



Grandparenting and fertility: the role of spatial differences in the Netherlands



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Faculty of Spatial Sciences
Master Population Studies
Master Thesis Mariska Klinkien
S3530361 – h.h.m.klinkien@student.rug.nl
Supervisor: Roberta Rutigliano

Abstract

Recent research in the Netherlands has shown an increasing probability of additional childbirth when grandparents are involved in the childcare of their grandchildren (Kaptijn et al., 2010; Thomese & Liefbroer, 2013). However, a geographical overview of this phenomena is lacking (Kulu, 2013). The objective of this research is to investigate whether there is a spatial variation of grandparental childcare and its consequences on the likelihood of additional birth, by investigating whether there are urban vs. rural differences and whether there are differences between four different regions in the Netherlands. Data from the first two waves of the Netherlands Kinship Panel Study is used to perform binary logistic regressions with additional childbirth (yes/no) as dependent variable. Results show that there is no significant difference in grandparental childcare between urban and rural areas, and between the Northern, Western, Southern and Eastern part of the Netherlands. The likelihood of additional childbirth does not significantly increase or decrease when the spatial aspect of grandparental childcare is considered.

Content

Abstract	2
1. Introduction	4
2. Theoretical background	5
2.1 Changes in fertility levels in developed countries.....	5
2.2 Changes in fertility levels in the Netherlands.....	6
2.3 Grandparents as source for childcare	8
2.4 The normative context in shaping the grandparents role.....	9
2.5 The role of the welfare state in childcare	11
2.6 Spatial differences in fertility	12
2.7 Spatial differences in the Netherlands	14
2.8 Conceptual model.....	17
2.9 Hypotheses	18
3. Method.....	19
3.1 Data and statistical method.....	19
3.2 Data cleaning and sample selection.....	20
4. Results	22
5. Conclusion and discussion	26
Ethical considerations.....	28
References	29
Appendix	32
A – Descriptive Statistics	32
Table A.1 Descriptive Statistics Grandparental childcare vs. No Grandparental childcare	32
Table A.2 Descriptive Statistics Urban vs. Rural	33
Table A.3 Descriptive Statistics Country Parts (NUTS-1).....	34
Table A.4 Non missing vs. missing Grandparental childcare	35
B – Logit models	36
B.1 Logit model 1: Urban vs. Rural	36
B.2 Logit model 2: Country Parts (NUTS-1)	37
C – Codebook.....	38
Table C.1 Codebook categorical variables	38

1. Introduction

The role of women in developed countries has changed the last four decades. The change was made due to women's higher educational attainment and increased participation in the labour market, which resulted into a childcare gap in nuclear families (Becker, 1991). Meanwhile, at the macro level, the overall fertility of women declined which is explained in the literature by the New Home Economics theory of Becker (1991) and the Second Demographic Transition Model of Lesthaeghe (2014). The New Home Economics theory (Becker, 1991) explains low fertility of women from an economic perspective whereby women reconsider the costs of having children. The Second Demographic Transition Model (Lesthaeghe, 2014) explains low fertility of women by a change in ideational values with an individualistic perspective. However, these two theories do not completely explain the fertility trends. A clear link to gender is missing. At the macro level Esping-Andersen and Billari (2015) added gender egalitarianism as an important explanatory factor of the total fertility rate, whereby fertility of high educated women even increases again when society has adapted family policies to the new gender roles. Additionally, at the micro level Goldscheider et al. (2015) state that the Gender Revolution outcomes are also important to explain the fertility of couples on the individual level whereby women started working more and men get more involved in the caring and household tasks.

In the Netherlands social institutions are also challenged to support women in reconciling work with childcare. Statistics Netherlands (2015) states that conflict between motherhood and career could amongst others prevent women from having the desired number of children. Nowadays, the longevity of grandparents makes them even a more important source for childcare. More people live 'longer and into older ages as a result of improved health and living conditions' (Barnes et al., 2018, p.1), which makes grandparents suitable to take care of their grandchildren (Arber & Timonen, 2012). Margolis and Wright (2017) found that healthy grandparenthood is increasing due to health and mortality improvements. Ageing societies, like the Netherlands, have a growing supply of healthier grandparents (Arber & Timonen, 2012). Therefore, research by Kaptijn and his colleagues (2010) and Thomese and Liefbroer (2013) focussed on the role of grandparents in childcare and their influence on the fertility of their own children, in which it was found that when both, maternal and paternal grandparents were regularly involved in childcare, this increases the probability of additional childbirth significantly. However, in this research the geographical side on grandparental childcare and fertility is missing. The objective of this research is to investigate whether there are spatial differences in grandparental childcare and its consequences on the likelihood of additional childbirth based on compositional and contextual geographical differences (Kulu, 2013). The research question is: To what extent is there spatial variation in grandparental childcare and what are its consequences on the likelihood of additional childbirth in the Netherlands? Thereby, a broader understanding of the spatial context in which extended family, in this case Dutch grandparents, provide childcare and their influence on fertility choices of their own children will be gained.

Data from the first two waves of the Netherlands Kinship Panel Study will be used to perform logistic regressions with additional childbirth (yes/no) as dependent variable. Respondents aged 17-50 with at least one child will be selected, too see how the existing involvement of grandparental childcare influences additional childbirth. The important explanatory variables will be grandparental childcare and two geographical variables. First geographical variable will be based on urban vs. rural areas. Second geographical variable will be based on the four Dutch country parts at the NUTS-1 level: North, East, South and West (see appendix C.1 codebook). These two geographical variables will be tested in separate logistic models. The control variables age of the respondent and the number of children of the respondent will be added to the models. Other control variables will be tested to see how robust the results are.

2. Theoretical background

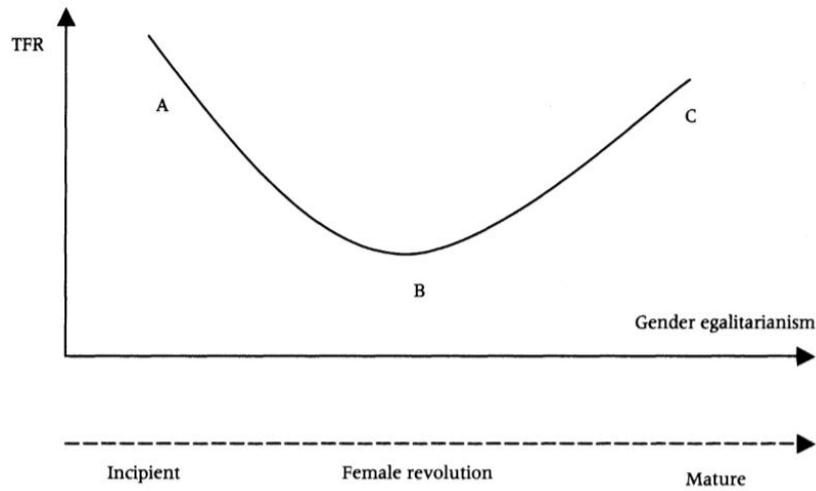
2.1 Changes in fertility levels in developed countries

Due to higher educational attainment and increased labour market participation the role of women within Western countries has changed the last four decades, which had a big influence on fertility levels. These fertility levels are theoretically explained by the New Home Economics theory (Becker, 1991) and the Second Demographic Transition Model (Lesthaeghe, 2014). First, the New Home Economics Theory from Becker (1991) discusses a development to low fertility with an economic perspective. The increased education level of women and therefore their increased participation in the labour market made them reconsider the costs of having children. Women were normatively seen as the childcare providers within the family, but have now less time to do so (Becker, 1991), which resulted in lower fertility rates, especially in countries where there is little support to help these women combine work and family life (McDonald, 2006). Second, The Second Demographic Transition Model from Lesthaeghe (2014) explains the low fertility level of women in industrialized countries driven by a change in ideational values. According to the model these ideational values changed to a more individualistic perspective. Couple instability resulted in low fertility through declining marriages on the one hand and raising cohabitations and divorces on the other hand (Lesthaeghe, 2014).

However, within these two theories the gender perspective is missing. At the macro level Esping-Andersen and Billari (2015) added gender egalitarianism as an important factor in explaining the fertility of women nowadays. At the micro level Goldscheider et al. (2015) state that the rise in female participation in the labour market is only the first part of changing family behaviour, which they refer to as the Gender Revolution. The second part of the Gender Revolution is that men become more involved in the private household (Goldscheider et al., 2015).

The theoretical perspectives of the New Home Economics Theory (Becker, 1991) and the Second Demographic Transition Model (Lesthaeghe, 2014) do not completely explain the fertility trends. The macro level approach of Esping-Andersen and Billari (2015) and the micro level approach of Goldscheider (2015) are also important to consider. The New Home Economics Theory and The Second Demographic Transition Model both explain that fertility levels of women will remain low. Nevertheless, Esping-Andersen and Billari (2015) show in figure 1 that, at the macro level, the fertility of women also can increase again. Important to note is that this increase in fertility mainly holds for highly educated women in the society. There is evidence of an U-shaped relationship between fertility and educational level, see figure 1, whereby (mainly high educated) women do have higher fertility than expected by New Home Economics Theory (Becker, 1991) and the Second Demographic Transition Model (Lesthaeghe, 2014). Condition to reach this increase in fertility level is that the society adjusted policies to the new egalitarian gender roles. Therefore, Esping-Andersen and Billari (2015) propose a new theoretical framework for societies in which gender egalitarianism has a dominant normative status. In figure 1 the framework of Esping-Andersen and Billari is shown. First the decrease of TFR from point A to point B at the macro level, as also theoretically explained by Becker (1991) and Lesthaeghe (2014). Nonetheless, Esping-Andersen and Billari (2015) emphasize that this trend towards low fertility, which they call 'erosion of the family' (p.1), might not proceed in future. Instead of fertility remaining low Esping-Andersen and Billari (2015) state an increasing fertility trend (from B to C) for which they give three reasons. Firstly, they found some evidence that the family preferences of people did not change with regard to marriage, motherhood and preferred number of children, so this refutes the value-change argument stated by the Second Demographic Transition Model (Lesthaeghe, 2014). Secondly, they address that there is some evidence that fertility rates are actually positively related with female employment, income and economic development, in contrast to the two previous theories. Thirdly, Esping-Andersen and Billari (2015) state a reverse trend whereby female education level plays an important role. Goldscheider et al. (2015) also support the finding that in countries where female employment is higher, also fertility is higher. Arpino et al. (2013) state that the Netherlands is an example of a country that has moved towards point C in figure 1.

Figure 1 Fertility trend of women before, during and after the female revolution

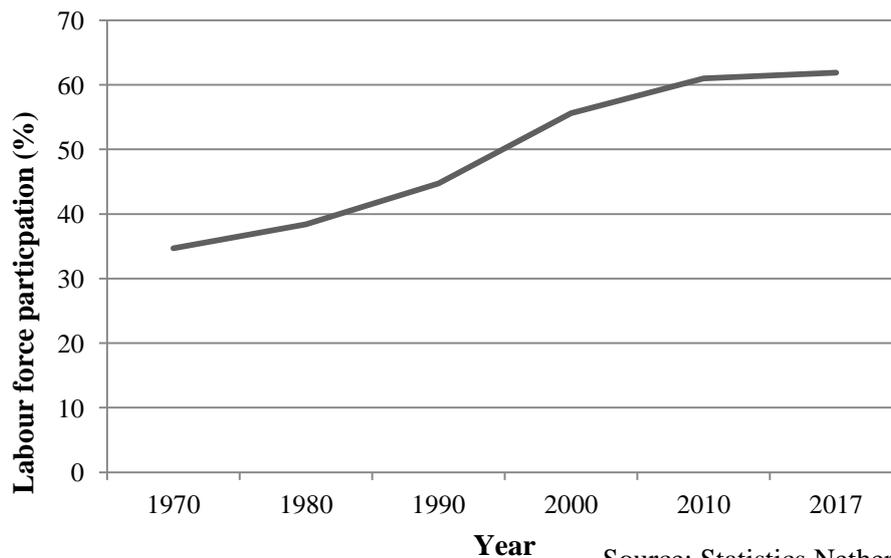


Source: Esping-Andersen & Billari, 2015, p.9

2.2 Changes in fertility levels in the Netherlands

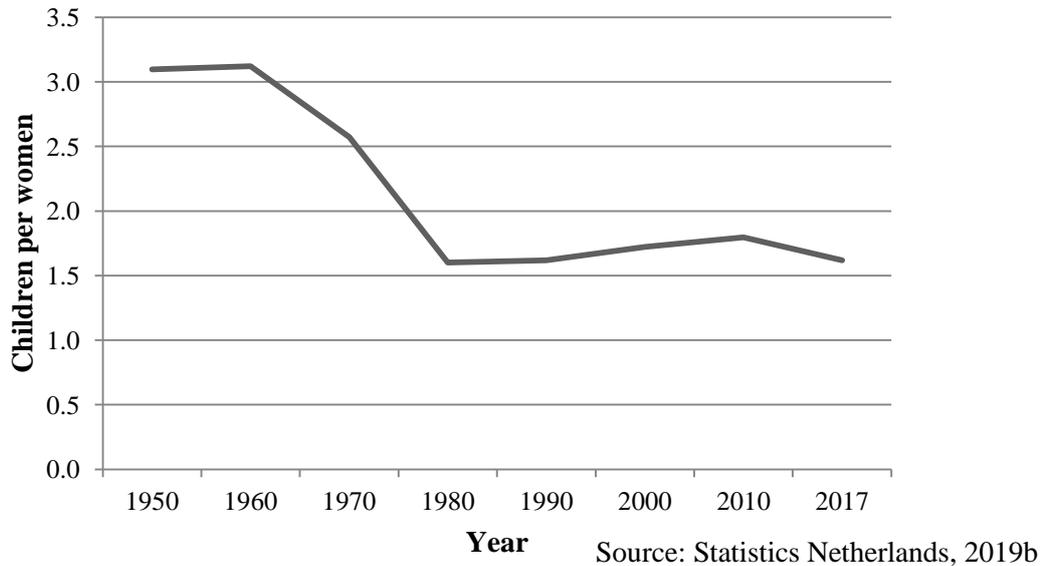
Focusing on the Netherlands for this research figures 2 and 3 show that the increase of the share of women in the labour market and the decrease in fertility applies to the country (Statistics Netherlands, 2019a, b). Figure 2 shows that the female revolution has also set in the Netherlands at the end of the twentieth century; the net labour force participation of women increased from 34.1% in 1969 to 61.9% in 2017. Figure 3 shows that the TFR in the Netherlands decreased from 3.097 children per women in 1950 to 1.619 children per women in 2017, which is comparable to the European average TFR (United Nations, 2017).

