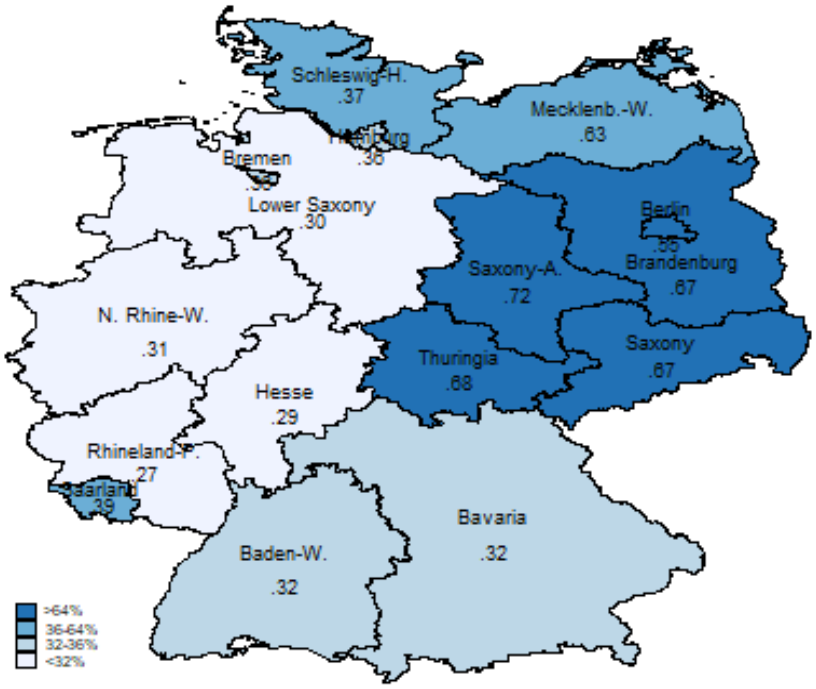

Figure 1: Map on the proportion of people disagreeing or strongly disagreeing with the statement that 'A pre-school child is likely to suffer if his/her mother works' in different states in 2005. Darker shades of blue representing a bigger proportion of those who disagree. Own editing based on data from Generations Gender Programme (2016a)

There is a clear line between certain groups of states regarding their attitude towards working women as well. In the Generations and Gender Survey they asked the respondents whether they agree with the statement that 'A pre-school child is likely to suffer if his/her mother works'. From Figure 1, we can see that in 2005 the states where the highest rate of the population disagreed with this statement, that is the ones colored with the darkest blue with over 64% of the population disagreeing, were all formerly in the East (Brandenburg, Saxony, Saxony-Anhalt, Thuringia and Berlin, although only the Eastern half of it belonged to the soviet bloc). Even Mecklenburg-West Pomerania, the last remaining state from GDR, represent a high proportion of disagreeing with its 63%.

3 Literature Review – Handling the endogeneity issues in grandparental childcare

According to Aassve, Arpino and Goisis (2012), estimating the effects of grandparental childcare is quite challenging as mothers and grandparents make their decisions simultaneously regarding whether they want to work and whether they are willing to provide childcare, thus the childcare method that they end up using is the outcome of the negotiations between them. We cannot really measure the preferences of the mothers toward working, nor the preferences of grandparents toward helping with childcare. It is possible that a grandparent values leisure time more, or the mother prefers formal childcare instead, and without controlling for these in an OLS we can underestimate the effect of grandparental help. On the other hand, overestimation can also occur if for instance the mother is highly motivated to work and the grandmother enjoys being with her grandchildren. Besides the problem of unobserved preferences, to analyze the problem we need a database that links together the three generations with special focus on the mothers, and that also includes data on childcare provision, which I found incredibly hard to find.

Arguing for the reliability of simple methods, several studies used linear probability models, logits or probits for the estimation. However, they generally find a much smaller effect this way than the papers using proper identification strategies. Relying on a simple OLS model, Bratti, Frattini and Scervini (2018, p. 1240) find that in Italy if the maternal grandmother is eligible for retirement it increases the mothers' labor force participation by 7.1 percentage points. Although running the same regression for women without children as well they cannot find that positive effect, I do not think that it is an adequate test, as eligibility for retirement can work through different channels other than help with childcare. Zamarro (2011) using a probit model also finds that grandmothers helping with childcare can increase mothers labor force participation in some countries.

