

Identifying the Effect of Temporal Work Flexibility on Parental Time with Children

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Abstract

It is recognized that employment policies must grant flexibility to the working schedules to allow parents to reconcile family and work. By exploiting the particularity of the East German labor market, I identify the causal effect of temporal work flexibility on parental time with children. The analysis unambiguously shows that it allows parents to spend about 30 percent more time with their children. The results can be generalized to Germany as a whole. It can be concluded that temporal work flexibility can be used as a device to mitigate the adverse effect of parental employment on the child's cognitive development.

Keywords: Time Use, Childcare, Flexible Working Schedules, Flexitime, Endogeneity

JEL Classification: J08, J13, J21, J22, J33, J81

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1 Introduction

The stimulation of domestic demand is high on the political agenda of industrialized countries not only in the aftermath of the worldwide financial crisis. The increase in female labor force participation is perceived as one means to reach this goal by using this additional labor force potential and to further spur GDP growth. Facilitating female labor force participation and to increase female working hours is therefore an important issue in the political discussion. In this respect, a better and broader provision of child care facilities and other incentives as well as concerns about a possible reconciliation of work and family are widely discussed. In recent years, this issue has developed to be less a female matter. Fathers are encouraged to take parental leave and women take more advantage of career possibilities.

The increased labor supply, in particular of mothers, has created new challenges that must be dealt with in modern societies. Psychologists claim that the first months and years of a child's life are crucial for its cognitive and emotional development.¹ Time and material resources are important determinants of the cognitive development of children. In particular, parental time investments are major inputs in the development of human capital of children but is also known to be an important mechanism for the intergenerational transmission of economic status (Guryan et al. 2008 Becker?). Many economist, sociologist and psychologist investigate the impact of early maternal employment on the cognitive development of children. The results are very heterogeneous and mostly not causal so that some studies find a detrimental impact of early maternal employment in particular during the first year of a child's life on its cognitive development in later years (Baum 2003, Ruhm 2004, Hill et al. 2005, Ruhm 2008, Bernal 2008). This strong negative impact is however offset when maternal employment occurs during or after the second years of a child's life (Blau and Grossberg 1992). To mitigate the adverse influences of parental employment, the need to grant higher degrees of temporal work flexibility is now widely acknowledged in order to allow parents and their kids to spend more time with each other.

Claims for a high female labor supply and in this respect, a good provision of childcare facilities as well as a more family oriented employment policy are not new for inhabitants of the former German Democratic Republic (GDR). Policies aimed at a reconciliation of family and work were implemented in the former GDR already since the 1950s in order to make use of the total labor force potential and has henceforth shaped its employment policies significantly. The particularity of the labor market of the GDR allows me to identify the effect of temporal work flexibility on

¹See for example Lewis and Brooks-Gunn (1979), Harris (1983), Baydara and Brooks-Gunn (1991)

parental time with children. The German re-unification can be further exploited as a natural experiment which serves as a clear-cut identification strategy. The major contribution of this paper is to causally examine the relationship between measures granting temporal work flexibility to parents and to examine in how far this flexibility is indeed used to spend more time with kids.

By law, every citizen of the GDR had the right but also the obligation to work. The freedom of choice of the workplace as postulated in Art. 24 of the constitution of the GDR was however not only restricted by personal qualification but also by the requirements of the central socialist plan. Yet, already educational choices were strongly influenced and restricted by the socialist plan so that citizens were also not free to choose their education (Prantl and Spitz-Oener 2009). Consequently, the allocation of jobs did not necessarily coincide with personal interests or societal needs (Frerich and Frey 1993). However, the provision of childcare facilities was exceptionally good in the former GDR so that about 95 percent of the 3 – 6 year old kids were enrolled in kindergarten in 1989. The opening hours of day care further determined contracted working hours for parents. Also, flexible working hours were granted by the firm only and can therefore be viewed as being exogenous to the worker. These specifics of the GDR-labor market allow me to identify and estimate the effect of flexitime arrangements on parental time with children in East Germany after re-unification. For the analysis I use German Time Use Data for the year 1991/92 for East German employees.

Even though flexible working hours cannot be chosen by the worker, it is possible that some occupations are more likely to grant flexitime arrangements. If workers in these occupations are additionally more likely to spend their free time with their kids, OLS estimates would be biased. Yet, I find no evidence for such kind of non-random selection. As a further robustness check I test whether results obtain for East German workers can be generalized to all Germans based on GSOEP data for 2002 – 2008. To account for inverse causality, I use an instrumental variable approach. Results show similar effects of temporal work flexibility on parental time with kids.

Due to a lack of appropriate data, in particular of panel data, previous research mainly focuses on analyzing the dependence between market work and time that parents spend with their kids (Hallberg and Klevmarken 2003, Han 2004, Guryan et al. 2008) and, as mentioned above, the resulting cognitive development of children.² Only few studies approach this question by trying to find a causal link by investigating the extension of maternity leave on the cognitive development

²Most studies dealing find a negative association between early maternal employment and the influence on the cognitive development of children (Baum 2003, Brooks-Gunn et al. 2003, Ruhm 2004, Hill et al. 2005, Bernal 2008, Ruhm 2008, Blau and Grossberg 1992).

of children. Dustmann and Schönberg (2008) find no evidence that an extension of maternity leave in Germany which allows mothers to spend more time with their children has any effect on the child's cognitive outcomes. In contrast to that, Carneiro et al. (2010) find strong positive effects of extended maternity leave for Norway. Another strand of the literature is concerned with investigating the influence of working schedules on children's well-being (Strazdins et al. 2004, 2006) as well as the on the time shared by parents and kids (Hill and Stafford 1980, Bryant and Zick 1996, Daly 1996, Zick and Bryant 1996, Milkie et al. 2004). Only very few studies investigate the association between flexible working hours and labor supply (King 1978, Barrett 1982, Macpherson 1988, Euwals 2001). Yet to my knowledge, this is the first paper that analyzes and quantifies the causal effect of flexible working schedules on parental time with children.

The analysis of this paper is organized as follows: in a first step, I will describe the labor market situation and the employment policies of the former GDR in detail. The section further presents the estimation strategy and potential threats to identification. Section 3 presents the data and shows descriptive statistics on the allocation of childcare related activities and market work over a standard day. The following section discusses the results. In a first step, I compare the determinants of having a job that offers some degree of temporal work flexibility to analyze compositional differences between these groups. The following part is devoted to the description of the main effects of work time flexibility on parental time. Section 5 tests whether selectivity is present and whether the results obtained for East Germany also hold for Germany as a whole. Finally, section 6 concludes.

2 Identification Strategy and Econometric Model

2.1 Background Discussion and Identification Strategy

To identify the effect of temporal work flexibility on the time that parents devote to be with their children, I concentrate on East German parents. Labor market and employment policies in East Germany were very distinct from those in western countries. This section gives an overview and will present the identification strategy in more detail.

Already since the 1950s, the need to use the total available labor potential to stimulate growth has been recognized by the authorities in the former German Democratic Republic (GDR). Major aspects of related employment policies was integration of the female labor force into the labor market so that the reconciliation of family and work is possible (Frerich and Frey 1993). Since the

VIIIth and the Xth party congress of the Socialist Unity Party (SED) in 1971 and 1972, huge social programs were launched by Erich Honecker. These programs were aimed at the creation and promotion of measures to further increase female labor participation. In this regard, the provision of childcare facilities for kids under the age of 6 was drastically expanded in subsequent years. The labor code of the GDR (AGB 1980) postulated explicitly in § 240 that each firm is obliged to create possibilities for working mothers that allows them to reconcile family and work. Moreover, childcare facilities were regulated by law to be open between 6 am and 6 pm (Führ and Furck 1998). For the usage of such facilities, parents were to pay only a very small proportion of their income that was used for the provision of food.

According to § 167 of the labor code, begin and end of the individual work day of parents were determined between firm and worker but were regulated to lie within the opening hours of childcare facilities. Labor unions were also allowed to influence working hours and working time according to § 22, AGB yet flexible working hours or even flexitime arrangements were not explicitly regulated in the former GDR. The provision of childcare facilities reached its peak in 1989 so that according to the Statistical Office of the GDR, about 80 percent of kids under the age of 3 were enrolled in the crèche in 1989 and even 95 percent of kids aged 3 – 6 were enrolled in kindergarten (Statistical Office of the GDR 1990). Female labor force participation was also highest during this year: 90.6 percent of all working age women were employed in 1989.³

Art. 24 of the constitution of the GDR (1989) further postulated that each citizen had the right to work and was free to choose his workplace but every citizen in the working age population was also obliged to work. In reality, however, the freedom of choice was restricted not only by personal qualification but more importantly by societal demand arising from central planning. Consequently, labor demand was not determined by profit maximization of firms. People could choose a suitable job from those provided at a given point in time by the state (Frerich and Frey 1993). This means a priori that the allocation of jobs that was required for the fulfillment of the socialist production plan did not necessarily coincide with interests and needs of the individual employees. Since the VIIIth party congress of the SED in 1971, occupational choices were to be made according to economic requirements of the centrally planned economy. Young people were to be nudged to choose to work in those occupations that had a great importance within the production process and for the supply of the population of the former GDR at the time of choice. Numerous sanctions and other means of exerting moral pressure were allowed in this process to

³See Frerich and Frey (1993)

induce an occupational choice in line with the planned economy. Given such a myopic education policy, it was likely that the available qualification did not match the required one.

To improve the search and matching process given the ever changing economic conditions in accordance with the socialist plan, a planning and steering system for workers and for career advice was established. It was administered by the state secretary and by administrative bodies in the council of county or district (Frerich and Frey 1993). These councils had the right to restrict the number of hires but also to wield influence as to the choice of workers. Firms were able to hire workers only within the limits of the central plan. In addition, each individual worker was at risk of having to change the workplace if required. Over the decades, the East-German authorities mainly ensured the labor requirements in the main firms and allowed smaller firms more freedom to choose their own workers.