Figure 2 Net female labour force participation in the Netherlands, 1970 – 2017



Source: Statistics Netherlands, 2019a

Figure 3 Total Fertility Rate Netherlands, 1950 -2017



Besides, the age of first and second birth increased along with the increase of the labour force participation of women, see figure 4. Statistics Netherlands (2015) states that 58% of the women expect a negative effect on the job market with their first birth, while 24% of the men expect a negative effect of their first birth on their career. So, women expect much more of a conflict with their career when starting a family compared to men. This is also evident when looking at working hours of women and men with children: women with children work significantly less than men with children (Statistics Netherlands, 2015). Figure 5 shows the change in working hours of women around their first birth. Especially a big decline in working 35 hours or more is visible. When a women gets a first child the share of women who work part-time increases from around 50% to 70%. So, a large part of women with a child works part-time in the Netherlands. Consequently, after the first birth women are less economically independent than men (Perez et al., 2018).

Figure 4 Age of the mother at first and second birth in the Netherlands, 1950-2017

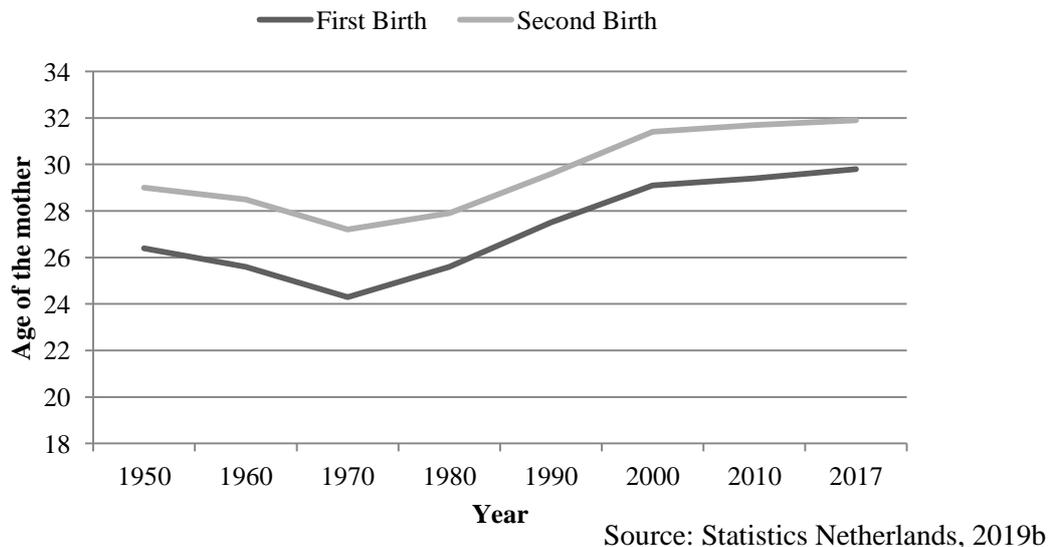
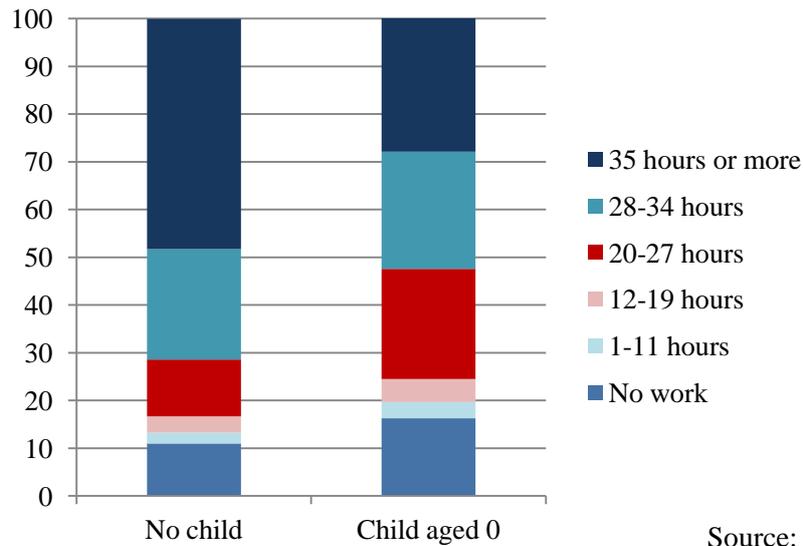


Figure 5 Change in working hours women around first birth in the Netherlands, 2017



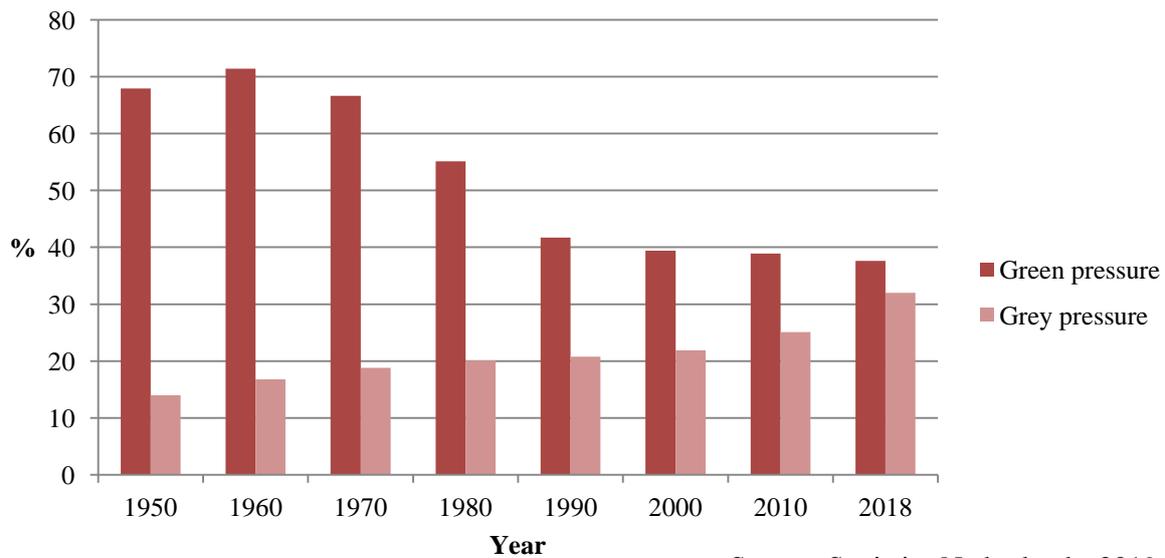
Research about family formation in the Netherlands (Statistics Netherlands, 2015) showed that two children is the overall desired number of children. Obtaining the desired number of children depends on various factors. One of the factors that can hinder obtaining the desired number of children could be combining motherhood and career (Statistics Netherlands, 2015). As McDonald (2006) stated it is important that the government steps in and makes supportive policies for women to be able to combine career and motherhood. These policies should aim at providing women the support to have the desired number of children besides their career. In paragraph 2.5 there will be a more extensive discussion on the Dutch governmental policies on family life and work. Nonetheless, due to the increased longevity of elderly nowadays, grandparents are a very important source for childcare (Kaptijn et al., 2010; Arber & Timonen, 2012; Herlofson & Hagestad, 2012; Thomese & Liefbroer, 2013; Margolis and Wright, 2017) and thereby might help couples to reach their desired number of.

2.3 Grandparents as source for childcare

Grandparents at the macro level

Like the global trend in developed countries the Netherlands is an ageing society. Arber & Timonen (2012) noticed that ‘the scope for grandparenting is therefore widening, and grandparenting is taking on new forms as the social and economic context of family relationships evolve’ (p.1). Additionally, longevity causes more people to live ‘longer and into older ages as a result of improved health and living conditions’ (Barnes et al., 2018, p.1), which makes grandparents able to be with their grandchildren for a longer period (Arber & Timonen, 2012). So, at the macro level the demographics of grandparents in developed contemporary societies have changed. On the one hand the number of grandparents has grown and on the other hand the number of grandchildren has declined (Arber & Timonen, 2012). This is also true for the Netherlands. In figure 6 the demographic pressure of the Netherlands over time is displayed. The grey pressure is a proxy for the potential grandparents and the green pressure is a proxy for childbirths. In 1950 the green pressure was way higher than the grey pressure in the Netherlands, but this has changed over time. Especially the baby boom generation consists of an increasing number of elderly, which caused the grey pressure to double between 1950 and 2018, which means more possible grandparents. However, at the same time the green pressure declined due to the fact that the number of children per women has declined (see figure 3), which means less grandchildren. Emphasizing that grandparents live longer and healthier nowadays (Margolis & Wright, 2017), it possible for grandparents to be longer and more actively engaged with a smaller amount of grandchildren (Arber & Timonen, 2012).

Figure 6 Demographic pressure the Netherlands 1950-2018



Source: Statistics Netherlands, 2019c

Grandparents at the micro level

Due to these changes at the macro level, grandparents are an even more important preliminary source of childcare support nowadays. Therefore, recent studies in the Netherlands have looked beyond the nuclear family and started to include the informal childcare provided by the grandparents at a micro level perspective (Kaptijn et al., 2009; Thomese and Liefbroer, 2013). First, Kaptijn et al. (2010) came up with the life history theory in which it is important for the mother to have, besides the father of the child, also other kin as a resource for raising the child. Another theory is the cooperative breeding hypothesis in which it is reasoned from evolutionary past that ‘grandmothers are among the most important caregivers besides the parents’ (Kaptijn et.al, 2010, p. 394). Focussing on the outcomes these theories Kaptijn et al. (2010) found that grandparental childcare leads to an increased probability of additional childbirth within the coming 8 to 10 years. Second, Thomese and Liefbroer (2013) also looked at the influence grandparents have on the fertility of their children with three theoretical perspectives; ‘needs and opportunities, normative preferences and gendered involvement of grandparents’ (pp. 406-408). They found that when both, maternal and paternal grandparents were involved, there is an increased probability on additional childbirth. This grandparental childcare was complementary to the available formal childcare. Thomese and Liefbroer (2013) found that the use of grandparental childcare and the use of paid childcare were fairly independent from each other. It was also found that grandparental childcare does make a big difference compared to paid childcare. Paid childcare does not facilitate additional childbirth, whereas the extensive grandparental childcare does (Thomese and Liefbroer, 2013).