To handle the endogeneity issues in this context, researchers mainly use the instrumental variables approach. Compton and Pollak (2011) find a positive effect of 4-10 percentage points (p.3) on mothers' labor force participation in the US on the subsample of married women with young children using the proximity to the grandmothers as an instrument for help from them. Even though it is a general assumption in childcare literature (Compton, 2015), I doubt that proximity can be taken as an exogenous variable. However, as an endogeneity control Compton and Pollak (2011) also restrict their sample to military wives, whose location depends only on the military, and thus proximity is exogenous. Also, as they are using the National Survey of Families and Households conducted in 1987-1988 and then in 1992-1994, and a micro-data from the census of 2000, I believe that their findings not necessarily relevant for today's situation due to possible changes in family structures and ties as well as formal childcare options. In addition, the only way they can measure proximity to the maternal grandmother or mother-in-law is based on whether they live in the birth state of the mother or her husband. Taking into consideration the size of these states I find it questionable to use it as a proxy. There might be mothers who are categorized as living close to their mother just because they live in the same state, although it might take them more than 3 hours to get to each other. I do not think that there is any practical difference between a grandmother living in the same state in a 3-hours distance and a grandmother living in another state in a 6-hours distance, as none of them will be able to provide regular childcare nor will they be able to provide assistance in ad-hoc situations, such as taking the child home if the mother has to work overtime for instance. I assume that by acquiring a database with concrete proximity measures they would have estimated a bigger effect. For this reason I will experiment with a more accurate proximity measure based on the distance in hours to the maternal grandmother.

Another widely used instrument is whether grandparents are alive. Arpino, Pronzato and Tavares (2014) find a positive and significant effect of 32 percentage points (p.381) using

Italian data. However, despite having data on it, they are not including such important variables as the health or the proximity of the grandparents in the model, they only use them for the purpose of robustness checks. Similarly, Posadas and Vidal-Fernandez (2013) finds a positive impact, but of a smaller scale and it was not significant.

If instead of local average treatment effects, that can be gained from IV regressions (Angrist et al., 1996 as cited in Kanji, 2018), the average treatment effect is of interest, it is viable to switch to a bivariate probit model (Kanji, 2018). By doing so Kanji (2018) estimated the effect in the UK to be 31.5 percentage points (p.537) using a binary variable for the proximity of grandparents. Arpino, Pronzato and Tavares (2014) also find a positive and significant effect, slightly smaller though than when they estimated it by IV, of 30 percentage points (p.385) changing to a bivariate probit estimation method. Aassve, Arpino and Goisis (2012) found an even bigger increase (42 percentage points) in Germany when they conducted a cross-country analyses using bivariate probit regressions with instrumental variables on whether the maternal grandmother is alive and the number of siblings of the mother. Alternatively, fixed effects can be used for controlling for family heterogeneity. By experimenting with it, Posadas and Vidal-Fernandez (2013) find a 9 percentage point increase in mothers' labor market participation (p.3). All in all, there seems to be a consensus on the sign of the effect, but not on the magnitude of it, and the methodology could be improved as well.

4 Data

For the analysis I use the Generations and Gender Survey, the aim of which is to create a publicly available multigenerational panel database for European countries. I use the first and second waves that were conducted in 2005 and 2009 respectively in Germany (Generations & Gender Programme, 2016a; Generations & Gender Programme, 2016b). In both cases I restrict the sample to 18-50 year old mothers with at least one child who is at least 1 year old but is not older than 12. This way I get 1355 observations in the first wave and 460 in the second. Since there are so few observations in the second wave, especially if I take into account that for some crucial variables there are lot of missing values or the variable is just missing altogether (such as the proximity in hours to the maternal grandmother or the region where the respondent lives), I prefer not to use it as a panel database, but instead run regressions on both waves separately with mainly focusing on the first wave.

