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Mothers at work: The relationship between Labor Market Participation and External Child Care in Germany.

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Abstract

Recent family policy programs mainly focus on two aims: bringing women into work and raising the birthrate. These goals appear to be contradictorily because usually it is the mother who leaves her workplace to care for the children. So, she has to face the risk of reducing chances for an adequate labor market return. Improving the external child care supply is widely regarded as appropriate solution of this problem. This study investigates the relationship between the rate of child care arrangements and the labor market participation of mothers using large scale data between 2006 and 2012. This study leads to two main results: first, the child care rates influence part time employment among mothers positively. It moreover increases the general employment rates as well. Second, the employment type remains relatively stable over time. The findings suggest that switches from part time to full time employment are a negligible pattern in the working life of mothers. So, the findings are good news for politicians that the family policy programs seem to reach their aim and bring mothers back into work. But they are bad news regarding the gender time gap: It seems to be likely that higher child care provision rates do not help to change the working patterns of mothers.

1. Introduction

Nowadays, women are at the focus of family politics for two reasons: they are wanted to have children and they are wanted to participate in the labor market. This is to tackle two problems of the demographic change: the decreasing birthrates and the loss of professional workforce. Additionally, gender equality in labor market participation is a major goal of German politics as well. The puzzle, however, is how mothers who are willing to reenter the labor market are enabled to fulfil the demands of caring for their children and being employed. This question raises because mostly mothers are the main child carers.

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It seems obvious that the time which is necessary for child caring and housework lacks for pursuing a paid job and *vice versa*. Part time employment is widely considered the most important instrument to handle both family obligations and labor market participation. Consequently, since decades Germany faces a considerable gender time gap. The part time employment rates of women doubles to 70% when they have children while the part time employment rates of men in this case even decrease (from 8% to 6%) (Gender Daten Portal 2015, 22). Most women give family commitment as reason for their part time employment; while, in contrast, men report lacking full time employment supply in this situation (Gender Daten Portal 2015, 23).

Interrupting the working career can be expensive. Since decades especially in Germany women earn much less than men. In 2013 women's wages lay 23% under the wages of men. Of course this is difference reflect the fewer working hours of women, but even when women and men are equally educated and employed women earn around 7% less than men (see Destatis 2015). The main explanation for this gap is that women more often interrupt their working career because of family obligations. Thus, female part time employment serves not only as the key for a work-family life-balance, in the contrary it can slow down the female working career in the long term.

Besides legal and financial support to moderate the negative short term effects on income and secure employment options for women serves the provision of publicly subsidized child care facilities as a third instrument is to help solving the time-conundrum and make the interruption as short as possible. Thus, in this study the focus is on the gender time gap from a policy-implementation perspective. I consider external child care as one of the most important policy instruments to allow parents, and especially mothers, to participate in the labor market.

Given that female employment is predominantly part time, this study's focus is twofold. First, it observes the relationship between the provision rates of child care and the tendency to part time employment of mothers. Second, this study reveals a more detailed view into the flexibility of mothers to switch between types of employment. So, this study investigates two questions: Do the child care provision rates impact the labor market participation of mothers? And, do less part time employment is mirrored in higher full time employment? These questions are observed by analyzing longitudinal large scale data from the GSOEP with multiple logistic regression and sequence analysis.

This study is organized as follows. Section 2 presents the theoretical frame and the hypotheses. In section 3 the used data and the analysis method are described. Section 4 provides the empirical findings. The study is summarized in section 5 and gives a brief discussion of its implementations for further research.

2. Theoretical frame

2.1 Overview of female employment in Germany

Recently, women in Germany are significantly more often engaged in part time employment than men (e.g. Fitzenberger, Schnabel, and Wunderlich 2004; Pfau-Effinger 1993; Rosenfeld, Trappe, and Gornick 2004). To explain this situation it seems promising to look back to the beginning of industrialization. With the end of the agricultural society in the 19th century men started to become the main breadwinners. According to Pfau-Effinger (1993) the required hard work in industrial production typically excluded women because of lacking physical preconditions. So, they did not enter the growing industrial labor market after the end of agricultural in house working structures. At the very time a second factor encouraged the rise of the so called traditional family model: The urban bourgeoisie served as the pacemaker in cultural issues. Given that their ideals based on women being housewives and mothers it became the leading female role model. This model then subsequently was established in the growing welfare state regime (see Pfau-Effinger 1993; Pfau-Effinger 2004). Nowadays, women work around 23% (or 9 weekly hours) less than men. This phenomenon, known as gender time gap, grew during the last decades of the 20th century and is now stable since the last 15 years.

