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Does Work-Time Flexibility Really Improve the Reconciliation of Family and Work?

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Abstract

Temporal work flexibility is often viewed as means to improve the reconciliation of family and work. By exploiting the German re-unification and the particularities of the labor market of the German Democratic Republic, I show that flexitime allows mothers to spend more time with their children. The additional childcare time is added to the already existing work burden. It is accommodated by reductions in regenerative time and leisure which makes a reconciliation of family and work even more strenuous. A comparison between East and West suggests a significantly positive endogeneity bias that largely overstates the effectiveness of work-time flexibility on parental time.

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

JEL Classification: J08, J13, J21, J22

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1 Introduction

The successful integration of women into the labor market calls for the creation of measures that allow for an easier reconciliation of the needs of both work and family life. As a response to the changing needs of modern societies, flexible work arrangements are often viewed as a means to facilitate this trade-off. The implementation of such measures are often viewed to improve employee satisfaction, well-being, and helps to reduce stress (Working Families Flexibility Act 2012).

In this paper, I examine whether work-time flexibility indeed allows parents to meet better the needs of job and children. One of the major implications of such a reconciliation is that by being able to influence working schedules to some extent, enables parents to spend more time with their children. This is a highly relevant economic question as already Becker (1965) noted that apart from material investments, time investments of parents are major determinants of the accumulation of human capital of their children.¹ Following from that argument, additional parental time is likely to foster and improve the cognitive development of children (Sui-Chu and Willms 1996, Sayer et al. 2004, Hofferth and Sandberg 2001, Guryan et al. 2008). The main questions of this study are whether flexible work arrangements indeed allow parents to spend more time with their children and whether they contribute to reducing the stress associated with reconciling family and work.

This paper contributes to the ongoing political discussion in different ways: First, I find causal evidence that flexible work arrangements are used by mothers to spend more time with their children. Second, this positive time effect is mainly driven by mothers with more productive characteristics and better educational backgrounds who attach a higher value to spending time with their children. Third, as the additional childcare time is added to the already existing total work burden, a reconciliation of family and work is made even more strenuous instead of improving it. Finally, I find that the endogeneity bias which originates from the active choice of working conditions for childcare concerns, largely overstates the true effect of work-time flexibility on parental childcare.

The analysis of this paper is based on German time use data. Germany is particularly well suited for this study. It not only enables me to exploit the German re-unification as a quasi experiment to estimate causal effects but the differences in the economic and social environments of East and West Germans constitute a very sensible setting to quantify the endogeneity bias arising from the choice of working conditions for childcare concerns of West Germans.

Since the early 1970s it became a priority of employment policies in the former German Demo-

¹Time investments are also important for the intergenerational transmission of economic status (Guryan et al. 2008).

cratic Republic (GDR) to ensure a reconciliation of job and family for mothers. Each citizen's right and duty to work as postulated in Art. 24 of the constitution of the GDR developed into an obligation over time and people were expected to work full-time. Other forms of employment as well as non-participation were socially unacceptable. The freedom of the choice of workplace which was constitutionally guaranteed was not only restricted by personal qualification but more importantly by the requirements of the centralist plan. At any given time, the match between workers and jobs did not necessarily coincide with individual interests (Frerich and Frey 1993). In addition, people had no influence on the working conditions offered by the job and work-time flexibility was unknown in the former GDR (Andraschko 2011). Consequently, flexible work arrangements are exogenous and are not subject to choice.

The increasing female employment rates of the past decades received considerable attention in the literature as they introduced new challenges to modern societies: they allow for larger material investments but they also reduce a mother's available time for childcare. Although Bianchi (2000) finds only limited impact of the reallocation of a mother's time to market work on the time spent with her children and on the well-being of the child over the past decades, some psychologists repeatedly raised concerns that maternal employment can be detrimental to a child's cognitive and emotional development.² In that respect, temporal work flexibility is often regarded as one option for employed parents to reschedule their working hours to some extent as to better meet the needs of their children and to make time for them.

Economist, sociologist and psychologist have contributed to the debate by investigating the impact of early maternal employment on the cognitive development of children. Due to a lack of appropriate data, in particular of panel data, previous research in that field mainly focused on the dependence between market work at the extensive margin and time that parents spend with their children. The resulting impact on the cognitive development of children is however inconclusive. (Hallberg and Klevmarken 2003, Han 2004, Guryan et al. 2008).³ Only a few of these articles examine the causal relationship. Dustmann and Schönberg (2008) use extensions of maternity leave regulations in Germany as exogenous variation to proxy potentially higher parental time investments. They find no effect on cognitive outcomes of children. Carneiro et al. (2010) who analyze long-run cognitive effects of extended maternity leave for Norway find a strong and positive im-

²See for example Lewis and Brooks-Gunn (1979), Harris (1983), Baydar and Brooks-Gunn (1991).

³Most studies 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). The negative association is however offset when maternal employment occurs during or after the second years of a child's life (Blau and Grossberg 1992).

pact. Another strand of the literature explores the influence of working schedules on the child's well-being (Bianchi 2000, Strazdins et al. 2004, 2006) as well as on the time shared by parents and children (Hill and Stafford 1980, Bryant and Zick 1996, Daly 1996, Zick and Bryant 1996, Milkie et al. 2004). Very few studies investigate the association between flexible working schedules and labor supply (King 1978, Barrett 1982, Macpherson 1988, Euwals 2001). Yet to my knowledge, this is the first paper that examines the causal effect of temporal work flexibility on parental time with children and is able to quantify the usual endogeneity bias.

The paper proceeds as follows. The next section describes the labor market situation and employment policies of the former GDR which are used as identification strategy. Following this discussion, I shortly discuss the estimation strategy. Section 3 presents the data and selected descriptive statistics. The following two sections discuss the results and tease out the mechanisms driving them. In section 6, the endogeneity bias is analyzed by comparing East and West German estimates. Finally, section 7 concludes.

2 Identification Strategy and Econometric Model

2.1 Identification Strategy

Studies that analyze the effect of work arrangements on parental time with children usually suffer from an endogeneity problem in that occupations and the hours worked reflect individual preferences. In particular women, who are the main care-takers, choose to not participate in paid work at all or to work part-time for childcare concerns.⁴ The special economic and social environment in the former GDR constitutes a sensible setting to study the relationship between flexible work and parental time because it allows abstracting from individual preferences.

The authorities of the former GDR, a planned economy, recognized the need to use the total available labor force potential to stimulate economic growth already shortly after World War II. It got more and more difficult to find guest workers such that it was essential to also integrate women into the labor market. Since women were the main caretakers of children, it became a priority of the employment policies since the 1970s to ensure the reconciliation of family and work (Frerich and Frey 1993).⁵ The provision of formal childcare institutions was drastically expanded with designated opening hours between 6 am and 7 pm to ensure full-day care (Frerich and Frey

⁴Mothers either prefer to work part-time or they have to do so because of a lack of a provision of formal childcare (Booth and van Ours 2009, Booth and Ours 2013).

⁵The labor code of the GDR (AGB 1980) postulated explicitly in Art. 240 that it was the obligation of the firm to create measures to ensure that work and family can be reconciled.

1993). This allowed mothers not only to actively participate in the workforce but also to work full-time. The Statistical Office of the GDR recorded that about 80 percent of children under the age of 3 were enrolled in crèche in 1989 and even 95 percent of all children aged between 3 and 6 were enrolled in all-day kindergarten (Statistical Office of the GDR 1990).⁶ Female labor force participation was highest during this year: employment rates amounted to 90.6 percent among working age women in 1989.⁷

Art. 24 of the constitution of the GDR postulated furthermore that each citizen of working age had the right and the duty to work and that men and women were treated equally in front of the law. Any other form of employment or even non-employment was socially unacceptable. The unwillingness to work was in the worst case even punished with jail.⁸ Being only a housewife was only a socially accepted option for mothers with at least 3 children below the age of 16 (Trappe 1995).

Weekly working hours were regulated to be 43 3/4 for everybody; exceptions were granted only to mothers with more than 2 children below the age of 16. Since the 1970s, part-time work was granted only in exceptional and duly justified cases for a determined period of time and mainly to older women.⁹ In 1989, about 27 percent of all employed women worked part-time compared to 33.5 percent in the West. In most cases, part-time work in the former GDR was associated with only a slight reduction in working hours such that 60 percent of part-time employed women in 1989 worked between 25-35 hours per week; another 20 percent of them even worked more than 35 hours per week and only 20 percent provided less than 25 weekly hours of work (Beyer and Winkler, eds 1990, Schäffgen 1998, Trappe 1995).¹⁰ It follows that men and women likewise were expected to participate in full-time market work.

In addition to the right to work, Art. 24 of the constitution also guaranteed each citizen a free choice of workplace. This freedom was however restricted by the constitution due to personal qualification and even more importantly due to the societal demand for labor in conjunction with

⁶In comparison, in 1990 places in crèches were available only for 2.7 percent of children under the age of 3 in West Germany (Bundesministerium für Familie und Senioren 1994). Kindergarten places were available for 78.3 percent of children aged between 3 and 6 but only 12 percent of these allowed for full-day care (Schäffgen 1998). Moreover, after-school care was provided only for 50 out of 1000 primary school children (Bundesministerium für Familie und Senioren 1994).

⁷In West Germany, 55 percent of all women were employed in 1989. See Frerich and Frey (1993), Schäffgen (1998).

⁸See Art. 249 of the criminal code of the GDR, StGB 1968.

⁹Acceptable reasons were the care of old or handicapped people or in the case of specific family burdens. The part-time entitlement was re-assessed and re-approved on an annual basis (Schäffgen 1998, Beckmann and Kempf 1996, Trappe 1995).

