Fathers' Response to Public Childcare Expansion: Whether and When to Take Parental Leave*

Lisa-Marie Duletzki† Nayeon Lim‡

December 5, 2025

Abstract

This study examines the impact of public childcare expansion for children under three in Germany on parental labor dynamics, particularly focusing on fathers' responses to the increased maternal labor supply facilitated by expanded childcare availability. Using extensive administrative data, we find that the expansion of childcare led fathers to reduce their labor supply in terms of days worked while significantly increasing their uptake of parental leave. Crucially, fathers' leave-taking patterns closely synchronize with mothers' return to work, highlighting the joint labor supply and leave-taking decision among couples. These findings provide broader implications for gender equality within households by demonstrating that parents coordinate their labor supply in response to family policies.

*We would like to thank Johannes Schmieder, Daniele Paserman, Patricia Cortés, Kevin Lang, Matthias Collischon, Daniel Kühnle, Linh Tô, James Feigenbaum, Joshua Goodman, Martin Fiszbein, and all participants at the 2023 LBJ Policy Research Workshop, the 2023 MEA Annual Meeting, and seminars at Boston University, the University of Bonn, the University of Konstanz, the Halle Institute for Economic Research (IWH) and GradAB for invaluable comments and suggestions. We also would like to thank the Research Data Center of the Institute for Employment Research (IAB) for providing the data and support with the data processing. All errors are our own.

†IAB and University of Duisburg-Essen; lisa-marie.duletzki@iab.de

‡Korea Capital Market Institute; nayeonlim@kcmi.re.kr

1 Introduction

To promote gender equality in both labor markets and households, many countries have developed family policies aimed at increasing fathers' involvement in childcare. Previous research has mainly focused on the impact of paternity leave policies on fathers' participation in childcare and household responsibilities as well as their labor supply (Rege and Solli, 2013; Farré and González, 2019; Patnaik, 2019; Tamm, 2019). However, the implications of public childcare expansion on fathers' behaviors have been less thoroughly explored.

Public childcare expansion is a key family policy designed to ease the childcare burden on mothers and help them return to work. Consequently, existing research has predominantly focused on mothers, yielding mixed results (Carta and Rizzica, 2018; Andresen and Havnes, 2019; Kleven et al., 2019; Attanasio et al., 2022). However, considering that parents make joint decisions in response to family policies, it is important to investigate how childcare policies also influence fathers' behaviors and household dynamics. While Andresen and Havnes (2019), Krapf et al. (2020) and Brewer et al. (2022) examine the effects of public childcare on fathers' labor supply, they produce mixed results and provide a limited understanding of other outcomes. Considering that Zoch and Schober (2018) found that early childcare expansion led mothers to adopt less traditional gender attitudes, it's important to examine its impact on fathers' overall behaviors, including labor supply, childcare involvement, and gender dynamics within households.

In this paper, we assess the effects of childcare expansion for very young children (specifically those under three, hereafter referred to as "early childcare") on fathers' labor market outcomes, as well as the joint effects on within-household labor supply. Along with substantial positive effects on labor supply for mothers, we show that fathers also react by coordinating their parental leave accordingly.[1] We conduct a generalized difference-in-difference estimation exploiting county-level and temporal variation in childcare expansion.[2] Using rich administrative data from Germany, we find that early childcare expansion in Germany caused fathers to reduce labor supply in terms of days worked and increased their parental leave take-up. Specifically, we find that fathers coordinated with their partner by taking parental leave around the time when mothers return to work. However, as fathers mostly take only the two months of leave reserved for them, this short interruption does not significantly affect their earnings. This study provides novel evidence that the expansion of early public childcare can reduce the gender gap in labor market outcomes and childcare involvement through increased take-up of fathers' parental leave.

[1] Positive effects of childcare expansion on maternal labor supply have also been shown for Germany in: Bauernschuster and Schlotter (2015); Müller and Wrohlich (2020); Lim and Duletzki (2023).

[2] We exploit this variation based on evidence that regional variation in the timing of childcare expansion was primarily driven by supply shocks exogenous to mothers' labor supply (See more details in Section 5). Further, we adapt recent heterogeneity-robust estimators, shown in Table 4.

If early childcare expansion indeed encourages more mothers to engage in the labor market, it can have several theoretical implications for fathers' labor market outcomes. On one hand, early childcare availability may have little impact on fathers. Given that mothers are mostly the primary caregivers for children in many countries, childcare availability may affect only mothers' labor market outcomes. Also, the increase in mothers' earnings and working hours may not be large enough to induce significant changes in fathers' behavior or work incentives. For instance, Andresen and Havnes (2019) and Brewer et al. (2022) have found no significant impact of public childcare for 1-2-year-olds and 3-4-year-olds on fathers' labor supply in Norway and the UK, respectively.

Conversely, it could also lead to a reduction in fathers' labor supply or earnings for several reasons. First, fathers might become more involved in childcare and household duties when mothers are more actively engaged in the labor market due to the availability of childcare. Fathers may take more parental leave, pick up their children from childcare facilities, or assume more household chores as their wives spend more time in paid work. Second, if mothers earn more, fathers may have fewer incentives to work longer hours, as they are no longer the sole breadwinners in the household. Notably, Krapf et al. (2020) found negative effects of public childcare provision on fatherhood premiums in lower-earning households, suggesting that the increase in mothers' earnings due to childcare provision can reduce the burden on fathers to compensate for any loss in household earnings following mothers' career interruptions. Consistent with this, our findings indicate that fathers respond to the availability of public childcare by reducing their labor supply, particularly in terms of the number of days worked.

Our paper contributes to the literature in two main ways. First, we provide novel empirical evidence on how early childcare provision affects fathers' parental leave take-up, in addition to its impact on their labor supply. The effects of public childcare policies have so far been primarily evaluated in terms of maternal outcomes. Although several studies have examined its impact on fathers' outcomes, the evidence is considerably more limited compared to that of mothers, and the existing literature yields mixed results. While Andresen and Havnes (2019) and Brewer et al. (2022) find no significant impact on fathers in Norway and the United Kingdom, respectively, Krapf et al. (2020) find that public childcare provision decreases fatherhood premiums in lower-earning households in the canton of Bern. Additionally, Arkhangelsky et al. (2024) find that early childcare expansion had a short-term negative effect on paternal labor supply in the Netherlands, which is more pronounced with lower initial childcare availability. In addition to these findings, we discover that public childcare expansion for children under three reduces fathers' labor supply, specifically the number of days worked in the first two years after birth. Furthermore, we show that this reduction in fathers' days worked aligns with the increase in their parental leave take-up.