The German history of division after World War II, however, evolved two different systems: In West Germany the male breadwinner-female carer model was dominant while the East German regime encouraged a nearly 100% female full time employment rate comparable to the men's (Rosenfeld, Trappe, and Gornick 2004). Since the German reunification in 1990 less women in the West German federal states live as housewives but still the female full time employment rates are below the rates in the Eastern federal states (e.g. Grunow, Hofmeister, and Buchholz 2006; Kreyenfeld and Geisler 2006). However, both German systems recently seem to converge to the model of the male breadwinner with a female part time housewife (Rosenfeld, Trappe, and Gornick 2004). In the West German federal states working women still tend to either have no children or when they become mothers they are likely to leave the

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labor market (e.g. Drobnic, Blossfeld, and Rohwer 1999; Grunow, Hofmeister, and Buchholz 2006; Kreyenfeld and Geisler 2006) or work in part time jobs (Fitzenberger, Schnabel, and Wunderlich 2004). In the East German federal states the growing female part time employment rate is strongly determined by less labor market demand (Rosenfeld, Trappe, and Gornick 2004).

Another important factor that influences the decision for female labor market participation depends on the attitudes towards female out of house engagement. The crucial turning point in female working careers typically is the birth of a child. So, even if both parents share positive attitudes towards female employment the presence of children is likely to lower this acceptance. This particularly counts for the West German federal states and if pre-school children are living in the household (e.g. Alwin, Braun, and Scott 1992; Grunow, Hofmeister, and Buchholz 2006; Scheuer and Dittmann 2007). Typically women are the main child carers and therefore usually leave their work for at least the first time after childbirth. However, when they choose to return to paid work the question of who is caring for the young child emerges and the arrangement of the institutional environment arrives special importance.

2.2 The nexus between external child care and working mothers

The German child care system is widely regulated and largely financed by federal and regional state level government (Dörfler 2007, 25). Legally and economically responsible bodies, however, are the local authorities which partially run day care facilities themselves or allow private agencies to manage child care arrangements (Dörfler 2007, 25). In Germany basically three types of child care facilities are common: For children younger than three years (*Krippe*), for children aged between three and five years (*Kindergarten*), and children older than five years up to 14 year (*Hort*) (see Dörfler 2007, 26 ff. for an overview). In 1996 the West German federal states started to increase the supply of pre-school child care considerably, and since 2004 the government forced the expansion of child care facilities for under three year olds (Lewis et al. 2008). The legal right to attend an appropriate child care place was provided in 1999 for pre-school children and in 2004 for under three year old children (Dörfler 2007, 24).

Besides the infrastructural supply of external child care the actual German family policy agenda embraces numerous legal and financial subsidies. To support young families instruments like parental leave (*Elternzeit*), child-rearing benefits (*Elterngeld*), child

allowance (*Kindergeld*), or tax deduction for children (*Kinderfreibetrag*) are established (see Trzcinski 2000 for an overview). All of these programs aim on encouraging a free choice between different parenting models as the male breadwinner-female carer or dual earner-dual carer model (Rosenfeld, Trappe, and Gornick 2004, 106) or any constellation between these two poles. Single parents are supported with high priority as well. Altogether the German efforts in family policy can be seen as outstanding in comparison to other European countries (Lewis et al. 2008).

Now, the question is whether the political programs in increasing publicly provided child care have an impact on female employment. The body of prior empirical literature in this regard is relatively rare. Kreyenfeld and Hank (2000) find that during the 1990s external child care did not influence the employment rate of mothers significantly. Moreover, they find that patchwork-solutions are even more likely to enable mothers' employment than drawing on the grandparents. These findings are in line with research by Pfau-Effinger (2005) who also finds that formal external child care supply does not affect female employment. Besides, due to the economic development during the post-reunification phase overcapacities in child care facilities in the Eastern federal states occurred through increasing female unemployment (Hank, Tillmann, and Wagner 2001).