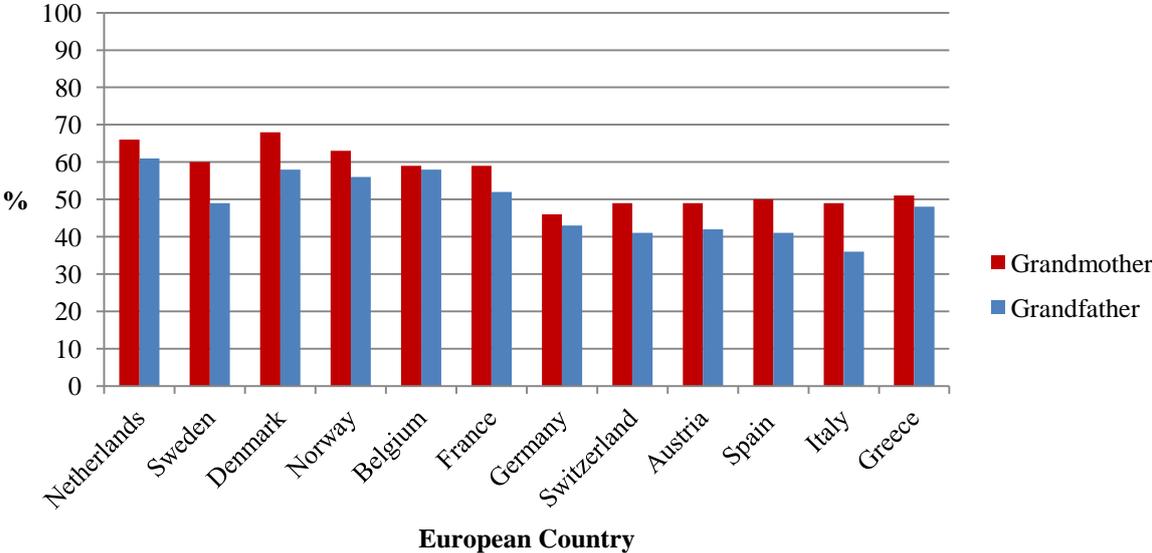
Besides, there was a clear gender difference; ‘grandmothers and maternal grandparents were most likely to step in, compared to grandfathers and paternal grandparents’ (Thomese and Liefbroer, 2013, p.417). This gendered perspective is also very important according to Arber & Timonen (2012), who note that grandparenting is mostly performed by the grandmothers in practice.

2.4 The normative context in shaping the grandparents role

The type of welfare state and the type of family policies in a country strongly determine how the role of grandparents in the society is shaped (Herlofson & Hagestad, 2012). This macro perspective is perceived as very important by Herlofson and Hagestad (2012) to understand the individual perspective. In the European context research of Herlofson and Hagestad (2012) shows that there is a difference between Northern and Southern Europe. In Southern Europe grandparents are more involved in daily life of their grandchildren, see figure 8, to make it possible for mothers to combine motherhood and employment, because the welfare state lacks this support. Therefore grandparents are

defined as ‘mother savers’ in Southern European familialistic welfare states. In Northern Europe the welfare state is supportive towards women to combine motherhood with their work by providing and stimulating formal care. Still, in Northern European countries, including the Netherlands ‘young parents say that they would not make it without the support from their own parents in times of need’ (Herlofson & Hagestad, 2012, p.29), and define grandparents as ‘family savers’ in their type of welfare state. The comparative research of Herlofson and Hagestad (2012) in Europe shows that around 30% of the Dutch grandparents strongly agrees that they need to be there for their grandchildren in cases of difficulty, but only 8% of the grandparents strongly agrees that they need to contribute to their grandchildren’s financial security. Compared to Southern European countries the Netherlands scores lower on both statements. However, contrary to the outcomes on these two statements, the Netherlands has higher proportions of grandparents regular involvement in grandchild care than other Southern European countries, see figure 7.

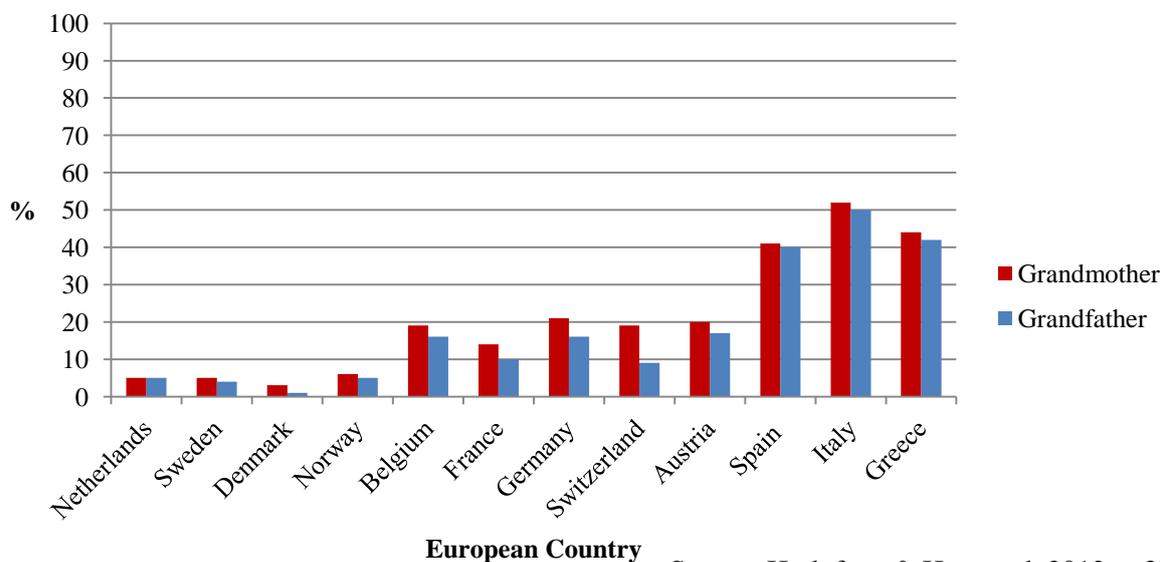
Figure 7 ‘Percentage of grandparents (aged 50-79) who look after their grandchildren ‘regularly’ or ‘occasionally’ (past 12 months), by country and gender’



Source: Herlofson & Hagestad, 2012, p.36

Among the grandparents in figure 7 there is a big difference when it comes to daily involvement in childcare. In that case Southern countries like Spain, Italy and Greece score high and the Netherlands scores low, see figure 8. These results show that Dutch grandparents are regularly involved with grandchild care, but generally not on a daily basis.

Figure 8 ‘Percentage of grandparents (aged 50-79) who provide daily (or almost daily) grandchild care among grandparents who look after grandchildren at least occasionally (past 12 months), by country and gender’



Source: Herlofson & Hagestad, 2012, p.37

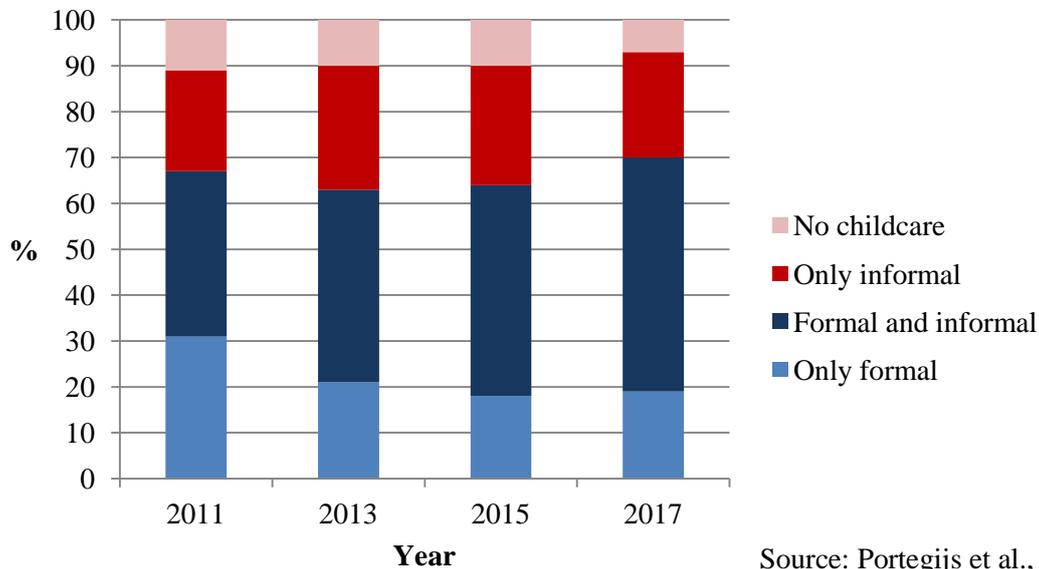
2.5 The role of the welfare state in childcare

The European Union (2018) advocates to increase good quality formal childcare in European member states in order to increase the labour force participation of both, men and women. Especially, low female labour force participation is seen as an economic loss ‘counting to 370 billion euro a year loss for Europe’ (European Union, 2018, p.1) of which caring responsibility is the main cause. Therefore, Barcelona Targets were set to improve pre-school childcare. First Barcelona target is to make good quality and affordable childcare available for 33% of children aged under three. Second Barcelona target is to make good quality and affordable childcare available for children aged three up to mandatory school age. Mills et al. (2014) found that both targets have been surpassed by the Netherlands. It was also found that the Netherlands mainly use formal childcare for the pre-school age on a part-time bases (less than 30 hours a week), which is not surprising considering the low full-time employment rate of mothers (Mills et al, 2014). Figure 9 shows that in the Netherlands the combination of formal and informal care is relatively most used by Dutch parents.

Also the Dutch government (2011) is supportive towards women to combine motherhood and employment. This is reflected in the 2005 Dutch Childcare Act, which was created to stimulate women to participate in the labour market due to making formal childcare more accessible and letting childcare providers compete in order to lower the fees for the care. There are two types of formal childcare in the Netherlands: day-care centres and home daycares. In day-care centres employed professionals take care of children aged three months up to 4 years (mandatory school age) during the day from Monday up to and including Friday. The number of children per staff member varies between four and a maximum of eight children. For older children, at primary school, pre- and after-school care is possible. In home daycares self-employed childminders take care of maximum four children in their own home, or the children’s parents’ home. The Government of the Netherlands (2011a) states that the childcare costs not only need to be paid for by parents, but also by employers and the government. For employers this means that the government implemented a childcare levy. From the government itself Dutch parents can get a childcare allowance, which is provided for each child, based on the costs for formal childcare and the income situation of the nuclear family. An important condition for receiving the allowance is that the childcare organisation (day-care centres or home daycares) must be accredited following the rules and regulations stated in the Dutch Childcare Act. It is even possible for parents to receive allowance if the grandparents babysit their children on a

regular basis. Nonetheless, the grandparents than must be able to show that they adhere to the requirements of the Childcare Act, which involves childcare bureaus to see if they qualify (Government of the Netherlands, 2011a).

Figure 9 Use of childcare children aged 0 – 3 in the Netherlands, 2013-2017



Source: Portegijs et al., 2018

Additionally, in the Netherlands pregnant women are entitled to have pregnancy and maternity leave at a minimum of 16 weeks. Normally the pregnancy leave starts between six to four weeks before the expected day of birth. The maternity leave starts at the day the baby is born and lasts at least for ten weeks, even if the baby is born later than the due date. So, the pregnancy and maternity leave together are a continuous period that consist of at least 16 weeks and might be extended if the baby is born late. Women who want to resume their work earlier are still obligated to take at least 42 days of maternity leave after the birth (Government of the Netherlands, 2011b). The benefits for the leave normally are the same as the income of the women, with a maximum around €175 per day. If your income is above the maximum, it drops during the pregnancy and maternity leave. If a women is employed, the leave needs to be applied for at their employer. If a women is self-employed or unemployed the leave needs to be applied for at the Social Security Agency UWV. As proof of the pregnancy an official statement of the due date is needed from a midwife or a doctor (Government of the Netherlands, 2011b).

Besides maternity leave there is also paternity leave in the Netherlands. This leave, for the partner of the women, consisted of two paid days, which could be supplemented with three days unpaid parental leave. However, current cabinet increased the number of paid paternity leave days from two to five per January 1st 2019. Aim was to make partners able to take up more leave time without any financial consequences. So, for paternity leave, five days is the standard now (Government of the Netherlands, 2016). Finally, parents can take up unpaid parental leave to take care of children under the age of eight. The arrangements of unpaid parental leave differ per collective labour agreement (Cao) (Government of the Netherlands, 2011c).

2.6 Spatial differences in fertility

Besides changes in fertility over time, new demographics of grandparents and the role of the welfare state in shaping roles within families, the spatial dimension might also influence fertility. In the previous century Sharlin (1986) did research on the relationship between urban-rural differences in fertility in Europe by looking at the Demographic Transition the European countries have gone through.

Sharlin (1986) found that marital fertility in cities is often lower than marital fertility in rural areas, whereby the decline in fertility set in earlier in urban and was faster areas than in rural areas. Still, he also found contradictory examples of European countries in which it was the other way around. So, the relationship appeared not to be causal. Sharlin (1986) addressed that there were even more striking differences in fertility between regions, to which is referred as 'cultural areas' (p.258). Hence, rural-urban differences in fertility would be subordinate to regional differences in fertility. Therefore Sharlin (1986) stated that if there are no significant regional differences in fertility, differences in rural-urban fertility are not to be expected.

However, more recently researchers do acknowledge a relationship between settlement size and fertility (Kulu et al., 2007). Kulu et al. (2007) give an overview of research done in North America and Europe, which show that there is 'a significant urban-rural variation in fertility level ... in post-transition North American and European societies' (p.268). Kulu et al. (2007) themselves examined below-replacement fertility differences in Nordic countries (Denmark, Finland, Norway and Sweden) in post demographic transition. It was acknowledged that the gap between urban and rural fertility levels has decreased, but it was found that 'the larger the settlement, the lower the fertility' (Kulu et al., 2007, p.265).