¹⁰In contrast, in 1993 68 percent of the part-time employed West-German women worked more than 20 hours per week but less than 35, 19 percent worked less than 20 hours and less than 13 percent worked irregular hours (Schäffgen 1998).

the central plan. Profit maximization of firms played no role. Even before any occupational decision was made, educational choices were already strongly influenced by the socialist plan (Prantl and Spitz-Oener 2009). When it then came to the choice of the specific job, job seekers were allowed to choose one from a list of possible workplaces (Frerich and Frey 1993). Workers could not exert any influence on the working conditions offered and flexible working hours were unknown in the former GDR (Andraschko 2011). It follows that workers were essentially allocated to jobs due to societal production requirements yet not personal interests (Frerich and Frey 1993).

Identification relies on the economic and social conditions in the former GDR according to which full-time employment of women and men was the norm and was guaranteed by an extensive network of kindergartens and crèche. Furthermore, occupation and the workplace were allocated such that career decisions do not reflect preferences for a reconciliation of work and childcare. The usual endogeneity problem resulting in working hour reductions to ensure childcare is not an issue for East German workers as there was no choice. Since flexible working hours did officially not exist, flexitime arrangements reported by these parents can therefore be viewed as being exogenously provided.

2.2 Threats to Identification

Following from the identification strategy, it would be ideal to have data on the allocation of time for men and women that were collected directly after the German reunification in 1990. The analysis of this paper is based on data for 1991/92 from the German Time Use Survey. The fact that these data were collected 2 years after the German reunification could be seen as threat to the identification strategy as East German employees might have adjusted their behavior. However, rapidly after the fall of the Berlin wall in 1989, it became clear that the East German economy was in shambles. The region was forced to undergo massive structural changes.

Between 1989 and 1992, the East German GDP declined by roughly 30 percent, value added fell by more than 60 percent and employment decreased by 35 percent (Burda and Hunt 2001). Within the first 10 months after the opening of the Wall, industrial production even declined by two thirds (Siebert 1992). Registered unemployment rose from 0 percent, as claimed by the authorities in the former GDR, to more than 15 percent.¹¹ Moreover, a privatization wave was rapidly launched after the fall of the Wall. Since East German firms were far away from the efficient production frontier

¹¹When hidden unemployment (such as early retirement, involuntary part-time work, training schemes for the unemployed etc.) is counted, the unemployment rate was even about 18 percentage points higher (Burda and Hunt 2001).

(Burda and Funke 1995), a large number of them did not survive the restructuring process. Some of the surviving ones had to cut down employment by up to 80 or 90 percent. These dramatic changes in the East German economy from which the labor market had yet not recovered in 2000 (Burda and Hunt 2001) brought considerable uncertainty to people who grew up in an political environment of guaranteed work and a feeling of social security.

Given the tremendous economic difficulties, citizens of the former GDR had only limited possibilities during these 2 years to adapt to the new structures of the market economy. People did not change their jobs or occupations during the first two years after the opening of the Wall to gain work-time flexibility. Those workers who stayed in Eastern Germany were predominantly interested in having *a* job. The exogeneity argument is consequently still valid for the time period analyzed in this paper. An additional fact that works in favor of this argument is the unchanged exceptionally good provision of full-time daycare centers in East Germany. According to the Federal Statistical Office, 114 kindergarten-places were available for 100 children aged 3 – 6 during these years in the former GDR which allowed East German mothers to participate in the labor market given the availability of suitable jobs.

2.3 Empirical Strategy

The following linear equation estimates the average effect of temporal work flexibility on parental time with children separately by $s = \{m, f\}$:¹²

$$C_i^s = X_i^{s'} \beta^s + \beta_F^s F_i^s + \epsilon_i^s. \quad (1)$$

The dependent variable, C_i , measures maternal or paternal time with children. It is defined in two ways: (1) as total minutes devoted to childcare time, C_i or (2) as total minutes of childcare time relative to the time spend on all household activities, $c_i = \frac{\sum_t C_{it}}{\sum_t HP_{it}}$.

The main variable of interest, F_i , is an indicator that takes the value 1 if the person is granted flexitime arrangements and it is 0 otherwise. The associated coefficient captures the average differential effect of temporal work flexibility on maternal or paternal time with children. The error term denoted by ϵ_i is random. All other control variables will be included in a vector X_i of predetermined characteristics.¹³

¹²The underlying assumption is that parents generally want to spend primary childcare time with their children but due to time restrictions, it is possible that not everyone was able to do so during the reported diary day. Zero parental time is hence regarded rather as a result of measurement error than of "non-participation". The OLS estimator is consequently consistent and unbiased (Amemiya 1973, Kalenkoski and Pabilonia 2012).

¹³The baseline vector includes age, a dummy for low and high skills, dummies for marital status, diaries that were

3 Data and Descriptive Statistics

The analysis of this paper is based on German Time Use Data (*Zeitbudgeterhebung*) for the year 1991/92. The data was collected by the German Federal Statistical Office (Statistisches Bundesamt 2003) in four survey periods between October 1991 and July 1992 to obtain representative information across the whole year. It provides a variety of socio-economic, work and household characteristics that are harmonized with the microcensus, the largest German household survey, to allow for comparability with other German data sources. The target population comprises private households with a German household head and it covers all members above the age of 11. The results of this survey are representative at the national level as well as at the federal state level.

The distinguishing feature of this dataset which also makes it particularly useful to this study is that it contains detailed information about the exact timing of activities for two consecutive days. Each interviewed household member reports all the activities he or she engaged in during 5 minute time intervals. These entries were then coded by the Statistical Office into more than 200 broad activity aggregates.¹⁴ I further combined these activities into four major time use categories which are 1. leisure (L), 2. paid market work (MW), 3. household work (HW) and 4. all remaining activities which will be referred to as tertiary time (T). For this study, mainly the first three aggregates are relevant.¹⁵ I define leisure activities as all pleasurable activities that people do not need to undertake at all and that nobody can be paid to do them instead. Market work comprises all job-related activities. Household production captures all work activities performed in the household for which market substitutes can be purchased. Hence, these tasks satisfy the third-party rule by Reid (1934) as somebody else could execute them such as cleaning, cooking etc.

The most relevant time use category to this paper is the time that parents spend on childcare activities, also denoted as C_i^s , for $s = m, f$, in equation (1). This aggregate comprises all "primary" care activities that parents *directly* spend with their children such as learning, playing, care in case of illness, changing diapers, washing and feeding the child, etc. Such tasks can be either productive such as learning, or changing diapers etc. or they can be enjoyable for example playing with the child, cuddling, etc. In this paper, I broadly attribute childcare time to household work.¹⁶ An

reported during weekends, full-time work and a dummy that indicates whether the diary day was a normal one, 2 dummies for regional GDP groups per capita (1. low and 2. medium) and 2 dummies for the regional agglomeration structure (1. rural and 2. some agglomeration).

¹⁴The design of the survey as well as the coding of activities are based on international recommendations issued by the International Association of Time Use Research (IATUR) to assure the comparability with time use surveys of other EU-member states (Kraus 2001, Ehling 1998).

¹⁵Intervals of commuting or traveling time are added to the related activity. It shall be noted, that an aggregation of the activities into these four broad aggregate measures is inherently arbitrary. See also Burda et al. (2013).

¹⁶Guryan et al. (2008) infer from their findings that parents perceive it to be fundamentally different from home pro-

alternative definition would be to also include all "secondary" childcare activities namely when parents report to spend time on a non-specified task in the company of their children. Unfortunately that kind of information can only be derived from children above the age of 11 who completed their own time diaries.

Information about work-time flexibility is self-reported by the respondent. Flexitime can be roughly defined as the ability to rearrange working schedules within certain predetermined limits. In most cases, core working hours (e.g., 10:00 am to 2:00 pm) are determined during which all employees are required to be on-site. Within these limitations, employees can exert some control over the timing of work required to fulfill their work commitment (Hill et al. 2001).

Descriptive Statistics

The analysis is based on employed East German parents with children aged 15 or younger. Table 1 shows that about 83 percent of the employed East German women and virtually all of the employed men worked full-time. This is explained by the upbringing in the former GDR where full-time employment for women was the norm. Further descriptive statistics are reported by gender and employment status in the first four columns of table 9 in Appendix 7. It illustrates that men tend to be slightly older on average, more likely to be married and better skilled. Another important feature that needs to be pointed out here and that is important for the subsequent analysis is that there is no significant compositional difference between mothers working full-time or part-time.

The main dimension of interest to this paper is the individual use of time. Table 1 reports average daily minutes of the broad time use categories by sex and employment status. It illustrates that employed mothers spend about 500 minutes (8.3 hours) on market work while men report to work about 85 minutes longer on average. Mothers who have some temporal work flexibility tend to work statistically significantly longer hours from which it follows that their disposable time for other activities is more limited. Fathers, in contrast, who work flexitime spent slightly less time on work yet the difference is statistically not significant.