The free choice of the workplace was thus *de facto* very limited and workers could not exert any influence on the working conditions that were being offered. The usual endogeneity between working hours and child time that arises when parents are free to choose their workplace and the associated working conditions is therefore not an issue for East German workers. It can therefore be argued that being granted flexitime is exogenous. The effect of flexible working hours can therefore be regarded as being causal on the determination of parental time with their children in the case of Eastern German workers. A significant effect on parental time can therefore be attributed to flexible working schedules.

2.2 Empirical Strategy and Threats to Identification

To estimate the average effect of temporal work flexibility on parental time with children, I estimate the following estimation equation:

$$\ln C_i = \mathbf{X}'_i \beta_1 + \beta_2 F_i + \epsilon_i, \quad (1)$$

where $i = \{m, f\}$ denotes observations for men of women, respectively. The variable of interest is F_i which takes the value one if the person is granted some degree of temporal work flexibility. The coefficient of interest is β_2 which captures the average difference in maternal or paternal time with children that result from temporal work flexibility. The random error term is denoted by ϵ . The dependent variable, $\ln C_i$, is defined in three ways: (i) as the minutes of parental time, (ii) the log of minutes of childcare related activities per day or (iii) as the fraction of parental time relative

to the total time spent on household production. Finally, X_i is a matrix of personal predetermined characteristics.⁴

The data were collected two years after the German re-unification which could be understood as one potential threat to identification. Rapidly after the fall of the Berlin wall in 1989, East Germany underwent massive structural changes. According to Burda and Hunt (2001) employment declined by 35 percent between 1989 and 1992 and the East German GDP declined by roughly 30 percent during the same period. Unemployment rose from 0, as claimed by the authorities in the former GDR, to more than 15 percent when only registered unemployed are counted but rose to 33 percent if hidden unemployment (including early retirement, involuntary part-time work, training schemes for the unemployed etc.) is also included. Hence, the whole economy of the former GDR was in shambles.⁵

Given the dramatic increase in unemployment, joblessness and non-employment that followed the collapse of the former GDR and the associated uncertainty about the future, workers were predominantly interested in having *any* job. In addition, the actual level of qualification of East German workers did not necessarily match the one demanded by a market economy. Hence, it seems very implausible under such uncertain economic conditions that the degree of flexibility granted by a job was a choice criterion for East German parents. The previous argument that being offered flexitime was not a choice of parents in order to spend more time with their children still holds so that flexitime arrangements can be regarded as being exogenous. In addition, the provision of full-time daycare centers was still exceptionally good in East Germany after the German re-unification so that according to the Federal Statistical Office, 114 kindergarten-places were available for 100 children aged 3 – 6 in the former GDR. This fact reinforces the claim that flexitime was not chosen by workers for childcare concerns. In order to test for the possibility of non-random selection of flexible working hours for workers in certain occupations, I conduct robustness checks in section 5.1.

3 Data and Descriptive Statistics

This main analysis of this paper is based on the German Time Use Data (*Zeitbudgeterhebung*) for the year 1991/92. These data were collected by the German Federal Statistical Office (Statistisches Bundesamt 2003). It provides a variety of socio-economic, work and household characteristics.

⁴The matrix includes age, 3 educational dummies, 2 dummies for regional GDP per capita and 2 dummies for the regional structure.

⁵See Burda and Hunt (2001).

In addition, this dataset contains detailed information about the exact timing and the duration of child related activities and market work for each 5 minute time interval per day which makes it particularly interesting for this study.

The more than 200 activities that respondents engage in during a standard workday are aggregated into four major time use categories: pure leisure, paid market work, household work and tertiary time of which the first three are relevant for the current study.⁶ More specifically, pure leisure comprises all activities that are pleasurable but that do not need to be undertaken at all and nobody can be paid to do them. Market work is defined as all direct job related activities of primary and second jobs, but also comprises time spent on internships, qualification and education on or for the job, job search as well as breaks during the workday and work-related travel time. Household production captures all those activities for which market substitutes can be purchased so that somebody could be paid to do them and which further satisfy the third-party rule by Reid (1934) such as cooking, grocery shopping, cleaning, gardening etc. All childcare related activities are defined as household related activities in this paper. The final aggregate, tertiary time, is defined as all essential activities that nobody else can overtake such as sleeping or personal hygiene. The last time use aggregate is however not considered in this paper.

Guryan et al. (2008) infer from their findings that parents perceive time spent with their children as being fundamentally different from homeproduction or leisure even though childcare is both productive and enjoyable. In this paper, childcare comprises only "primary" activities such as learning, playing, care in case of illness, changing diapers, washing and feeding the kid, bring it to bed, to cuddle it etc. All minutes of commuting time related to child or adult care are also defined as child related time. It is possible to infer from the data how much time parents spend in the company of their children and thus including "secondary" activities who are however mainly supervisory. In this paper, I will however, only focus on primary childcare activities in order to capture those activities that indicate something about the quality of the interaction of parental time and thus about the amount of time that is directly invested by the parent (Guryan et al. 2008).

The information about the temporal work flexibility is provided by the respondent. He is asked to indicate whether or not the job grants flexitime arrangements. In general, flexitime is broadly defined as the ability to rearrange one's work hours within certain guidelines offered by the company. In most cases, core hours (e.g., 10:00 a.m. to 2:00 p.m.) are defined during which all employees must be working and are thus required to be on-site. Employees are given some degrees

⁶Intervals of commuting or traveling time are added to the related activity. It can be further noted that an aggregation of the activities into these broad measures is inherently arbitrary. See also Burda et al. (2007).

of control over the timing to fulfill their work commitment (Hill et al. 2001). It is mainly granted to allow the worker reconcile family and work.

3.1 Sample Description

To analyze the effect of temporal work flexibility on parental time, I restrict the sample to employed East German parents aged between 20 and 50 with children under the age of 15. Table 9 reports descriptive statistics by sex. In East Germany, shortly after the German re-unification, almost all of the employed sample men worked full-time and about 81 percent of the employed women. Flexitime arrangements are more likely to be granted to women.

The table further shows that men are on average slightly older, are more likely to be married and tend to have on average more children than women. The age distribution of kids between mothers and fathers is similar yet men are slightly more likely to have kids under the age of 3. Also the skill distribution among men and women is similar. The table shows that sample parents are generally well educated but among those with the lowest levels of education, women are slightly more likely than men.

3.2 Time Dimension

To get a first impression about the timing of activities across a standard workday, I will describe the temporal dimension of activities more closely. To start with, the distribution of parental time with kids is shown by sex in figure 2. Independent of the gender, parents are most likely to spend time on child related activities around 6 – 8 a.m. but to an even stronger extent in the evening hours between 5 – 8 p.m. Women tend to be slightly more likely to engage in primary child related activities during each time interval per day yet the differences are not big.

Table 1 reports the average amount of minutes spent on childcare activities for all employed men and women. In total, sample women spend on average about 48 minutes on primary child related activities while men devote about 9 minutes less time. When differentiating between flexitime status, I find that women devote an average of about 43 minutes to be with their kids when flexitime is not an option but if flexitime is granted, women spend about 18 minutes more on primary child time. For men, in contrast, the table shows only very little differences in the average amount of time devoted to time with children depending on the degree of flexibility of working schedules.

The relatively low average minutes of total primary childcare time are strongly driven by the

fact that about 31 percent of all women and about 38 percent of all men report not have spent any primary time during the standard day with their kids. Measuring the minutes of parental time of those workers who reported non-zero time with their kids indicate about 69 minutes for women and about 63 minutes in the case of men. Figure 3 shows the distributions of of non-zero parental time by gender. It shows that a high proportion of parents spend only little primary childcare time. Figure 5 additionally represents the distribution of parental time by age group of the children. It shows that the high share of parents who spend only little primary childcare time is strongly driven by those parents with older kids.

In addition to the absolute amount of parental time, table 1 reports the fraction of parental time relative to the minutes of household work. This fraction amounts to 21 percent for men and it ranges between 21 and 28 percent for women depending on flexitime status. Women who are granted flexitime, devote about 7 percentage points more of their total household time to be with their kids while no difference is obtained for men.

Table 1: Allocation of time by employed workers by sex depending on whether or not the job offers flexitime.

	women			men		
	all	no flex.	flex.	all	no flex.	flex.
minutes of child time	47.65 (61.91)	43.79 (58.87)	61.38 (70.24)	38.71 (51.56)	38.27 (51.51)	40.64 (51.98)
fraction of household time	0.22 (0.24)	0.21 (0.24)	0.28 (0.25)	0.21 (0.26)	0.21 (0.26)	0.21 (0.24)
minutes of homeproduction	217.19 (166.49)	222.51 (172.70)	198.05 (140.90)	186.42 (137.06)	189.74 (150.96)	171.76 (122.62)
minutes of market time	418.36 (282.01)	407.24 (288.43)	453.33 (254.73)	452.78 (273.64)	442.95 (281.14)	489.05 (235.33)
N	561	438	123	591	482	109

Table 1 also shows the hours of market work and of household production for employed men and women. While women report to work in general about 418 minutes (7 hours), men devote on average about 34 minutes more to market work.⁷ It is interesting to note that both women and men who are granted flexitime arrangements are found to work longer hours on the job and to spend more time with their children. Women with flexitime arrangements work about 46 minutes longer on the job and tend devote about 25 minutes less on household work. When men are considered, the table shows that those who work flexitime work on average about 46 minutes

⁷Note that diaries are filled-in during the weekday and during weekends.

more and they tend to devote about 18 minutes less on household work compared to those who do not work flexitime.

Figure 4 gives an additional graphical representation in the left panel of the difference by gender in the allocation of parental time during each time interval t between parents who are granted flexitime arrangements and those who are not. Positive values indicate a higher propensity for parental time during the t -th interval of parents whose jobs offer some kind of temporal work flexibility. Vertical lines indicate the boundaries of a standard workday in East Germany according to the data.⁸ The graph shows that the differences in parental time with children are noisy but are highest for parents with flexible working schedules around the boundaries of the standard workday. This indicates that it is in particular those time intervals that allow these parents to spend more time with their kids.