After this finding, Kulu (2013) contributed a more detailed research on differences between urban and rural fertility, looking at compositional and contextual causes. First compositional difference is that fertility differences might be related to educational level of people living in certain places. Kulu (2013) argues that higher educated people have lower fertility rates and because urban areas contain the highest share of high educated people this could be an explanation of low fertility in urban areas. Secondly, the share of students, often childless, is also biggest in cities and this may therefore lower fertility rates in urban areas. Thirdly, the share of married couples is highest in smaller settlements, which is linked to higher fertility in rural areas. However, Kulu (2013) acknowledges that nowadays cohabitation and having children is also very common, which decreases the importance of marriage before having children and therefore makes the third argument less strong. Last compositional factor considered by Kulu (2013) is selective migration. Selective migration within fertility variation is explained by couples moving from larger to smaller settlements, for the sake of raising their children in a more suited place. Hence, Kulu (2013) found that this form of migration often takes place over a small distance, from the city to a more rural suburb near the city, which is often not visible in data.

Second, there are contextual factors causing fertility differences between urban and rural areas 'through economic opportunities and constraints or cultural factors' (Kulu, 2013, p.897). Firstly, the spatial difference in the costs of the children is discussed. There is an argument that urban children are more expensive through higher costs for products and services compared to rural costs for products and services. Besides, parents in urban areas would have higher costs and consume more time for transportation of their kids to different daily activities compared to rural parents. However, this argument is refuted, because cities do have more clustered and variety in amenities than rural areas, therefore these transportation costs and time consumption for parents would be lower in cities compared to rural areas. Lastly, the urban setting would lead to higher spending on children because of the presence of all kinds of different services, amenities and social norms, whereas in rural areas there is less pressure on parents to live up to these norms and children might even be contributing to family income when the parents for example run a own business. Secondly, in urban areas there are more opportunities and normative pressure in the labour market. Therefore, having a child for parents in urban areas has higher opportunity costs, creating a greater work and family life conflict, than in rural areas. Both, the economic constraints and the economic opportunities are a rational view of utility maximising. However, Kulu (2013) argues that childbearing is not only a rational choice, also culture plays an important role. Rural couples are described as 'family-oriented subculture within a country' and urban couples are faced with 'individual autonomy and self-actualization ... which usually means fewer children' (Kulu, 2013, p. 898). Cities are more heterogeneous: besides family-oriented couples they have singles and childless couples (Kulu, 2013).

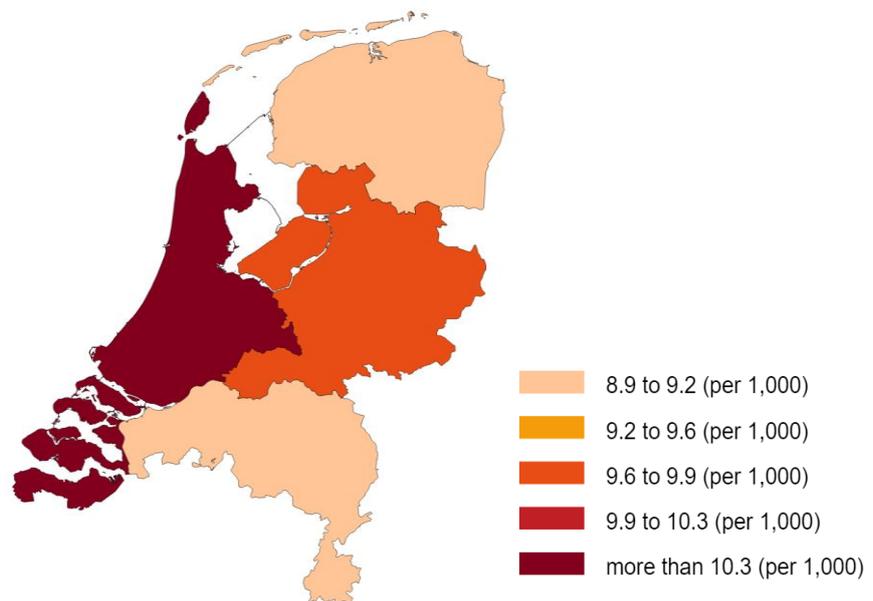
The last contextual cause of difference in fertility between urban and rural areas discussed by Kulu (2013) is the residential environment. Unlike urban areas, rural areas are perceived as child-friendly, open and natural spaces. Therefore, people in small settlements are more likely to be exposed to other families with children. Besides the environment, also the housing type and size appeared to be

important for fertility level differences. Urban areas are characterized by terraced housing and apartments, in which fertility levels are lower than the housing characteristics of rural areas, where people mainly live in semi-detached and detached houses (Kulu, 2013). Opportunities and constraints on the housing market therefore also shape the fertility decisions of couples. In urban areas moving opportunities are often limited, which might lead to lower fertility, whereas in rural areas more moving opportunities might lead to higher fertility (Mulder, 2006; Kulu, 2013).

2.7 Spatial differences in the Netherlands

As can be seen on the map in figure 10 the live born children ratio is highest in the Western part of the Netherlands (more than 10.3 per 1,000), followed by the Eastern part (9.6-9.9 per 1,000) and the Northern and Southern part (both 8.9-9.2 per 1,000).

Figure 10 Live born children ratio per country part Netherlands 2017

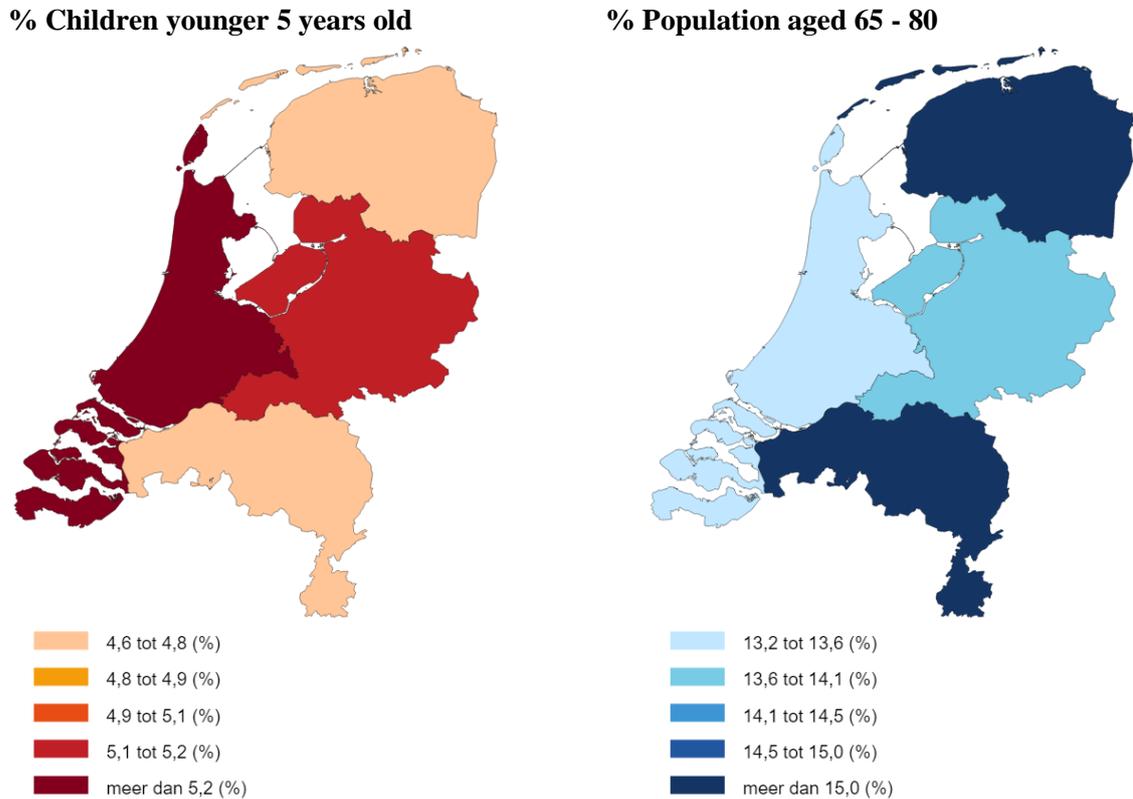


Source: Statistics Netherlands, 2019d

Additionally, to see how children and elderly are spatially distributed in the Netherlands two age-groups, 0-5 years old and 65-80 years old, are mapped according to the four country parts of the Netherlands (NUTS-1: North, South, East and West), see figure 11. The Western part of the Netherlands consists for a large part of the Randstad, which is the economic and politic centre of the country. The largest cities of the Netherlands (Amsterdam, Rotterdam, Den Haag and Utrecht) are located in the Randstad, which is therefore the most urbanized part of the country. The left map shows the relative part of the population aged under five. The highest percentage of this age-group can be found in the Western part of the Netherlands (over 5.2%), second is the Eastern part and lowest percentages of children under five are found in the Northern and the Southern parts of the Netherlands (4.6 - 4.8%). The right map shows the relative part of the population that is aged between 65 and 80, who are the potential grandparents. As can be seen, and also shown in figure 6, this age-group is bigger than the youngest age-group in the population. The Northern and Southern part contain the highest percentages of people aged 65 – 80 (above 15%), followed by the Eastern part, and the Western part shows the lowest share of people aged 65 – 80 (13.2 – 13.6%). Spatially, the two age-groups are contrary distributed in the country parts. Comparing the two maps shows that in the more rural parts of the Netherlands (North and South) the share of children under five is lowest and the share of people aged 65 – 80 is highest, and the most urbanized part of the country (West) contains the

largest share of children under five, while the share people aged 65 – 80 is lowest in this part. This indicates that there is a larger supply of grandparents for a smaller amount of grandchildren in the Northern and Southern rural areas of the Netherlands, whereas there in the Western and Eastern areas there are more grandchildren and fewer grandparents.

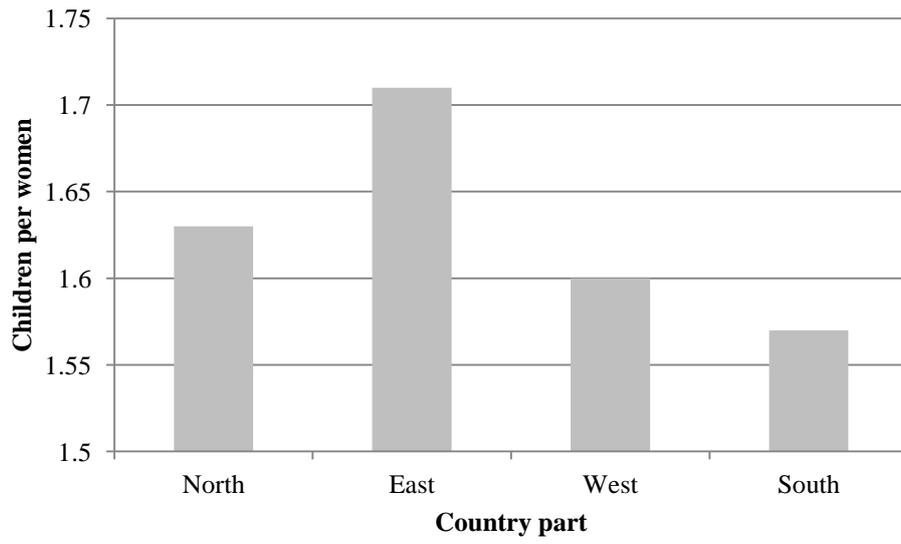
Figure 11 Age-groups (relative) per country part Netherlands 2017



Source: Statistics Netherlands, 2019d

Nevertheless, the Western region does not have the highest number of children per women. In figure 12 it can be seen how the total fertility rate (TFR) differs in the four country parts. The highest TFR can be found in the Eastern part and the lowest TFR can be found in the Southern part. Statistics Netherlands examined differentiation in TFR between Dutch municipalities (2017). First, it appeared that the TFR is highest in municipalities located in the Bible Belt, a region where Reformed people with live with the traditional family norms that prefer larger families. This region reaches from the South-West to the Eastern part of the Netherlands, in which the highest TFR's where found in municipalities in the Eastern part of the Bible Belt. So, the high TFR of the Eastern part in figure 12 can be explained by the high TFR of people in the Bible Belt located in this area. Second, lowest TFR's where found in the municipalities with the university cities that contain large shares of students, as also found by Kulu (2013) in Nordic countries. The students often already left the urban areas because of work when they start a family (Statistics Netherlands, 2017). Lastly, low TFR was found in the most Southern part of the Netherlands (Limburg), in which municipalities face population decline. Young people are leaving this region to start a family elsewhere (Statistics Netherlands, 2017).