Second, using administrative social security data, we precisely estimate both fathers' employ-

ment interruptions and mothers' return to work after birth. With this, we provide fine-grained and novel evidence on couples' joint labor supply responses to public childcare expansion. We show that fathers increase their parental leave take-up and reduce their days worked, coordinating their leave to coincide with their spouses' return to work. Regarding fathers' parental leave take-up, previous research has mainly evaluated how providing earmarked leave reserved for fathers affects their labor supply and childcare involvement. For Germany, Tamm (2019) finds that earmarked paternal leave increases fathers' involvement in childcare and housework while reducing labor supply only on the intensive margin in the short run. Rege and Solli (2013) find that reform-induced increases in paternal leave in Norway decrease fathers' earnings for up to five years. In contrast, Patnaik (2019) finds that in Quebec, earmarked paternal leave increases household production by fathers while having no effect on fathers' employment outcomes. We contribute to this literature by showing that public childcare provision can also affect paternal leave-taking by encouraging more fathers to take leave around the time when mothers return to work. As early childcare expansion led mothers to return to work earlier, typically around one year after birth,[3] fathers increased their parental leave take-up at the extensive margin, coordinating their leave to coincide with their spouses' return to work. This finding implies that public childcare policies can influence both mothers and fathers, promoting gender equality in both the household and labor markets.

2 Public Childcare and Family Policies in Germany

In Germany, childcare is predominantly provided by municipalities or non-profit organizations, heavily subsidized and regulated by federal and local governments. Operational procedures are overseen by youth welfare offices at the county level, and "private" for-profit providers constitute a minor segment, about 3% of the market as of 2014. The public childcare system is age-differentiated, offering kindergarten for children aged three to six and early childcare (*Krippe*) for those under three. Substantial subsidies make it affordable for parents, who pay around €250 monthly for early childcare slots and even less for kindergarten (Hoernig, 2023). The fee structure is income-progressive and sibling-regressive, allowing parents to choose the extent of daily childcare. A notable majority of children under three attend more than 30 hours weekly, while only half of the older children do so.

Following reunification, Germany initiated several public childcare reforms, starting in 1996 with legislation guaranteeing kindergarten places for children aged 3-6, which significantly increased attendance and achieved nearly 90% coverage for this age group by the early 2000s. However, early childcare for children under three remained scarce, particularly in West Germany, where

[3] In Germany, parents are entitled to share 14 months of paid parental leave if both parents participate. As fathers mostly take the two months of leave exclusively reserved for them, many mothers take one year of leave.

the enrollment rate was about 2% in 2002. This scarcity was linked to lower maternal labor force participation in West Germany, rooted in historical institutions and social norms favoring the male-breadwinner model.[4] Addressing the demand for childcare and aiming to boost maternal labor supply and fertility rates, the German government embarked on a series of reforms from the mid-2000s to expand early childcare, particularly targeting West Germany due to its unique challenges. These efforts included the 2005 federal daycare expansion law, aiming for a 17% coverage rate by 2010, and subsequent reforms to increase coverage to 35% by 2013 and introduce legal entitlement for 1-2-year-old children's childcare slots by 2013. These reforms significantly increased early childcare coverage, especially in West Germany.

In 2007, the German government also introduced the Parental Allowance and Parental Leave Act, enacting two significant reforms. First, it made all parents eligible for benefits equal to two-thirds of their average net earnings from the previous year, with a minimum of 300 euros and a maximum of 1800 euros, for up to 12 months. Before this act, benefits were means-tested and capped at 300 euros for 24 months. Second, the act designated two months of paid parental leave exclusively for fathers, which would be forfeited if not used. This legislation was implemented uniformly across all regions of Germany, which reduces the likelihood of confounding estimation results when controlling for year and county fixed effects.[5]

3 Data and Sample

Our study relies on data from multiple sources. We obtain labor market data using the Integrated Employment Biographies (IEB version 16.00.01), which is a German administrative social security data set provided by the Institute for Employment Research (IAB). To identify fathers, we employ the married couples identification method proposed by Goldschmidt et al. (2017) and Bächmann et al. (2021). Using surnames, addresses and age bounds, we can identify husbands of mothers in the administrative data. However, it is important to note that this approach allows us to identify only approximately one-third of fathers, as it relies on married couples sharing their surname. Also, couples are identifiable only when both partners are subject to social security in the first place.[6]

[4] In contrast, East Germany's more gender-egalitarian policies under the socialist regime encouraged higher female labor market participation and well-developed public childcare infrastructure.

[5] However, to address any potential concerns that its effects might vary systematically across counties over time, we control for the share of highly educated or high-income women most affected by the reform (Raute, 2014; Welteke and Wrohlich, 2019) at the county-year level in our generalized difference-in-differences estimation for robustness checks. Reassuringly, we observe little change in our estimation results.

[6] We test the representativeness of our sample in three main ways. First, we compare mothers that can be matched through the couples identification to a spouse to those mothers where we find no match (see Appendix section 2). Second, to verify whether the imputed sample of couples is representative of parents with young children in the population of Germany, we compare key variables to information from the German Microcensus. (see Appendix section 3). Third, we use information from the Microcensus to distinguish couples with small children that are married

Therefore, for our main analysis, we rely on 6,500 couples who are identified to have had their first child in each year between 2001 and 2014 in the administrative data.

Regarding information on the early childcare coverage rate, we use data provided by the German Statistical Office. Dividing the number of children under three enrolled in public childcare by the overall number of children under three gives us a measure for early childcare coverage at the county-year level. Although the childcare reform was implemented between 2005 and 2014, we consider the sample period from 2007 to 2014 for several reasons. First, data on early childcare coverage rates at the county level are only available from 2006 onwards. Second, excluding the years 2005 and 2006 ensures greater consistency in the sample period, especially considering the changes in the parental leave regime that took effect in 2007. Additionally, it is plausible that the childcare expansion resulting from the reforms was slow in the early years due to a lack of preparedness.

4 Gender Gap in Earnings in Germany

A recent wave of papers has shown that the child penalty for mothers accounts for a large part of the remaining gender earnings gap in many developed countries.[7] Furthermore, the gap attributed to the child penalty has not narrowed over time. Does the same trend hold true for Germany?

To investigate the contribution of the child penalty to the gender earnings gap over time in Germany, we adopt the dynamic decomposition framework proposed by Kleven et al. (2019). This framework allows us to decompose the gender earnings gap within couples into components explained by gender differences in education level, the impacts of having children, and unexplained residuals. Using the couples' sample obtained from the IEB, we estimate the effect of having children for every calendar year for each gender employing the following specification:

$$Y_{ise}^{g} = \sum_{y} \sum_{j=-3(\neq -1)}^{7} \alpha_{yj}^{g} \cdot \mathbf{I}[e=j] \cdot \mathbf{I}[s=y] + \sum_{k} \beta_{k}^{g} X_{kis}^{g} + \nu_{ist}^{g} \tag{1}$$

where Y_{ise} is the labor market outcome for individual i, at event time e, and in calendar year s. In this specification, the event is childbirth and the event time $e = 0$ corresponds to the year of childbirth. Interacting event time dummies with calendar year dummies allows us to estimate year-specific effects of having children, which are event coefficients by birth cohort $(s-e)$. X_{kis} includes a full set of age dummies, calendar year dummies, and education dummies.[8]

and unmarried and show that they are similar in terms of education and income (see Figure A.21).

[7] For cases in Denmark, the USA, and Austria, see Kleven et al. (2019); Cortés and Pan (2023); Kleven et al. (2024).