5 Estimation Strategy

5.1 Instrumental variables approach

As discussed before, since receiving grandparental help in childcare is not exogenous to the model, I cannot use a simple OLS to estimate the effects of it, as it could severely under- or overestimate it. Therefore, I will follow the approach of instrumental variables. In order to properly estimate the causal effect Angrist, Imbens and Ruben (1996) lists 5 assumptions that must be met. First, according the Stable Unit Treatment Value Assumption (SUTVA), the outcome of a given person should not be related to treatment status of others. Second, the instrument should be as good as randomly assigned. Third, exclusion restriction implies that the only way the instrument can affect the outcome variable is through an effect of it on the treatment. Forth, because of the relevance assumption the covariance between the treatment and the instrument has to be nonzero. Fifth, the monotonicity assumption ensures that there are no defiers.

5.2 The model

To estimate the effects of grandparental childcare I used the following instrumental variable model:

$Y = \beta_0 + \beta_1 \widehat{Help} + \beta_2 X + u$ (second stage equation)

$Help = \delta_0 + \delta_1 Z + \delta_2 X + v$ (first stage equation), where

Y is the dependent variable. I ran regressions on 3 different types of dependent variables. Firstly, I wanted to see how important grandparental help is for mothers to participate in the labor market, then how it affects those already on the labor market to work, and finally to choose to work fulltime instead of part-time.

$Help$ is the childcare help received from the grandmother. It is a dummy variable that takes 1 if the maternal grandmother helps with childcare, 0 otherwise. I only take into account the help from grandmothers, since they are playing a more important role than grandfathers (Tobio, 2001 as cited in Aassve et al., 2012). Also, there is no data on the parents of the father, so I do not know whether the mother-in-law provides childcare. However, several papers confirm that the main explanatory variable is actually the help from the maternal grandmother and not the mother-in-law (see e.g. Zamarro, 2011; Bratti, Frattini & Scervini, 2017; etc.).

Z represents the instrumental variables. I was experimenting with instrumenting the help from the grandmother with several different variables in the first stage equation. I use: 1) the proximity to the grandmother in hours; 2) a proximity dummy generated from it that takes 1 if the grandmother lives within half an hour and 0 otherwise, as this is the distance within it seems plausible that she can provide regular childcare; 3) a dummy on whether the grandmother is alive, 4) the number of sisters alive the maternal grandmother has, because if her sisters are having children as well, then the grandmother has to share her attention between more grandchildren; 5) a dummy on whether the grandfather has any limitation or disability, so that the grandmother would have to take care of him as well, and would be less able to help with childcare; 6) a dummy on whether the grandmother reached the retirement age, which was 65 during these waves; and finally, 7) a combination of these variables including the proximity dummy (except for the second wave, where it is not available), the number of sisters alive, whether the grandfather is limited and whether the grandmother has reached the retirement age.

X contains all the control variables. I controlled for the mother's characteristics in the regression, such as her age, age square, number of children she has, the age of her youngest child, educational level, health status, whether she is married or a migrant, whether she lives in a state previously being part of West Germany, and an opinion variable measuring the attitude towards working mothers, that is a dummy that takes 1 if she disagrees with the statement that

„A pre-school child is likely to suffer if his/her mother works". I also included some basic characteristics on the partner: a dummy variable that takes 1 if he works and a categorical variable based on the range of amount of money received from his main source of income.

Finally, u and v stand for the error terms.

6 Results

6.1 Descriptive statistics

Tables 1 and 9 (see Appendix) show the means of the observable characteristics of the mothers based on whether they use grandparental help. Since almost all of the differences are significant, it is clear that assignment to the treated or the control group is not random, and a simple OLS could be severely biased. During the first wave mothers getting help from the maternal grandmother were significantly younger, had fewer and younger children, a higher proportion of them had good health and a smaller proportion of them had fair health, a smaller percentage of them were migrant, were married, lived in West Germany, but a higher percentage of them disagreed with the statement that a "A pre-school child is likely to suffer if his/her mother works'. However, I cannot reject that the control and treated group is the same regarding their level of education, the proportion of them being in bad health, nor whether their partner works or which income group he is in.