Given the long working hours of East German parents, available time for primary childcare is limited. Mothers spend on average of 68 minutes on such activities during a standard workday and slightly more so when working flexitime. Fathers, in contrast, allocate on average only half an hour to primary care. The amount of primary parental time naturally declines with the child's

Table 1: Average Daily Allocation of Time by Employment Status and Sex Depending on Whether or not the Job Offers Flexitime for East German Parents.

| | women | | | men | | |
|----------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| | all | no flex. | flex. | all | no flex. | flex. |
| <i>all employed</i> | | | | | | |
| min. of child time | 64.95 (63.55) | 62.78 (62.98) | 69.67 (64.64) | 29.53 (43.11) | 29.41 (42.73) | 30.12 (45.05) |
| fraction of household time | 0.264 (0.219) | 0.251 (0.214) | 0.292 (0.228) | 0.220 (0.277) | 0.219 (0.278) | 0.22 (0.273) |
| min. of homeproduction | 240.32 (121.89) | 237.45 (121.49) | 246.54 (122.77) | 125.07 (96.39) | 126.63 (97.79) | 117.33 (89.06) |
| min. of market time | 500.44 (146.70) | 494.85 (142.36) | 512.57 (155.30) | 582.88 (159.18) | 584.23 (160.32) | 576.24 (153.76) |
| full-time fraction | 0.85 (0.36) | 0.84 (0.36) | 0.86 (0.35) | 0.98 (0.12) | 0.98 (0.13) | 0.99 (0.08) |
| <i>N</i> | 853 | 584 | 269 | 957 | 796 | 161 |
| <i>full-time employed</i> | | | | | | |
| min. of child time | 61.57 (59.05) | 61.13 (60.29) | 62.52 (56.43) | 29.22 (42.83) | 29.00 (42.38) | 30.31 (45.13) |
| fraction of household time | 0.266 (0.221) | 0.255 (0.216) | 0.288 (0.229) | 0.219 (0.278) | 0.218 (0.279) | 0.225 (0.273) |
| min. of homeproduction | 227.41 (115.24) | 225.25 (116.49) | 231.98 (112.66) | 123.37 (95.35) | 125.04 (97.26) | 115.22 (85.21) |
| min. of market time | 521.12 (132.18) | 514.53 (127.33) | 535.13 (141.19) | 588.12 (153.41) | 590.05 (153.91) | 578.69 (151.07) |
| <i>N</i> | 725 | 452 | 230 | 942 | 782 | 232 |

Standard deviations are given in parentheses.

age. Comparing the amount of childcare time to all household activities gives an indication about the composition of household tasks. The average fractions show that mothers allocate an average of 28 percent of their total household time to primary childcare which is significantly larger for women with temporal work flexibility. Fathers devote on average about 5 percentage points less but the difference by flexitime status is negligible.

In addition to the aggregate average numbers, figure 1 illustrates how employed parents allocated their time with their children across the diary day. The vertical lines indicate the average Eastern German workday as derived from the data.¹⁷ Since mothers are the main caretakers, it is unsurprising that they are more likely to spend time on primary care activities during each time

¹⁷Author's calculations. These boundaries are defined as the average starting interval and the average finishing time interval of market work in East Germany in 1991/92 as reported by all respondents.

Figure 1: Distribution of Parental Time with Kids across a Standard Day for Full-Time Employed East German Parents by Sex.

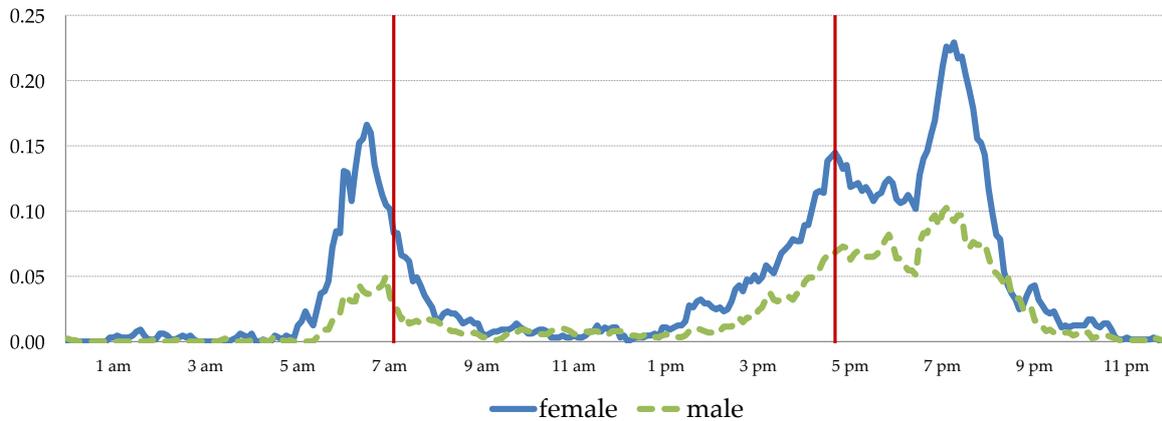
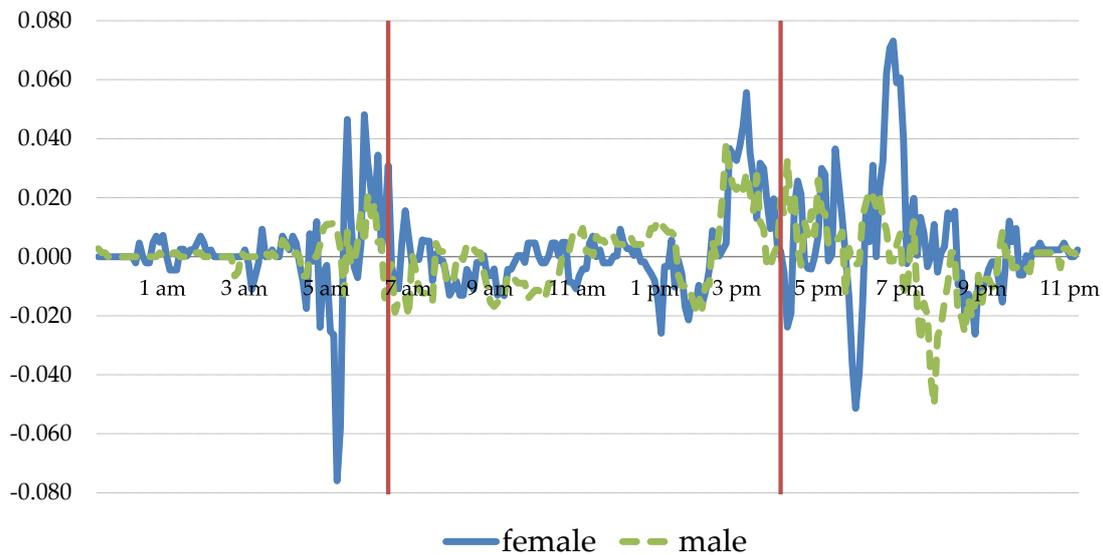


Figure 2: Difference in the Distributions of Parental Time with Kids for Full-Time Employed Workers by Sex Depending on Flexitime Status.



interval of the day. The figure shows two main peak times: primary childcare time occurs predominantly in the morning around 6 – 7:30 am when children are prepared for kindergarten or school and to an even stronger extent in the evening between 5 – 8 pm during dinner, homework and bath time. During the morning hours, care responsibilities are predominantly provided by mothers.

Furthermore, figure 2 shows flexitime differences in the incidence of parental time during each time interval t by gender. Positive values indicate that parents who work flexitime are more likely to spend time with their children. Differences in the incidence of primary parental time tend to be positive and most pronounced around the intervals marking the standard workday. This confirms that the dynamics at the margin of the standard work day are largest, in particular for mothers. It can hence be concluded that work-time flexibility is mainly used during these time intervals. The

figure reveals another feature of the timing of such activities. The probability for childcare time is augmented before the beginning but mainly at around the end of the standard workday.

4 Does Temporal Flexibility Increase Parental Time with Kids?

The main effects of work-time flexibility on parental time with children are reported in table 2 by gender and employment status.¹⁸ All other control variables have the expected sign such that only coefficient estimates of the flexitime indicator will be shown in the remainder of this section.

In addition to the pre-determined variables described in section 2.3, I use three dummies that control for the age of the child in order to account for the fact that a child's need of his parent's time reduces strongly with age and hence the expected impact of flexitime.¹⁹ All results show that flexitime generally allows both parents but mothers in particular to spend more time with their children. Employed women are found to allocate about 9 minutes more of their available time per day on childcare activities (column 1). This number itself seems little yet compared to the average of 65 minutes, this differential effect translates into an increase in primary childcare time of about 14 percent. As shown by the first four columns in table 9 in the Appendix, the sample compositions between full-time and part-time employed mothers do not statistically differ. It can therefore be concluded that these additional minutes of maternal time are due to the fact that disposable time of part-time mothers is less scarce. When only full-time employed mothers are regarded, the differential effect reduces to 2 extra minutes which translate into an increase of 3 percent but this estimate is insignificant.

The second column of this table illustrates the difference in the amounts of time devoted to childcare relative to total household time. It can be interpreted as the additional relative importance placed on primary care. It reveals that mothers, who have some work-time flexibility, allocate an average of 3 – 4 percentage points of their household time more to primary childcare activities. Given that household work does not significantly differ by flexitime status (as reported in table 1), it can be mainly attributed to the differential effect on primary childcare time. Again, if these differential effects are compared to the overall averages as shown by table 1, I find that temporal work flexibility increases the relative time of such activities by 12 – 16 percent.

In contrast to that, work-time flexibility is not found to have any impact on the time spent with

¹⁸Since virtually all fathers are full-time employed, only those results will be presented in the remainder of this section. Results for all determinants are available from the author on request.

¹⁹These dummies refer to 1. children below the age of three, 2. those in kindergarten aged between 3 and 6 and 3. children above the age of 10 who need less care and attention of their parents. The reference group consists of children aged between 6 and 10.