This study, however provides insight in the relationship between child care provision and the employment of mothers by using longitudinal data between 2006 and 2012. It thereby investigates the situation after introducing the legal changes towards a right on attending a child care place in 1996 for pre-school children. And it captures the time span since 2009 when the right of child care places for all children between one and three years from the 1. August 2013 was agreed. Especially the latter government action was accompanied by controversial public debates, but also followed by considerable strained efforts in the extension of child care facilities particularly in the Western federal states.

2.3 Theoretical model and hypothesis

The effect of the child care rate on a mother's labor market return is usually modelled as a function of the child care costs which reduce the income gained through the mother's labor supply. This relationship was first analyzed by Heckman (1974). The negative impact of the costs for external child care is supported by Ribar (1992) and Kreyenfeld and Hank (2000). In contrast, Leibowitz, Klerman and Waite (1992) find that on the one hand higher income predicts a later market return of women, but on the other hand tax credits are likely to reduce

this delay. Taking account of the scope of this analysis I chose to leave the cost effect out of the covariates. Using these data would need the use of more detailed data regarding the child care provision, say on the level of town and municipalities, because these authorities are responsible for the costs. For this study I assume that as the German child care system is widely locally comparable regarding the supply of child care availability as well as the costs are widely publicly regulated. Since a private child care market still did not have emerged (Kreyenfeld and Hank 2000) I assume that the costs parents have to contribute are relatively evenly distributed throughout one area.

To investigate the impact of the child care provision rate on female employment I, first, assume that parents who have positive attitudes toward public child care will draw on it, and second, that – since the enhancement programs started around a decade ago – the current child care provision rates fit the actual demand and thereby reflect the level of acceptance. Thus, I assume that as long as employment capacities equal employment demand the mothers who are willing to work, and revealing positive attitudes towards external child care will make use of it¹. The first hypothesis therefore is:

H1 High child care provision rates reveal a positive impact on the mothers' employment.

Public child care allows mothers to use their time more flexible. Good provision rates should help to close the gender time gap. This is because the legal flexibility for mothers to move from part time to full time employment plus the availability of external child care could lead to an increase in full time employment. So I hypothesize:

H2 Less part time employment reflects in higher full time employment.

3. Data and method

3.1 Dependent and independent variables

This study uses data from the GSOEP (German Socio Economic Panel) of the years 2006 to 2012². Thereby, only data from women who are mothers and living together with at least one child between newborns and aged 14 years are analyzed³. The dataset is unbalanced. In total it includes data from 4,034 individuals. The logistic regression models refer to this full number

¹ This model deliberately excludes the opportunity of using informal child care like relatives or other social networks. This is because the quality of available data does not sufficiently capture the variety of possibilities in this regard. Besides, Kreyenfeld and Hank (2000) find that the impact of grandparents living in the same region does not influence the mothers' employment rate significantly.

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of observations (N=11,843). For sequence analysis purpose only mothers who are each year in the dataset over the entire seven periods are used (n=473).

The dependent variable is whether a mother is working part time (1) or not (0). Part time employment means to be employed less than 35 weekly working hours. Mothers who are not part time employed can be unemployed or work full time (= more than 35 hours per week). Furthermore, the models are estimated for being employed and being full time employed as well. The main explanatory variable is the rate of provided child care. The data are provided by the *Statistisches Bundesamt* (destatis). The variables are generated as the relation between the number of provided child care places and the total number of children on the federal state level. The rate is classified into three groups corresponding with the typical external day care organizations: For children younger than three years (*Krippe*), for children aged between three and five years (*Kindergarten*), and children older than five years (*Hort*)⁴.

Furthermore, the statistical model includes a set of control variables that allow to control for alternative factors that might influence the employment status (data source: GSOEP). Thus, information about the size of the household by capturing the total number of children actually living in the household are used. The number of children typically influences the necessary time for caring and house work and thereby reduces the available time for labor market participation. Since usually the mothers take most of the house work-regarding responsibility (see e.g. Hochschild and Machung 2012) caring for a larger household might reduce their employment activities. Another important factor is the age of the youngest child (e.g., see Alwin, Braun, and Scott 1992; Scheuer and Dittmann 2007). Commonly, younger children seek for more care than older ones. So the youngest child's age is controlled by using three age-groups: Children aged under three years (infants), children aged between 3 and 5 years (pre-schoolers), and children aged older than five years (school-children). These classes correspond with the external child care organization structure.