The balance analysis (Appendix, Table 9) for the second wave reveals similar patterns. Though the variable living in West Germany is missing here as it is not included in the database, and respondents could have moved since the first wave, the other differences follow the ones in the previous one except for the general health indicators; here the proportion of mothers with good health is lower and the proportion of those with fair or bad health is higher for respondents who received help from the grandmother. Also, here I cannot reject that the control and treated group is the same regarding their opinion and the proportion of migrants.

variables	Control	Observations	Treated	Observations	Difference	p-value
age	36.86	1106	34.14	236	2.72	0.00
low education	0.16	1085	0.13	231	0.02	0.37
medium education	0.62	1085	0.65	231	-0.02	0.50
high education	0.22	1085	0.22	231	0.00	0.99
number of children	1.99	1106	1.69	236	0.30	0.00
age of youngest child	6.10	1106	5.10	236	1.01	0.00
good health	0.86	1104	0.91	235	-0.05	0.03
fair health	0.12	1104	0.06	235	0.06	0.01
bad health	0.02	1104	0.03	235	-0.01	0.52
migrant	0.18	1105	0.11	236	0.07	0.01
married	0.77	1097	0.64	234	0.13	0.00
west	0.88	1106	0.81	236	0.07	0.01
opinion	0.46	1098	0.58	236	-0.12	0.00
partner works	0.77	1093	0.75	235	0.02	0.43
low income	0.27	829	0.30	178	-0.03	0.48
medium income	0.51	829	0.46	178	0.05	0.19
high income	0.22	829	0.25	178	-0.03	0.42

Table 1: Balance test for the first wave. Own calculations based on data from Generations Gender Programme (2016a)

6.2 Effects of help from the maternal grandmother

Table 2 shows the outputs of the regressions on labor market participation in 2005. Column 1 shows the OLS regression, and columns 2-5 the different types of IV regressions. I only included those specifications where both the F-statistic was high enough and the R^2 was convincing in the first stage equation. This way I ended up with the following instruments: proximity to the maternal grandmother (column 2), a proximity dummy (column 3), a dummy on whether the grandmother is alive (column 4), the number of sisters alive (column 5), and finally, a combination of the proximity dummy, whether the grandmother is pensionable, and the number of sisters alive (column 6). In model 6 I only consider those with a grandmother alive. Here, the effect of the grandmother being pensionable is negative. This might be because retired people are also older, and thus probably less healthy and less able to provide childcare.

The effects of help from the grandmother are only significant in the 3rd and the 6th specification, out of which the latter is preferred based on the F-statistics and the R^2 of the first stage equation. Thus, the effect of the help from the grandmother on participation is 31 percentage points, which is really big but more-or-less in line with the 42 percentage points that Aassve and his co-authors (2012) found in the case of Germany, although they were using far fewer control variables. And not so surprisingly, those who have smaller kids are less likely to participate in the labor force by 7 percentage points, and a 1 year increase in the youngest child's age increases the labor force participation by 6 percentage points. Also, living in West Germany decreases the probability of participating by roughly 22 percentage points, whereas disagreeing with the statement that a child suffers if his/her mother works increases it by 14 percentage points. What is quite surprising is that being married is not significant at all, although the tax system encourages the male breadwinner model. The partners income category wasn't significant either, but it's probably due to the fact that it is not a precise data, since they are only asking for income ranges for their jobs, so it cannot be aggregated. This is way I only took into consideration the income range of the main job.

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	IV - proximity to mother	IV - proximity dummy	IV - mother alive	IV - number of sisters alive	IV - multiple instruments
VARIABLES	participate	participate	participate	participate	participate	participate
help form grandmother	0.039	-0.206	0.542***	-0.022	-0.124	0.306*
mother's characteristics						
medium education	0.074	0.045	0.035	0.077	0.088	0.062
high education	0.149***	0.115*	0.088	0.158***	0.157**	0.091
general health	✓	✓	✓	✓	✓	✓
age	0.079***	0.106***	0.087***	0.076***	0.065*	0.055
age square	-0.001***	-0.001***	-0.001***	-0.001***	-0.001	-0.001
number of kids	-0.094***	-0.090***	-0.053**	-0.097***	-0.096**	-0.074***
age of youngest kid	0.039***	0.040***	0.046***	0.039***	0.043***	0.056***
migrant	0.019	-0.041	0.002	0.010	0.012	-0.005
married	-0.031	-0.071	-0.001	-0.047	-0.041	-0.049
west	-0.164***	-0.179***	-0.132**	-0.171***	-0.231***	-0.218***
opinion	0.167***	0.173***	0.124***	0.175***	0.165**	0.139***
partner's characteristics						
work	0.051	0.176**	0.16	0.065	0.045	0.003
income group	✓	✓	✓	✓	✓	✓
Constant	-0.904**	-1.182**	-1.283**	-0.818**	-0.55	-0.629
Observations	971	673	673	961	596	409
R-squared	0.225	0.203	0.090	0.227	0.226	0.269
First stage, dependent variable: help from grandmother						
proximity to grandmother		-0.009***	-	-	-	-
proximity dummy		-	0.211***	-	-	0.269***
mother alive		-	-	0.129***	-	-
number of sisters alive		-	-	-	-0.026**	-0.027
mother pensionable		-	-	-	-	-0.121***
controls		✓	✓	✓	✓	✓
constant		0.075	-0.157	0.147	0.065	-0.392
R-squared		0.107	0.153	0.099	0.110	0.219
F		7.84	52.63	30.96	5.27	18.28
Prob > F		0.005	0.000	0.000	0.022	0.000