Table 2: Estimation Results for the Flexitime Indicator on Child Related Time by Gender and Employment Status.

| dep. var. | minutes | fractions |
|-------------------------|---------|-----------|
| <i>all women:</i> | | |
| | 9.27* | 0.051* |
| | (2.50) | (3.70) |
| N | 853 | 853 |
| R ² | 0.380 | 0.356 |
| <i>full-time women:</i> | | |
| | 2.114 | 0.038* |
| | (0.58) | (2.55) |
| N | 725 | 725 |
| R ² | 0.398 | 0.398 |
| <i>full-time men:</i> | | |
| | 3.947 | 0.027 |
| | (1.01) | (1.14) |
| N | 942 | 942 |
| R ² | 0.194 | 0.142 |

Absolute t -statistics in parentheses. * indicates significance levels of 10% or higher. Standard errors are robust. Standard control variables: age, 2 skill dummies, dummies for being married, weekend observations and full-time work; an indicator on whether the day was a normal one, 2 dummies for regional GDP groups per capita and 2 dummies for regional agglomeration structure. I additionally added three dummies on child age.

children when fathers are considered. Given that childcare is perceived as female responsibility, it is women who make use of the higher degree of work-time flexibility for childcare reasons.

The results presented in this section are robust to the inclusion of various different other sets of explanatory variables as reported in table 10 in the Appendix. Column (2) illustrates results accounting for the non-linearity of parent's age by including a squared and a cubic age polynomial. Yet given that the ages of parent and child are merely correlated with correlation coefficients of 38 percent for mothers and 42 percent for fathers, it is not a sufficiently accurate proxy for the child's need for care. Consequently, the coefficient estimates of the flexitime indicator are lower and less

accurately measured. In columns (3) and (4), I additionally control either for occupations or for log hourly wages.²⁰ Again, coefficient estimates are generally similar across specifications and do not differ significantly. The final column presents coefficient estimates of the flexitime dummy when all of these sets of controls are added simultaneously. Compared with the preferred specification, estimates are again not statistically different. We can therefore be confident about the coefficient estimate of the preferred specification.

5 How Can These Results be Explained?

As the previous section has shown, it is mainly mothers who use flexitime to spend additional time on primary childcare activities. It follows that any measure that is merely directed at improving the reconciliation of family and work will only have a measurable impact on a mother's use of time. In this section, I want to further discuss some of the mechanisms associated with work-time flexibility by gender. In a first step, I want to examine the determinants of flexitime. I will then discuss the effect of flexitime on other time use aggregates. As shown before, temporal work flexibility is associated with longer working hours. The question that arises in this respect is how do these mothers reallocate their activities in order to allow for the positive differential impact on primary childcare time? If mothers additionally allocate longer working hours after conditioning on individual characteristics, it can be argued that the stress level of these women who have to balance family and work is likely to be augmented. This might further reduce their well-being and might eventually negatively affect the child as well (Peeters et al. 2005, van Rijswijk et al. 2004, Moen and Yu 2000, Ruhm 2000, Cox et al. 2000). Finally, if the probability of work-time flexibility increases with the quality of job attributes, it can be argued that in addition to spending more time with their children, which in itself is found to have a positive impact on the cognitive development of children (Sui-Chu and Willms 1996, Sayer et al. 2004, Hofferth and Sandberg 2001, Guryan et al. 2008), it is likely that parents in such jobs also spend more quality time which further increases the cognitive development of the child.

5.1 Determinants of Flexitime

Marginal effects of probit models on the probability to have some work-time flexibility are reported by subsample in table 3. To further test the validation of the identification strategy according to which the flexitime probability should not depend on the child's age, I added a dummy

²⁰I included 24 occupation dummies. Results for the impact on wages will be discussed in more detail in section 5.3.

variable for the presence of children under the age of six in the household. Since the care of young children is more time consuming, it can be argued that if mothers were given a choice, they would rather choose jobs that offer some work-time flexibility. The results however reveal an insignificant coefficient estimate which emphasizes the validity of the identification strategy. Fathers, in contrast, with younger kids tend to have a lower likelihood to be granted some temporal work flexibility.²¹

Coefficient estimates indicate that only a few individual characteristics have a significant impact on the flexitime probability: while it increases with age for women, age has neither a strong nor a significant impact on fathers. Skill levels are important determinants in that flexitime is less likely to be granted to high-skilled mothers but it is more probable, although inaccurately estimated, for high-skilled fathers as compared to the reference group of medium skilled men. In addition, marital status is found to have a positive impact on fathers only.

The uniting feature of these specifications is that the probability to work flexitime is mainly determined by work and workplace characteristics. It is more likely for full-time employed mothers, white-collar workers and employees in the service sector. Higher log hourly wages tend to be positively associated with flexitime work for mothers but the impact is significant only for those working full-time.

Regional characteristics indicate that work-time flexibility is more likely in regions with the highest levels of GDP per capita among all new *Länder*. Probabilities are lower in regions with only some agglomeration as compared to urbanized regions; the opposite holds for rural areas yet results are significant for men only.

5.2 Differential Impact on Other Time Use Aggregates

One of the main aims of the introduction of work-time flexibility is to ensure an easier reconciliation of family and work at reduced levels of stress. One aspect is to allow parents to schedule their working time in order to spend more time with their children which is known to positively affect the cognitive development of children (Sui-Chu and Willms 1996, Hofferth and Sandberg 2001, Sayer et al. 2004, Guryan et al. 2008). As I have shown in the previous sections, the data prove this to be successful, in particular for mothers who earn above mean wages. What is however striking is that mothers who work flexitime, also work generally longer hours (see table 1). The question is,

²¹It could also be argued that if given the choice, mothers with younger children would rather prefer to work part-time. The probability of East German mothers to work part-time is not significantly related to the presence of children below the age of 6. This result further strengthens the identification strategy. Results are available upon request.

Table 3: Marginal Effects of the Probability to Work Flexitime by Sex and Employment Status.

| | women | | men |
|-----------------------------------|-------------------|-------------------|-------------------|
| | all | full time | full time |
| <i>personal characteristics:</i> | | | |
| age | 0.005* (1.92) | 0.005* (1.70) | -0.002 (1.21) |
| low skilled | -0.022 (0.33) | -0.098 (1.10) | 0.035 (0.52) |
| high skilled | -0.075* (2.06) | -0.069* (1.80) | 0.024 (1.00) |
| married | -0.010 (0.22) | 0.004 (0.09) | 0.087* (1.93) |
| employed partner | 0.014 (0.32) | -0.003 (0.07) | 0.065* (2.25) |
| <i>household characteristics:</i> | | | |
| children younger than 6 | 0.018 (0.54) | 0.052 (1.43) | -0.057* (2.36) |
| <i>workplace characteristics:</i> | | | |
| white-collar | 0.121* (3.14) | 0.096* (2.12) | 0.120* (4.90) |
| log hourly lab. income | 0.105* (2.75) | 0.131* (2.80) | 0.028 (0.90) |
| service sector | 0.117* (2.75) | 0.138* (3.20) | 0.099* (4.22) |
| usual weekly wrk. hrs | 0.007* (2.04) | 0.006* (1.73) | 0.002 (1.54) |
| full-time | 0.006 (0.09) | - | - |
| <i>regional characteristics:</i> | | | |
| some agglom. | -0.037 (0.84) | -0.004 (0.09) | -0.059 (1.53) |
| rural | 0.044 (1.05) | 0.064 (1.41) | 0.114* (3.79) |
| N | 885 | 721 | 942 |
| R ² | 0.096 | 0.098 | 0.138 |

Absolute z -statistics in parentheses. * indicates significance levels of 10%. In addition, a dummy for larger than average regional GDP per capita is included, as well as a dummy for the unemployment rate being 12.5% – 15%.

how are other activities reallocated?

Besides allowing for more childcare time, flexitime arrangements should also reduce the stress associated with balancing family and work (van Rijswijk et al. 2004). In this section, I will examine the impact of temporal work flexibility on other time use aggregates in order to get a broader picture about the impact of work-time flexibility on the composition of activities during a standard workday. Table 4 reports coefficient estimates for the flexitime indicator on minutes spent on the

Table 4: Effect on the Allocation of Minutes of Time by Gender and Employment Status.

| dep. var.: | minutes of ... | | | | |
|---------------------------|-----------------------|-------------------|-------------------|--------------------|---------------------|
| | ...household- work | ...market work | ... total work | ...leisure time | ...tertiary time |
| <i>all women:</i> | | | | | |
| flexitime | 7.63 (0.86) | 12.35 (1.17) | 20.16* (2.72) | -5.87 (0.95) | -14.29* (2.49) |
| log hrl wages | 9.22 (0.89) | 12.28 (0.88) | 21.49* (2.73) | 6.51 (0.98) | -28.00* (4.11) |
| <i>full-time mothers:</i> | | | | | |
| flexitime | 2.53 (0.27) | 13.51 (1.18) | 16.05* (2.04) | -3.04 (0.56) | -12.37* (1.95) |
| log hrl wages | -0.71 (0.05) | 27.25* (1.66) | 26.81* (2.84) | 10.83 (1.29) | -37.64* (4.33) |
| <i>full-time fathers:</i> | | | | | |
| flexitime | -7.52 (0.96) | -18.94 (1.49) | -26.46* (2.55) | 23.805* (2.63) | 2.66 (0.36) |
| log hrl. wages | 8.23* (1.15) | -5.82 (0.52) | 2.41 (0.26) | 8.52 (1.07) | -10.92* (1.67) |

Absolute t - statistics in parentheses. * indicates significance levels of 10%. Standard errors are robust. Additional controls: age, 3 child age dummies, 2 skill dummies, dummies for being married, weekend observations, full-time work, indicating whether the day was a normal one, 2 dummies for regional GDP groups per capita and 2 dummies for the regional agglomeration structure.

four main activity aggregates: market work (MW), household production (HP), leisure (L) and tertiary time (T) by gender and employment status.