To take account of the households' socioeconomic situation the model further includes the annually income of the household before taxes is coded as lower than 20.000 Euro, between 20.000 and 60.000 Euro and more than 60.000 Euro, the age of the mother in years

² The data are used without including the weighted parameters because a subsample of the original unbalanced panel data is investigated. Therefore these data refuse capturing by sampling weights.

³ Whether the father or another adult person lives in the household is not investigated. Information about the social network are not at the center of interest for the theoretical frame of this study.

⁴ The five years boundary is used as a proxy. Typically, children start their school-life after their 6th birthday. Some children, however, are allowed to opt in an earlier start, but others start later. Thus defining the boundary at the fulfilled 5th year of life captures on average the age of being a school-child.

as well as the mother's highest educational status, coded in unskilled, professionally skilled, or having an academic degree. The general economic condition in a federal state is controlled by the changing rate of the gross domestic product (data source: *destatis*). This growth rate refers to the previous year to capture its typically lagged effects on the general labor market situation. Furthermore, a dummy variable for living in a federal state belonging to the territory of the former German Democratic Republic, which are nominated as East federal states, serves as a control variable for differences grounding in the prior cultural context.

3.2 Estimation approach

To investigate the research question a logistic regression with robust standard errors is estimated. Scholars using logistic regression models typically face special challenges regarding the interpretation of the estimates. This problem is due to the complex impact of the omitted variables in this regression method. In contrast to linear regression techniques a straightforward comparison between models or samples typically leads to a misinterpretation of the estimated coefficients (Mood 2010, 67). To overcome this problem and make the estimates comparable and straightforwardly interpretable I will use average marginal effects models. These models provide the estimated impact of the logistic regression model on the depended variable with all covariates held constant at their means.

In this study I investigate the effect of child care rates on the part time employment status and for control purpose additionally on full time employment and being employed. So, I use models with different depended variables but the full set of covariates. The results of these models are best comparable and interpretable with the estimated Average Marginal Effects (AME) presented graphically.

4. Empirical findings

4.1 Descriptive analysis

The dataset consists of a total of 11.843 observations⁵ from 4,034 individuals⁶. Among these 2,670 (66.2%) individuals are employed, 681 are engaged in a full time employment, 1,989 are working part time. The mean number of children is 1.6. Most of the observed mothers have their youngest child are aged under three years (n=2,469, 61.2%), the groups with the

⁵ The complete descriptive results are presented in Appendix Table 2. The Appendix can be provided by the author upon request under christine.prokop@uni-oldenburg.de.