The right panel of figure 4 further shows the differences in the distribution of working hours depending on flexitime status for every time interval t . Again, positive values indicate a higher propensity of work for people with flexitime arrangements during the t -th time interval. The graph reveals that parents who are granted flexitime arrangements are more likely to work during standard hours as compared to parents as compared to parents who are not. These parents however tend to start their workday slightly later but also tend to end it slightly later on average. In the evening hours, women are again less likely to work after 6 p.m. when their jobs allow for flexitime. In contrast to that men with flexitime have a higher probability to work during these time intervals.

4 Results

4.1 Determinants of Flexitime

Before starting to analyze whether and to what extent temporal work flexibility is used by parents to spend more time with their kids, I will investigate the determinants of being granted flexitime work in more detail. Marginal effects by employment status and gender are reported in table 12. The table shows that age is positively yet insignificantly associated with the probability to work flexitime in the case of female workers. Older men, in contrast, are found to have a lower probability. The level of education has no significant influence for neither men nor women. Additionally, being married or having an employed partner is not found to significantly affect the probability

⁸It is defined by the average start of the workday and the average end of the workday in East Germany in 1991/92 reported by the respondents.

to work flexitime either.

The major determinants of that probability are workplace characteristics. The table shows that being a white-collar workers and an employee in the service sector has the highest impact on determining whether or not flexitime is granted. Among all employed women, having a white-collar job increases the probability by 20 percent for women and by 15 percent for men. Female service sector employees tend to be 12–14 percent more likely to have some degree of flexibility and men in such jobs tend to be 10 – 11 percent more likely. Women with higher incomes tend to be more likely to work in such jobs while the wage rate is not found to have a strong and significant impact for men.

The table furthermore shows differences in regional characteristics which have differentials influences on the probability to work flexitime. The probability to work in such jobs is highest for East Germans who live in regions with the highest GDP of all new länder. Regions with only some agglomeration tend to have a lower probability as compared to urbanized regions yet flexitime arrangements tend to be more likely to be granted in rural regions. In addition, the table shows that those regions with the highest unemployment rate (12.5 – 15 percent in 1991/92) tend to be associated with lower probabilities of such jobs.

When the household composition is regarded, table 12 reveals that parents with more kids are less likely to be granted flexitime arrangements. This finding emphasizes the earlier claim that people do not choose to work flexible hours for childcare concerns. If people were free to choose, one would rather expect a positive association of the number of children. The age of kids is not found to have a significant influence on the probability to be granted some degree of temporal work flexibility for women. For fathers, I only find that having children aged 3 to 6 years or kids older than 10 is positively associated with the probability to work flexitime.

The particularity of the employment policies in the former GDR in combination with the ubiquitous provision of childcare facilities explain the high levels of female labor force participation in East Germany and the pronounced rate of full-time employment among the employed sample women. The determinants of the probit regressions described here, in particular regarding age and number of children, underline the validity of the identification strategy that parents did not choose to have flexible working schedules but that such arrangements can rather be understood as gift granted by the employer mainly to people in white-collar jobs and employees in the service sector (Guryan et al. 2008).

4.2 Does Temporal Flexibility Increase Parental Time with Kids?

4.2.1 Baseline Results

Now, I will turn to the investigation and quantification of the causal effect of temporal work flexibility on parental time with children. Estimation results are reported in table 2. It shows the coefficient estimate of the flexitime indicator for (1) the absolute minutes of parental time, (2) log minutes of childcare time and (3) the fraction of child time respective to total household work by gender and employment status. The table shows that women who work in jobs that grant some degree of temporal flexibility spend on average about 15 minutes more on primary child care related activities than those women who do not. Given the comparatively low amount of time that employed parents spend on primary childcare time (47 minutes on average) as presented in table 1, the effect is sizable. Expressed relative to the average time that mothers spend with their kids, these 14 minutes corresponds to an increase of 30 percent. Keeping in mind that mothers who are granted some temporal work flexibility work on average longer minutes, further corroborates the very sizeable impact that such work arrangements have on maternal time with kids.

Men, in comparison, who are granted flexible working schedules do not significantly affect spend more time on primary childcare related activities. Full-time employed men spend about 4.5 minutes more on childcare time if they are granted flexible working hours yet this effect is not significant. This finding is not surprising given that such activities are considered to be predominantly female tasks.

Yet, as shown earlier, many parents, particularly with older children, report zero minutes of primary childcare time. To account for that, the second panel of table 2 reports the effect of flexitime arrangements for parents who report non-zero childcare related activities. Accordingly, employed mothers with some temporal work flexibility spend on average about 24 log points or 27 percent more time to be with their kids. When the sample is restricted to full-time employed mothers, the coefficient estimate reveals 27 log points or about 30 percent more maternal time. For men, flexitime does not result in more paternal time with kids.

Finally, when parental time is regarded in relation to the total time devoted to household activities – as given by the third panel of table 2 – mothers are found to spend about 7 percentage points more of their total household activities on child time when flexitime is granted. Given that women spend on average about 22 percent of their total household time on primary child time, an increase by 7 percentage points for mother who are granted flexitime arrangements corresponds

Table 2: Estimation Results for the flexitime indicator on child related time and the fraction of total household time by gender and employment status.

	employed		full-time	
	female	male	female	male
<i>1. minutes of child time:</i>				
flexitime	14.812*	3.073	14.586*	4.515
	(2.24)	(0.59)	(2.04)	(0.86)
N	561	591	455	580
R ²	0.138	0.105	0.132	0.104
<i>2. log minutes of child time:</i>				
flexitime	0.240*	0.018	0.266*	0.043
	(1.90)	(0.14)	(1.83)	(0.33)
N	389	365	318	356
R ²	0.084	0.096	0.074	0.095
<i>3. fraction of total household time:</i>				
flexitime	0.072*	-0.008	0.067*	-0.007
	(2.93)	(0.31)	(2.64)	(0.25)
N	561	591	455	580
R ²	0.105	0.088	0.118	0.086

Absolute t - statistics in parentheses. * indicates significance levels of 10%. Standard errors are robust. Additional control variables: age, 2 skill dummies, a dummy for being married as well as regional dummies accounting for GDP per capita and agglomeration type.

to an increase of about 32 percent. The effect for men, in contrast, is again low and insignificant.

These baseline findings suggest that women who are granted some degree of temporal work flexibility, use this freedom to spend a huge amount of time more on childcare related activities. These results can be interpreted as strong evidence that such work arrangement indeed enhance the reconciliation of family and work. Given that parents and specifically mothers with flexible working schedules work on average longer hours as compared to the reference group, these figures emphasize the very sizeable positive influence even more.

4.2.2 By age of children

Until so far, only average effects of temporal work flexibility on parental time were analyzed, independent of the age of the child. Younger children need more time from both parents and time investments are found to be most effective in the first year of a child's life (Carneiro et al. (2010)).

In this section, I will therefore analyze the effect of temporal work flexibility depending on the age of children. Table 3 therefore reports the estimates of the coefficient estimates of the flexitime indicator by age of children for all employed parents by gender.

With children under the age of 3 only, mothers tend to devote about 50 minutes more on childcare activities when they are granted some degree of temporal work flexibility. It is specifically these first three years of a child's life during which time and resource investments are most effective for the cognitive development of children (source). The estimates show that granting some degree of temporal work flexibility to mothers can be an important tool that could help to mitigate the adverse effects of employment on the cognitive development of children.⁹ In this respect, such work arrangements can indeed help mothers with very young kids to reconcile family and work. Also fathers with children under the age of 3 are found to spend about 13 minutes more time with their children when flexitime is granted yet this effect is not accurately measured.

The table also shows that mothers tend to spend about 55 log points or 73 percent more on primary childcare related activities with children under the age of 3 when only positive values are considered. Given the low number of observations, these finding must be regarded with caution. Father, in contrast, devote about 34 log points or about 40 percent more time to such activities yet the estimate is marginally insignificant. When the fraction of child time relative to the total amount of household work is regarded, mothers with kids under the age of 3 devote about 20 percentage points more of their total household time to childcare activities when flexitime is possible. Fathers, in contrast, tend to spend about 6 percentage points more to be with their kids but the coefficient estimate is again not statistically significant.

With increasing age, children need or even want less care from their parents and time inputs are less efficient. The lower time inputs are lead to lower additional time that parents spent with their kids when being granted flexitime arrangements. This fact has a mitigating effect on the average coefficient estimates independent of the child's age. Women with pre-school kids devote about 29 minutes more of their available time to be with their kids if their jobs allow for some degree of flexibility. Women with kids under the age of 10 are found to spend only about 20 minutes more on childcare activities. Fathers with kids in these age ranges tend to spend slightly less additional time with their children when their working hours allow for some degree of flexibility. Restricting the sample to parents who report non-zero childcare time reveals a relatively stable and very pronounced positive effect of flexitime. Accordingly, mothers tend to devote between 46

⁹(Baum 2003, Brooks-Gunn et al. 2003, Ruhm 2004, Hill et al. 2005, Bernal 2008, Ruhm 2008, Blau and Grossberg 1992, Carneiro et al. 2010.

Table 3: Estimation Results for the flexitime indicator on child related time and the fraction of total household time for employed workers by gender, depending on the age of the child.

	women			men		
	min. of child time	log min. of child time	fraction of hh time	min. of child time	log min. of child time	fraction of hh time
kids \leq 3	50.527*	0.549*	0.202*	13.516	0.339	0.057
	(2.25)	(1.88)	(3.85)	(0.87)	(1.59)	(0.93)
N	98	83	99	115	99	115
kids \leq 6	28.858*	0.524*	0.123*	18.499*	0.328*	0.045
	(2.51)	(3.64)	(3.10)	(2.02)	(2.31)	(1.09)
N	238	181	239	267	205	268
kids \leq 10	20.352*	0.457*	0.087*	14.981*	0.276*	0.027
	(2.39)	(3.60)	(2.83)	(2.07)	(2.14)	(0.84)
N	385	298	386	403	296	405
kids \geq 10	18.389*	0.255	0.086*	-6.047	-0.542*	-0.018
	(2.11)	(0.86)	(2.32)	(1.49)	(1.93)	(0.50)
N	176	91	176	188	69	188

Absolute *t*- statistics in parentheses. * indicates significance levels of 10%. Standard errors are robust. Additional control variables: age, 2 skill dummies, a dummy for being married as well as regional dummies accounting for GDP per capita and agglomeration type.

to 52 log points (58 – 69 percent) more time when their kids are under the age of 10. Fathers tend to spend on average about 28 – 33 log points (32 – 39 percent) more time with their kids. Relative to total household time mothers tend to have between 9 to 12 log points higher childcare fractions; paternal fractions are positive yet not statistically significant.