[8] Education levels are classified into three categories: no vocational training, vocational training, and university

Figure 1 illustrates the trend of the gender earnings gap over three years following childbirth among couples. While the gender earnings gap due to child penalties did not decrease over time in Denmark and the US (Kleven et al., 2019; Cortés and Pan, 2023), Figure 1 shows that the gender earnings gap has decreased since the mid-2000s, and that this reduction is mostly explained by the decrease in child penalties in Germany.

This reduction in child penalties could stem from an improvement in maternal labor market attachment and a reduction in fathers' labor supply to increase their involvement in household and childcare duties.[9] In the German context, the expansion of public childcare has led to a substantial improvement in maternal labor supply (Bauernschuster and Schlotter, 2015; Müller and Wrohlich, 2020; Lim and Duletzki, 2023). Additionally, Zoch and Schober (2018) find that early childcare expansion causes a shift away from traditional gender norms. In this paper, we show that fathers also adjust their labor supply, and that the reduction in days worked can be translated into an increase in the uptake of parental leave.

5 The Effects of Early Childcare Expansion on Parents' Labor Market Outcomes

In this section, we examine how early childcare expansion affects labor market outcomes of parents who had their first child. Following the identification strategy proposed by Müller and Wrohlich (2020) and Lim and Duletzki (2023), we exploit the variation in early childcare expansion across counties and over time to estimate its impact on labor market outcomes of mothers and fathers, respectively.[10] To do so, we conduct a generalized difference-in-difference estimation as follows:

$$Y_{ict} = \alpha + \beta ECC_{ct} + \gamma Z_{ct} + \delta X_{it} + Year_t + County_c + \epsilon_{ct} \tag{2}$$

where Y_{ict} is the outcome of interest. ECC_{ct} denotes the early childcare coverage rate in county c and year t, Z_{ct} represents a set of county-year specific characteristics, including the average age of population, the population ratio of female, college graduates and women aged between 25 and 40, the employment share of each industry, population density, fertility rate, and unemployment rate. X_{it} controls for individual characteristics including education and age. $Year_t$ and $County_c$ are year and county fixed effects, respectively. The regression is weighted using the population

(applied science).

[9] Using the information on time use in German Socio-Economic Panel (SOEP) data, we show that fathers indeed have increased their time spent on childcare and chores, while mothers have reduced their time allocated to these activities since the 2000s in Germany as depicted in Figure A.4.

[10] Lim and Duletzki (2023) explain that large parts of early childcare expansion were driven by exogenous supply shocks and discuss the identifying assumptions and strategies in detail.

size of each county in the year 2007 and standard errors are clustered at the county level. As the reform-induced early childcare expansion mainly occurred during 2007-2014, we limit the sample to parents whose first child was under three in each year (t) during this period.

The results in Panel A of Table 1 show that early childcare expansion improved mothers' overall labor market outcomes, including earnings, employment, days worked, and wage levels as suggested in Lim and Duletzki (2023). On the other hand, the results in Panel B suggest that early childcare decreases fathers' employment and days worked, but not enough to affect their earnings significantly. Moreover, early childcare expansion does not impact fathers' daily wages. This result implies that early childcare expansion reduces fathers' labor supply, specifically in terms of total working days rather than working hours.[11]

In Table 3, we report heterogeneities in the effects by household type. We differentiate between three types: dual earner, female breadwinner, and male breadwinner households. These groups differ in their underlying decision-making processes regarding joint labor supply after birth. Arguably, fathers' decisions to interrupt their employment (even for a very short term) are related to the relative importance of their income to the household. Similarly, mothers' return to work is conditioned on childcare availability and fathers' involvement. Thus, this provides insights into how fathers' reduced days worked translate into positive effects for mothers.

Table 3 shows that positive effects on mothers' employment probability are driven by male breadwinner and dual earner households, while the effects on earnings are far more pronounced for female breadwinner households. The negative effects on fathers' days worked are more pronounced in female breadwinner and dual earner households. These results suggest that childcare expansion facilitates an earlier return for mothers in male breadwinner households without affecting fathers' labor market behavior. In contrast, couples in female breadwinner households react jointly, resulting in a reduction in days worked for fathers and a pronounced positive effect on mothers' earnings. Here, we observe mothers with a strong incentive to return to work after birth. Arguably, with fathers reducing their days worked and access to childcare, a return to their previous career trajectory is facilitated. Thus, public childcare provision can have a direct effect on mothers and an indirect effect through fathers. Regarding dual earner households, we find significant effects for all outcomes. Here, both partners have an incentive to stay attached to their workplaces and contribute more evenly to household income. In conclusion, we show that the effects of childcare expansion can vary by the labor supply decisions of both parents in the early years after birth.

For robustness checks, we address possible heterogeneity in treatment effects across time and counties by applying the alternative estimators of Sun and Abraham (2021) and Callaway and Sant'Anna (2021). In order to apply these estimators, we transform our treatment into a binary variable so that fathers in counties with an increase of more than 5 percentage points in early

[11] We confirm that there is no impact of early childcare expansion on fathers' full-time work or regular employment.

childcare coverage rate within one year are considered treated.[12] Table 4 shows that the effects on days worked are comparable in magnitude between our standard TWFE regression and alternative heterogeneity-robust estimators. Additionally, in Table 5 we perform a sensitivity analysis, showing the effects when not controlling for Z_{ct} and X_{it}. This shows that the included control variables do not confound our results.

6 Why Does Early Public Childcare Provision Reduce Fathers' Working Days?

Our main finding indicates that the provision of early childcare has an impact on fathers' labor supply, notably leading to a reduction in the number of days worked. How can this outcome be understood? Panel (c) of Figure 2 distinctly shows that the influence on fathers' working days is most significant during the first two years following childbirth. This period coincides with when fathers are most likely to take their parental leave, either immediately after birth or when the child reaches one year old, as depicted in Figure A.3. This pattern suggests that the decrease in fathers' working days may be associated with an increase in the use of parental leave.

Column (1) of Table 2 supports this interpretation by demonstrating that the expansion of early childcare indeed leads to a rise in fathers' utilization of parental leave.[13] However, the finding presented in column (2) indicates that the expansion of early childcare has a rather small impact on fathers' days of leave. This could be attributed to fathers generally taking only the two months of parental leave exclusively reserved for them as shown in Figure A.2. Moreover, the same hetereogeneities across household types hold for parental leave take-up as in the results for days worked. Fathers in dual earner and female breadwinner households reduce days worked, which is translated into an increase in parental leave take-up (Table 3, Panel D). In line with positive effects on mothers' earnings for these two groups, we interpret this as fathers supporting the return of mothers to work, jointly with childcare uptake.

If fathers take parental leave to support their wives' return to work, it would be more strategic for them to do so one year after childbirth, rather than immediately after. In Germany, parents are entitled to share 14 months of paid parental leave if both parents participate. Typically, mothers take one year of leave, while fathers often take the two months of leave that are exclusively reserved for them. While a number of fathers do take leave right after the birth, there is a tendency for some to opt for leave one year later, which assists their wives in better reattaching to the labor market.

[12] Kleven et al. (2024) and Lim and Duletzki (2023) suggest this identification strategy using event study analysis and explain in detail how to define the event and its justification.

[13] In Table 6 the sensitivity of the results are tested by including only county and year fixed effects. The results do not change substantially.