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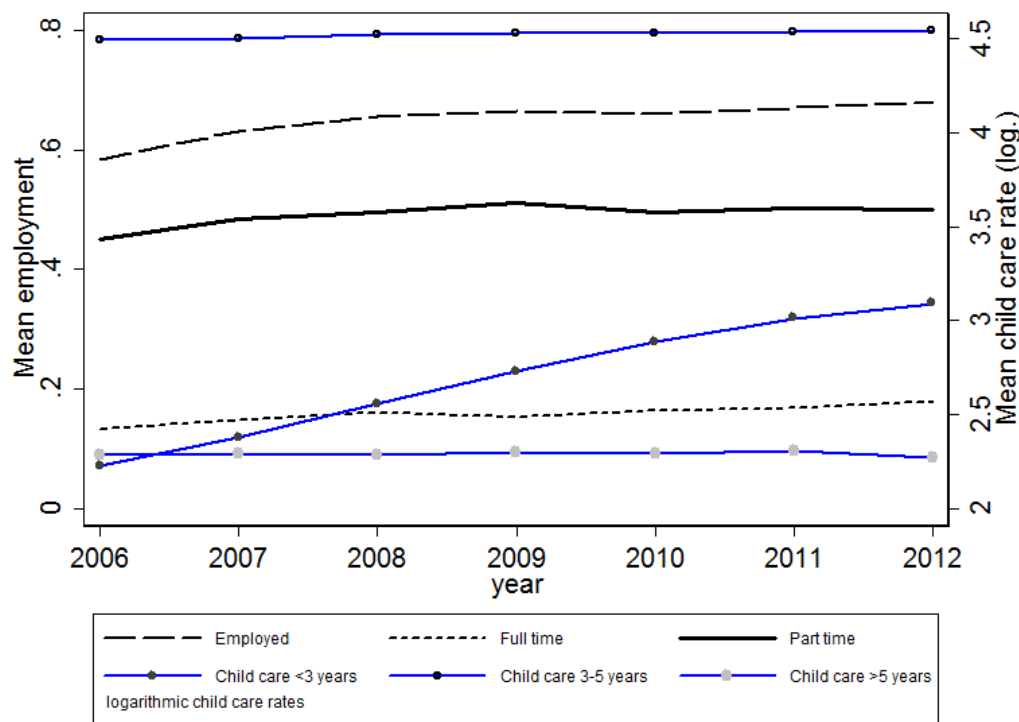
youngest child being pre-school (n=783, 19.4%) and school-children (n=782, 19.4%) are almost equally sized. The mothers are average 39 years old at their last occurrence in the dataset. Most of the mothers are professionally skilled (n=2,520, 62.5%), 879 (21.8%) mothers hold an academic degree, while 635 (15.7%) do not hold any degree. Among the observed mothers 52.2% have between 20.000 and 60.000 Euro for their household's disposal, 36.7% have more than 60.000 Euro, and 11% have less than 20.000 Euro. The economic growth rate of the year prior to the investigated year is on average 3.0%.

The child care provision rate for children aged younger than three years has a mean over all federal states and the observed time span of 23.9%⁷. The rate of child care for pre-schoolers has a mean of 91.9%. The child care provision rate for school-children is with 16.2% the lowest within the child care system. Saxony-Anhalt is the federal state with the highest rates in all three child care groups. Within the child care for under three years old children the Eastern federal states reveal the highest rates while the distribution is mixed for the other child care facilities. The least child care rates hold Schleswig-Holstein, Lower Saxony and North Rhine-Westphalia.

The relationship between the development of the employment rates and the child care rates over time is visualized in Figure 1. On the left y-axis the mean employment is displayed. The graphs separate for being employed at all, being full time and being part time employed. The right y-axis shows the mean child care rates. They are separated for each age group. The child care rate-values are logarithmic to allow displaying them together with the employment rates. Only total employment and part time employment show a slight increase between 2006 and 2008. After 2008 their development is stable. Among the child care rates only the rates for child care of the very young children shows a considerable increase. This rise is likely to reflect the governmental activities in expanding the capacities for under three years olds' child care to meet the legally committed child care rates of 35% in 2013. As the employment rates and most child care rates are relatively stable I expect to find only weak correlations between the child care rates and employment. In the following section the analysis is presented in two steps, with an AME analysis of the multiple logistic regression followed by a sequence analysis to reveal deeper insight into the chronological development of the employment status among the observed mothers.

⁶ These information stems from the last occurrence of an individual in the dataset, but is only used for dataset description purpose not for analysis.