For kids older than 10, the effect of temporal work flexibility diverges for mothers and fathers. While mothers still tend to devote about 18 minutes more time, fathers tend to have different priorities when flexitime is possible. They are found to spend about 6 minutes less on child related activities than fathers who cannot influence their working schedules at all but these estimates are marginally insignificant. Mothers who report non-zero minutes of primary child time have about 26 log points more with their kids while fathers with older kids reduce these activities by even 54 log points. It shall be noted that only primary activities are considered here so that only those fathers are compared who report non-zero childcare activities. This reduces the number of observations considerably so that these differences shall not be over-interpreted.

All findings point into the same direction: flexitime is used by parents to spend more time with their kids. Flexitime is most effective for very young children where mothers tend to spend about

50 minutes more on primary childcare activities. These effects can be understood as evidence that such working conditions allow for a better reconciliation of family and work. This flexibility is also important to mitigate the adverse effect maternal employment on the child's cognitive development in particular during the first year of the child's life.

4.2.3 Determinants of Parental Time

All determinants of parental time with kids are reported in table 4. For an identification of the effect, I only control for predetermined characteristics. Potential sources of non-random selection shall be avoided by including job related characteristics which might bias the results.¹⁰ The table shows that only few of these determinants have a significant influence on parental time.

Table 4: Time Use Data: Determinants of time devoted to child care in Eastern Germany by sex for all employed workers.

	minutes		log minutes		fraction	
	female	male	female	male	female	male
flexitime indicator	14.812*	3.073	0.240*	0.018	0.072*	-0.008
	(2.24)	(0.59)	(1.90)	(0.14)	(2.93)	(0.31)
age	-2.284*	-2.271*	-0.030*	-0.038*	-0.011*	-0.011*
	(5.20)	(6.65)	(3.06)	(4.52)	(6.17)	(7.43)
low skilled	-14.184	-11.145	-0.321	-0.004	-0.069*	-0.071*
	(0.87)	(1.00)	(1.15)	(0.01)	(1.86)	(2.07)
high skilled	4.138	-4.654	0.064	0.038	-0.015	-0.031
	(0.75)	(1.08)	(0.54)	(0.37)	(0.70)	(1.43)
married	-30.335*	8.640	-0.343*	0.217	-0.019	0.093*
	(4.00)	(1.20)	(2.76)	(1.39)	(0.89)	(3.15)
GDP dummies	yes	yes	yes	yes	yes	yes
regional agglomeration	yes	yes	yes	yes	yes	yes
N	561	591	389	365	561	591
R ²	0.138	0.105	0.084	0.096	0.105	0.088

Absolute t - statistics in parentheses. * indicates significance levels of 10%. Additional control variables: a dummy accounting for weekend diaries, 2 dummies controlling for GDP by regions and two dummies for agglomeration types.

Older parents are found to spend generally less time with their kids. This is easily explained as older parents tend to have older kids who need less care and attention. The age effect is of similar size for male and female workers and an increase of ten years reduces parental time by about 23 minutes or by 30 percent. The parent's education does not have a strong and significant

¹⁰See Angrist and Pischke (2009) for potential biases induced by including bad controls into the regression.

effect on parental time on average. The table shows that low skilled parents spend generally less time on childcare activities as compared to medium skilled workers. Mothers with higher skills, in contrast, are found to invest slightly more time yet the effect is not significant. High-skilled fathers seem to have different priorities. They are found to devote slightly though insignificantly less time to childcare related activities than fathers with medium educational attainments. The estimates furthermore show that while married mothers devote about half an hour less time to childcare related activities, the opposite holds for fathers. Husbands devote on average about 8.6 minutes more on time with their kids. It can thus be argued that married couples share childcare responsibilities, which relieves mothers by allowing them to allocate their activities differently.

I additionally control for regional characteristics and find that parental time is lowest in regions with the lowest GDP per capita. This finding can be explained by the fact that parental time investments are positively associated with incomes. Parents who live in regions with lower incomes rather worry about earning enough income to financially support their families (Guryan et al. 2008). Furthermore, parental time is higher in more urbanized areas. People living in rural areas, in contrast, tend to spend less time on childcare related activities.

5 Robustness Check

5.1 Selection

Workers who are granted flexitime were assigned to particular jobs in the former GDR and had hence did not choose a job because of childcare concerns. I have shown in section 4.1 that service sector employees and white-collar workers are significantly more likely to be granted flexitime. Table 5 additionally shows the average incidence of flexitime arrangements by gender for different occupations in 1991/92 in Eastern Germany. It shows that among men and women, flexitime is most likely to be granted in office occupations, in the textile industry as well as in social service jobs. Management employees as well as engineers and merchants are equally likely to be offered some degree of flexibility. These occupations tend to require a higher degree of education so that it can be argued here that it is rather the better educated workers who benefit most from flexible working schedules. As Guryan et al. (2008) show, better educated workers tend to spend quantitatively and qualitatively more time with their kids.¹¹ If a variable that affects both the occupation granting flexitime and childcare time is not controlled for and has a systematic impact,

¹¹See also Bianchi and Robinson (1997), Bryant and Zick (1996), Datcher-Loury (1988), Leibowitz (1977).

the coefficient estimate of the flexitime indicator will be biased. In this section, I will therefore account for potential non-random selection of workers in different occupations.

Table 5: Flexitime incidence by occupation and sex for all employed workers.

	female	male
agriculture & mining	0.132	0.109
paper & wood	0.000	0.000
metal production & processing	0.000	0.176
engineering	0.071	0.070
metal construction	0.111	0.083
textiles & leather	0.500	0.500
food	0.000	0.200
construction	0.053	0.036
upholsterers	0.000	0.000
painters	0.000	0.000
packers	0.000	0.000
machine operators	0.000	0.000
engineers, chemists, physicists	0.286	0.216
merchants & traders	0.239	0.276
transport	0.115	0.093
management & consulting	0.300	0.293
office occupations	0.532	0.473
security operations	0.130	0.071
artists & authors	0.000	0.000
medicine & health	0.042	0.048
social services	0.382	0.404
other service occupations	0.000	0.000
others	0.222	0.286

Table 11 shows the differences in the sample composition of workers who are granted flexitime and those who are not. By means of a simple t-test, I test in how far the explanatory variables differ among the groups. Columns (3) and (6) report p-values of the t-test for each set of variables. The table shows that the dependent variables significantly differ for sample women. Yet no significant differences are found among men. Since these are the dependent variables, finding differences among the groups is essential for obtaining any effects of working flexitime in the subsequent analysis using econometric techniques.

Comparing all explanatory variables, the t-tests reveal no significant differences among the groups of workers. This finding is good as it can hence be argued that differences in parental time result from different behaviors but are not driven by different sample compositions. Non-random selection might originate from different channels though as described earlier.

To identify the potential non-random selection, I use three different exclusion restrictions. As shown earlier, service sector employees and employees in white collar-occupations have a greater probability to be granted flexitime arrangements. I therefore include two dummies accounting for these conditions. The major exclusion restriction, however, is the average rate of flexitime work in different occupations and different sectors for Germany in the second wave of the German Time Use Data (2001/02).¹² The rate of flexitime arrangements by sector and occupation in Germany in 2001/02 captures the difference in occupation- and sector-specific tendencies to grant flexitime. This exclusion restriction is appropriate if employers acknowledge that such working schedules influence the work output positively. In addition, information about being granted flexitime arrangements are used 10 years after the survey year of interest. It can therefore clearly be assumed that the exclusion restriction is highly correlated with the incidence of flexitime arrangements in different jobs and industries in 1991/92 but it does not affect parental time during this year. The strong positive correlation of the rate of flexitime arrangements in 1991/92 and 2001/02 is further shown in figure 6 in the appendix. The rate of flexitime arrangement in the second survey year is therefore an appropriate exclusion restriction to identify possible non-random selectivity.

A selectivity corrected model, also known as treatment effects model, is estimated and results are reported in table 6. It shows estimates of the flexitime indicator, the selection term as well as the coefficient estimate of the main exclusion restriction of the first stage probit model by gender and employment status. The table reveals that the rate of flexitime in 2001/02 by sector and occupation is highly significant in all regressions and is strongly positively correlated with the probability to be granted flexible working schedules. Consequently, the sector- and occupation-specific tendencies to grant flexible working schedules are well captured by this term.

The selection term is found to be insignificant in all cases which suggests that selection of workers in different occupations and sectors is no issue in Eastern Germany in 1991/92. The only exception is obtained for full-time employed men yet it is safe to assume here that flexitime is rather taken by women to spend more time with their kids yet is not very likely to be true for men. OLS estimates are hence adequate when the causal effect of temporal work flexibility on parental time shall be investigated. Accounting for possible selection, however, shows a negative though insignificant selection effect when minutes of parental time are regarded which suggests that OLS estimates are downward biased. These estimates indicate that parents who are granted

¹²I tried different other exclusion restrictions: (i) the rate of shift work by sector and occupation in Eastern Germany only in 2001/02 and (ii) the rate of shift work in West Germany in 1991/92. Both other exclusion restrictions deliver very similar results to those reported here.