Figure 12 Total Fertility Rate North, East, West and South Netherlands 2017



Source: Statistics Netherlands, 2019d

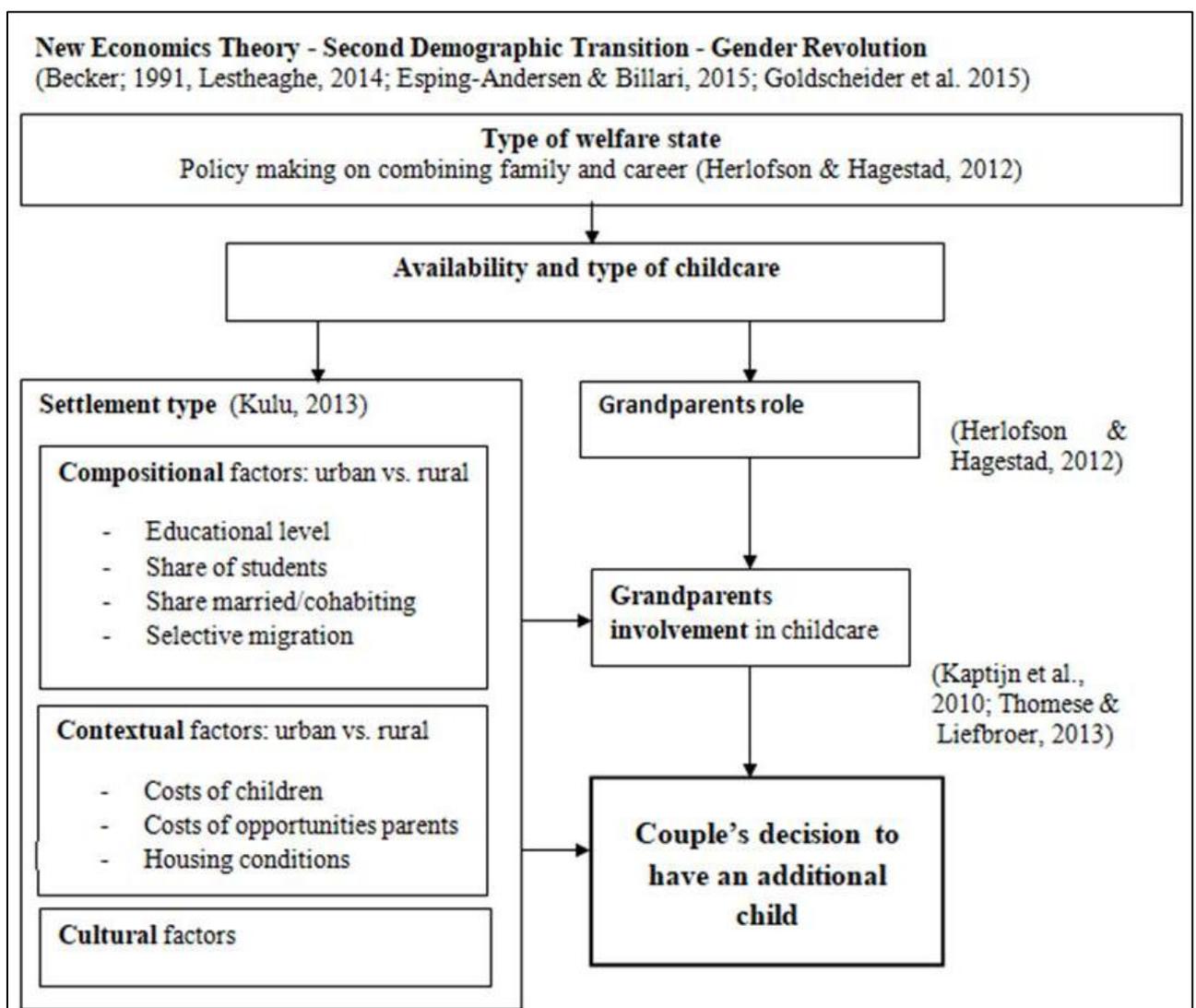
2.8 Conceptual model

From the theories and the previous researches discussed in this chapter the conceptual model is derived, see figure 13. First, the overall basis of the conceptual model are the New Economics Theory (Becker, 1991), the Second Demographic Transition Theory (Lesthaeghe, 2014) and in addition to these two theories, Esping-Andersen and Billari (2015) and Goldscheider et al. (2015) who include the Gender Revolution as an important factor in explaining the changing family behaviour and the development of fertility in developed countries.

Second, the boxes at most left are the empirical supports from Kulu (2013) that explain fertility differences on the hand of compositional, contextual and cultural factors. These factors are focussed on differences between rural and urban areas. These differences might be reasons for grandparents to step in or not step in for grandchild care, and can influence a couple's (nuclear family) decision to have or not have an additional child and therefore create variation in fertility between rural and urban areas.

Additionally, it is important to take the context of the welfare state the couple lives in into account as a whole. The existing or missing governmental support for formal childcare can shape the normative preference for formal childcare and/or grandparental childcare (Herlofson & Hagestad, 2012). Adding to this, there is the empirical proof that grandparents (extended family) involvement in childcare can have a significant influence on the couple's decision: to have or not have an additional child.

Figure 13 Conceptual model additional childbirth



2.9 Hypotheses

Based on the findings of Kulu (2013) and the findings of Kaptijn et al. (2010) and Thomese and Liefbroer (2013) I expect that there will be variation in grandparental childcare, and a positive effect on the likelihood of fertility when grandparents are involved, between rural and urban context and in different parts of the Netherlands. I expect that compositional and contextual factors will cause the variation in grandparental childcare between urban and rural areas and different Dutch country parts.

With the binary logistic regressions the following null hypotheses will be tested:

1. Urban and rural areas are different in the relationship between usage of grandparental childcare and additional childbirth.
2. The Dutch country parts (North, South, East, and West) are different in the relationship between usage of grandparental childcare and additional childbirth.

3. Method

The interest of this research is to investigate whether there is a spatial variation in grandparental childcare and its consequences on the likelihood of additional childbirth. The method used in this thesis will be very similar to the design of the research of Thomese & Liefbroer (2013) about the role of grandparents on childcare and childbirths in the Netherlands. The same dataset and statistical method will be used. Sample selection will also be largely similar. However, this thesis will add new geographical independent variables based on literature from Kulu (2013).

3.1 Data and statistical method

In this thesis quantitative research will be done with the Netherlands Kinship Panel Study dataset collected by Dykstra et al. (2005). The database allows ‘the examination of family and kinship in the Netherlands from a dynamic multi-actor perspective’ (Dykstra et al., 2005, p.11). One of the central components of the NKPS is to conduct research on family relationships that go beyond the nuclear family. This is why this database is suited for this research: the role of grandparents (extended family) in the fertility decisions of the nuclear family.

The data that will be used in this study consists of the random main sample. The data is collected in four waves of which the first two main samples will be used in this analysis. The first Wave was collected in 2002-2004 by face-to-face interviews with the assistance of laptops (CAPI) and complemented by self-completion questionnaires. The main sample consists of 8161 respondents and the response rate was 42.2%. The second Wave was collected in 2006 -2007, additional methods were used: telephone and web interviewing (CATI & CAWI), by which 6091 respondents were re-interviewed (Dykstra et al., 2004; 2012).

To answer the research question binary logistic regression will be performed. The (limited) dependent variable is having additional child in Wave 2 (‘yes/no’). The information for this variable will be obtained from Wave 2. In the second Wave ‘respondents were asked ‘Did you have any children with your (ex-)partner since the last interview?’’ (Thomese & Liefbroer, 2013, p.409.). When this question is answered positive (yes), this will be measured as an additional birth. The choice to not use Wave 3 and Wave 4 is made because of the low number of additional births in Wave 3 and Wave 4. Too few observations were left to use in the analysis.

The most important independent variables are the two geographical variables and the variable about grandparental childcare. First geographical variable is made by recoding the categorical variable urbanization level of the municipality of the respondent, to a rural vs. urban dummy variable. Second geographical variable is made by recoding the twelve Dutch provinces into four country parts: North, East, South, and West. These four country parts are NUTS-1 level. I choose to use this level to have a good size of observations for each category and this is also a geographical level that is used within Statistics Netherlands. Thirdly, the grandparental childcare variable is recoded like Thomese and Liefbroer (2013) did. The following interview question is used: ‘In the last three months, did you receive help from {name, description} with taking care of the children, such as babysitting, care, bringing and fetching? Answer categories were ‘none’(1), ‘once or twice’(2), ‘several times’ (3)’ (Thomese & Liefbroer, 2013, p.409). Questions answered with ‘several times’ (3) will be a positive measure for grandparental childcare. This question was asked to three persons: the father, the mother and one of the parents-in-law of the respondent. If one of these persons answered ‘several times’ (3) I coded grandparental childcare as ‘yes’ (1). If none of these persons answered ‘several times’ (3) I coded grandparental childcare as ‘no’ (0).

Besides these three important independent variables, two other control variables will be used. To make sure there is not too much correlation between the independent variables the number of control variables is limited. The following control variables will be derived from Wave 1, i.e. before the individuals took the decision to have an additional child:

- age of the respondent
- number of children of the respondent

Additionally, based on my hypotheses, interactions between the geographical variables and the grandparental childcare variable will be added to the model. Lastly, I will run other model specifications with more control variables to see whether the results are robust.

Model 1:
 $\text{Ln(odds) Additional childbirth} = \text{constant} + \beta_1 * \text{age} + \beta_2 * \text{number of children} + \beta_3 * \text{grandparental childcare} + \beta_4 * \text{rural vs. urban} + \beta_5 * \text{grandparental childcare} \# \text{rural vs. urban} + e$

Model 2:
 $\text{Ln(odds) Additional childbirth} = \text{constant} + \beta_1 * \text{age} + \beta_2 * \text{number of children} + \beta_3 * \text{grandparental childcare} + \beta_4 * \text{country parts NUTS1} + \beta_5 * \text{grandparental childcare} \#\text{country parts NUTS1} + e$

3.2 Data cleaning and sample selection

As stated before, the data cleaning and sample selection will largely be in line of the sample selection of Thomese and Liefbroer (2013). First, the NKPS Waves were merged together according to the family numbers of respondents. Data consistency has been checked by comparing the variables sex and birth year of the respondents in each Wave. After merging the Waves together, first the respondents were selected who participated in two Waves (n=6,091). Second, all the respondents aged 50 years or older were dropped because they fall outside the range of the fertile ages to be able to have an additional child (n=3,617). Thirdly, to know if grandparents are involved in the childcare, respondents were selected on having at least one child (n=2,212). Fourth, to clean the dependent variable ‘additional child in Wave 2’, the missing values of this variable have been dropped (n=1,357). Lastly, to clean the main explanatory independent variable ‘grandparental childcare’, the missing were dropped. This decision was made based on two models I run, one with and one without the missing category, but the results did not change. Therefore the missing in grandparental childcare were dropped, which brings the sample size back to n=941. The descriptive statistics of the missing grandparental childcare, compared to the non missing grandparental childcare, can be seen in appendix A.4.

Table 1 shows the frequency of additional childbirths in Wave 2 within the final sample. From the total selected sample 25.40% of the respondents in Wave 1 had an additional child in Wave 2.

Table 1 Frequency of having an additional child in Wave 2 (dependent variable)

	Freq.	Percent	Valid	Cum
0 ‘no’	702	74.60	74.60	74.60
1 ‘yes’	239	25.40	25.40	100.00
Total	941	100.00	100.00	

Table 2 shows the frequency of grandparental childcare in the sample. 32.62% of the respondents receive grandparental childcare from one of the parents (father, mother or a parent-in-law) and 33.37% of the respondents receive grandparental childcare by more than one of the parents. So, in total 65.99% of the respondents receives grandparental childcare. For more descriptive statistics about grandparental childcare vs. no grandparental childcare see appendix A.1.

Table 2 Frequency of grandparental childcare in Wave 1 (independent variable)

	Freq.	Percent	Valid	Cum
0 'no'	320	34.01	34.01	34.01
1 'yes, by one parent'	307	32.62	32.62	66.63
2 'yes, by more than one parent'	314	33.37	33.37	100.00
Total	941	100.00	100.00	

Table 3 shows the percentages of the selected respondents in the different categories of the two geographical variables. The frequency of the rural vs. urban variable shows that in the sample 37% of the respondents live in a rural municipality and 63% of the respondents live in an urban municipality. The variable with the country parts contains a large share of respondents in the Western country part and has a small share of respondents in the Northern country part. The respondents in the Eastern and the Southern country parts both evenly represented in the sample.

Table 3 Frequency of geographical independent variables (n=941)

% Rural vs. urban	
Rural	37%
Urban	63%
% Country part (NUTS-1) respondent (1-4)	
West	40%
North	10%
South	25%
East	25%

4. Results

The descriptive statistics about the sample in this analysis are provided in table 4 (extended table see appendix Table A.2). The descriptive information gives the first important information about the selected sample. The total sample consists for 69% of women and 31% of men. Overall, 25% of the respondents had an additional child in Wave 2. From all the respondents 66% received help from grandparents in caring for their children. In 28% of the cases the support came from the grandfather, in 49% of the cases the grandmother was involved and in 33% of the cases one of the grandparents-in-law was involved.