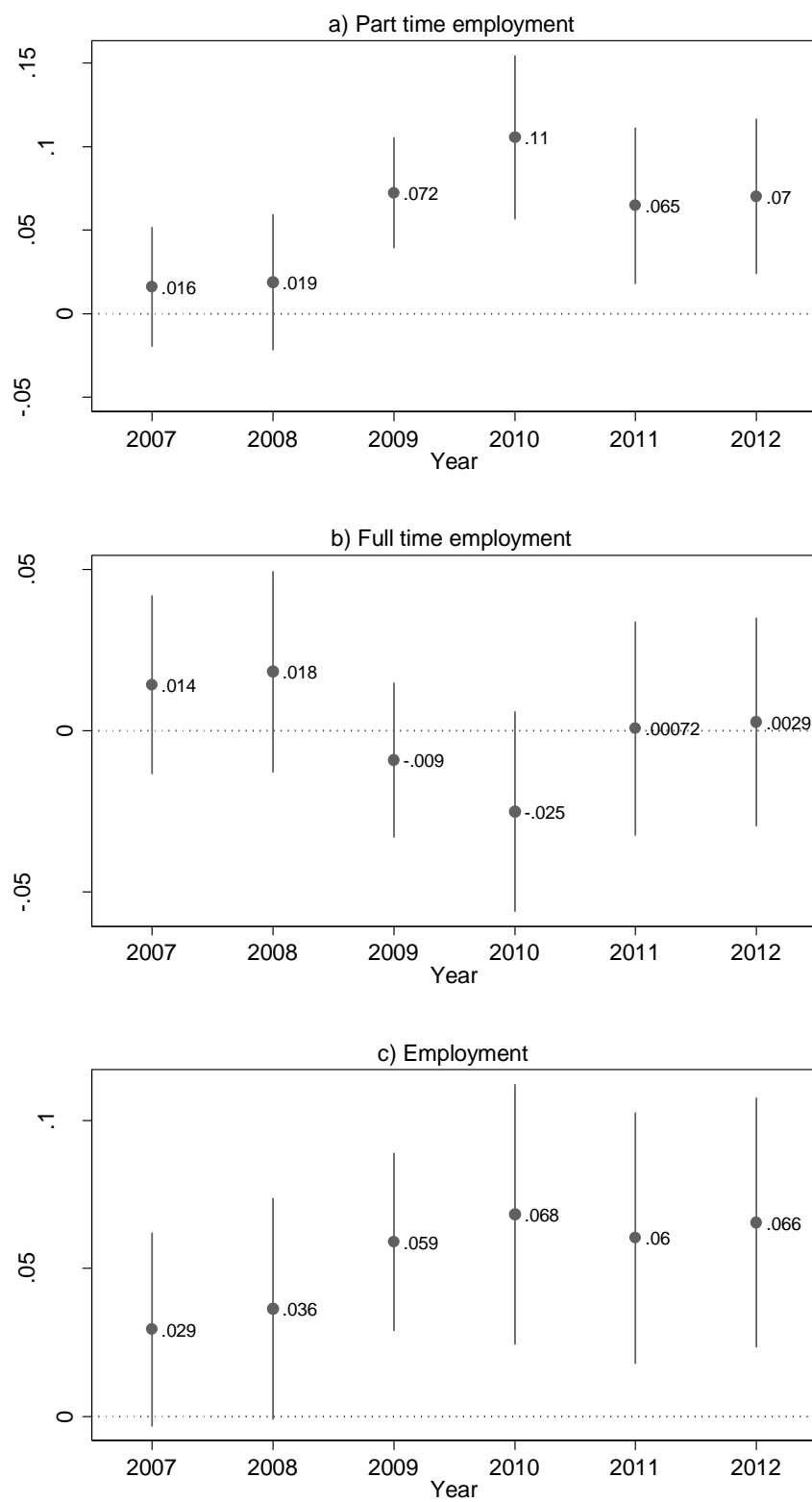
⁷ The complete child care rates are given in Appendix Table 4.

Figure 1 Employment and child care rates over time

4.2 Average marginal effects

The AME are estimated over the full sample (N=11,843). They are given graphically to visualize the effect of the full multiple logistic regression models on part time employment as dependent variable (see Figure 2, panel a)). The logistic regression models further are estimated for full time employment (panel b)) and being employed at all (panel c)) to provide information about whether and how changes in part time employment might reflect in the employment or the full time employment rates. The AME-plots in Figure 2 show on the y-axis the impact of the regression in percentage-points. Values – including their confidence intervals (90%) – higher than zero represent statistically significant effects (p-values >0.1). The x-axis gives the values per year so that the regression impact is shown over time.

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Figure 2 Average marginal effects on employment (Confidence Interval 90%)

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First, the analysis shows that since 2009 the effect of child care impact the mothers' part time employment positively (see Figure 2 panel a)). The growth rates vary between 6.5 and 11%-points, with its peak in 2010. Full time employment, however, decreased in the years 2009 and 2010 around 0.9 and 2%-points. The decrease in full time employment with a parallel increase in part time employment could hint to mothers who switched from full time to part time employment. Notwithstanding, the general employment rates increased between 2009 and 2012 in dependence on the child care rates between 5.9 and 6.8%-points (see Figure 2 panel c)). So, for all three employment types I find a correlation with the child care rates. They seem to be likely to increase the mothers' part time employment which additionally rises their tendency to participate in the labor market more often. Thus, external child care seems to moderate the employment rates positively. With these findings hypothesis H1 (*High child care provision rates reveal a positive impact on the mothers' employment.*) can be confirmed. Further, it can be concluded that mothers are more likely to work in part time jobs than to be unemployed or to work full time. This finding basically underpins prior evidence toward the gender time gap.