Table 6: Estimation results for flexitime indicator, selection term and coefficient estimate of the exclusion restriction from a treatment effects model on child related time and the fraction of total household time by gender and employment status.

	employed		full-time	
	female	male	female	male
<i>1. minutes of child time:</i>				
flexitime	32.022*	28.124*	39.776*	33.963*
	(2.03)	(1.67)	(2.21)	(1.99)
selection term ($\hat{\lambda}$)	-11.506	-15.650	-16.703	-18.396*
	(1.18)	(1.57)	(1.52)	(1.82)
rate of flexitime (1st stage)	1.286*	1.075*	1.106*	1.064*
	(4.04)	(3.21)	(3.24)	(3.16)
N	561	591	455	580
<i>2. log minutes of child time:</i>				
flexitime	0.000	0.059	0.129	0.173
	(0.00)	(0.15)	(0.36)	(0.44)
selection term ($\hat{\lambda}$)	0.164	-0.025	0.093	-0.082
	(0.85)	(0.11)	(0.43)	(0.35)
rate of flexitime (1st stage)	1.260*	1.046*	1.153*	0.975*
	(3.17)	(2.45)	(2.69)	(2.20)
N	389	365	318	356
<i>3. fraction of total household time:</i>				
flexitime	0.074	0.048	0.164*	0.059
	(1.18)	(0.58)	(2.37)	(0.69)
selection term ($\hat{\lambda}$)	-0.002	-0.035	-0.064	-0.041
	(0.04)	(0.71)	(1.53)	(0.81)
rate of flexitime (1st stage)	1.286*	1.075*	1.106*	1.064*
	(4.04)	(3.21)	(3.24)	(3.16)
N	561	591	455	580

Absolute t - statistics in parentheses. * indicates significance levels of 10%. Standard errors are robust. Additional control variables: age, 2 skill dummies, a dummy for being married as well as regional dummies accounting for GDP per capita and agglomeration types. Additional exclusion restriction: dummy for white-collar workers.

some degree of temporal work flexibility spend on average about half an hour more on childcare related activities. However, no evidence for non-random selection of occupations offering flexitime arrangements is obtained. It can therefore be concluded that OLS estimates give appropriate estimates of the effect of working flexitime on parental time.

5.2 Can the Results be Generalized?

Eastern German workers are socialized differently than Western Germans as described in section 2.1. Consequently, it is possible that attitudes towards work and spending time with kids differ entirely but also that the sample itself is non-representative for Germany as a whole. In order to test whether the results obtained for East Germans also hold for all Germans a decade later, I use a different dataset, namely the GSOEP data for the years 2002 – 2008. The sample is restricted to all employed workers under the age of 55 with kids under the age of 15.

5.2.1 Definition of Variables and Sample

Apart from a wide range of socio-economic information and workplace related characteristics, the GSOEP data contains information on the hours spent on childcare related activities on a typical weekday. Respondents do not fill in diaries but report estimated average amounts of time. Accordingly, all sorts of activities that are performed together with kids are comprised by this variable. Hence, it is not merely primary childcare time as in the case of the German Time Use Survey. Secondary activities like watching TV together with the kid or eating dinner with the whole family or doing other things while the child takes a nap are also counted. In addition, respondents can only specify full hours of childcare time so that the individual variability of this variable across years is limited.

Detailed information on temporal work flexibility is also scarce in this dataset. To approximate temporal work flexibility, I define all people who indicate to start their workday at varying time intervals as having a greater degree of temporal work flexibility granted by the job. This information is available only biannually between 2002 and 2008. Various reasons are possible why parents and particularly mothers start to work at different time intervals of the day. I will therefore analyze the sample again by employment status. Since people who belong to this group might be compositionally different from those who work flexitime as analyzed by the German Time Use data, I will examine the determinants of work with such schedules more closely in section 5.2.3.

5.2.2 Descriptive Statistics: Parental Time with Children

Table 7 reports the respective allocation of average childcare time and market work for a usual workday by sex and employment status. In addition, mean hours depending on whether or not the job grants some temporal flexibility is shown. Compared with the information on primary childcare time derived from the time diary information of the German Time Use Data, parental

time here is much higher.¹³

Table 7: GSOEP: Allocation of usual hours of child time and market work by gender and depending on whether or not the job offers temporal flexibility.

	women			men		
	all	no flex.	flex.	all	no flex.	flex.
<i>full-time employed</i>						
hours of usual child time	3.34 (3.71)	3.03 (3.20)	3.94 (4.50)	1.49 (1.71)	1.47 (1.74)	1.53 (1.65)
hours of usual market work	8.74 (1.76)	8.92 (1.71)	8.39 (1.80)	9.82 (1.64)	9.93 (1.10)	9.59 (1.75)
N	819	542	277	3485	2353	132
<i>all employed</i>						
hours of usual child time	5.11 (4.76)	4.98 (4.71)	5.35 (4.83)	1.52 (1.78)	1.50 (1.82)	1.56 (1.68)
hours of usual market time	5.83 (2.76)	6.09 (2.69)	5.36 (2.82)	9.70 (1.81)	9.83 (1.71)	9.43 (1.97)
N	3267	2099	1168	3618	2438	1180

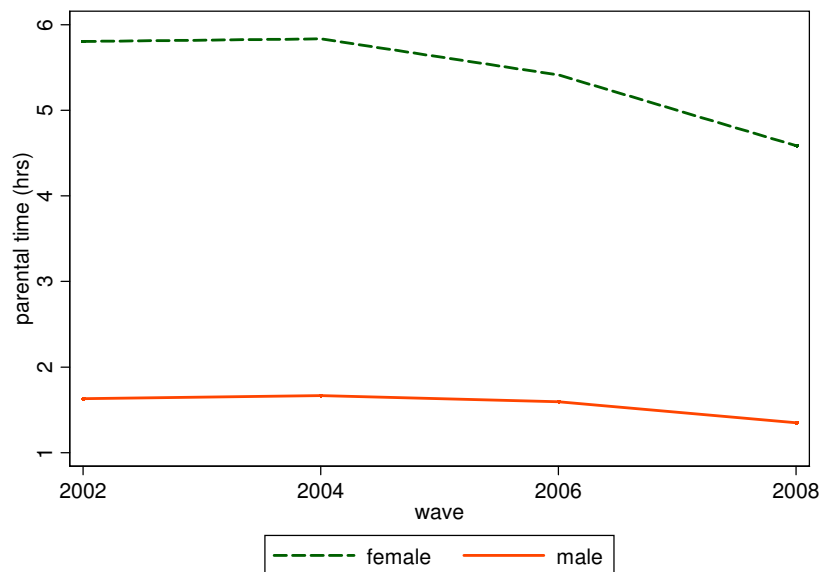
Table 7 shows that all employed mothers devote on average 5.1 hours on childcare activities between 2002–2008 and full-time employed mothers about 3.3 hours. Women who start their workday at varying time intervals tend to spend on average about 22 – 54 minutes more time with their kids. The table additionally shows full-time employed women report to work on average more than 8.7 hours and including also part-time employed mothers, average market work amounts to an average of 5.8 hours. Women who have some temporal work flexibility report to work 32 – 42 minutes less. Respondents of the Time Use survey, in contrast, reported longer average minutes of market work if flexitime was granted.

Men, in contrast, tend to spend only about 1.5 hours on childcare activities during a usual workday and there is virtually no difference depending on the degree of temporal work flexibility. Regarding working hours, fathers report to work on average almost 10 hours. Again, men without flexibility report to work on average about 20 minutes longer.

In addition, figure 7 shows the distribution of average parental time by gender for full-time employed parents. While most men devote at most 2 hours on childcare activities, the distribution of mother's time is wider. The evolution of parental time with children over the sample period is depicted in figure 1. It shows that employed mothers devote significantly more time to child

¹³It has to be furthermore noted that the definitions of the activity aggregates are not comparable across the data sets.

Figure 1: GSOEP: Parental Time with Children of Employed Parents by Sex (2001 – 2008).



care related activities than fathers over the whole time period. However, average parental time decreases from 2001 to 2008. While mothers spent on average about 5.8 hours on child care time in 2002, the average time drops to 4.6 hours in 2008. Fathers, who devoted about 1.7 hours to such activities in 2002 on average, devote only 80 percent at the end of the sample period.

Even though the absolute amounts of time devoted to parental time differ between the datasets due to different definitions, the direction of impact is the same: women devote more of their time to be with their kids when their jobs allow for some kind of temporal flexibility. The preceding analysis will show whether this is robust after controlling for pre-determined characteristics.

5.2.3 What determines a Varying Start of the Workday?

Table 13 shows the marginal effects of the determinants of starting the working at different time intervals by employment status. The table shows that the probability to have such a job tends to decrease with tenure and age for women and with years of schooling for men.

Employed mothers with kids under the age of 6 tend to be more likely to start working at different time intervals while the opposite holds for fathers. The number of kids has no influence on the mother's decision yet it is associated with lower probabilities for fathers.

When it comes to workplace characteristics I find that service sector employees and parents employed in white-collar job tend to have a greater probability to start their workday at different time intervals. While the work biography does not matter for father, mothers with more years of full-time experience tend to be more likely to have some degree of temporal work flexibility. In

addition, mothers who work in firms with no other coworkers also tend to have a higher probability. Fathers, in contrast, have the highest probability for being granted some flexibility when they work in firms with more than 2000 employees. Furthermore, a higher log labor income is negatively associated with the choice to start working at different time intervals when all employed mothers are regarded and the opposite association holds for fathers. Other workplace characteristics do not have a significant impact on the choice of such a job.

Like in the case of the German Time Use Survey, service sector employees and those in white-collar occupations have the greatest probability to have some degree of temporal work flexibility. While the age of children does not affect this likelihood in 1991/92 for East Germany, the age of children matters for Germany as a whole. Accordingly, in particular mothers with very young children seem to choose to work at different time intervals per day for childcare reasons. In the next section, I will analyze the impact between flexible working schedules and parental time using an instrumental variable approach to check whether the results obtained for East Germany can be generalized.

5.2.4 Parental Time

Empirical Specification and Identification

To estimate the impact of temporal flexibility on parental time, the following estimation equation will be estimated:

$$\ln C_{it} = \mathbf{X}'_{it}\beta_1 + \beta_2 F_{it} + \gamma_t + \gamma_i + \epsilon_{it}. \quad (2)$$

$\ln C_{it}$ is the log of childcare time reported by respondent i at time t . The main variable of interest is F_{it} which is an indicator variable that takes the value 1 if the person has some temporal work flexibility and 0 otherwise. The respective coefficient β_2 therefore estimates the impact of childcare time due to being granted some degree of temporal work flexibility. I control for time fixed effects, γ_t , to account for the fact that parental time with children generally trends downward for men and women over the observation period. Moreover, individual fixed effects, γ_i , are added in some specifications. I hence compare individuals who are exposed to temporal work flexibility to those who are not. The matrix \mathbf{X}_{it} contains some predetermined control variables such as age, years of schooling, federal state dummies and dummies for being married and holding the German citizenship.