Independent of employment status, mothers with some work-time flexibility spend more of their available time on all work related activities which is defined as the sum of time devoted to market work and household production. For the sample of all employed mothers this differential effect is driven by both the longer time associated with household and market work. In the case of full-time employed mothers, the larger total work burden originates mainly from longer working hours.

The association between work-time flexibility and household work is insignificant but positive. Since childcare time is a subcategory of household production, differencing out its effect (see table 2) results in an almost zero reaction of absolute minutes of non-child-care related household time to work-time flexibility. Combining this with the previously found positive effect on *relative* maternal time (see section 4) suggests that the significantly larger percentage of all household tasks that

are allocated to childcare are due to the increased time for exactly these activities. Those mothers consequently add the additional childcare time to the already existing household tasks.

Women almost entirely accommodate the significantly higher total work burden by reducing tertiary time T which includes sleep and other regenerative activities. The combination of the results of this section indicates that although some autonomy over the working schedules allows mothers reallocate their time in such a way that they can spend more of their available time with their children but at the cost of a significantly increased total work related activities. The increased work burden and the fewer minutes of regenerative time during a standard workday is very likely to increase stress levels as it is getting more and more difficult for mothers to schedule their daily hours in order to reconcile the needs of family and work and also their own expectations about the provision of childcare (Sui-Chu and Willms 1996, Hofferth and Sandberg 2001, Guryan et al. 2008). Consequences of that could be reductions in the overall well-being (Peeters et al. 2005, van Rijswijk et al. 2004, Moen and Yu 2000, Cox et al. 2000) and might even impact individual health in the long-run (i.e. Cox et al. 2000). A mother's lower well-being and augmented stress level are likely to eventually rub off on the child (Ruhm 2000). From that it follows that the potentially positive effect resulting from spending more primary time with their children (Sui-Chu and Willms 1996, Sayer et al. 2004, Hofferth and Sandberg 2001, Guryan et al. 2008) is likely to be mitigated.

Fathers, in contrast, who have some temporal work flexibility are found to have reduced amounts of both market work and household production in favor of own leisure activities but rather not for childcare. It follows that policies that are targeted at a better reconciliation of family and work should be combined with giving additional incentives to fathers to actively contribute to childcare activities but also to strengthen their awareness about their own contribution to sharing the related work burden. Without setting additional incentives, the main care responsibility borne by mothers will induce a larger work total burden. This rather counteracts an effective reconciliation of family and work instead of improving it.

In addition to that, table 4 also reports the coefficient estimates of log hourly wages. Information on wages is given as monthly labor income in 12 brackets, each of 250 DM by the respondent. Hourly wages are derived by dividing these monthly wages by 4 times the reported normal weekly working hours. Given this rough measure, I will mainly concentrate on investigating the direction of its impact but will neglect the magnitude in the remainder of this paper.²²

²²Table 12 in the Appendix illustrates rough estimates on the impact of the flexitime indicator and other characteristics on log hourly wages. The flexitime indicator suggests a positive and significant wage premium for mothers and fathers likewise.

Respective results show that larger hourly wages are associated with more household work in the case of all employed women. Women who work part-time earn relatively high hourly wages for comparatively few hours of work (Gustafsson et al. 1996). In fact, the correlation between part-time work and log hourly wages is 0.27 for East German mothers. This drives this estimate. At the same time, higher earnings are associated with longer working hours, which is particularly true in the case of full-time employed mothers. The total work burden of paid and unpaid work is significantly positively associated log hourly wages. Here again, it is compensated by even larger reductions in tertiary time.

5.3 Wage Impact

The probability to have some work-time flexibility is found to be positively associated with more productive work characteristics such as white-collar work or service sector employment.²³ Such jobs are generally better remunerated and are known to be more attractive to female workers as shown by table 11 in the Appendix. The probability of employment in such jobs is furthermore positively associated with skill levels such that workers with higher levels of education are between 11 and 13 percent more likely to be white collar workers and have a 6 percent increased probability to work in the service sector.

I have also shown that the positive impact of flexitime arrangements on parental time with children is associated with more time devoted to all work related activities at reduced amounts of regenerative time. This combined with the positive correlation of the probability to work flexitime and more productive work characteristics for mothers, who are the main caretakers, gives rise to an additional mechanism: larger incomes from work might allow parents not only to reallocate their time as to spend more time with their children but they might also be able provide a higher quality of childcare.

As it is not feasible to directly test the differential impact of work-time flexibility on the quality of parental childcare with the data at hand, I will divide the sample by labor income. This is a rough proxy for the quality of care in that higher educational attainments which increase hourly earnings are found to be positively correlated with the quality of childcare amongst others by Kalenkoski and Foster (2008), Bianchi (2000), Bianchi and Robinson (1997), Datcher-Loury (1988), Hill and Stafford (1980).

Using the estimates from the preferred specification presented in section 4, I predict the differ-

²³ Flexitime work itself is remunerated with higher hourly wages even after controlling for such characteristics, as shown by table 12 in the Appendix.

Table 5: Differences in Predicted Childcare Time by Flexitime Status Depending on Mean Log Hourly Wages

| | minutes | | fractions | |
|------------------------------|------------------|------------------|------------------|------------------|
| | below mean | above mean | below mean | above mean |
| <i>all employed mothers:</i> | | | | |
| pred. diff. | -1.185 (0.24) | 10.92* (3.11) | 0.015 (0.90) | 0.056* (4.80) |
| average time | 65.37 | 64.60 | 0.263 | 0.265 |
| N | 390 | 463 | 390 | 463 |
| <i>full-time mothers:</i> | | | | |
| pred. diff. | -5.524 (1.09) | 6.636* (2.01) | 0.010 (0.58) | 0.049* (3.90) |
| average time | 66.19 | 57.29 | 0.273 | 0.259 |
| N | 349 | 376 | 349 | 376 |
| <i>full-time fathers:</i> | | | | |
| pred. diff. | 2.196 (1.01) | 0.537 (0.37) | 0.024 (1.43) | -0.004 (0.41) |
| average time | 24.852 | 32.06 | 0.199 | 0.233 |
| N | 371 | 571 | 371 | 571 |

Absolute t - statistics in parentheses. * indicates significance levels of 10%. Standard errors are robust. Additional controls: age, 2 skill dummies, 3 child age dummies, dummies for being married, weekend observations, full-time work, indicating whether the day was a normal one, 2 dummies for regional GDP groups per capita and 2 dummies for the regional agglomeration structure.

ential amount of childcare time by keeping everything else constant. Results are reported in table 5. Temporal work flexibility is found to have a large and significantly positive effect only for mothers with higher than mean hourly wages. In the case of all employed mothers, hourly wages and time devoted to market work is significantly negatively correlated. This means that these mothers generally allocate fewer hours to market work and can consequently make use of that available time to be with their children instead. For full-time mothers, in contrast, who earn larger than average wages, the correlation coefficient between hourly wages and hours worked is 0.04 and insignificant.²⁴ This suggests that these mothers irrevocably allocate more of their available time to childcare activities yet without working less. To the contrary, as illustrated by table 6, these women

²⁴The same holds for the sample of full-time employed with lower than average wages.

even allocate significantly more of their time to paid market work. The low differential effect for all full-time employed mother, that was found before (see table 2), therefore masks this important distinction.

The predicted differential effect of hourly wages on the fraction of childcare time is also positive but it is significant only for those mothers with higher than mean hourly wages. It follows that these women allocate more of their overall household work to childcare activities. As further shown by table 6, this positive differential effect is only driven by the larger time investments in primary childcare activities. The amount of time allocated to household production for mothers with larger than mean wages although positive is low and insignificant. If the additional childcare time is differenced out it follows, that respective mothers even allocate less of their available time to non-care related household activities. The reduction in non-care related household time with increasing wages is in line with the model predictions of Gronau (1977) according to which women with higher wages buy more market substitutes instead of doing the housework themselves.²⁵

Table 6: Differences in Predicted Minutes of Time by Gender and Employment Status Depending on Mean Log Hourly Wages.

| | HP | | MW | | L | | T | |
|------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| | below mean | above mean |
| <i>all employed mothers:</i> | | | | | | | | |
| pred. diff. | 14.30* | 2.54 | 18.30* | 21.82* | -11.30* | -6.82* | -21.30* | -17.54* |
| | (2.15) | (0.59) | (2.39) | (3.10) | (3.27) | (2.69) | (6.61) | (7.61) |
| N | 390 | 463 | 390 | 463 | 390 | 463 | 390 | 463 |
| <i>full-time mothers:</i> | | | | | | | | |
| pred. diff. | 13.05* | 0.42 | 18.80* | 20.96* | -10.01* | -2.12 | -8.33 | -13.41* |
| | (1.87) | (0.14) | (2.45) | (4.39) | (2.51) | (0.85) | (1.13) | (2.20) |
| N | 349 | 376 | 349 | 376 | 349 | 376 | 349 | 376 |
| <i>full-time fathers:</i> | | | | | | | | |
| pred. diff. | -8.45* | -11.03* | -8.45* | -15.40* | 17.11* | 25.23* | -0.33 | -0.79 |
| | (2.27) | (5.88) | (2.27) | (2.11) | (3.19) | (7.49) | (0.09) | (0.27) |
| N | 371 | 571 | 371 | 571 | 371 | 571 | 371 | 571 |

Absolute t - statistics in parentheses. * indicates significance levels of 10%. Standard errors are robust. Additional controls: age, 2 skill dummies, 3 child age dummies, dummies for being married, weekend observations, full-time work, indicating whether the day was a normal one, 2 dummies for regional GDP groups per capita and 2 dummies for the regional agglomeration structure.