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

Table 2: The effect of childcare provision from maternal grandmother on the mother's labor force participation in 2005.

Moving on to working probability, we can see a very similar pattern in Table 3, where I only consider those who are participating in the labor force, those that either work or are unemployed but looking for a job. Getting help from the grandmother seems to be even more important in this case, it can increase the probability of working by 54 percentage points based on the IV model with multiple instruments (column 6). Also, we can see that the OLS (column 1) severely underestimated the effect both here and in case of participation, so it really was necessary to use the instruments.

The educational levels are actually significant here: the more educated a mother is, a more likely it is that she finds a job. Similarly to the case of participation, the smaller the child is, or the more children a mother has, the smaller are the chances of finding a job. Also, coming from the West is not significant here, which might be due to the lack of jobs in the Eastern regions.

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	IV - proximity to mother	IV - proximity dummy	IV - mother alive	IV - number of sisters alive	IV - multiple instruments
VARIABLES	work	work	work	work	work	work
help from grandmother	0.096**	0.049	0.723***	0.479	0.020	0.542***
mother's characteristics						
medium education	0.161***	0.137**	0.127**	0.165***	0.170***	0.152**
high education	0.276***	0.243***	0.218***	0.283***	0.291***	0.234**
general health	✓	✓	✓	✓	✓	✓
age	0.072***	0.072**	0.056*	0.062***	0.062*	0.032
age square	-0.001***	-0.001**	-0.001	-0.001**	-0.001	-0.000
number of kids	-0.096***	-0.089***	-0.055**	-0.082***	-0.099**	-0.080***
age of youngest kid	0.041***	0.045***	0.051***	0.043***	0.044***	0.064***
migrant	-0.001	-0.005	0.034	0.024	0.007	0.047
married	0.001	-0.000	0.061	0.040	0.042	0.082
west	0.060	0.018	0.060	0.069	0.040	-0.045
opinion	0.146***	0.168***	0.124***	0.121***	0.102	0.106**
partner's characteristics						
work	0.116	0.246***	0.232**	0.110	0.081	0.049
income group	✓	✓	✓	✓	✓	✓
Constant	-1.185***	-1.129**	-1.228**	-1.208***	-0.957**	-0.668
Observations	967	671	671	957	592	407
R-squared	0.210	0.222	0.005	0.132	0.209	0.204
First stage, dependent variable: help						
proximity to grandmother		-0.009***	-	-	-	-
proximity dummy		-	0.211*	-	-	0.271***
mother alive		-	-	0.129***	-	-
number of sisters alive		-	-	-	-0.027**	-0.027
mother pensionable		-	-	-	-	-0.122***
controls		✓	✓	✓	✓	✓
constant		0.086	-0.145	0.118	-0.014	-0.357
R-squared		0.107	0.154	0.098	0.110	0.221
F		7.74	52.64	30.98	5.54	18.34
Prob > F		0.006	0.000	0.000	0.019	0.000

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

Table 3: The effect of childcare provision from maternal grandmother on the mother's probability of working in 2005.

Finally, for estimating the effect of help from the grandmother on working fulltime instead of parttime, I only had three specifications where the F-statistics in the first stage equation were high enough. The results for these are in Table 4. However, the help from the maternal grandmother was not significant in any of these models. Nonetheless, I find that those who are already working are more likely to do it fulltime if they are migrants, the effect being roughly 22 percentage points. Living in the West decreases it by 39 percentage points, which is probably due to the better fulltime childcare coverage in the East. The opinion variable is not significant here, so whether you think your child would suffer if you work only affects whether you work or not, but not how much.