The main problem for identification in this context is reverse causality. Parents are free to choose their jobs due to the pecuniary and non-pecuniary compensation package it offers. Thus, it is likely that people and in particular mothers choose to accept a job that offers flexibility because of childcare considerations. To deal with this concern, I use an instrumental variable approach where I instrument for the temporal work flexibility, F_{it} , with the rate of temporal work flexibility by occupation and sex of parents with children older than 10. This instrument is highly correlated with the individual inclination to have some degree of temporal work flexibility and it accounts for the fact that flexibility is more likely to be granted in particular industries. In addition, section 4.2 has shown that parents and in particular fathers of older kids set their priority differently from childcare concerns. For the instrument to be exogenous to the error term, it is important that the individual works in a job that grants flexibility of working schedules to have more time with kids only for those parents with young kids because these are excluded from the instrument.

These assumptions are relatively plausible as the instrument accounts for the fact that flexibility is more likely in particular industries. In addition, it is mainly parents of younger kids who choose to work in jobs offering temporal work flexibility in order to be with their kids which is picked up by the instrument. Older kids need less attention of their parents and teenagers might sometimes even refuse to spend too much time with their parents. It follows that for those parents having a job that offers flexible working hours is not motivated by childcare concerns but by other factors.

Description of Results

Estimation results on log hours of parental time are reported in table 8. Column (1) presents results from pooled OLS regressions and column (2) shows IV estimates accounting for reverse causality. Column (3) reports results from fixed effects regressions and finally, column (4) depicts coefficient estimates of instrumental variable fixed effects regressions.

As before, each cell in the table corresponds to a coefficient estimate of the flexibility dummy variable for separate regressions by employment status.¹⁴ Estimation results obtained for all German workers generally corroborate earlier findings and suggest that temporal work flexibility increases parental time in particular of mothers.

The pooled OLS results as reported in the first two columns of table 8 indicate that full-time employed women who start their workday at different time intervals spend on average about 9.6 log points more on childcare related activities. In absolute time this means that these mothers

¹⁴Predetermined variables such as age, years of schooling, marital status, German nationality, dummies for the federal state of residence and time dummies are additionally controlled for.

Table 8: GSOEP: Estimation results on parental time in logs by gender. OLS and Fixed-Effects Regressions (2002 – 2008).

	OLS		FE	
	OLS (1)	OLS-IV (2)	FE (3)	FE-IV (4)
<i>female workers:</i>				
full-time employed	0.214* (3.73)	0.096 (0.71)	0.034 (0.36)	0.603 (1.51)
first stage <i>F</i> -statistic	–	174.67	–	9.90
N	592	448	592	363
R ²	0.123	0.160	0.085	0.066
<i>part-time employed</i>				
part-time employed	0.068* (1.69)	0.178* (1.92)	0.055 (1.04)	-0.114 (0.27)
first stage <i>F</i> -statistic	–	376.86	–	20.40
N	1426	977	1426	836
R ²	0.085	0.085	0.137	0.168
<i>male workers:</i>				
full-time employed	0.036 (1.32)	0.088 (1.60)	0.003 (0.08)	-0.036 (0.20)
first stage <i>F</i> -statistic	–	591.78	–	27.27
N	1781	1781	1781	1690
R ²	0.108	0.106	0.030	0.021

Absolute *t*- statistics in parentheses. * indicates significance levels of 10%. Standard errors are robust. Additional controls: age, years of schooling, marital status, German nationality, dummies for federal states of residence as well as time dummies. The first stage *F*-statistic indicates the Kleibergen-Paap *rk* Wald *F*-statistic.

devote about 0.32 hours or 19 minutes more of their time to be with their kids which is comparable to the estimates obtained from time use data. However, this estimate is not very accurate which stems from the fact that only integer hours of average childcare time could be reported by the respondent so that the variability of this information is low. A comparison of results obtained by OLS and IV further reveals the expected upward bias of simple OLS estimates when reverse causality is not accounted for. Coefficient estimates obtained from fixed effects regressions need to be regarded with caution due to the low degree of changes in the flexibility indicator over time among individuals. Yet, the direction of impact is the same as before even though the coefficient estimates are insignificant: full-time employed women who are granted some degree of temporal work flexibility spend more time on childcare activities than the reference group. The table further

shows the F-statistic of the first stage for the instrumental variable approaches. It reveals that the instrument is well suited for the pooled OLS regressions yet it is less strong in the case of instrumental fixed-effects.

The second panel of table 8 presents estimation results for part-time employed women who account for about 75 percent of all employed women in the sample. Such work itself grants workers already a higher degree of temporal flexibility to be with their kids. I will now analyze and quantify how time with children is additionally affected by starting the workday at different time intervals. The OLS estimates suggest that women who start their workday spend about 18 log points more on childcare time than part-time employed women with fixed schedules. Fixed effects regressions reveal however, that among the changers, being granted some degree of temporal flexibility reduces parental time with kids. However, only 20.6 percent of all part-time employed women with kids change the flexibility status over the years. Consequently, the coefficient represents only the decision of one fifth of the sample. The F-statistics of the first stage regression additionally indicates that the instrument is well suited in this case.

In the case of men, the OLS estimates show that being granted some degree of temporal work flexibility increases the time that fathers spend with their kids by about 8.8 log points which corresponds to an increase of 8 minutes. Comparing the coefficient estimates of the pooled regressions reveals a downward bias of the simple OLS estimates when reverse causality is not accounted for. Fixed-effects regressions, in contrast, show that temporal work flexibility hardly affects paternal time with kids. These results are not very surprising yet must be regarded cautiously. Firstly, fixed-effects regressions only explain the behavior of about 15 percent of the full-time employed fathers and 35 percent of the changers even report multiple changes. In addition, figure 7 shows that the variability of paternal time with kids is low for only integer numbers of paternal time can be reported.

It can be concluded from the results described in this section that the results obtained from time use data for East German workers can be confirmed for all German workers for the time period from 2002 to 2008. It follows that parents indeed use the temporal work flexibility to spend more time with their kids.

6 Conclusion

Childcare activities are still largely perceived as female responsibilities. Yet, better occupational careers and equal opportunities for women will weaken the differentiation of male and female tasks in the future. Political measures to facilitate parental leave of fathers give mothers further incentives to participate and re-enter the labor market. This will make the creation of measures to facilitate the reconciliation of family and work even more necessary. This paper examines the causal link between temporal work flexibility and parental time and seeks to quantify the effect. This is an important issue because time investment is one of the major determinants for the cognitive development of children in particular during the first year of a child's life. Maternal employment during these years is found to negatively affect the child's cognitive development. This paper contributes to this discussion by showing that flexible working schedules significantly increase parental time which might mitigate the negative adverse effect on the cognitive development of children.

For identification, I exploit the German re-unification as quasi-experiment. Even though, both parts of Germany were subject to similar regulations before 1990, the economic situations were very different. The particularity of the East German labor market helps me to identify the causal link. Childcare facilities were almost ubiquitous in East Germany and the job choice was strongly restricted by the requirements of the centrally planned economy. Working conditions can hence be understood as being exogenous and not subject to choice. The analysis of this paper is based on German Time Use Data for the year 1991/92. To check whether the results obtained for Eastern Germany can be generalized to Germany as a whole, I additionally use GSOEP data. The identification for this dataset is obtained by an instrumental variable approach.

The estimation results suggest that flexibility with respect to the organization of working hours increases parental time in particular of mothers by about 30 percent. While the positive effect is independent of the child's age for mothers, I find that flexitime arrangements increase paternal time only for kids under the age of 10. For older children, however, the opposite is found which suggests that these fathers rather substitute their non-market time away from child related activities as these kids need generally less attention and care from their parents.

The results are robust and indicate that flexible working schedules indeed enhance the reconciliation of family and work not only for mothers. No evidence for systematic selectivity of flexitime arrangements in certain occupations is found for East German workers. Results obtained from GSOEP data for Germany as a whole further reveal that accounting for the endogeneity between

flexible work arrangements and parental time is crucial. OLS estimates tend to overestimate the true influences of temporal work flexibility for mothers but to underestimate the impact for fathers.

Increasing the fraction of labor supply of women is high on the political agenda. In order to encourage aggregate domestic demand and to boost aggregate domestic production and therefore to spur aggregate economic growth in the medium-run, it is essential to use the total labor market potential. To give women an incentive to supply work at the extensive and intensive margin requires them to be able to reconcile family and work. As the example of the former GDR shows, measures to enhance temporal work flexibility can only work in combination with an expansion of the provision of childcare facilities. A further modification of the tax system for married couples that hampers labor force participation in Germany are additionally needed to improve the labor market situation and thus to stimulate growth.

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7 Appendix

Table 9: TU: Summary Statistics for employed workers by gender.

	women	men
<i>individual characteristics:</i>		
age	34.282 (5.671)	35.905 (6.022)
low skilled	0.039 (0.194)	0.027 (0.162)
medium skilled	0.581 (0.494)	0.579 (0.494)
high skilled	0.380 (0.486)	0.394 (0.489)
married	0.808 (0.395)	0.905 (0.293)
<i>household characteristics:</i>		
# of kids	1.984 (0.818)	2.036 (0.866)
kids ≤ 3	0.175 (0.380)	0.195 (0.396)
kids aged 3–6	0.250 (0.433)	0.257 (0.437)
kids 6–10	0.262 (0.440)	0.230 (0.421)
kids 10– 15	0.314 (0.464)	0.318 (0.466)
<i>work characteristics:</i>		
full-time employed	0.811 (0.392)	0.981 (0.135)
flexitime	0.219 (0.414)	0.184 (0.388)
N	561	591

Table 10: GSOEP: Summary Statistics for employed workers by gender.

	women	men
<i>individual characteristics:</i>		
age	34.39 (5.85)	40.30 (6.03)
years of schooling	12.27 (2.39)	12.41 (2.69)
married	0.79 (0.41)	0.93 (0.25)
full-time employed	0.25 (0.43)	0.96 (0.19)
<i>household characteristics:</i>		
# of kids	1.70 (0.72)	1.89 (0.82)
kids ≤ 3	0.07 (0.26)	0.07 (0.25)
kids aged 3–6	0.21 (0.41)	0.23 (0.42)
kids 6–10	0.62 (0.49)	0.59 (0.49)
kids 10–15	0.49 (0.50)	0.50 (0.50)
	3267	3618

Figure 2: Time Use: Distribution of parental time with kids across a standard day for employed parents by sex.