Table 4 Descriptive statistics sample and rural vs. urban

Variables	All (N=941)		Urbanity	
	M or %	SD	Rural (n=349)	Urban (n= 592)
% Women (n=645)	69%		32%	31%
% Men (n=296)	31%		68%	69%
% Additional child (Wave 1 vs. Wave 2)	25%		25%	26%
% Receiving grandparental childcare	66%		63%	68%
% Receiving childcare from grandfather	28%		29%	27%
% Receiving childcare from grandmother	49%		47%	50%
% Receiving childcare from grandparent-in-law	33%		32%	33%
<i>Compositional factors</i>				
Age of female respondent (17-50)	34.45	4.36	34.15	34.63
Age of male respondent (17-50)	36.85	4.95	36.93	36.80
Age of mother	63.15	7.51	63.33	63.04
Age of father	65.90	8.07	65.79	65.96
Educational level female respondent (1-4)	2.11		2.02	2.16
Educational level male respondent (1-4)	2.29		2.04	2.44
Number of children	2.01		2.08	1.97
Number of working hours female respondent	21.70	9.09	20.37	22.45
Number of working hours partner of female resp.	42.64	11.35	43.05	42.40
Number of working hours male respondent	42.55	9.91	44.02	41.65
Number of working hours partner of male resp.	16.85	12.32	18.34	16.12
<i>Contextual factors</i>				
% Paid childcare	38%		32%	41%
Housing type respondent (1-5)	2.97		2.34	3.35

Rural vs. Urban

Also the descriptive statistics of the variable rural vs. urban can be seen in table 5. The percentage of the respondents that had an additional child in Wave 2 was 25% for rural areas and 26% for urban areas. The overall grandparental childcare received was 5% higher in urban areas (68%) compared to rural areas (63%). Comparing grandfathers shows that in rural areas grandfathers were more involved compared to urban areas (29% vs. 27%), whereas in urban areas grandmothers were more involved compared to rural areas (47% vs. 50%).

First compositional difference, looking at educational levels of female and male respondents, shows that the level is for both slightly higher in urban areas compared to rural areas (female: 2.15 vs. 2.02, male: 2.44 vs. 2.04). Second, the number of children in the families is slightly higher in rural areas (2.08) compared to urban areas (1.97). Third, the number of working hours shows that overall the male works full-time (over 40 hours a week) and the female works part-time (less than 23 hours a week). Contextually, in urban areas 41% of the respondents use paid childcare, whereas in rural areas

only 32% of the respondents use paid childcare. Second, housing type also does differ between urban and rural areas (3.35 vs. 2.34).

Country parts

Table 6 shows the descriptive statistics of the four different country parts used in the analysis (extended table see appendix Table A.3). Important to keep in mind are the differences in sample size per country part. Western country part has the largest sample size (n=379) and the Northern country part has the smallest sample size (n=94). So, the country parts are not all equal represented. In the Western and Eastern part 25% of the respondents had an additional child, in the Southern part this was 26% and in the Northern part this was 27%. The most grandparental childcare was received in the Eastern part (69%) and the least grandparental childcare was received in the Northern part (55%). Overall, in all country parts the most childcare was received from the grandmother (45%-50%).

The compositional descriptive statistics show that the female respondents are on average youngest in the Eastern part and oldest live in the Western part. Youngest male respondents live in the Northern part and oldest male respondents live in the Southern part. Additionally, in every country part the father of the respondent is older than the mother of the respondent. Second, educational level is highest for females in the South and males in the West. Educational level is lowest for females in the North and males in the South. Third, the number of children is in all country parts around 2. Fourth, the number of working hours of the respondents and their partners show that the females work part-time in all four country parts and the males work full-time in all four country parts.

Contextually, the use of paid childcare is highest in the Western country part (44%) and lowest in the Eastern country part (31%). Second, housing type differs the most between the Western (3.53) and the Northern (2.26) country parts.

Table 6 Descriptive statistics country parts

Variables	Country Parts			
	West (n=379)	North (n=94)	South (n=234)	East (n=234)
% Additional child (Wave 1 vs. Wave 2)	25%	27%	26%	25%
% Receiving grandparental childcare	66%	55%	68%	69%
% Receiving childcare from grandfather	27%	24%	28%	30%
% Receiving childcare from grandmother	49%	45%	48%	50%
% Receiving childcare from grandparent-in-law	34%	22%	33%	35%
<i>Compositional</i>				
Age of female respondent (17-50)	34.79	34.53	34.63	33.68
Age of male respondent (17-50)	37.02	35.39	37.40	36.78
Age of mother	62.96	62.52	63.64	63.21
Age of father	66.07	65.30	66.05	65.73
Educational level female respondent (1-4)	2.15	1.97	2.17	2.01
Educational level male respondent (1-4)	2.42	2.31	2.11	2.25
Number of children	2.01	1.97	1.96	2.09
Number of working hours female respondent	22.73	21.52	21.17	20.63
Number of working hours partner of female resp.	42.17	40.36	44.89	41.90
Number of working hours male respondent	42.70	40.21	43.49	42.53
Number of working hours partner of male resp.	14.25	20.41	19.71	16.33
<i>Contextual</i>				
% Paid childcare	44%	40%	34%	31%
Housing type respondent (1-5)	3.53	2.26	2.55	2.78

To test my hypotheses two binary logistic regressions are performed with focus on the grandparental childcare and the geographical variables. Model 1 and model 2 below are the fitted regression models. For both models the control variables age and number of children were significant on a 99% confidence level and have a negative effect on additional childbirth (see appendices B.1 and B.2 for the regression tables). For model 1, the grandparental childcare variable and the rural vs. urban variable were not significant. The interaction between grandparental childcare and rural vs. urban was significant for yes # urban (compared to no # rural) on a 90% confidence level, but not significant on a 95% confidence level. For model 2 the variables grandparental childcare and country parts were not significant. Also the interaction between those two variables was not significant.

Model 1:

$$\text{Ln(odds) Additional childbirth} = 7.074 - 0.170 * \text{age} - 1.191 * \text{number of children} - 0.311 * \text{grandparental childcare} - 0.541 * \text{urban} + 0.739 * \text{grandparental childcare} * \text{urban}$$

Model 2:

$$\text{Ln(odds) Additional childbirth} = 7.026 - 0.171 * \text{age} - 1.201 * \text{number of children} - 0.232 * \text{grandparental childcare} - 0.086 * \text{country part WEST} + 0.116 * \text{country part NORTH} - 0.258 * \text{country part SOUTH} + 0.232 * \text{grandparental childcare} * \text{country part WEST} - 0.287 * \text{grandparental childcare} * \text{country part NORTH} + 0.467 * \text{grandparental childcare} * \text{country part SOUTH}$$

Additionally, I checked whether my results were robust. Besides model 1 and model 2 I ran other model specifications with more different control variables. Nevertheless, the results did not change in sign and size, only in significance. So, I decided to present the two simplest models and not over control my model and take out variance.

Interpreting the conditional effects of a logistic regression on the logit scale is rather complex, therefore transformation to predicted probabilities, which can be done with the margins command, is recommended (Mehmetoglu & Jakobsen, 2017). Figures 13 and 14 show the margin plots of the interactions between grandparental childcare and the geographical variables in the two models. These plots show the predicted probabilities, with 95% confidence intervals, to have an additional child for the two interactions of the two models. Figure 13 shows that in rural areas the predicted probability of having an additional child is higher when grandparents are involved in the childcare (0.27) compared to when they are not involved (0.21). For the urban area this seems to be the other way around: higher predicted probability of having an additional child when there are no grandparents involved (0.29) compared to when grandparents are involved (0.24). However, confidence intervals overlap each other, so there is not a significant difference in the probabilities to have an additional child when receiving or not receiving grandparental childcare. Also, there are no significant differences between rural and urban areas when it comes to receiving or not receiving grandparental childcare and the likelihood of additional childbirth as also there the confidence intervals overlap. Figure 14 shows that in the Western country part the predicted probability for having an additional child is equal for receiving or not receiving grandparental childcare (0.26). In the Northern (0.29) and Eastern (0.27) country parts the predicted probability for having an additional child is higher when there are no grandparents involved in the childcare. In the Southern country part the predicted probability for having an additional child is higher when grandparents are involved in the childcare (0.27). However, again none of these predicted probabilities are significantly different. Also, between the four country parts all the confidence intervals overlap, which means that there is no significant difference in grandparental childcare and the likelihood of additional childbirth between the four country parts.

Figure 13 Predicted probabilities for an additional childbirth: grandparental childcare # rural vs. urban

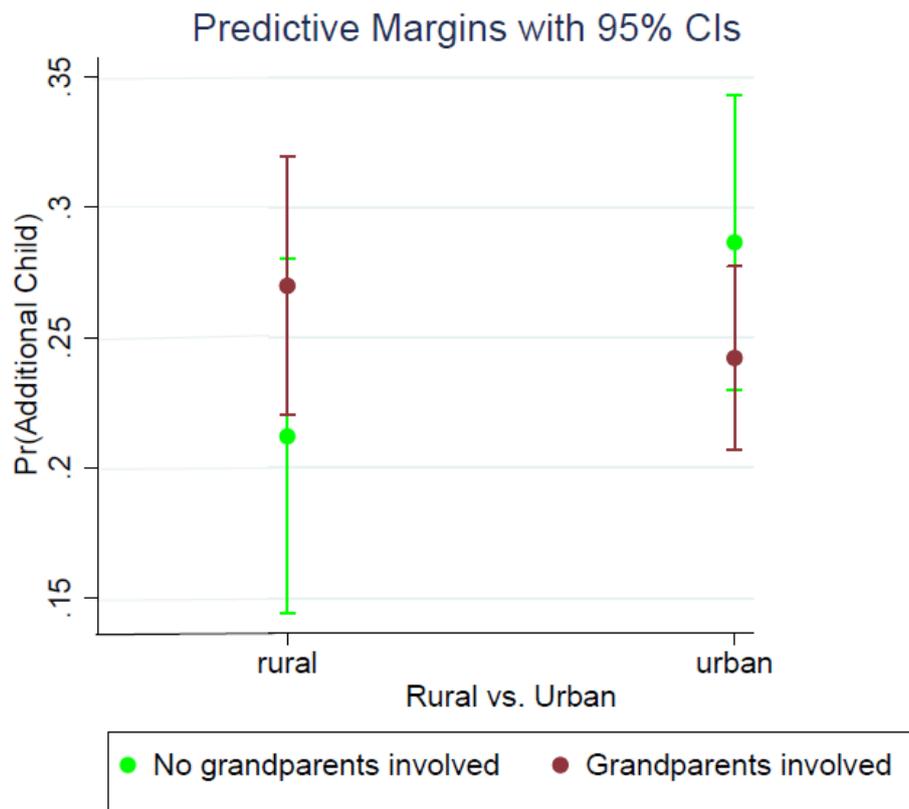
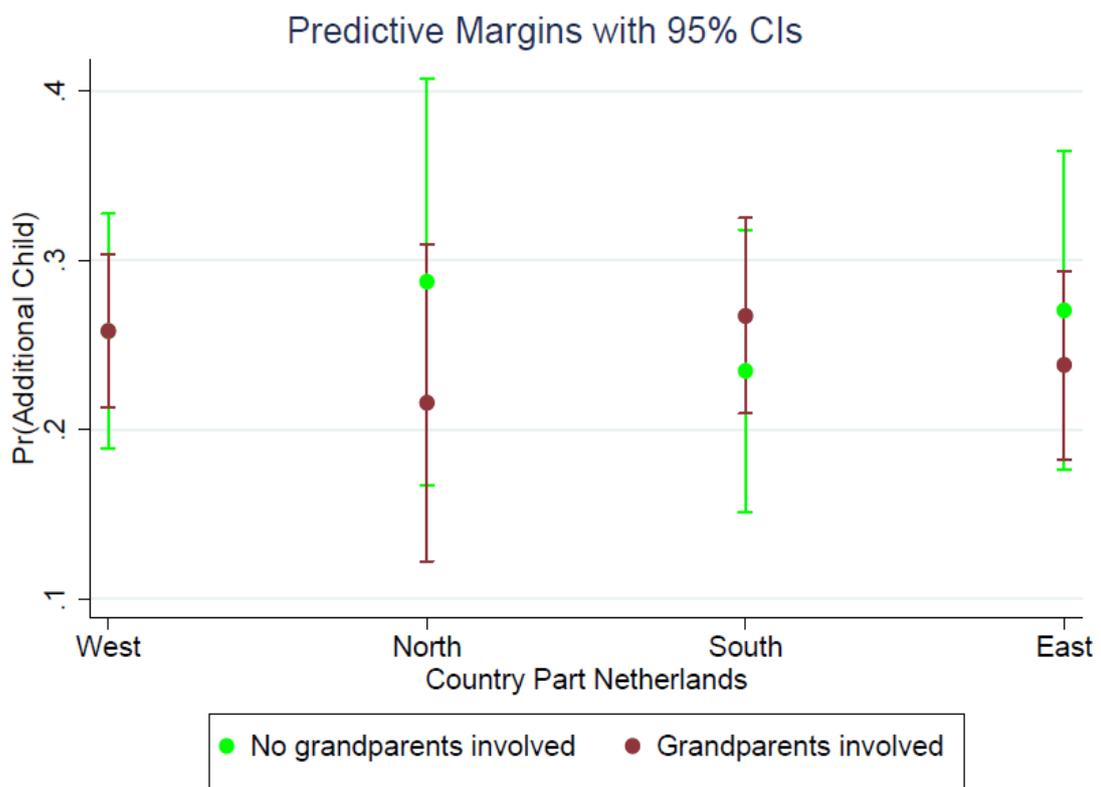


Figure 14 Predicted probabilities for an additional childbirth: grandparental childcare # country parts



5. Conclusion and discussion

Conclusion

The objective of this research was to investigate whether there is a spatial variation in grandparental childcare and its consequences on the likelihood of additional childbirth. Dutch couples, aged between 17-50, with at least one child were selected. The spatial part is examined by looking whether there are rural vs. urban differences and whether there are differences between the four different country parts of the Netherlands, NUTS-1 regions: North, East, South and West. Hypotheses were based on compositional and contextual differences between these two different spatial classifications. Grandparental childcare was coded as 'yes' when the respondent received help with childcare several times in the last three months. Two third of the couples (66%) received help with the care for their children from at least one of their parents. The most of the care was given by the grandmothers (49%). From all the couples, a quarter (25%) had an additional child between Wave 1 and Wave 2. Besides, looking at the descriptive statistics, it was confirmed that in general the Dutch female works part-time (less than 23 hours a week) and the Dutch male works full-time (over 40 hours a week).