4.3 Sequence analysis

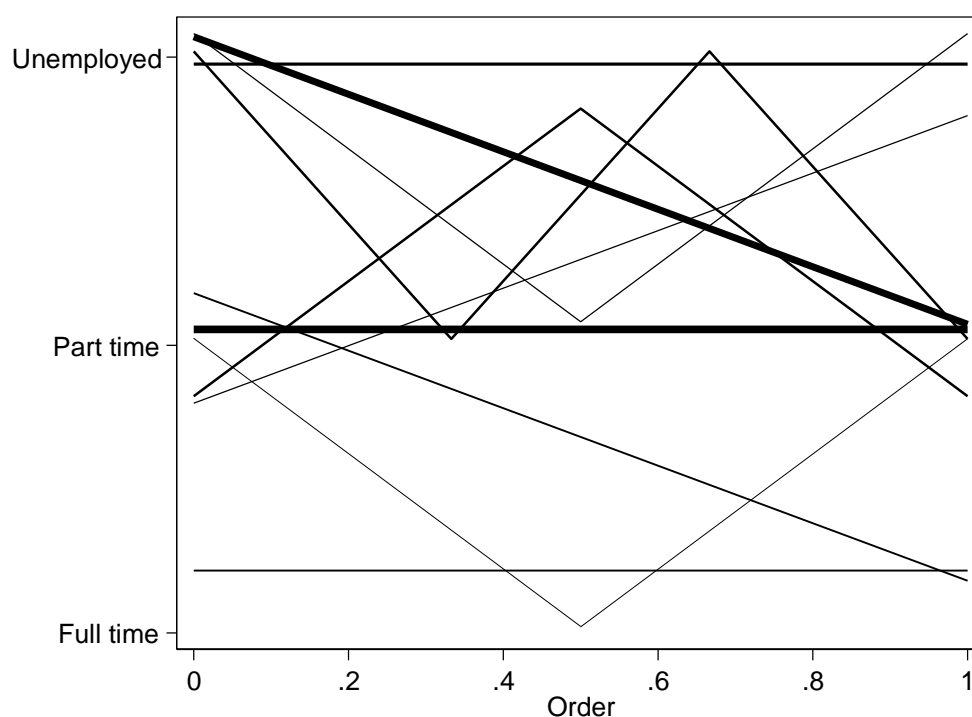
In the last step of this study I use sequence analysis technique to reveal deeper insight into the development of the mothers' employment status. This analysis is conducted among the subsample of mothers who are in the dataset over the entire observed time span of seven years. These are 3,311 observations from 473 mothers. A sequence consists of two information. On the one hand the employment type which a mother holds, and on the other hand the time span in which the mother holds a certain employment type. Taken both information together we can analyze which employment types (being employed/unemployed, work part time, work full time) are held how long, and which switches are the most likely.

Figure 3 shows a graphical analysis of the ten most frequent sequences. On the y-axis the three employment types are given, while on the x-axis the time is represented with 0 as the beginning of the observation and 1 as the end of the seven years. The thickness of the lines gives information about the frequency of the sequence. The thicker the line, the more observations reveal this pattern. The graphical analysis suggests two main findings: First, most of the mothers are part time employed for the entire time span (n=97), followed by

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mothers who are unemployed ($n=42$)⁸. Over the entire seven years only 27 mothers are full time employed. Second, a considerable number of mothers switches from unemployment to part time employment ($n=32$). The graphic shows that strikingly more mothers switch between unemployment and part time employment and back ($n\sim 54$) than from part time to full time employment⁹. Moreover, only very few mothers ($n=7$) switch from part time to full time employment.