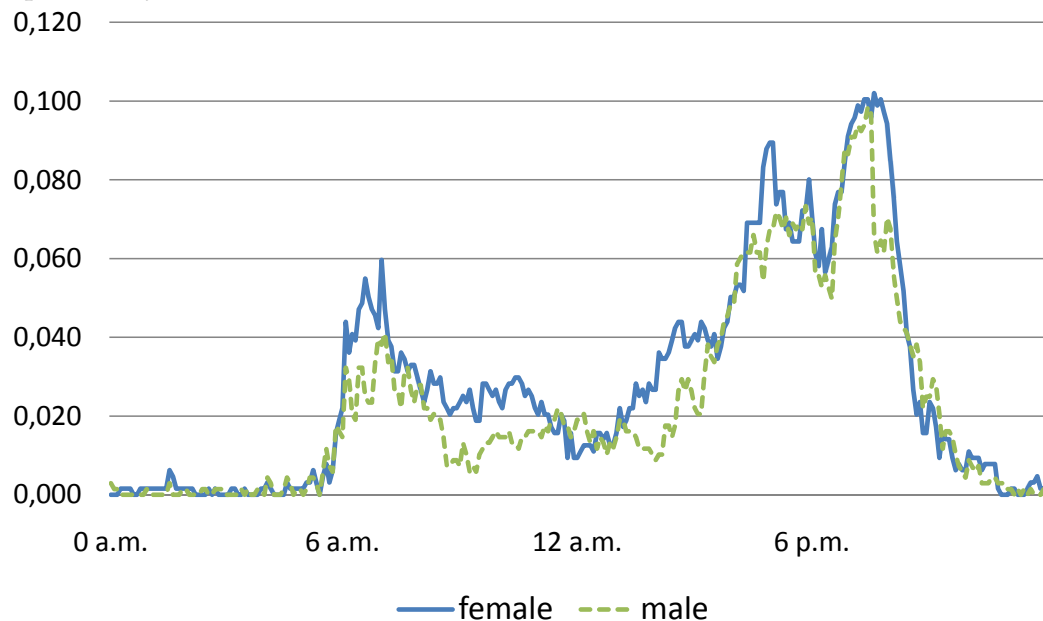


Table 11: TU: Summary Statistics for employed workers by flexitime status and gender and t-tests for compositional differences.

	female			male		
	no flex. (1)	flex. (2)	t-test (3)	no flex. (4)	flex. (5)	t-test (6)
<i>dependent variables:</i>						
minutes with kids	43.790 (58.867)	61.382 (70.243)	0.0053	38.268 (51.517)	40.642 (51.980)	0.6645
log minutes with kids	3.705 (1.029)	3.983 (1.054)	0.0251	3.752 (0.921)	3.778 (1.044)	0.8404
fraction of time with kids	0.208 (0.241)	0.278 (0.248)	0.0051	0.214 (0.259)	0.211 (0.244)	0.9081
<i>individual characteristics:</i>						
age	34.201 (5.702)	34.569 (5.569)	0.5251	35.929 (5.994)	35.798 (6.169)	0.8373
low skilled	0.039 (0.193)	0.041 (0.198)	0.9262	0.027 (0.162)	0.028 (0.164)	0.9745
medium skilled	0.587 (0.493)	0.551 (0.498)	0.6093	0.593 (0.492)	0.514 (0.502)	0.1290
high skilled	0.374 (0.485)	0.398 (0.492)	0.6295	0.380 (0.486)	0.459 (0.501)	0.1277
married	0.822 (0.383)	0.756 (0.431)	0.1022	0.907 (0.291)	0.899 (0.303)	0.8082
<i>work characteristics:</i>						
full-time	0.817 (0.387)	0.789 (0.410)	0.4728	0.979 (0.143)	0.991 (0.096)	0.4203
N	438	123		482	109	

Figure 3: Time Use: Distribution of non-zero parental time of employed workers by sex.

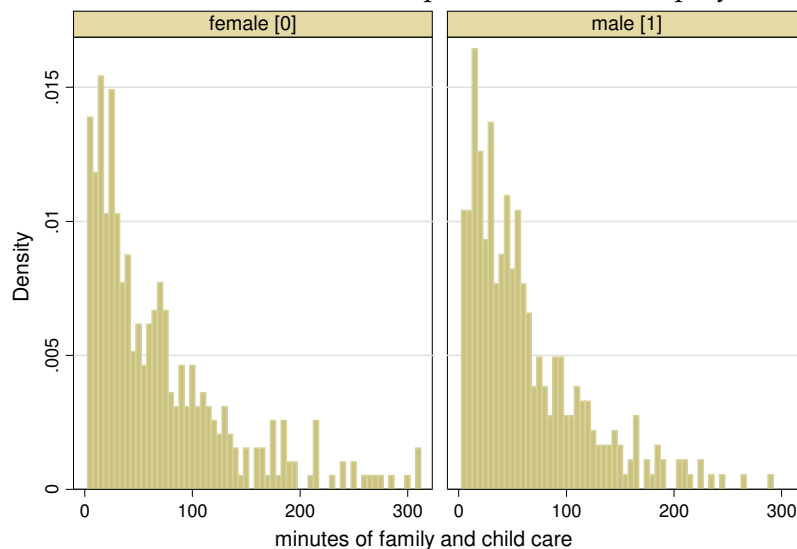


Figure 4: Time Use: Difference in the distributions of parental time with kids (left) and market time (right) for employed workers by sex depending on flexitime status.

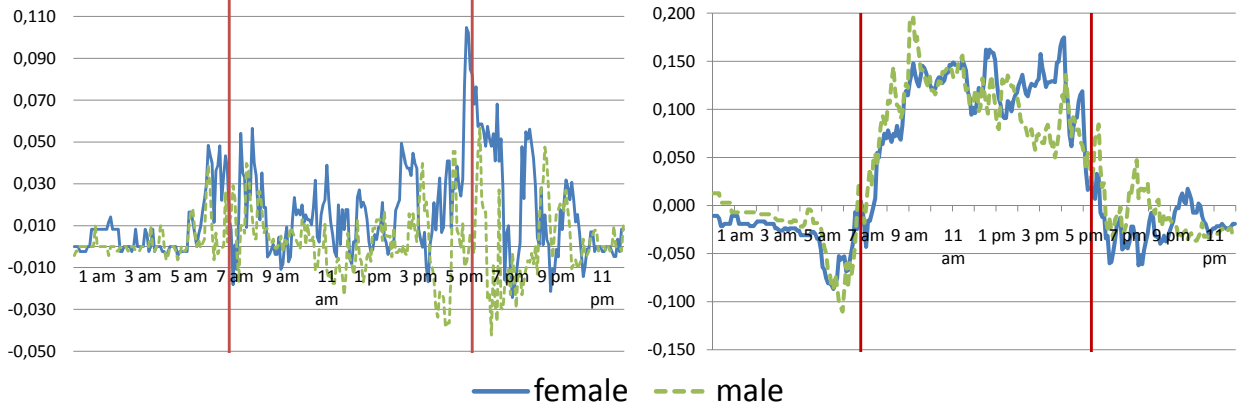


Figure 5: Time Use: Distribution of child time of full-time East Germans by age of kids.

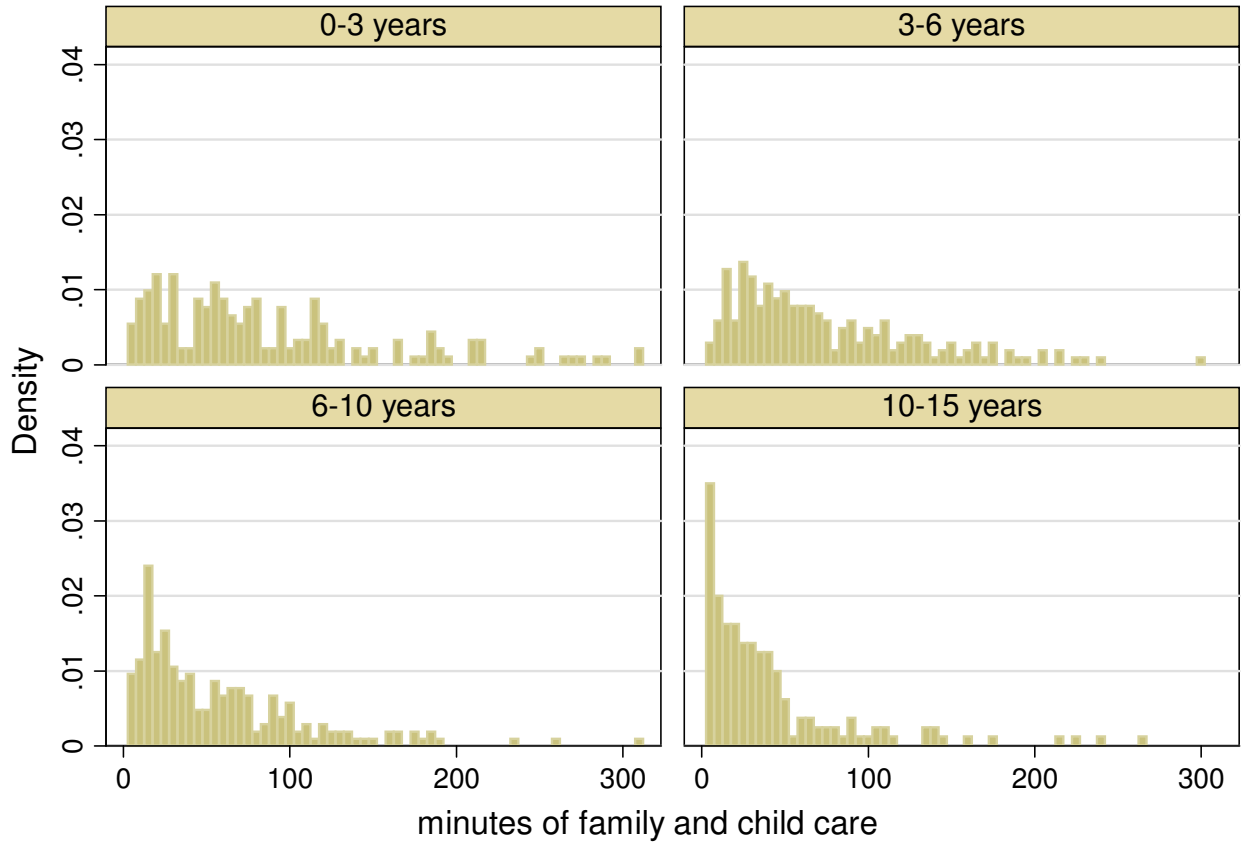


Figure 6: TU: Correlation between the rate of flexitime work in 1991/92 and 2001/02.