The descriptive statistics of the first model (rural vs. urban) show little compositional differences. The educational level of females and males is slightly higher in urban areas compared to rural areas (female: 2.15 vs. 2.02, male: 2.44 vs. 2.04), whereas the number of children is higher in rural areas (2.08) compared to urban areas (1.97). Contextually, more paid childcare is used in urban areas (41%) compared to rural areas (32%) and housing type differs (urban: 3.35 vs. rural: 2.34). After running the logistic regression for the first model it appeared that there is no significant difference in the interaction between the variables grandparental childcare and rural vs. urban. The predicted probabilities of the interaction show that in rural areas the predicted probability of having an additional child is higher when grandparents are involved in the childcare (0.27) compared to when they are not involved (0.21). For the urban area this seems to be the other way around: higher predicted probability of having an additional child when there are no grandparents involved (0.29) compared to when grandparents are involved (0.24). However, confidence intervals overlap, so there is not a significant difference.

The descriptive statistics of the second model (country parts) show some little compositional differences regarding age and educational level of female and male respondents. Contextually, there is again difference in use of paid childcare and housing type. Use of paid childcare is highest in the Western country part (44%) and lowest in the Eastern country part (31%). Second, housing type differs the most between the Western (3.53) and the Northern (2.26) country parts. After running the logistic regression for the second model it appeared that there is no significant difference in grandparental childcare between the four country parts. The predicted probabilities of the interaction in the second model show that in the Western country part the predicted probability for having an additional child equal for receiving or not receiving grandparental childcare (0.26). In the Northern (0.29) and Eastern (0.27) country parts the predicted probability for having an additional child is higher when there are no grandparents involved in the childcare. In the Southern country part the predicted probability for having an additional child is higher when grandparents are involved in the childcare (0.27). However, again none of these predicted probabilities are significantly different.

To conclude, both hypotheses are rejected, which gives the following answer to the research question: I have find no significant spatial differences in grandparental childcare, and it does not significantly in- or decrease the likelihood of additional childbirth in the Netherlands.

Discussion

Fertility is a very personal matter, so modelling additional childbirth will only be partly explained by a quantitative analysis. As explained in the theoretical background and the conceptual model, there are many variables that (partly) explain fertility. Still, to prevent bias and correlation there is chosen to put a limited number of variables in the models. The control variables age and the number of children, the main variable grandparental childcare, the geographical variables and the interaction between the grandparental childcare and the geographical variables are considered. However, the measurement for the main independent variable grandparental childcare is not optimal, as also discussed by Thomese

and Liefbroer (2013). It does not become clear from the data whether the grandparents for example babysit on a 'regular basis ... whereas others may have provided it on a rather ad hoc basis only' (Thomese & Liefbroer, 2013, p.415-416). There might for example be an agreement between parents and grandparents to babysit at least on one (fixed) day a week when both parents work, while others just step in for certain irregular moments. It would be very interesting if these two different types of grandparenting have the same influence on fertility or not. Distinguishing between regular and ad hoc grandparental childcare would be interesting for the future, but is this data is not available yet.

Additionally, more information on the grandparents themselves could give a better picture of from their perspective. This information should contain information with compositional and contextual factors to see how the grandparents differ geographically.

Nonetheless, the results do show that in the Netherlands, in which the government is supportive towards combining work with family life and paid childcare is arranged, two third of the couples do use informal care by grandparents (66%). Paid childcare is used more in urban areas (41%) than in rural areas (32%), but in both areas complemented with grandparental childcare (68% vs. 63%). This supports the findings of Portegijs et al. (2018) which show that Dutch couples often use a combination of formal and informal childcare. Unfortunately, the data did not give any information on the quantity of both, formal and informal, childcare. It would for example give better insights when it is known how many hours of each type of childcare is used a week. Besides, when it comes to the Gender Revolution Theory (Goldscheider et al. 2015) it would be interesting to see how the primary childcare within the couple is divided. The NKPS data did not give detailed information on how the division of childcare is arranged within the couple. From the descriptive statistics on the working hours it could be deduced that women take more of the childcare take more care of the children compared to their male partners, because the descriptive statistics show that in general Dutch women mainly work part-time and Dutch men work full-time. So, to see whether in the Netherlands the males get more involved in the private households, which Goldscheider et al. (2015) imply with the Gender Revolution, more detailed information on childcare division within the nuclear household is needed.

Despite the expectations, there has not been found any significant spatial variation of grandparenting. Factors that might play a role are: the sample size and composition. The total sample (n=941) might have been too small and too homogeneous to capture enough variation within the different geographical areas. Therefore it would be beneficial if the database of the NKPS would be expanded in future. The more respondents, the smaller the geographical scale can be for investigation.

Another factor that might play a role in the non significance of the spatial variation in grandparental childcare might be selective migration, which Kulu (2013) also mentioned when looking into spatial variation of fertility. As explained before, selective migration within fertility variation is explained by couples moving from larger to smaller settlements, for the sake of raising their children in a more suited place. Hence, Kulu (2013) found that this form of migration often takes place over a small distance, from the city to a more rural suburb near the city. When these more rural suburbs are part of the urban areas within the data, this selective migration is not visible in an analysis. The in practice 'more rural' parts are still seen as urban, while its compositional and contextual factors are actually more rural. Still, Kulu (2013) emphasizes that it is not only the selective migration that explains spatial variation in fertility, but residential context also matters. Descriptive statistics (table 5) do show that the houses in rural areas are bigger than in urban areas.

Lastly, it would be interesting to do the analysis with more recent data. The data used dates from 2002 to 2007 but in the mean time the longevity of elderly has only increased further (Margolis & Wright, 2017) which might have other outcomes when it comes to grandparental childcare.

So in future, with a more precise measurement of the grandparental childcare, more information on childcare division within the couple, a more precise measurement of rural vs. urban, a larger and more recent dataset it would be interesting to redo the analysis to see if there are significant differences between rural and urban areas when it comes to grandparental childcare and fertility.

Ethical considerations

Anonymity of the participants of the Netherlands Kinship Panel Study is very important. Therefore the datasets will be handled with caution and stored save with a password. I have signed the statement of affiliation and confidentiality of the GGP. Due to the fact that it is secondary data, the data was already considerably anonymous. To make sure that the analysis done is transparent, the process of the sample selection and recoding is carefully described in the method chapter.

References

- Arber, S. & Timonen, V. (Ed.) (2012). *Contemporary grandparenting. Changing family relationships in global contexts*. Bristol: The policy Press.
- Arpino, B., Esping-Andersen, G. and Pessin, L. (2015). How Do Changes in Gender Role Attitudes Towards Female Employment Influence Fertility? A Macro-Level Analysis. *European Sociological Review*, 31(3), 370-382.
- Asping-Andersen, G. & Billari, F. C. (2015). Re-theorizing Family Demographics. *Population and Development Review*, 41(1), 1-31.
- Barnes, M., Gahagan, B., & Ward, L. (2018). *Re-imagining old age*. Wilmington: Vernon Press.
- Becker, G.S. (1991). *A treatise on the family*. Cambridge: Harvard University Press.
- Dykstra, P.A., Kalmijn, M., Knijn, T.C.M., Komter, A.E., Liefbroer, A.C. & Mulder, C.H. (2005). Codebook of the Netherlands Kinship Panel Study, a multi-actor, multi-method panel study on solidarity in family relationships, Wave 1. NKPS Working Paper No. 4. The Hague: Netherlands Interdisciplinary Demographic Institute
- Dykstra, P.A., Kalmijn, M., Knijn, T.C.M., Komter, A.E., Liefbroer, A.C. & Mulder, C.H. (2012). Codebook of the Netherlands Kinship Panel Study, a multi-actor, multi-method panel study on solidarity in family relationships, Wave 2. NKPS Working Paper No. 8. The Hague: Netherlands Interdisciplinary Demographic Institute.
- European Union (2018). Barcelona Objectives, on the development of childcare facilities for young children with a view to increase female labour participation, strike a work-life balance for working parents and bring about sustainable and inclusive growth in Europe (the “Barcelona objectives”). Retrieved on May 2nd 2019, from https://ec.europa.eu/info/sites/info/files/bcn_objectives-report2018_web_en.pdf
- Goldscheider, F., Bernhardt, E. & Lappegard, T. (2015). The Gender Revolution: A Framework for Understanding Changing Family and Demographic Behavior. *Population and Development Review*, 41(2), 207-239.
- Government of the Netherlands (2011a). Factsheet Childcare and Childcare Allowance. Retrieved on April 29th 2019, from <https://www.government.nl/documents/leaflets/2011/10/13/fact-sheet-childcare-and-childcare-allowance>
- Government of the Netherlands (2011b). Q&A pregnancy and maternity leave. Retrieved on April 29th 2019, from <https://www.government.nl/documents/leaflets/2011/08/24/q-a-pregnancy-and-maternity-leave>
- Government of the Netherlands (2011c). Q&A unpaid leave. Retrieved on April 29th 2019, from <https://www.government.nl/documents/leaflets/2011/10/20/q-a-unpaid-leave>
- Government of the Netherlands (2016). Longer paternity leave for partners. Retrieved on April 19th 2019, from <https://www.government.nl/latest/news/2016/09/09/longer-paternity-leave-for-partners>
- Herlofson, K. & Hagestad, G.O. (2012). Transformations in the role of grandparents across welfare states. In Arber, S. & Timonen, V. (Ed.), *Contemporary grandparenting. Changing family relationships in global contexts* (27-49). Bristol: The policy Press.