I tried to run the same regressions using the second wave as well, but I found that grandparental help does not have a significant effect on the probability of mothers' labor force participation nor on the probability of working (see Appendix, Table 10 and 11), which could be interpreted as a decrease in the importance of grandparental childcare provision due to the improvements in the availability of childcare facilities. It should be noted that some important variables were missing from the second wave, such as the closeness to the mother, limitations of the father, or regional data, and whether the person was born in the country for respondents who were not included in the first wave. There is no data on whether the mother works full-time or part-time either. So all in all, I wouldn't want to draw any far-reaching conclusions from the second wave.

VARIABLES	(1) OLS fulltime	(2) IV - proximity dummy fulltime	(3) IV - mother alive fulltime	(4) IV - multiple instruments fulltime
grandmotherhelp	-0.009	0.208	-0.015	0.254
mother's characteristics				
medium education	0.021	-0.032	-0.001	0.048
high education	0.036	-0.007	0.013	0.012
general health	✓	✓	✓	✓
age	0.012	0.014	0.013	0.057
age square	-0.000	-0.000	-0.000	-0.001
number of kids	-0.025	-0.026	-0.032	-0.024
age of youngest kid	-0.003	-0.003	-0.004	0.004
migrant	0.214***	0.220***	0.224***	0.219**
married	0.009	0.134	0.008	0.115
west	-0.329***	-0.385***	-0.325***	-0.391***
opinion	0.001	0.000	0.012	0.014
partner's characteristics				
work	-0.142	-0.230	-0.170	-0.183
income group	✓	✓	✓	✓
Observations	499	361	493	221
R-squared	0.124	0.139	0.130	0.142
First stage, dependent variable: help from grandmother				
proximity dummy		0.236***	-	0.291***
mother alive		-	0.120***	-
number of sisters alive		-	-	-0.017
mother pensionable		-	-	-0.107
controls		✓	✓	✓
constant		-0.205	-0.154	0.857
R-squared		0.160	0.100	0.272
F		31.8552	10.2982	8.97434
Prob > F		0.0000	0.0014	0.0000

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

Table 4: The effect of childcare provision from maternal grandmother on the mother's probability of working fulltime instead of part-time in 2005.

6.3 Robustness

I need to be confirm that the instruments I use really do work through the channel of grandparental childcare. It is an important step, as it is possible that for instance a grandmother living within 30 minutes or being pensionable can benefit the family through other channels as well and thus ease the labor market participation. They can help on a regular basis with housework and thus freeing up more time for the family to engage in working. On the other hand, mothers living close or being pensionable and thus older and probably less healthy can also hold back the respondents from participation, as they might need to take care of the elderly instead.

So I run a linear probability model on the participation and on the working probability of fathers from the same age-range, with having at least one child, and the youngest child being between 1 and 12[1], on the used instruments, then those are insignificant. From Table 5, it can be seen that only one of the instruments, the proximity dummy, is significant, but only when the dependent variable is participation and only at a 10% significance level. This indicates that the main channel these instruments work is through childcare.

[1] I believe that using the subsample of women of the same age cohort without a single child would be better for the robustness check, as their labor force behavior might be more similar to that of mothers. Unfortunately, there are too few observations for this subsample. However, Bloemen et al. (2010 as cited in Bratti, Frattini & Scervini (2018) claims that fathers do not play such an important role in childcare, so they should not be affected by the availability of the grandmother either.

VARIABLES	(1) participate	(2) work	(3) fulltime
proximity dummy	-0.063*	0.006	0.061
number of sisters alive	-0.007	0.039	-0.036
mother pensionable	0.015	0.042	-0.022
controls	✓	✓	✓
constant	0.677	-0.756	1.957**
Observations	162	162	137
R-squared	0.354	0.289	0.236

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

Table 5: Robustness test using the subsample of fathers

6.4 Heterogeneity

Unfortunately, the sample size of the Generations and Gender Survey is too small to be able to see how grandparental childcare provision can affect mothers who are most in need of it, such as single mothers for instance, or mothers with very bad health. Nonetheless, I did divide the sample into smaller subsamples based on the age of the youngest child, the number of children, the mother's educational level, the partner's income level, and finally based on their attitudes towards working mothers. To estimate the effects of participation (Table 6), working probability (Table 7), and the probability of working fulltime (Table 8), I used the IV model with multiple instruments, that is the proximity dummy to the maternal grandmother, the number of sisters alive, and a dummy on whether the maternal grandmother is pensionable.