In Figure 3, we present the leave-taking behavior of fathers in relation to the mother's return to work. This descriptive analysis suggests that parents coordinate their labor supply decisions after having a child. Along the 45-degree line, fathers are observed to take parental leave in the same month that the mother returns to work. Additionally, there is noticeable clustering of mothers returning to work around one year after childbirth. We use this observation as motivation to investigate whether the early childcare expansion affects this dynamics. Specifically, when early childcare expansion induces mothers to return to work, does it also affect the timing of fathers' leave-taking?

The result in column (3) supports this notion, showing a positive impact of early childcare expansion on the likelihood of fathers taking leave one year after childbirth. Moreover, the finding in column (4) suggests that early childcare expansion increases the likelihood of fathers taking leave exactly when their wives return to work. This finding indicates that the expansion of early childcare may lead to more mothers engaging in the labor market and some fathers subsequently reducing their paid work days to take a more active role in childcare.

7 Why Does Public Childcare Increase Fathers' Parental Leave Take-up?

The availability of early public childcare has a significant impact on family dynamics, especially concerning parental leave behaviors. Before the expansion of early childcare in West Germany, childcare responsibilities for children under three predominantly fell upon mothers, with about 60% of them not returning to work until three years after childbirth (Lim and Duletzki, 2023). During this period, fathers' involvement in childcare was minimal, reflecting traditional family roles where mothers were the primary caregivers.

The introduction and availability of early childcare mark a substantial shift in these dynamics. With early childcare provision, mothers are more likely to return to work sooner and are more inclined to work full-time. A common pattern observed is that many mothers return to work and enroll their children in daycare approximately one year after giving birth. This period of re-entry into the workforce often involves a transition period where children are initially placed in daycare for only a few hours (Winner, 2015). This transitional phase necessitates fathers to take parental leave consecutively right after mothers return to work to ensure continuous care for the child during the adjustment to daycare.

This shift towards early childcare not only supports mothers in resuming their professional lives more readily but also encourages fathers to participate more actively in early childcare through parental leave. The structure of early childcare and the need for a smooth transition for children

into daycare environments prompt fathers to take leave, facilitating a more balanced sharing of childcare responsibilities between parents. This change illustrates the potential of early childcare to reshape traditional roles by increasing fathers' involvement in the formative years of their children's lives.

8 Conclusion

This paper provides new insights into the impact of early childcare expansion on fathers' labor supply, extending the literature that has predominantly focused on mother's outcomes. Our analysis, based on detailed administrative data and a generalized difference-in-difference approach, reveals that early childcare expansion leads to a measurable reduction in fathers' labor supply, particularly in the number of days worked. Importantly, we find that this adjustment is largely driven by an increase in parental leave-taking, with fathers coordinating their leave to align with the time mothers return to work.

The broader implications of our findings underscore the potential for family policies, such as public childcare expansion, to influence paternal behavior in significant ways, even in contexts where such policies have traditionally been designed with a focus on maternal employment. Since fathers only react by reducing their days worked, it is often difficult to assess the effects of family policies with survey data that identify employment on annual level. Using matched couples withing social security data, however, we uncover the fine-grained responses of fathers and relate them to the effects found for mothers. These findings suggest that policies aimed at expanding public childcare can play a crucial role in reshaping gender roles within households and promoting greater gender equality.

References

Andresen, M. E. and Havnes, T. (2019). Child care, parental labor supply and tax revenue. *Labour Economics*, 61:101762.

Arkhangelsky, D., Yanagimoto, K., and Zohar, T. (2024). Flexible analysis of individual heterogeneity in event studies: Application to the child penalty. *arXiv preprint arXiv:2403.19563*.

Attanasio, O., de Barros, R. P., Carneiro, P., Evans, D. K., Lima, L., Olinto, P., and Schady, N. (2022). Public childcare, labor market outcomes of caregivers, and child development: Experimental evidence from brazil. *NBER Working Paper Nr. 30653*.

Bächmann, A.-C., Frodermann, C., Lochner, B., Oberfichtner, M., and Trenkle, S. (2021). Identifying Couples in Administrative Data for the years 2001–2014. Technical report, Institut für Arbeitsmarkt-und Berufsforschung (IAB), Nürnberg.

Bauernschuster, S. and Schlotter, M. (2015). Public child care and mothers' labor supply—evidence from two quasi-experiments. *Journal of Public Economics*, 123:1–16.

Brewer, M., Cattan, S., Crawford, C., and Rabe, B. (2022). Does more free childcare help parents work more? *Labour Economics*, 74:102100.

Callaway, B. and Sant'Anna, P. H. (2021). Difference-in-differences with multiple time periods. *Journal of Econometrics*, 225(2):200–230.

Carta, F. and Rizzica, L. (2018). Early kindergarten, maternal labor supply and children's outcomes: Evidence from italy. *Journal of Public Economics*, 158:79–102.

Cortés, P. and Pan, J. (2023). Children and the remaining gender gaps in the labor market. Technical report.

Farré, L. and González, L. (2019). Does paternity leave reduce fertility? *Journal of Public Economics*, 172:52–66.

Goldschmidt, D., Klosterhuber, W., and Schmieder, J. F. (2017). Identifying couples in administrative data. *Journal for Labour Market Research*, 50(1):29–43.

Hoernig, Lukas; Schaffner, S. (2023). Rwi-geo-kita. Technical report, RWI Essen.

Kleven, H., Landais, C., and Søgaard, J. E. (2019). Children and gender inequality: Evidence from denmark. *American Economic Journal: Applied Economics*, 11(4):181–209.

Kleven, H., Landais, C., and Søgaard, J. E. (2024). Do family policies reduce gender inequality? evidence from 60 years of policy experimentation. *American Economic Journal: Economic Policy*.

Krapf, M., Roth, A., and Slotwinski, M. (2020). The effect of childcare on parental earnings trajectories.

Lim, N. and Duletzki, L.-M. (2023). The Effects of Public Childcare Expansion on Child Penalties: Evidence from West Germany. *Boston University-Department of Economics WP*.

Müller, K.-U. and Wrohlich, K. (2020). Does subsidized care for toddlers increase maternal labor supply? evidence from a large-scale expansion of early childcare. *Labour Economics*, 62:101776.

Patnaik, A. (2019). Reserving time for daddy: The consequences of fathers' quotas. *Journal of Labor economics*, 37(4):1009–1059.

Raute, A. (2014). Do financial incentives affect fertility-evidence from a eeform in maternity leave benefits.

Rege, M. and Solli, I. F. (2013). The impact of paternity leave on fathers' future earnings. *Demography*, 50(6):2255–2277.

Sun, L. and Abraham, S. (2021). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of Econometrics*, 225(2):175–199.

Tamm, M. (2019). Fathers' parental leave-taking, childcare involvement and labor market participation. *Labour Economics*, 59:184–197.