Table 6 further shows that for all mothers, temporal work flexibility is associated with more

²⁵The model assumes perfect substitutability between market goods and those produced at home.

time devoted to paid and unpaid work. While the burden is almost equally split up between more household and market work for women who earn lower than average wages, it is predominantly driven by the longer market work if hourly earnings are above the mean.

When the differential impact of flexitime on other time use aggregates is regarded, the table shows that mothers with lower than mean wages accommodate the significantly larger work burden by reductions in leisure and in tertiary activities. Mothers who earn above mean hourly wages, in contrast, are more likely to reduce time devoted to regenerated activities, in particular when being full-time employed.

As this section has shown, the larger maternal time investments in primary childcare are driven by women who earn larger than mean hourly wages. Yet, these augmented time investments go hand in hand with more time allocated to paid and unpaid work and is mainly accommodated by less regenerative time. All these results taken together suggest that these women put generally a high priority to spending time with their children (Sui-Chu and Willms 1996, Hofferth and Sandberg 2001, Guryan et al. 2008). They seem to use the temporal work flexibility to schedule their market work such that they can spend more of their time on childcare related activities which comes at some costs to the allocation of other personal activities.

6 Quantification of the Endogeneity Bias

Using data for Germany shortly after re-unification not only has the undisputed benefit of being able to use the re-unification as quasi experiment to estimate the causal effect of work-time flexibility on parental time with children, it also allows me to roughly quantify the endogeneity bias by comparing East and West German parents. Unlike for East German parents, temporal work flexibility is not exogenous for West Germans: those parents are able to choose working time arrangements and they do so for childcare reasons. In this regard, parents who have a keen interest in spending time with their children will choose jobs that allow them to schedule their working hours according to the schedule of their kids. A positive impact of flexible work arrangements on the amount of time spent on primary childcare is consequently not informative as it is mainly determined by the active choice of this selective group of parents.

In this section, I use the coefficient estimates of the Eastern German sample to predict the counterfactual parental time for West Germans. This is the amount of time that these parents would have spent with their children had they lived in Eastern Germany. This approach enables me to roughly quantify the endogeneity bias.

6.1 Allocation of Time by Region

In a first step, I will quickly discuss the differences between the East and West German sample. Mean values of the main time use aggregates are reported in table 7 by region, gender and employment status together with p -values of separate significance tests. Employed (full-time employed) West German mothers spend on average about 347 (445) minutes (or 5.8 (7.4) hours) on market work. This is about 153 (76) minutes less than what Eastern German mothers spent. Disposable time for non-market work related activities is hence on average significantly less scarce in the West. Respective mothers tend to allocate some of the additional non-market time to more household work. The considerably shorter workdays of West German mothers only explains the significantly larger amounts of childcare time of all employed mothers yet not of the full-time sample. The samples of employed mothers are compositionally different between the region. Only one quarter of the employed East Germans work part-time while about 75 percent of the respective West Germans do so (see the last four columns of table 9 for further descriptive statistics).

Table 7: Difference in the Allocation of Time for East and West German Parents by Employment Status and Sex.

| | women | | | | men | | | |
|----------------------------|--------------------|--------------------|----------|------------|--------------------|--------------------|----------|------------|
| | East | West | Δ | p -value | East | West | Δ | p -value |
| <i>all employed</i> | | | | | | | | |
| min. of child time | 64.95 (63.55) | 87.51 (86.25) | -22.56 | 0.000 | 29.53 (43.11) | 31.95 (47.78) | -2.42 | 0.168 |
| fraction of household time | 0.264 (0.219) | 0.261 (0.219) | 0.003 | 0.767 | 0.220 (0.277) | 0.256 (0.313) | -0.037 | 0.001 |
| min. of homeproduction | 240.32 (121.89) | 318.51 (153.49) | -78.20 | 0.000 | 125.07 (96.39) | 120.99 (106.39) | 4.08 | 0.296 |
| min. of market time | 500.44 (146.70) | 347.71 (162.47) | 152.73 | 0.000 | 582.88 (159.18) | 546.08 (153.93) | 36.80 | 0.000 |
| N | 853 | 1591 | | | 957 | 2724 | | |
| <i>full-time employed</i> | | | | | | | | |
| min. of child time | 61.57 (59.05) | 60.32 (69.27) | 1.26 | 0.735 | 29.22 (42.83) | 31.40 (46.21) | -2.18 | 0.206 |
| fraction of household time | 0.266 (0.221) | 0.231 (0.240) | 0.035 | 0.009 | 0.220 (0.278) | 0.258 (0.316) | -0.039 | 0.001 |
| min. of homeproduction | 227.41 (115.24) | 238.95 (152.23) | -11.55 | 0.133 | 123.37 (95.35) | 118.28 (102.84) | 5.09 | 0.184 |
| min. of market time | 521.12 (132.18) | 444.94 (173.67) | 76.19 | 0.000 | 588.12 (153.41) | 551.41 (149.04) | 36.71 | 0.000 |
| N | 725 | 492 | | | 942 | 2637 | | |

Standard deviations in parentheses.

Although men in West Germany allocate only insignificantly more of their disposable time to

primary childcare activities, the share compared to all household activities is significantly larger. The reason for that is that they allocate generally less time to non-paid work which therefore gives childcare activities a relative larger weight. In addition, East German men spend more than half an hour more on market work.

6.2 Quantitative Measures

East and West Germans do not only differ with respect to the share of full-time employment and observable individual characteristics they also have different employment biographies, work environments, etc. A direct comparison of the average amount of parental time between the regions is therefore not possible. The raw East-West differences can however be decomposed into differences due to observable and due to unobservable factors.

In a first step, the average amounts of parental time by region and by flexitime status (\hat{C}_F^r , for $r = E, W$ and $F = 0, 1$) will be predicted. The resulting predicted average differential impact of work-time flexibility by region is then found as $\Delta\hat{C}^r = \hat{C}_1^r - \hat{C}_0^r$. Since coefficient estimates for East Germany do not suffer from the endogeneity bias, they can be used to predict the counterfactual time that parents in West Germany would have spent on primary childcare activities, had they lived in Eastern Germany. This is computed by applying the East German coefficient estimates to West German characteristics: $\hat{\beta}_F^E \mathbf{X}_F^W$. The predicted childcare time differences by flexitime status F across the regions can hence be expressed as:

$$\begin{aligned} \Delta\hat{C}_F &= \hat{C}_F^W - \hat{C}_F^E \\ &= \left[\hat{C}_F^W - \hat{C}_F^{\hat{W}} \right] + \left[\hat{C}_F^{\hat{W}} - \hat{C}_F^E \right] \end{aligned} \quad (2)$$

$$= \mathbf{X}_F^W (\hat{\beta}_F^W - \hat{\beta}_F^E) + (\mathbf{X}_F^W - \mathbf{X}_F^E) \hat{\beta}_F^E. \quad (3)$$

Equation (3) is a modified version of the Oaxaca-Blinder decomposition (Blinder 1974, Oaxaca 1973) such that the East-West childcare time differences can be decomposed into differences captured by the coefficient estimates (first term) and those due to observed individual characteristics (second term).²⁶ Differences in coefficient estimates originate from unobserved characteristics such as omitted variables. This term can consequently be interpreted as a rough proxy of the endogeneity bias for West Germans resulting from the choice of work time arrangements for childcare concerns. The last term, in contrast, predicts the average difference in primary childcare time

²⁶The original Oaxaca-Blinder decomposition by flexitime status applied to this case would be: $\hat{C}_F^W - \hat{C}_F^E = \mathbf{X}_F^E (\hat{\beta}_F^W - \hat{\beta}_F^E) + (\mathbf{X}_F^W - \mathbf{X}_F^E) \hat{\beta}_F^W$ which differs in the sign of the separate terms.

Table 8: Differences in Predicted Values between East and West-German Workers as well as the Differences with Counterfactuals.

| | | women | | | | men | |
|---------------------------------------|-------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | | all | | full-time | | full-time | |
| | | \hat{C}_0 | \hat{C}_1 | \hat{C}_0 | \hat{C}_1 | \hat{C}_0 | \hat{C}_1 |
| <i>1. absolute minutes:</i> | | | | | | | |
| raw diff. | $\hat{C}_F^W - \hat{C}_F^E$ | 23.22* | 24.96* | 0.12 | -6.50 | 0.49 | 7.02* |
| | | (5.79) | (3.92) | (0.03) | (0.88) | (0.26) | (1.69) |
| expl. diff. | $\hat{C}_F^{\hat{W}} - \hat{C}_F^E$ | 8.43* | 12.18* | 2.60 | -10.73* | 0.55 | 6.17* |
| | | (4.09) | (3.56) | (1.00) | (2.45) | (0.84) | (4.77) |
| unexpl. diff. | $\hat{C}_F^W - \hat{C}_F^{\hat{W}}$ | 14.79* | 12.78* | 2.75* | 4.23* | -0.06 | 0.85* |
| | | (24.16) | (12.65) | (4.96) | (2.23) | (0.43) | (3.32) |
| <i>2. fraction of childcare time:</i> | | | | | | | |
| raw diff. | $\hat{C}_F^W - \hat{C}_F^E$ | 0.003 | 0.005 | -0.031* | -0.025 | 0.030* | 0.063* |
| | | (0.24) | (0.26) | (2.07) | (0.84) | (2.34) | (2.38) |
| expl. diff. | $\hat{C}_F^{\hat{W}} - \hat{C}_F^E$ | -0.016* | 0.003 | -0.023* | -0.051* | -0.006 | 0.025* |
| | | (9.85) | (1.14) | (2.47) | (1.83) | (1.28) | (2.73) |
| unexpl. diff. | $\hat{C}_F^W - \hat{C}_F^{\hat{W}}$ | 0.019* | 0.002 | -0.008* | 0.026* | 0.036* | 0.038* |
| | | (17.05) | (0.83) | (2.54) | (3.81) | (37.21) | (25.03) |

Standard deviations for predicted means and absolute t -statistics for predicted differences in parentheses. * indicates significance levels of 10% or higher. Controls for the predictions are: age, 3 child age dummies, 2 skill dummies, dummies for being married, weekend observations, full-time work, indicating whether the day was a normal one, 2 dummies for regional GDP groups per capita and 2 dummies for the regional agglomeration structure.

that results from differing observable characteristics across regions by using the unbiased coefficient estimates obtained from the East German sample. It can therefore be interpreted as the differential childcare time of West German parents had they lived in East Germany which means if they hadn't given the choice of the working time arrangements.