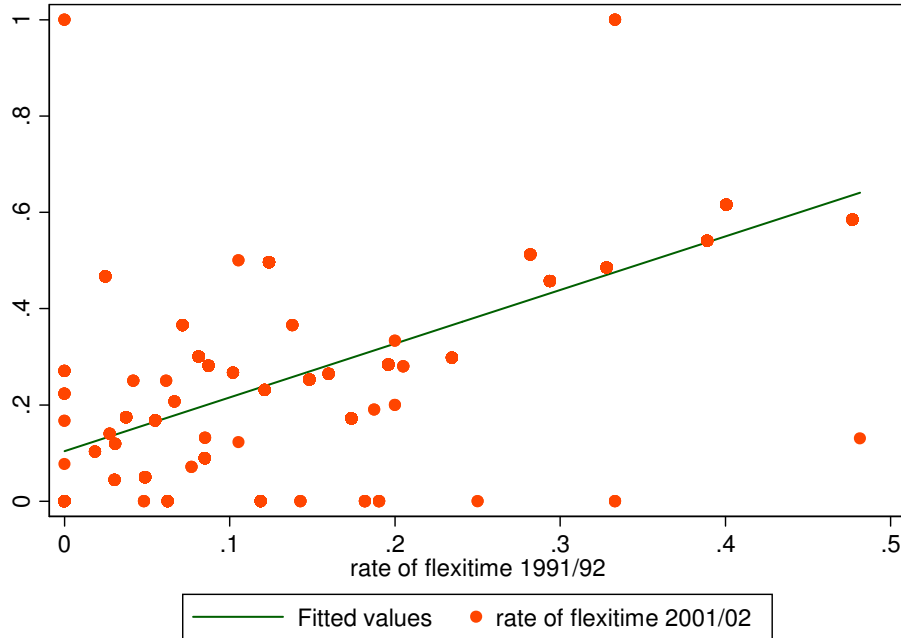


Figure 7: GSOEP: Distribution of child parental time with kids of all full-time employed Germans by sex.

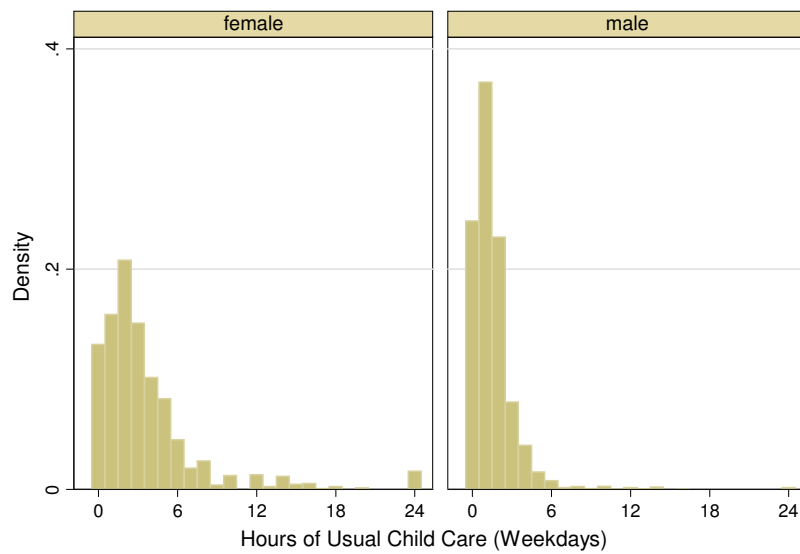


Table 12: TU: Marginal effects on the choice of working flexitime by sex and employment status.

	employed		full-time	
	female	male	female	male
<i>personal characteristics:</i>				
age	0.001 (0.33)	-0.007* (2.12)	0.002 (0.42)	-0.007* (2.22)
low skilled	0.031 (0.33)	0.066 (0.72)	0.047* (0.42)	0.053 (0.56)
high skilled	-0.038 (1.10)	0.005 (0.15)	-0.050 (1.33)	0.005 (0.14)
married	-0.017 (0.39)	0.039 (0.69)	0.002 (0.04)	0.018 (0.30)
employed partner	-0.064 (0.91)	-0.004 (0.08)	-0.062 (0.84)	-0.010 (0.18)
<i>household characteristics:</i>				
# of kids	-0.051* (2.36)	-0.029 (1.54)	-0.051* (1.92)	-0.027 (1.43)
kids 3–6	0.058 (1.15)	0.081* (1.71)	0.078 (1.30)	0.076 (1.56)
kids aged 6–10	-0.067 (1.23)	0.042 (0.82)	-0.045 (0.69)	0.037 (0.70)
kids aged 10–15	0.061 (1.03)	0.139* (2.64)	0.069 (1.02)	0.130* (2.42)
<i>workplace characteristics:</i>				
white-collar	0.197* (5.94)	0.152* (5.11)	0.178* (4.54)	0.148* (4.86)
log labor income	0.098* (2.21)	0.014 (0.61)	0.096* (1.77)	0.011 (0.54)
service sector	0.116* (3.41)	0.108* (3.61)	0.137* (3.55)	0.112* (3.66)
<i>regional characteristics:</i>				
GDP [30.000 DM; 35.000 DM]	0.109* (2.33)	0.104* (2.29)	0.086* (1.68)	0.112* (2.41)
regions with some agglomeration	-0.125* (2.67)	-0.066 (1.42)	-0.130* (2.63)	-0.063 (1.37)
rural	0.096* (2.06)	0.090* (2.15)	0.126* (2.55)	0.090* (2.13)
unemployment rate: 12.5% – 15%	-0.054 (1.18)	-0.017 (0.43)	-0.094* (1.95)	-0.020 (0.48)
N	561	591	455	580
R ²	0.191	0.129	0.190	0.129

Absolute z– statistics in parentheses. * indicates significance levels of 10%.

Table 13: GSOEP: Marginal effects on the choice of starting to work at varying time intervals by sex and employment status.

	employed		full-time	
	female	male	female	male
<i>personal characteristics:</i>				
age	-0.004*	0.001	-0.010	0.000
	(1.66)	(0.17)	(1.62)	(0.04)
yrs. of schooling	-0.004	-0.027*	-0.006	-0.028*
	(0.82)	(5.62)	(0.61)	(5.65)
married	-0.009	-0.009	-0.032	-0.029
	(0.36)	(0.26)	(0.76)	(0.76)
german	-0.030	-0.015	0.024	-0.012
	(0.84)	(0.53)	(0.35)	(0.41)
<i>household characteristics:</i>				
# of kids	0.012	-0.018*	0.010	-0.015
	(0.84)	(1.72)	(0.32)	(1.39)
kids < 3	0.086*	-0.092*	-0.060	-0.094*
	(1.68)	(2.32)	(0.52)	(2.35)
kids 3–6	0.013	-0.043	-0.111*	-0.052*
	(0.41)	(1.61)	(1.73)	(1.91)
kids aged 6–10	0.034	-0.013	0.037	-0.016
	(1.50)	(0.61)	(0.79)	(0.75)
<i>workplace characteristics:</i>				
white-collar	0.042*	-0.118*	0.024	-0.123*
	(1.91)	(5.79)	(0.47)	(6.00)
log labor income	-0.035*	0.033*	-0.004	0.030
	(2.89)	(1.84)	(0.17)	(1.42)
tenure	-0.002	-0.001	-0.007*	-0.001
	(1.11)	(0.63)	(2.05)	(0.74)
exp.: full-time empl.	0.004*	-0.004	0.008	-0.004
	(1.66)	(1.42)	(1.48)	(1.31)
exp.: part-time empl.	0.003	0.012	-0.008	0.015
	(0.81)	(1.48)	(1.10)	(1.64)
exp.: unempl.	-0.005	-0.006	0.010	-0.013
	(0.69)	(0.77)	(0.78)	(1.63)
service sector	0.087*	0.038*	0.022	0.039*
	(3.61)	(2.13)	(0.45)	(2.16)
second job	-0.055	-0.027	-0.130	-0.040
	(1.00)	(0.48)	(1.23)	(0.79)
no coworkers	0.171*	-0.053	0.198*	-0.022
	(3.64)	(1.08)	(1.91)	(0.44)
firm size: < 5	0.018	-0.247*	-0.083	-0.253*
	(0.50)	(6.62)	(1.03)	(6.59)
firm size: 5–200	-0.001	-0.280*	-0.031	-0.282*
	(0.05)	(13.55)	(0.59)	(13.61)
firm size: 200–2000	0.053	-0.113*	-0.023	-0.111*
	(1.57)	(4.97)	(0.37)	(4.89)
N	2656	2965	655	2866
R ²	0.040	0.097	0.073	0.104

Absolute z -statistics in parentheses. * indicates significance levels of 10%. Additional explanatory variables comprise for the time use data: regional dummies, a dummy indicating self-employment, a dummy for conservative political beliefs, the number of weekly working hours, a dummy indicating whether the partner is employed and the years of unemployment experience.