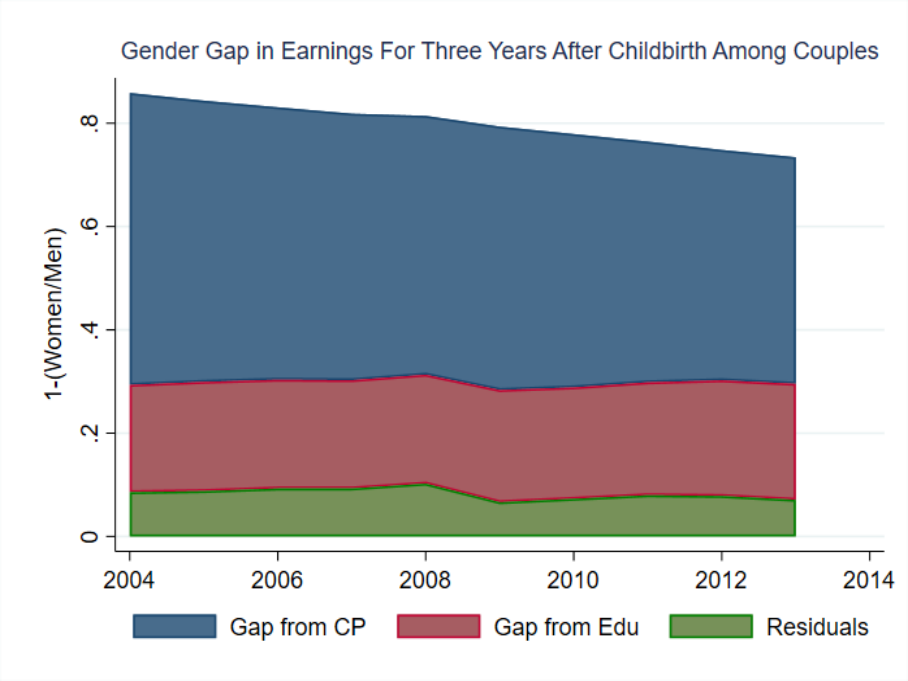
Welteke, C. and Wrohlich, K. (2019). Peer effects in parental leave decisions. *Labour Economics*, 57:146–163.

Winner, A. (2015). Das Münchener Eingewöhnungsmodell – Theorie und Praxis der Gestaltung des Übergangs von der Familie in die Kindertagesstätten. *KiTa Fachtexte*.

Zoch, G. and Schober, P. S. (2018). Public child-care expansion and changing gender ideologies of parents in germany. *Journal of Marriage and Family*, 80(4):1020–1039.

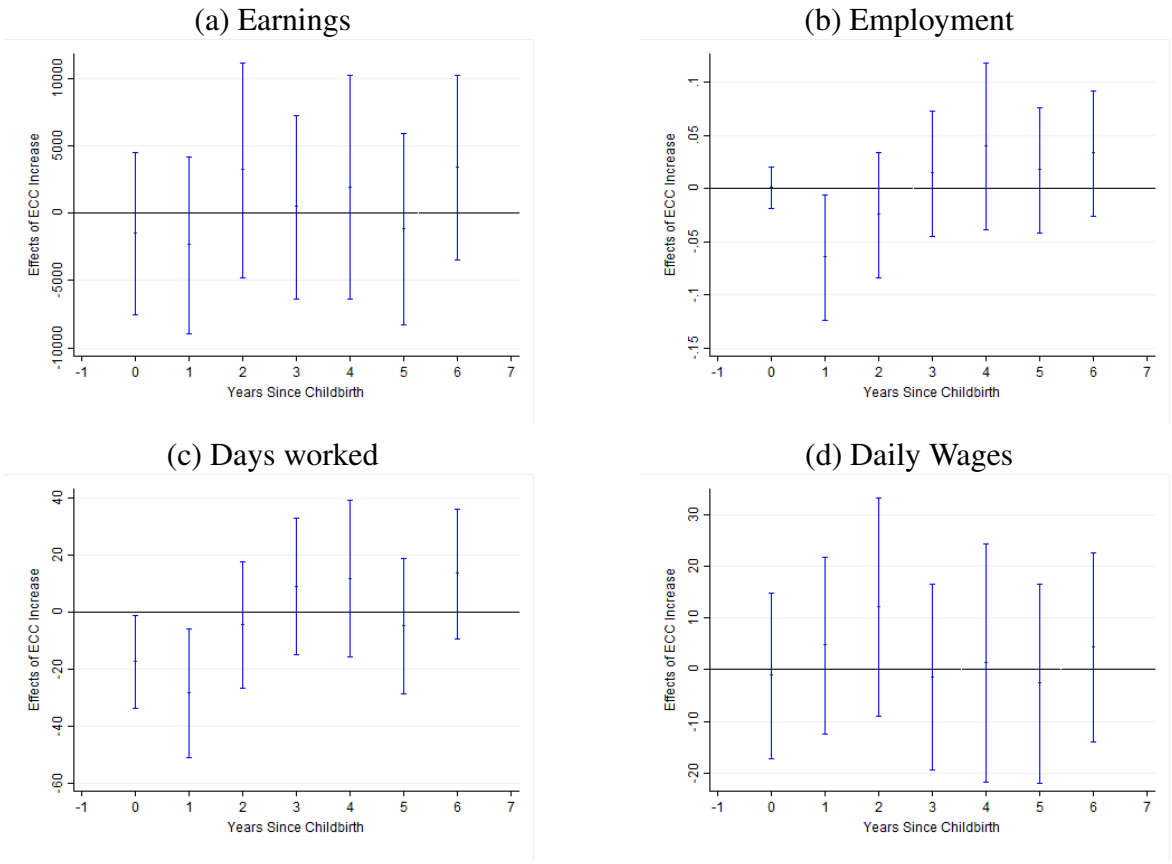
Figures

Figure 1: Decomposition of Gender Earnings Gap Among Couples



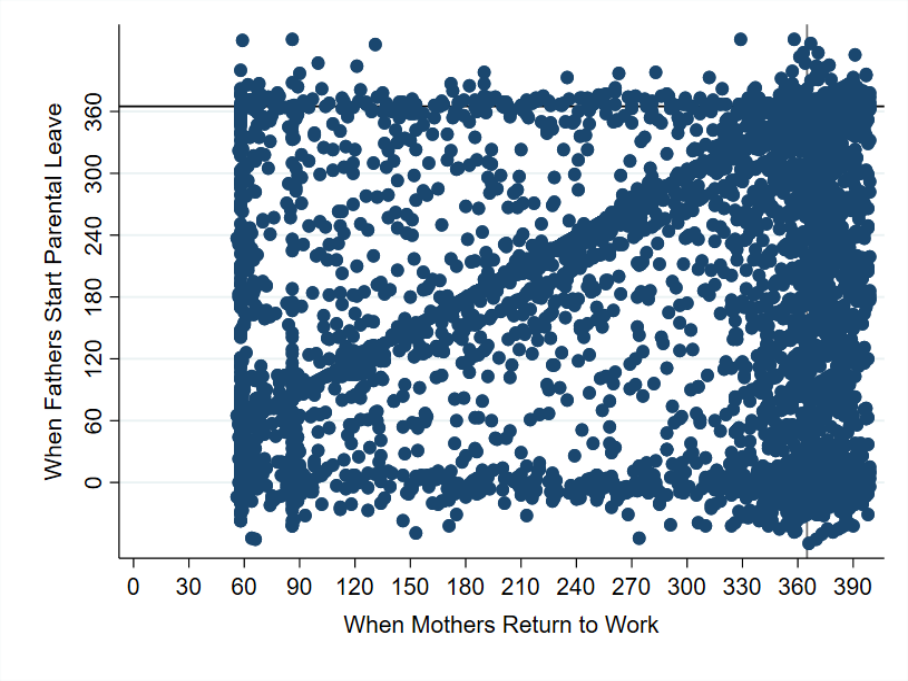
Note. This figure describes the gender earnings gap for couples who had a child under three between 2004 and 2013. The earnings gap is decomposed into components explained by gender differences in education level and the impacts of having children and unexplained residuals. The sample includes couples identified in the IEB.