- Kaptijn, R., Thomese, F., Van Tilburg, T. G., & Liefbroer, A. C. (2010). How grandparents Matter. Support for the Cooperative Breeding Hypothesis in a Contemporary Dutch Population.. *Human Nature*, 21(4), 393-405.
- Kulu, H., Vikat, A., & Andersson, G. (2007). Settlement size and fertility in the Nordic countries. *Population Studies*, 61(3), 265-285.
- Kulu, H. (2013). Why Do Fertility Levels Vary between Urban and Rural Areas? *Regional studies*, 47(6), 895-912.
- Lesthaeghe, R. (2014). The second demographic transition: A concise overview of its development. *Proceedings of the National Academy of Sciences of the United States of America*, 111(51), 18112-18115.
- Margolis, R. & Wright, L. (2017). Healthy Grandparenthood: How Long Is It, and How Has It Changed? *Demography*, 54(6), 2073-2099.
- McDonald, P. (2006). Low fertility and the state: the efficacy of policy. *Population and Development Review*, 32, 485-510.
- Mehmetoglu, M. & Jakobsen, T. G. (2017). *Applied Statistics Using Stata, a guide for the Social Sciences*. London: SAGE.
- Mills, M., Präg, P., Tsang, F., Begall, K., Derbyshire, J., Kohle, L., Miani, C., Hoorens, S. (2014). Use of childcare in the EU Member States and progress towards the Barcelona targets. Retrieved on May 2nd 2019, from https://www.rand.org/pubs/research_reports/RR185.html
- Mulder, C.H. (2006). Population and housing: a two-sided relationship. *Demographic research*, 15, 401-412.
- Sharlin, A. (1986). Chapter 5. Urban-rural differences in fertility in Europe during the demographic transition. In A.J. Coale and S.C. Watkins (Eds.), *The decline of fertility in Europe* (234-260). Princeton University Press: Princeton.
- Statistics Netherlands (2015). Two kids, but when and with whom? Retrieved on May 13th 2019, from <https://www.cbs.nl/nl-nl/achtergrond/2015/07/twee-kinderen-maar-wanneer-en-met-wie>
- Statistics Netherlands (2017). PBL/CBS Regionale bevolkings- en huishoudensprognose 2016–2040: analyse van regionale verschillen in vruchtbaarheid. Retrieved on July 11th 2019, from <https://www.cbs.nl/nl-nl/achtergrond/2017/24/regionale-verschillen- vruchtbaarheid>
- Statistics Netherlands (2019a). Arbeidsdeelname vanaf 1969. Retrieved on 8th of February 2019, from <https://opendata.cbs.nl/statline/#/CBS/nl/dataset/83752NED/table?ts=1549621174924>
- Statistics Netherlands (2019b). Geboorte; kerncijfers. Retrieved on 8th of February 2019, from <https://opendata.cbs.nl/statline/#/CBS/nl/dataset/37422ned/table?ts=1549633709690>
- Statistics Netherlands (2019c). Population; key figures. Retrieved on April 29th 2019, from <https://opendata.cbs.nl/statline/#/CBS/en/dataset/37296eng/table?ts=1556524123674>
- Statistics Netherlands (2019d). Regional key figures. Retrieved on May 9th 2019, from <https://opendata.cbs.nl/statline/#/CBS/nl/dataset/70072ned/map?ts=1557408426552>

- Perez, S.A., Brakel, van den, M. & Portegijs, W. (2018). Emancipatiemonitor: 2018, Welke gevolgen heeft ouderschap voor werk en economische zelfstandigheid? Retrieved on May 15th 2019, from <https://digitaal.scp.nl/emancipatiemonitor2018/welke-gevolgen-heeft-ouderschap-voor-werk-en-economische-zelfstandigheid>.
- Portegijs, W., Perez S.A. & Brakel, van den M. (2018). Emancipatiemonitor: 2018, Wie zorgt er voor de kinderen? Retrieved on May 15th 2019, from <https://digitaal.scp.nl/emancipatiemonitor2018/wie-zorgt-er-voor-de-kinderen>.
- Thomese, F., & Liefbroer, A. C. (2013). Child care and child births: The role of grandparents in the Netherlands. *Journal of Marriage and Family*, 75(2), 403-421.
- United Nations Development Programme (2017). Table 4 Gender Development Index (GDI), Retrieved on March 15th 2019, from <http://hdr.undp.org/en/composite/GDI>
- United Nations (2017). World Population Prospects 2017, Data Query. Total Fertility (children per women). Retrieved on May 2nd , 2019, from <https://population.un.org/wpp/DataQuery/>

Appendix

A – Descriptive Statistics

Table A.1 Descriptive Statistics Grandparental childcare vs. No Grandparental childcare

Variables	All (N=941)	
	Grandparental childcare (n=621)	No grandparental childcare (n=320)
% Additional child (Wave 1 vs. Wave 2)	27%	23%
<i>Compositional</i>		
Age of female respondent (17-50)	34.04	35.39
Age of male respondent (17-50)	36.52	37.32
Educational level female respondent (1-4)	2.13	2.05
Educational level male respondent (1-4)	2.29	2.29
% Good quality relationship with partner	96%	97%
Number of children	1.95	2.13
Number of working hours female respondent	21.68	21.77
Number of working hours partner of female resp.	43.06	41.66
Number of working hours male respondent	43.08	41.78
Number of working hours partner of male resp.	16.29	17.71
% Employment couple:		
Part-time/part-time	2%	3%
Part-time/full-time	62%	51%
Full-time/full-time	8%	9%
Part-time/unknown	1%	5%
Full-time/unknown	26%	31%
% At least three parents alive	88%	100%
% All four parents alive (parents + parents-in-law)	55%	74%
<i>Contextual</i>		
% Paid childcare	40%	34%
Housing type respondent (1-5)	2.97	2.98
Distance to grandmother (km)	14.93	32.57
Distance to grandfather (km)	18.24	32.41
Distance to grandmother-in-law (km)	17.42	32.47
Distance to grandfather-in-law (km)	19.56	35.14

Table A.2 Descriptive Statistics Urban vs. Rural

Variables	All (N=941)		Urbanity	
	M or %	SD	Rural (n=349)	Urban (n= 592)
% Additional child (Wave 1 vs. Wave 2)	25%		25%	26%
% Receiving grandparental childcare	66%		63%	68%
% Receiving childcare from grandfather	28%		29%	27%
% Receiving childcare from grandmother	49%		47%	50%
% Receiving childcare from grandparent-in-law	33%		32%	33%
<i>Compositional</i>				
% Women (n=645)	69%		32%	31%
% Men (n=296)	31%		68%	69%
Age of female respondent (17-50)	34.45	4.36	34.15	34.63
Age of male respondent (17-50)	36.85	4.95	36.93	36.80
Age of mother	63.15	7.51	63.33	63.04
Age of father	65.90	8.07	65.79	65.96
Educational level female respondent (1-4)	2.11		2.02	2.16
Educational level male respondent (1-4)	2.29		2.04	2.44
% Good quality relationship with partner	97%		96%	97%
Number of children	2.01		2.08	1.97
Number of working hours female respondent	21.70	9.09	20.37	22.45
Number of working hours partner of female resp.	42.64	11.35	43.05	42.40
Number of working hours male respondent	42.55	9.91	44.02	41.65
Number of working hours partner of male resp.	16.85	12.32	18.34	16.12
% Employment couple:				
Part-time/part-time	2%		3%	2%
Part-time/full-time	58%		63%	55%
Full-time/full-time	8%		4%	10%
Part-time/unknown	3%		2%	3%
Full-time/unknown	28%		27%	28%
% At least three parents alive	92%		93%	91%
% All four parents alive (parents + parents-in-law)	62%		64%	60%
<i>Contextual</i>				
% Paid childcare	38%		32%	41%
Housing type respondent (1-5)	2.97		2.34	3.35
Distance to grandmother (n=859) (km)	21.07	36.83	15.03	24.72
Distance to grandfather (n=775) (km)	23.63	39.43	18.09	27.25
Distance to grandmother-in-law (n=809) (km)	22.46	37.73	16.26	26.21
Distance to grandfather-in-law (n=689) (km)	24.98	40.07	15.38	30.73

Table A.3 Descriptive Statistics Country Parts (NUTS-1)

Variables	Country Parts			
	West (n=379)	North (n=94)	South (n=234)	East (n=234)
% Additional child (Wave 1 vs. Wave 2)	25%	27%	26%	25%
% Receiving grandparental childcare	66%	55%	68%	69%
% Receiving childcare from grandfather	27%	24%	28%	30%
% Receiving childcare from grandmother	49%	45%	48%	50%
% Receiving childcare from grandparent-in-law	34%	22%	33%	35%
<i>Compositional</i>				
% Women (n=645)	70%	62%	70%	67%
% Men (n=296)	30%	38%	30%	33%
Age of female respondent (17-50)	34.79	34.53	34.63	33.68
Age of male respondent (17-50)	37.02	35.39	37.40	36.78
Age of mother	62.96	62.52	63.64	63.21
Age of father	66.07	65.30	66.05	65.73
Educational level female respondent (1-4)	2.15	1.97	2.17	2.01
Educational level male respondent (1-4)	2.42	2.31	2.11	2.25
% Good quality relationship with partner	97%	96%	95%	97%
Number of children	2.01	1.97	1.96	2.09
Number of working hours female respondent	22.73	21.52	21.17	20.63
Number of working hours partner of female resp.	42.17	40.36	44.89	41.90
Number of working hours male respondent	42.70	40.21	43.49	42.53
Number of working hours partner of male resp.	14.25	20.41	19.71	16.33
% Employment couple:				
Part-time/part-time	2%	4%	2%	3%
Part-time/full-time	53%	59%	65%	61%
Full-time/full-time	11%	10%	6%	6%
Part-time/unknown	4%	2%	1%	1%
Full-time/unknown	28%	23%	26%	30%
% At least three parents alive	92%	93%	94%	90%
% All four parents alive (parents + parents-in-law)	62%	66%	57%	64%
<i>Contextual</i>				
% Paid childcare	44%	40%	34%	31%
Housing type respondent (1-5)	3.53	2.26	2.55	2.78
Distance to grandmother (km)	24.11	24.17	16.44	19.44
Distance to grandfather (km)	25.67	31.54	20.89	19.81
Distance to grandmother-in-law (km)	25.60	25.39	16.80	21.97
Distance to grandfather-in-law (km)	29.15	25.99	19.22	23.68

Table A.4 Non missing vs. missing Grandparental childcare

Table A.4.1 Frequency of having an additional child in Wave 2 including missing in grandparental childcare (dependent variable)

	Freq.	Percent	Valid	Cum
0 'no'	1075	79.22	79.22	79.22
1 'yes'	282	20.78	20.78	100.00
Total	1357	100.00	100.00	

Table A.4.2 Frequency of grandparental childcare in Wave 1 including missing (independent variable)

	Freq.	Percent	Valid	Cum
0 'no'	320	23.58	23.58	23.58
1 'yes, by one parent'	307	22.62	22.62	46.20
2 'yes, by more than one parent'	314	23.14	23.14	69.34
9 'missing'	416	30.66	30.66	100.00
Total	1357	100.00	100.00	

Table A.4.3 Descriptive Statistics grandparental childcare

Variables	Non missing (n=941)	Missing (n=416)*
% Women	69%	60%
% Men	31%	40%
Age of female respondent (17-50)	34.45	37.15
Age of male respondent (17-50)	36.85	40.44
Educational level female respondent (1-4)	2.11	1.83
Educational level male respondent (1-4)	2.29	1.98
Employment couple:		
Both part-time	2%	2%
Full-time/part-time	58%	48%
Both full-time	8%	12%
Part-time/unknown	3%	3%
Full-time/unknown	28%	32%
% Paid childcare	38%	24%

* Missing are dropped for the analysis after testing models with and without the missing category

B – Logit models

B.1 Logit model 1: Urban vs. Rural

Variable	Additional child in Wave 2		
	B	SE	OR
<i>Control variables</i>			
Age	-0.107***	(0.02)	0.844
Number of children	-1.191***	(0.14)	0.304
Grandparental childcare ^a			
Yes	0.427	(0.33)	1.533
<i>Geographical variable</i>			
Urbanity municipality ^b			
Urban	0.541	(0.34)	1.718
Grandparental childcare # urbanity municipality ^c			
Yes # Urban	-0.739*	(0.40)	0.478
Constant	6.533***	(0.76)	
Chi-2		257.5	
df		5	

Standard errors (SE) in parentheses. OR = odds ratios

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

Reference categories:

a. Not receiving grandparental childcare

b. Rural

c. No # Rural

Pseudo R2 = 0.2415

B.2 Logit model 2: Country Parts (NUTS-1)

Variable	Additional child in Wave 2		
	B	SE	OR
<i>Control variables</i>			
Age	-0.170***	(0.02)	0.843
Number of children	-1.201***	(0.14)	0.301
Grandparental childcare ^a			
Yes	-0.232	(0.40)	0.793
<i>Geographical variable</i>			
Country parts NUTS-1 ^b			
West	-0.086	(0.42)	0.918
North	0.116	(0.53)	1.123
South	-0.258	(0.46)	0.773
Grandparental childcare #			
Country part ^c			
Yes # West	0.231	(0.50)	1.261
Yes # North	-0.287	(0.69)	0.750
Yes # South	0.467	(0.55)	1.595
Constant	7.026***	(0.80)	
Chi-2		255.8	
df		9	

Standard errors (SE) in parentheses. OR = odds ratios

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

Reference categories:

a. Not receiving grandparental childcare

b. East

c. No # East

Pseudo R2 = 0.2398

C – Codebook

Table C.1 Codebook categorical variables

Variable	Coding
Additional child in Wave 2	0 = no 1 = yes
Grandparental childcare	0 = no 1 = yes
Urban – rural	0 = rural 1 = urban
Country parts NUTS-1	1 = West (Noord-Holland, Zuid-Holland, Utrecht, Zeeland) 2 = North (Groningen, Friesland, Drenthe) 3 = South (Noord-Brabant, Limburg) 4 = East (Overijssel, Gelderland, Flevoland)
Sex	0 = male 1 = female
Educational level	1 = elementary, secondary, lower vocational 2 = intermediate vocational (mbo) 3 = higher vocational (hbo) 4 = university, post-graduate
Paid childcare	0 = no 1 = yes
Housing type	1 = detached 2 = semi-detached 3 = row; corner 4 = attached row 5 = apartment or other