The columns of table 8 illustrate predictions by flexitime status with \hat{C}_0 being predicted values for parents without work-time flexibility and \hat{C}_1 represent values for parents with flexitime arrangements. Raw differences show that West Germans allocate more time to childcare activities than parents in the East except for full-time employed mothers. This itself is not interesting as the larger values for West Germans are driven by the endogenous decision of having temporal work flexibility. The question is how much of that difference is due to the endogeneity of work-time flexibility resulting from the choice of working time arrangements for child care concerns?

According to equation (3), raw differences in time allocations for care activities can be decomposed into an explained ($\hat{C}_F^{\hat{W}} - \hat{C}_F^E$) and an unexplained part ($\hat{C}_F^W - \hat{C}_F^{\hat{W}}$). Results are reported in table 8. A comparison of predictions between the counterfactual and the true East German averages can be viewed as the differential amount of time that West Germans would have spent on

childcare activities had they lived in the East. This is possible because the counterfactual values are predicted by applying East German coefficient estimates to West German characteristics.

The table illustrates that West German employed mothers would have spent on average more time on primary childcare related activities had they lived in Eastern Germany and in particular mothers who work flexitime. Such compositional sample differences account for about 32 – 34 percent of the overall difference between East and West if women do not work flexitime. This is mainly explained by the significantly larger fraction of female part-time employment in West Germany. In addition, East Germans part-time employed allocate on average about 80 minutes more of their available time to work. Accounting for these differences between the regions explains these positive explained differences.

Part-time employment itself offers some work-time flexibility in that West German women are likely to choose working schedules for childcare reasons (see e.g. Ondrich et al. 1996, Gustafsson et al. 1996).²⁷ Although such women do not seem to allocate differently the amount of childcare time relative to all household activities between East and West, explained contributions illustrate 6 times lower values. The reason behind that is that West German mothers would have spent less time to household activities had they lived in Eastern Germany. This is again mainly due to regional differences in the share of part-time employment and average working hours. Explained compositional differences in the case of mothers who have some work-time flexibility account for even larger fractions of the raw predicted childcare differential. They range between 49 and 64 percent.

Also full-time employed Est German mothers devoted on average about 76 minutes more to market work which shrinks to 35 minutes on average if only those women who additionally work flexitime are considered. The longer working hours limit the amount of time available for other activities. Predicted differences for full-time employed women reveal that West Germans mothers but in particular those with some temporal work flexibility would have spent less of their time to childcare activities had they lived in Eastern Germany. West German men, in contrast to that, who have some work-time flexibility would rather allocate more of their time to primary childcare had they lived in the former GDR. Compositional sample differences explain 40 percent of relative childcare time and (73) 88 percent of the raw East-West differences in minutes.

Furthermore, rows marked by $\hat{C}_F^W - \hat{C}_F^{\hat{W}}$ report the contributions of unexplained factors to ex-

²⁷As written in *Forbes* of January, 2013: "If you are a career-oriented woman with a family or considering building a family in the future, it's particularly important that you scrutinize your employers' or prospective employers' benefits policies to gauge how much or how little an organization caters to working parents' unique needs." *Forbes*, 29th of January, 2013.

plaining the overall East-West German predicted childcare differential. This term can be understood as a rough proxy of the endogeneity bias. These differences are found to be positive in all cases independent of gender and employment status which indicates that West Germans indeed spent significantly more of their time on primary childcare activities as compared to the counterfactual situation.

For the case of all employed women, unexplained differences are large and significant for both subsamples. For parents who have some work-time flexibility it accounts for 37 – 51 percent of the overall time differential between East and West. It is even larger for those mothers who do not report to work flexitime. About 70 percent of all employed West German women work part-time which by definition allows for some temporal flexibility. Childcare concerns are the main reason for West German mothers to work part-time (see e.g. Ondrich et al. 1996, Gustafsson et al. 1996). This endogeneity is therefore strongly driving the raw East-West differential although such mothers are not directly defined as working flexitime.

Due to the longer working hours, predicted unexplained differences in absolute minutes of full-time employed women are smaller but the endogeneity bias is found to be larger for those who work flexitime as compared to those who do not. For fathers, an insignificant and almost zero difference in unexplained factors is found for those who do not report to have some work-time flexibility. West German fathers, who work flexitime in contrast, report to spend significantly more time with their children as compared to the counterfactual value. This suggests that unobserved characteristics play a non-negligible role for men. Further research is needed to explain this finding in more detail.

To conclude, this section showed that the endogeneity bias between flexitime arrangements and parental time is significantly positive and non-negligible in magnitude. Raw East-West difference in parental time with children are therefore largely and significantly upward biased such that the raw differential impact of work-time flexibility for these parents largely overstates the true effectiveness of flexitime arrangements on allowing parents to reallocate their schedules as to spend additional time with their children during a standard workday.

7 Conclusion and Implications

In the political discussion, temporal work flexibility is often viewed as one means to allow parents to reconcile family and work by simultaneously allowing them to schedule their working hours in such a way that they are able to spend more time with their children. In this paper, I have tested

this assumption empirically by exploiting the German re-unification and the particularities of the East German labor market as quasi-experiment to estimate casual effects. Given that people in the former GDR had only a limited choice of the workplace but were unable to negotiate working time arrangements allows me to estimate the causal effect of temporal work flexibility on parental time with children.

The results of the analysis show that work time flexibility allows parents and in particular mothers to reallocate their time in order to spend more time per day to be with their children. The result is robust to different specifications.

I have also shown that flexitime work is positively associated with more productive characteristics. The positive differential effect of flexitime on parental time with children is driven by women with larger than mean hourly wages. These women are also found to have longer working hours such that the positive effect on childcare time can be viewed as evidence for different priorities about how to educate their children and how to spend their time with them. Higher parental educational attainments are found to be positively correlated with the quality of childcare amongst others by Kalenkoski and Foster (2008), Bianchi (2000), Bianchi and Robinson (1997), Datcher-Loury (1988), Hill and Stafford (1980) such that flexitime not only allows parents to spend more time with their children but also to have "better" time. It can therefore be argued that the larger time investments induced by flexitime are likely to positively affect the cognitive development of children.

This comes, however, at a cost: the longer working hours and the increased amount of time allocated to household production of mothers with work-time flexibility suggests that the additional childcare time is added to the existing heavy task load and consequently increases the total work burden. Mothers accommodate that by reducing the amount of regenerative activities and leisure time which is likely to increase work related stress (Sui-Chu and Willms 1996, Hofferth and Sandberg 2001, Guryan et al. 2008) and can have potentially negative implications on well-being (Peeters et al. 2005, van Rijswijk et al. 2004, Moen and Yu 2000, Cox et al. 2000). Consequently, reconciling family and work is an even more strenuous and is highly demanding which stands in stark contrast to what such policies aim at. For fathers, in contrast, work-time flexibility leads on average to less paid and unpaid work. They enjoy more leisure without however using their additional free time to spend more of it with their children.

A comparison of East and West Germany indicates a significant and positive endogeneity bias that largely overstates the true effectiveness of work-time flexibility on parental time with children

for mothers and fathers, likewise. The endogeneity arises because West German parents are able to choose working time arrangements for childcare reasons such that parents with a keen interest in spending time with their children will choose jobs that allow them to schedule their working hours according to the care schedule of their kids.

From a policy perspective, my results indicate that a reconciliation of family and work can only be reached if both parents share childcare responsibilities more equally. Policy makers should target fathers to a greater extent by raising awareness and ultimately setting further incentives. Extending work-time flexibility to a wider range of parents from various educational backgrounds will mitigate the expected positive impact on a child's cognitive development. Larger time investments alone are not enough. Such measures must be coupled with a comprehension that it is important how primary time is spent. Studying the direct impact of additional time investments on the cognitive development of children would be a very interesting avenue for future research.