Figure 2: Effects of Early Childcare Expansion on Fathers' Labor Market Outcomes in Each Year Following Childbirth



Note. This figure depicts the impact of early childcare expansion on fathers' outcomes in each year over a span of seven years following childbirth. It plots the coefficients estimated from equation (2), limiting the observations to those in each year after childbirth with 95% confidence intervals. Standard errors are clustered at the county level.

Figure 3: Leave-taking Behavior of Fathers in Relation to Maternal Employment



Note. This figure plots the months of father's parental leave in relation to the month of the mother's return to work. Each axis indicates the number of days after childbirth.

Tables

Table 1: The Effects of Early Childcare Expansion on Parents' Labor Market Outcomes

Panel A: Mothers

Outcomes of Interest:	Earnings	Employment	Days Worked	Daily Wage
	(1)	(2)	(3)	(4)
Early Childcare Coverage Rate	5976.2**	0.15**	19.9***	25***
	(1775.8)	(0.06)	(19.5)	(4.3)
Z_{ct}	Yes	Yes	Yes	Yes
X_{it}	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes
N	616,692	616,692	616,692	326,717

Panel B: Fathers

Outcomes of Interest:	Earnings	Employment	Days Worked	Daily Wage
	(1)	(2)	(3)	(4)
Early Childcare Coverage Rate	-106.0	-0.03**	-16.7**	5.3
	(2591.5)	(0.02)	(7.3)	(7.0)
Z_{ct}	Yes	Yes	Yes	Yes
X_{it}	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes
N	532,833	532,833	532,833	532,833

Note. The table presents the estimates for the impact of early childcare increase on parents' labor market outcomes. These estimates are obtained from the regression equation (2). N is the number of individuals in the sample. The outcomes are measured for three years after birth. Standard errors are clustered at the county level and are reported in parentheses (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). The regressions are weighted using the population size of each county in the year 2007.

Table 2: The Effects of Early Childcare Increase on Fathers' Parental Leave Take-up

Outcomes of Interest:	Paternity Leave Take-up	Days of Leave	Leave 1 Year After Childbirth	Take Leave When Mothers Return to Work
	(1)	(2)	(3)	(4)
Coverage Rate	0.11***	19.95***	0.23*	0.32*
	(0.05)	(8.39)	(0.14)	(0.19)
X_{ct}	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes
N	269,972	269,972	269,972	269,972

Notes. The table presents the estimates for the impact of early childcare expansion on fathers' parental leave take-up outcomes. These estimates are obtained from the regression equation (2), where the dependent variable is the average value of each outcome at the county-year level (Y_{ct}). The variable "Leave 1 Year After Childbirth" is an indicator equal to 1 if fathers take leave between 360 and 420 days after childbirth, and 0 if not. The variable "Take Leave When Mothers Return to Work" is an indicator equal to 1 if fathers take leave when mothers return to work within a $\pm$ 14-day window, and 0 if not. Standard errors are clustered at the county level and are reported in parentheses (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). The regressions are weighted using the population size of each county in the year 2007.

Table 3: Heterogeneity of Effects for Maternal Labor Supply (by Household Type)

Panel A: Mothers Employment

Outcomes of Interest:	Employment (Dual Earner)	Employment (Female Breadwinner)	Employment (Male Breadwinner)
Early Childcare Coverage Rate	0.12*	0.08	0.18***
	(0.066)	(0.072)	(0.046)
N	106,120	131,580	364,383

Panel B: Mothers Earnings

Outcomes of Interest:	Earnings (Dual Earner)	Earnings (Female Breadwinner)	Earnings (Male Breadwinner)
Early Childcare Coverage Rate	6,860*	13,766*	3,734
	(3,498)	(5,510)	(3,103)
N	106,120	131,580	364,383

Panel C: Fathers Days Worked

Outcomes of Interest:	Days Worked (Dual Earner)	Days Worked (Female Breadwinner)	Days Worked (Male Breadwinner)
Early Childcare Coverage Rate	-32.34**	-45.46*	-6.11
	(15.63)	(19.33)	(10.76)
N	133,000	106,601	185,958

Panel D: Fathers Parental Leave

Outcomes of Interest:	Take-Up (Dual Earner)	Take-Up (Female Breadwinner)	Take-Up (Male Breadwinner)
Early Childcare Coverage Rate	0.16**	0.16*	0.09
	(0.08)	(0.09)	(0.08)
N	133,000	106,601	185,958

Note. The table presents the estimates for the impact of early childcare increase on mothers' employment probability. These estimates are obtained from the regression equation (2). The three household types are based on within-couples earnings differentials pre birth. N is the number of individuals in the sample. Standard errors are clustered at the county level and are reported in parentheses (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). The regressions are weighted using the population size of each county in the year 2007. In all estimations we control for Z_{ct}, X_{it} , Year FE, and County FE.

Table 4: Robustness of Main Results (Days Worked)

Estimator:	TWFE	Callaway and Sant'Anna	Sun and Abrahams
	(1)	(2)	(3)
5% Expansion	-5.34 ***	-5.23 ***	-3.89***
	(0.6804)	(0.6074)	(0.6588)
Year FE	Yes	Yes	Yes
County FE	Yes	Yes	Yes
N	532,833	532,833	532,833

Note. The treatment variable is transformed to a binary indicator to successfully apply the estimators of Callaway and Sant'Anna (2021) and Sun and Abraham (2021). Treated individuals live in counties with a five percent expansion shock when their child is under three years old. The outcome is days worked within the first three years after birth. N is the number of individuals in the sample. Standard errors are clustered at the county level. Additionally, for (2) the option "long2" is used. Standard errors are reported in parentheses (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$).

Table 5: Sensitivity of Effects of Early Childcare Expansion on Fathers' Labor Market Outcomes

Panel B: Fathers

Outcomes of Interest:	Earnings	Earnings	Employment	Employment	Days Worked	Days Worked	Daily Wage	Daily Wage
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Early Childcare Coverage Rate	-106.0	2509	-0.03**	-0.006	-16.7**	-11.52*	5.3	9.2
	(2591.5)	(2403)	(0.02)	(0.006)	(7.3)	(4.6)	(7.0)	(6.3)
Z_{ct}	Yes	No	Yes	No	Yes	No	Yes	No
X_{it}	Yes	No	Yes	No	Yes	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	532,833	532,833	532,833	532,833	532,833	532,833	532,833	532,833

Note. The table presents the estimates for the impact of early childcare increase on parents' labor market outcomes. These estimates are obtained from the regression equation (2). N is the number of individuals in the sample. The outcomes are measured for three years after birth. Standard errors are clustered at the county level and are reported in parentheses (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). The regressions are weighted using the population size of each county in the year 2007.