Figure 3 The ten most frequent sequences



In conclusion, the findings from sequence analysis refine the findings of AME-analysis regarding the switch from part time to full time employment, because I find that this switch to be of secondary importance. The sequence analysis findings suggest that the decrease of full time employment in 2009 and 2010 is not likely to have impacted the increase in part time employment. With this finding I have to reject hypothesis H2 (*Less part time employment reflects in higher full time employment.*). However, what sequence analysis findings suggest is

⁸ Detailed information about the most frequent sequence-patterns and sequence-orders are given in Appendix Table 5. Furthermore, sequence-frequency graphs separated by the age of the youngest child according to the three age groups (<3, 3-5, >5 years) are given in Appendix Figure 1.

⁹ Further analysis suggests that in particular mothers with pre-school children switch from unemployment to employment (see Appendix Figure 1). Among mothers with younger or older children the employment patterns are more stable. Mothers with children aged under three years are more often unemployed, while mothers with school children are more likely to be steadily part time employed.

that there is barely any switch to full time employment among the observed mothers. Thus the conclusion from both analyses is twofold: First, the child care rates influence part time employment positively and thereby lead to increasing employment among mothers. Second, the employment type remains relatively stable over time and switches from part time to full time employment are a negligible pattern in the working life of mothers.

5. Conclusion and discussion

This study investigates whether the provision rates of external child care impact the labor market participation of mothers in Germany positively. This matters because the last decades' German family policy focused on two main goals: First, bringing more women into work to face the lack in professional labor force and allow gender equality, and second, raising the number of children to face the demographic change. Now these two goals are to some extent contradictorily. Usually, child caring are ascribed to be the women's duty, why new mothers typically leave their workplace more often and longer than new fathers. Longer interruptions, however, are making the mothers' return and conditions of their return into the labor market increasingly unlikely. So, one important aspect of German family policy is to enable a mother's return into paid work. Besides a number of financial and legal programs raising the daily child care provision rate is one of the dominant infrastructural programs of the last years.

So, this study investigates whether the political programs on child care provision reach their aims. I use large scale individual data from the GSOEP considering only mothers who live together with at least one child and data from the *Statistisches Bundesamt*. The analysis distinguishes between child care for under three year old children, for pre-schoolers, and school-children, which widely covers the general structure of German external child care options. I analyze these data on the basis of the average marginal effects of multiple logistic regression models using the type of employment as depended variable.

This study leads to two main results: first, the child care rates influence part time employment among mothers positively. Moreover, this increase in part time employment finds expression in rising employment rates. Second, the employment type remains relatively stable over time. The findings suggest that switches from part time to full time employment are a negligible pattern in the working life of mothers. So, the first conclusion is good news for politicians: The likelihood of mothers to participate in the labor market benefits from

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higher child care provision rates. So, one can conclude that the family policy programs widely reach their aim to bring mothers back into work. In contrast, these findings are bad news regarding the gender time gap: It seems to be likely that higher child care provision rates do not help to change the working patterns of mothers significantly.

At this point it seems necessary to mention that of course external child care provision alone cannot allow mothers full time employment. From a pedagogic perspective it should be considered that for children a more than 35 hours per week external child care is a very long time, which could overtax especially very young children. Besides, it might have personal reasons that mothers chose to work part time: It allows to participate in both family and working life. Perhaps, it is a question of time since family culture changes and the fathers start to draw on this freedom of choice as well? In such an scenario the risk of career-hindering parenthood-interruptions would be spread over the sexes and thereby could help to close not only the gender time gap, but also the gender pay gap.

This study is limited in two aspects. First, the focus of the research question lies on the external effects on a mother's employment status, and therefor leaves any social networking impact unobserved. However, considering the large number of observation I assume the effect of relying on a social network to be spread over the sample and thereby do not bias the results significantly. Second, due to the scope of this study the actual costs for external child care places are not taken into account. Although assuming that the widely publicly regulated child care fees converge to a comparable level within the federal states, I consider further research strategies fruitful to include the child care fees.

A further practically important aspect of external child care arrangements is its appropriate fit toward the need of the parents regarding the allocation and duration of the child care place. Thus particularly among West German states the rate of half-day care is significantly higher than in the Eastern states (e.g., see Hank, Kreyenfeld, and Spieß 2004; Kreyenfeld and Hank 2000). So, not only the quantity of the regionally provided child care arrangements matters but also their quality. Further research could improve by taking provision rates into account which discriminate for the daily duration or their flexibility.

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