From Table 6, getting help from the grandmother is only significant for participation in case of mothers with only one child, and to mothers with low or medium education. The former one seems to be counter-intuitive, as taking care of more children is more time-consuming for the mother, even if they spend the day in formal childcare facilities, and thus should be more in need of help in order to be able to participate in the labor market. Regarding education, it seems

plausible that mothers with a lower level of education are affected by grandparental help more, as they are probably less able to find jobs that pay them enough to employ a nanny or to use another type of paid formal or informal childcare.

subsample	estimated effect	observations
youngest child is between 1 and 6	0.169	203
youngest child is over 6	0.366	206
one child	0.341*	129
more than one child	0.207	280
low or medium education	0.359**	313
high education	0.198	96
low partner income	0.362	78
high partner income	0.346	103
positive towards working mothers	0.193	200
not positive towards working mothers	0.437	209

Table 6: Heterogeneous effects of childcare help from maternal grandmother on participation in 2005.

The results in Table 7 show that grandparental help also affects the probability of working significantly in case of mothers only one child and with low or medium education. Also, the effect, being 83 percentage points, is much bigger if the youngest child is over 6, than if he/she is between 1 and 6. Finally, the effect is significant for both those who are positive towards working mothers, and those who are not, but it is around 43 percentage points higher for the latter one. Perhaps these mothers are only willing to accept a job offer, if the grandmother can look after the children, as they perceive it as the closest substitute for maternal care.

subsample	estimated effect	observations
youngest child is between 1 and 6	0.340**	202
youngest child is over 6	0.830**	205
one child	0.526***	128
more than one child	0.383	279
low or medium education	0.641***	312
high education	0.439	95
low partner income	0.665***	77
high partner income	0.408	103
positive towards working mothers	0.338*	198
not positive towards working mothers	0.780***	209

Table 7: Heterogeneous effects of childcare help from maternal grandmother on working probability in 2005.

Finally, as it could been anticipated from previous estimations where grandparental help never affected significantly to work fulltime instead of part-time, it is only significant for one subsample here as well, the mothers who have attained a high education.

subsample	estimated effect	observations
youngest child is between 1 and 6	0.062	81
youngest child is over 6	0.216	140
one child	0.528	77
more than one child	0.237	144
low or medium education	0.066	161
high education	1.11 **	60
positive towards working mothers	0.372	130
not positive towards working mothers	0.165	91

Table 8: Heterogeneous effects of childcare help from maternal grandmother on probability of working fulltime in 2005.

6.5 Limitations

Although I found that grandparental help increases the probability of participation and working, I would also need to know whether formal and informal childcare are complementary or substitutes. It is possible that grandmothers being more available only means a shift from formal childcare to free informal childcare from the part of those who are already working

instead of mothers entering the labor market (Vuri, 2016). So if the only result of increasing the availability of grandparents by reducing the age of retirement is that mothers already working are switching to that method, then there are economic disadvantages of it. Simply, the older population would drop out of the labor market without any extra workers on the parts of mothers.

Also, maybe those whose grandparents would not be able to provide childcare because of living too far for instance are not even having a child as they know that they would have a tradeoff of either going back to work or having to care for the child themselves. Thus it can happen that making the grandmothers more available would first increase fertility, but then mothers would drop out of the labor market for the period of giving birth and taking care of the child after.

Moreover, the SUTVA might be violated. Mothers receiving help from their grandmother could very well effect the treatment of their sisters as well, as the grandmother would be less available for childcare.

Lastly, a common concern about opinion questions in surveys is that respondents might adjust their answers to how they behave not how they think people should behave, therefore they might be endogenous (van Gameren & Ooms, 2009). In the case of the Generations and Gender Survey this concern is even more noteworthy considering that in both waves they ask the opinion questions after the ones regarding employment, so it might be more tempting for the respondents to alter their opinion based on what they have responded in the previous job related questions.