Table 6: Sensitivity of Effects of Early Childcare Increase on Fathers' Parental Leave Take-up

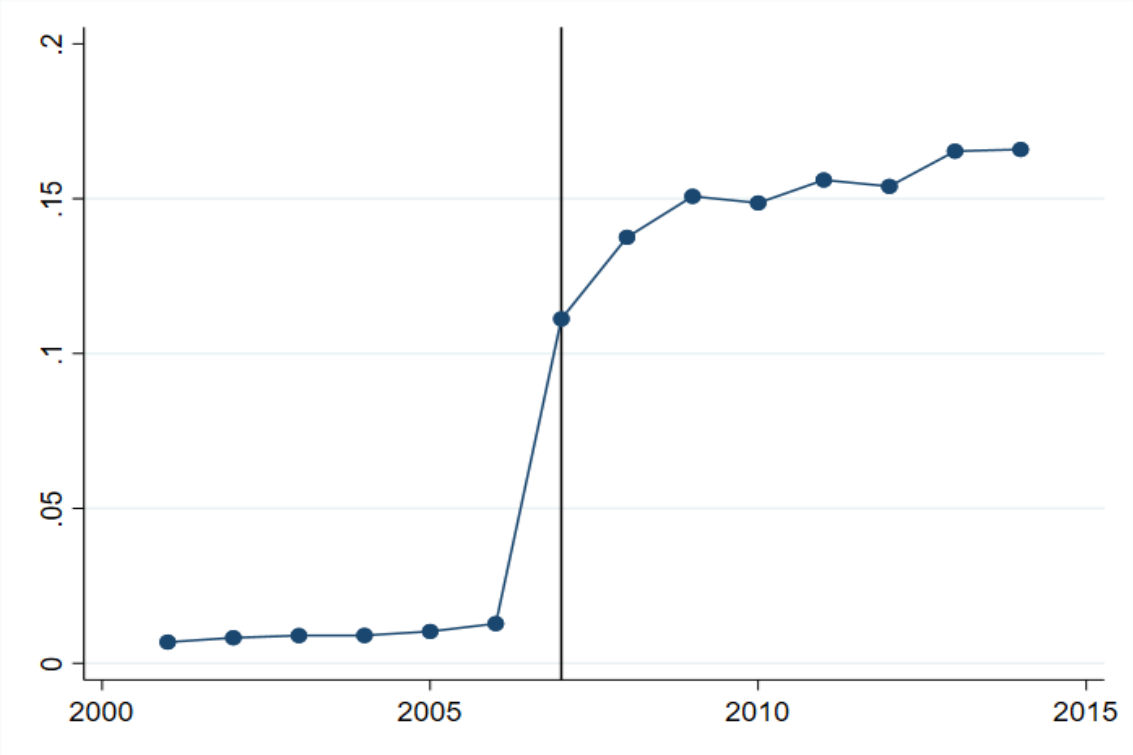
Outcomes of Interest:	Paternity Leave (1)	Paternity Leave (2)	Days of Leave (3)	Days of Leave (4)
Coverage Rate	0.11***	0.12***	19.95***	14.7*
	(0.05)	(0.05)	(8.39)	(6.5)
Z_{ct}	Yes	No	Yes	No
X_{ct}	Yes	No	Yes	No
Year FE	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes
N	296,972	399,168	296,972	399,168

Notes. The table presents the estimates for the impact of early childcare expansion on fathers' parental leave take-up outcomes. These estimates are obtained from the regression equation (2), where the dependent variable is the average value of each outcome at the county-year level (Y_{ct}). Columns (1) and (3) include all control variables. Standard errors are clustered at the county level and are reported in parentheses (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). The regressions are weighted using the population size of each county in the year 2007.

Appendix

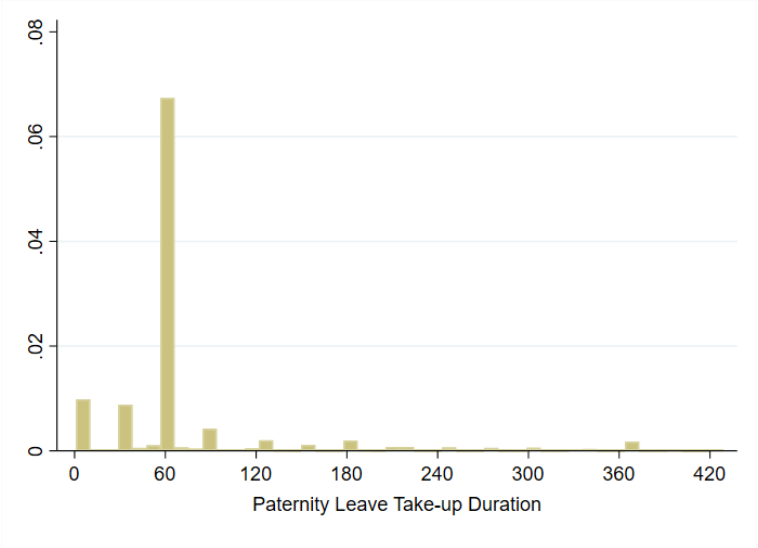
Appendix Section 1

Figure A.1: Paternity Leave Take-up Ratio in West Germany



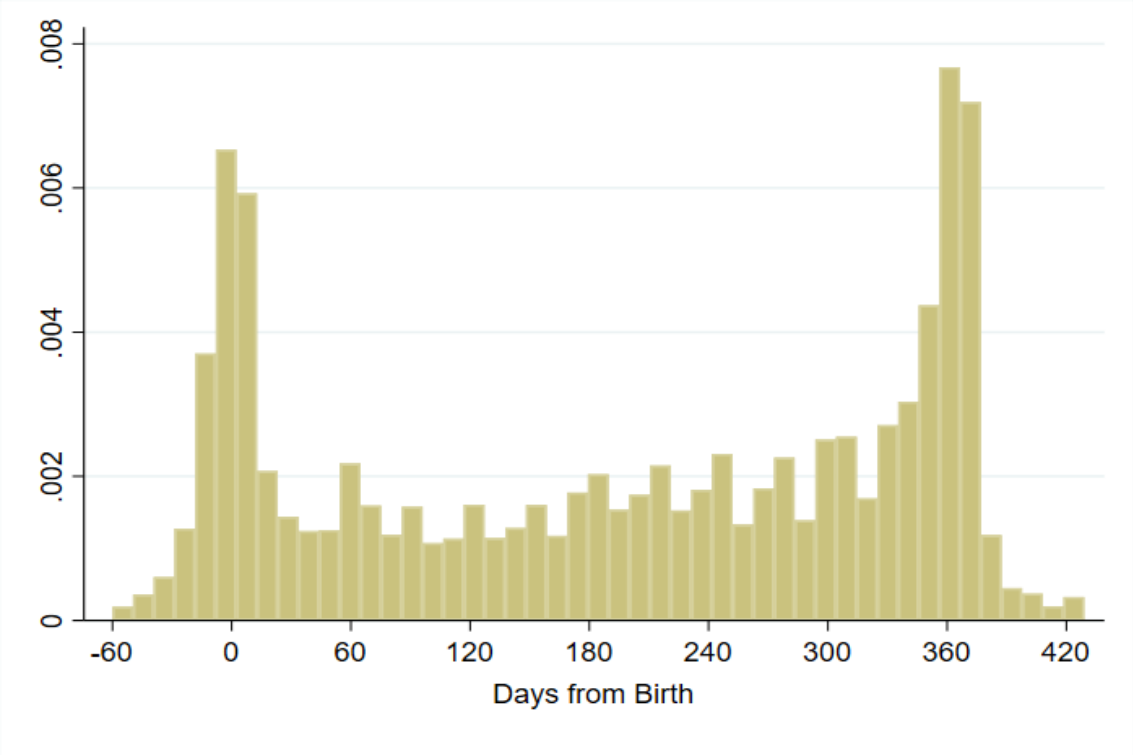
Note. The figure shows the percentage of fathers who take parental leave in West Germany. This percentage represents the proportion of fathers who took parental leave among those who had their first child in each year. The sample of fathers used in this analysis consists of individuals identified as fathers in the administrative data through the married couple identification method, as detailed in Section 3. Specifically, these fathers correspond to approximately one-third of the husbands of mothers who were identified as having their first child between 2001 and 2014 in the German administrative data.