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Appendix

Table 9: Summary Statistics for parents in East Germany by Gender, Employment and Flexitime Status.

| | EAST | | | | WEST | | | |
|------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | men | | women | | men | | women | |
| | all empl. | all empl. | full- time | part- time | all empl. | all empl. | full- time | part- time |
| <i>individual characteristics:</i> | | | | | | | | |
| age | 35.96 (7.39) | 33.76 (6.93) | 33.67 (7.00) | 34.32 (6.51) | 38.55 (8.13) | 35.81 (6.88) | 34.88 (8.93) | 35.84 (6.93) |
| low skilled | 0.04 (0.21) | 0.07 (0.26) | 0.07 (0.25) | 0.09 (0.28) | 0.09 (0.28) | 0.14 (0.34) | 0.17 (0.38) | 0.15 (0.36) |
| medium skilled | 0.56 (0.50) | 0.67 (0.47) | 0.67 (0.47) | 0.66 (0.47) | 0.49 (0.50) | 0.60 (0.49) | 0.52 (0.50) | 0.62 (0.49) |
| high skilled | 0.40 (0.49) | 0.26 (0.44) | 0.26 (0.44) | 0.25 (0.44) | 0.42 (0.49) | 0.26 (0.44) | 0.31 (0.46) | 0.23 (0.42) |
| married | 0.90 (0.30) | 0.80 (0.40) | 0.79 (0.41) | 0.88 (0.33) | 0.91 (0.29) | 0.76 (0.43) | 0.48 (0.49) | 0.81 (0.39) |
| <i>household characteristics:</i> | | | | | | | | |
| kids ≤ 3 | 0.18 (0.38) | 0.13 (0.34) | 0.13 (0.33) | 0.15 (0.36) | 0.23 (0.42) | 0.15 (0.36) | 0.14 (0.35) | 0.16 (0.37) |
| kids aged 3 – 6 | 0.27 (0.45) | 0.25 (0.43) | 0.24 (0.43) | 0.30 (0.46) | 0.22 (0.42) | 0.25 (0.43) | 0.22 (0.42) | 0.27 (0.44) |
| kids 6 – 10 | 0.22 (0.42) | 0.27 (0.45) | 0.28 (0.45) | 0.22 (0.42) | 0.24 (0.43) | 0.26 (0.44) | 0.23 (0.42) | 0.27 (0.44) |
| kids 10 – 15 | 0.33 (0.47) | 0.34 (0.48) | 0.35 (0.48) | 0.34 (0.47) | 0.30 (0.46) | 0.33 (0.47) | 0.41 (0.49) | 0.30 (0.46) |
| <i>work characteristics:</i> | | | | | | | | |
| full-time emp. | 0.98 (0.12) | 0.85 (0.36) | 1.00 (0.00) | 0.00 (0.00) | 0.97 (0.18) | 0.31 (0.46) | 1.00 (0.00) | 0.00 (0.00) |
| flexitime | 0.17 (0.37) | 0.32 (0.46) | 0.32 (0.47) | 0.29 (0.46) | 0.24 (0.43) | 0.17 (0.38) | 0.19 (0.38) | 0.16 (0.37) |
| N | 957 | 853 | 725 | 128 | 2724 | 1591 | 492 | 1184 |

Standard deviations in parentheses.

Table 10: Estimation Results for the Flexitime Indicator on Child Related Time by Gender and Employment Status.

| | 1. minutes of childcare time | | | | | 2. fraction of total household time | | | | |
|-----------------------------|------------------------------|----------------|-----------------|----------------|-----------------|-------------------------------------|------------------|------------------|------------------|------------------|
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| <i>all women:</i> | | | | | | | | | | |
| | 7.28 (1.64) | 6.94 (1.61) | 7.01 (1.41) | 6.11 (1.37) | 7.03* (1.74) | 0.043* (2.68) | 0.041* (2.58) | 0.036* (2.00) | 0.038* (2.39) | 0.039* (2.53) |
| <i>N</i> | 853 | 853 | 853 | 853 | 853 | 853 | 853 | 853 | 853 | 853 |
| <i>R</i> ² | 0.140 | 0.181 | 0.168 | 0.144 | 0.409 | 0.116 | 0.184 | 0.146 | 0.124 | 0.387 |
| <i>full-time women:</i> | | | | | | | | | | |
| | 0.97 (0.22) | 0.88 (0.20) | 0.39 (0.08) | 1.14 (0.26) | 1.04 (0.26) | 0.034* (1.96) | 0.031* (1.83) | 0.024 (1.24) | 0.031* (1.81) | 0.028* (1.74) |
| <i>N</i> | 725 | 725 | 725 | 725 | 725 | 725 | 725 | 725 | 725 | 725 |
| <i>R</i> ² | 0.140 | 0.179 | 0.197 | 0.140 | 0.418 | 0.130 | 0.194 | 0.175 | 0.131 | 0.392 |
| <i>full-time men:</i> | | | | | | | | | | |
| | 0.88 (0.22) | 0.36 (0.09) | -0.90 (0.22) | 0.00 (0.00) | 1.69 (0.43) | 0.006 (0.24) | 0.003 (0.13) | 0.007 (0.28) | 0.001 (0.02) | 0.025 (0.99) |
| <i>N</i> | 942 | 642 | 942 | 942 | 942 | 942 | 942 | 942 | 942 | 942 |
| <i>R</i> ² | 0.032 | 0.047 | 0.108 | 0.046 | 0.178 | 0.059 | 0.077 | 0.109 | 0.072 | 0.186 |
| <i>additional controls:</i> | | | | | | | | | | |
| age polynomial | | ✓ | | | ✓ | | ✓ | | | ✓ |
| occupations | | | ✓ | | ✓ | | | ✓ | | ✓ |
| log hrl wages | | | | ✓ | ✓ | | | | ✓ | ✓ |

Absolute *t*-statistics in parentheses. * indicates significance levels of 10% or higher. Standard errors are robust. Standard control variables: age, 2 skill dummies, dummies for being married, weekend observations, full-time work, indicating whether the day was a normal one, 2 dummies for regional GDP groups per capita and 2 dummies for the regional agglomeration structure.

Table 11: Marginal Effects for a Mother's Probability to be Employed or to Work Part-time.

| | white collar | | service sector | |
|------------------------------------|---------------------|-----------|-----------------------|-----------|
| | all | full-time | all | full-time |
| <i>flexitime indicator:</i> | | | | |
| | 0.153* | 0.137* | 0.155* | 0.170* |
| | (6.00) | (5.22) | (5.87) | (6.14) |
| <i>individual characteristics:</i> | | | | |
| male | -0.315* | -0.360* | -0.348* | -0.348* |
| | (16.68) | (19.08) | (19.72) | (18.04) |
| age | 0.060* | 0.057* | 0.016 | 0.025* |
| | (5.52) | (4.94) | (1.60) | (2.25) |
| low skilled | -0.114* | -0.062 | 0.167* | 0.167* |
| | (1.75) | (0.88) | (2.87) | (2.62) |
| high skilled | 0.103* | 0.126* | 0.060* | 0.062* |
| | (4.48) | (5.43) | (2.56) | (2.52) |
| married | -0.044 | -0.025 | -0.007 | -0.016 |
| | (1.20) | (0.68) | (0.20) | (0.40) |
| <i>workplace characteristics:</i> | | | | |
| log hourly wages | 0.150* | 0.213 | 0.149* | 0.135* |
| | (5.79) | (7.23) | (6.07) | (4.62) |
| <i>other controls:</i> | | | | |
| regional vars. | ✓ | ✓ | ✓ | ✓ |
| N | 1796 | 1653 | 1796 | 1653 |
| pseudo R^2 | 0.181 | 0.213 | 0.162 | 0.162 |

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

Table 12: Wage Equations.

| | women | | | | men | |
|------------------------------------|--------------|---------|------------------|---------|------------------|--------|
| | all | | full-time | | full-time | |
| | (1) | (2) | (1) | (2) | (1) | (2) |
| <i>Flexitime indicator:</i> | | | | | | |
| | 0.057* | 0.031 | 0.072* | 0.044 | 0.067 | 0.025 |
| | (1.89) | (1.09) | (2.39) | (1.56) | (1.53) | (0.55) |
| <i>individual characteristics:</i> | | | | | | |
| age | 0.062* | 0.060* | 0.081* | 0.079* | 0.029 | 0.021 |
| | (3.05) | (3.03) | (4.09) | (4.23) | (1.32) | (0.93) |
| age squared | -0.001* | -0.001* | -0.001* | -0.001* | -0.000 | -0.000 |
| | (2.88) | (2.90) | (3.91) | (4.07) | (0.98) | (0.62) |
| low skilled | -0.086 | -0.076 | -0.286* | -0.269* | -0.056 | -0.098 |
| | (0.78) | (0.69) | (2.04) | (1.94) | (0.48) | (0.85) |
| high skilled | 0.210* | 0.202* | 0.133* | 0.116* | 0.025 | -0.003 |
| | (6.25) | (6.09) | (4.16) | (3.72) | (0.85) | (0.09) |
| married | -0.216* | -0.204* | -0.182* | -0.162* | 0.102* | 0.094* |
| | (6.42) | (6.19) | (5.40) | (5.11) | (2.42) | (2.40) |
| <i>work characteristics:</i> | | | | | | |
| full-time emp. | -0.271* | -0.286* | – | – | – | – |
| | (5.15) | (5.22) | – | – | – | – |
| white-collar | – | 0.117* | – | 0.209* | – | 0.115* |
| | – | (2.80) | – | (4.60) | – | (3.57) |
| service sector | – | 0.096* | – | 0.084* | – | 0.064* |
| | – | (2.84) | – | (2.53) | – | (2.19) |
| N | 849 | 849 | 721 | 721 | 932 | 932 |
| R ² | 0.364 | 0.391 | 0.401 | 0.451 | 0.327 | 0.347 |

Absolute t - statistics in parentheses. * indicates significance levels of 10%. Standard errors are robust. Additional, non-reported controls: dummies for weekend observations, one indicating whether the day was a normal one, 2 dummies for regional GDP groups per capita and 2 dummies for the regional agglomeration structure.