7 Conclusion

In this thesis I estimated the effects of the most common informal childcare method, grandparental childcare; more specifically, I investigated help from the maternal grandmother on mothers' labor force decisions using data from the Generations and Gender Survey. The case of Germany is very interesting as even though West and East Germany have been reunified for almost 30 years now, there are still considerable differences in the formal childcare offered, as well as in the preferences of mothers towards working and childcare methods. I used the instrumental variables approach which can be considered standard in this context; however I tried to incorporate several instruments. I used an instrument that I could not find any other studies taking advantage of it using IV, on whether the maternal grandmother is pensionable. a proximity dummy, which was more accurate than in most of the other studies discussed in the literature review, and the number of sisters alive. I also controlled for the attitudes toward working mothers, although it might be endogenous. It is important to include it nonetheless, as the availability of some kind of childcare method is only a necessary condition, mothers also need to accept working mothers in order to take advantage of these opportunities and to try to go back to work

I found that in Germany it has significant effects on the extensive margin, that is mothers are more likely to participate in the labor market by almost 31 percentage points and to find a job by more than 54 percentage points. These effects are of a high magnitude, so new regulations regarding increasing the age of retirement to increase taxes should pay attention to it. However, grandparental has no significant effect on the extensive margin, as I found no evidence of them working fulltime instead of part-time thanks to the help they receive.

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Appendix

variables	Control	Observation	Treated	Observations	Difference	p-valu
age	39.29	341	36.83	118	2.46	0.00
low education	0.03	338	0.01	117	0.02	0.47
medium education	0.17	338	0.10	117	0.07	0.18
high education	0.80	338	0.88	117	-0.08	0.12
number of children	2.19	341	2.02	118	0.17	0.09
age of youngest child	7.15	341	6.07	118	1.08	0.00
good health	0.84	340	0.80	118	0.04	0.27
fair health	0.14	340	0.18	118	-0.04	0.30
bad health	0.02	340	0.03	118	-0.00	0.76
migrant	0.12	341	0.10	118	0.02	0.65
married	0.83	325	0.76	112	0.07	0.08
opinion	0.55	340	0.60	118	-0.05	0.36
partner works	0.81	340	0.77	118	0.04	0.38
low income	0.35	266	0.40	96	-0.04	0.46
medium income	0.39	266	0.41	96	-0.01	0.84
high income	0.25	266	0.20	96	0.05	0.29

Table 9: Balance test for the second wave. Own calculations based on data from Generations Gender Programme (2016b)

	(1)	(2)
VARIABLES	OLS participate	IV - mother alive participate
grandmotherhelp	0.100*	0.139
mother's characteristics		
medium education	0.170*	0.193*
high education	0.328***	0.346***
general health	✓	✓
age	0.055	0.059
age square	-0.001	-0.001
number of kids	-0.046	-0.037
age of youngest kid	0.018**	0.016
migrant	-0.114	-0.092
married	-0.069	-0.093
opinion	0.134***	0.134***
partner's characteristics		
work	-0.008	-0.022
income group	✓	✓
Constant	-0.513	-0.629
Observations	339	319
R-squared	0.145	0.136
First stage, dependent variable: help from grandmother		
mother alive		0.255***
controls		✓
Constant		-0.458
R-squared		0.101
F		22.50
Prob > F		0.000

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

Table 10: The effect of childcare provision from maternal grandmother on the mother's participation on the labor force in 2009.

VARIABLES	(1) OLS work	(2) IV - mother alive work
grandmotherhelp	0.111**	0.235
mother's characteristics		
medium education	0.228**	0.249**
high education	0.387***	0.398***
general health		
age	0.057	0.056
age square	-0.001	-0.001
number of kids	-0.028	-0.018
age of youngest kid	0.023**	0.023**
migrant	-0.076	-0.057
married	-0.082	-0.103
opinion	0.134**	0.131**
partner's characteristics		
work	0.093	0.093
income group		
Constant	-0.793	-0.871
Observations	339	319
R-squared	0.150	0.129
First stage, dependent variable: help from grandmother		
mother alive		0.255***
controls		✓
Constant		-0.458
R-squared		0.101
F		22.50
Prob > F		0.000

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

Table 11: The effect of childcare provision from maternal grandmother on the mother's probability of working in 2009.