Figure A.2: Duration of Paternity Leave



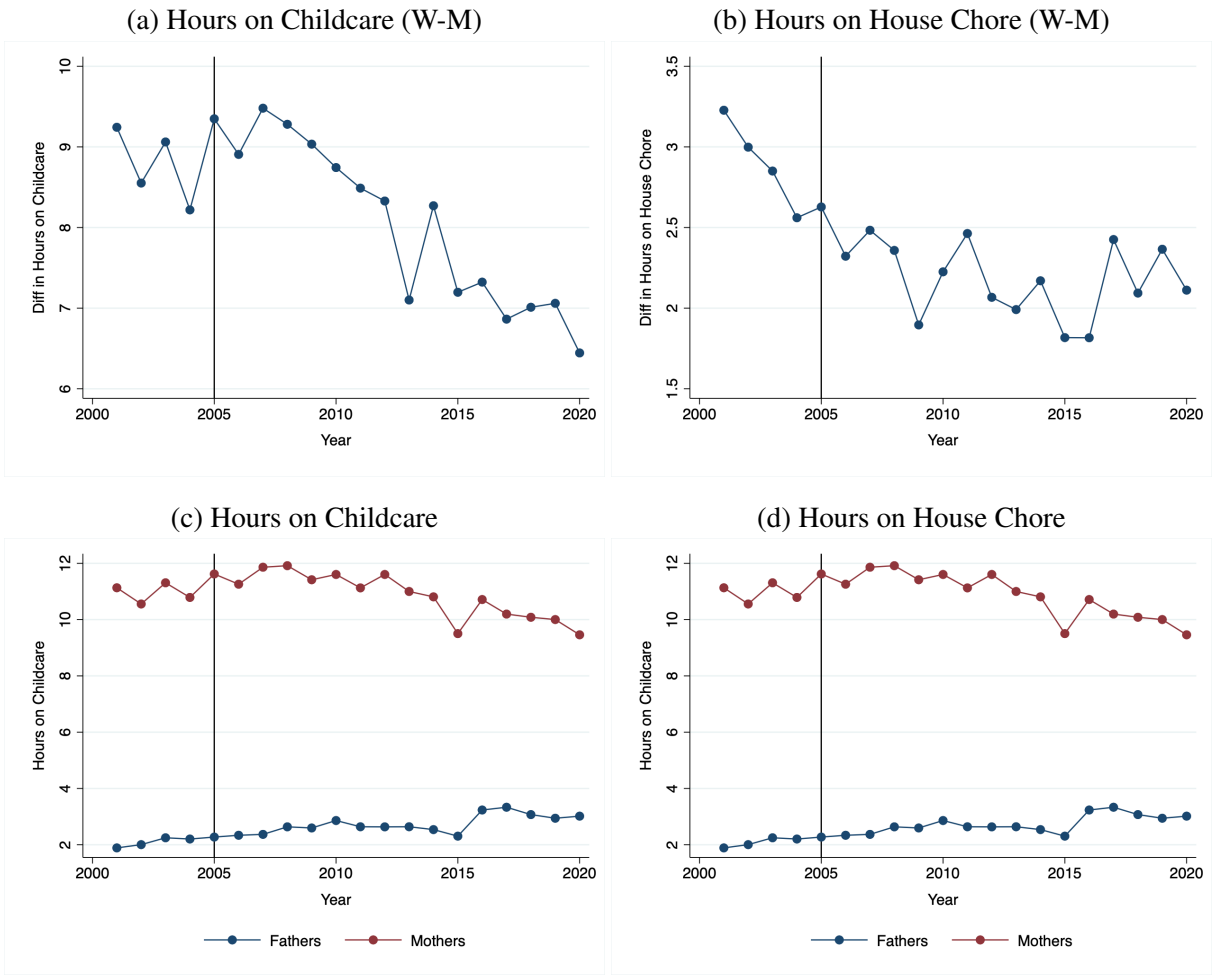
Note. The figure illustrates the duration of paternal leave taken by fathers in West Germany. In Germany, two months of paid parental leave are exclusively reserved for fathers. The result presented in this figure indicates that fathers predominantly make use of only these two months of leave allocated for them. The sample of fathers used in this analysis consists of individuals identified as fathers in the administrative data through the married couple identification method, as detailed in Section 3. Specifically, these fathers correspond to approximately one-third of the husbands of mothers who were identified as having their first child between 2001 and 2014 in the German administrative data.

Figure A.3: When to Take Paternity Leave



Note. The figure displays the timing of fathers' parental leave take-up in relation to the expected date of their child's birth. The result depicted in this figure indicates that fathers predominantly take parental leave either immediately after childbirth or one year following the birth. The sample of fathers used for this analysis comprises individuals identified as fathers in the administrative data using the married couple identification method, as explained in Section 3. To be specific, these fathers represent approximately one-third of the husbands of mothers identified as having their first child between 2001 and 2014 in the German administrative data.

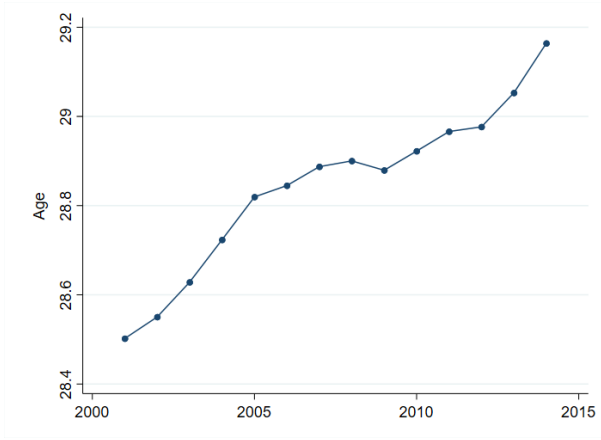
Figure A.4: Gender Gap in Earnings and Hours Spent on Childcare and House Chore



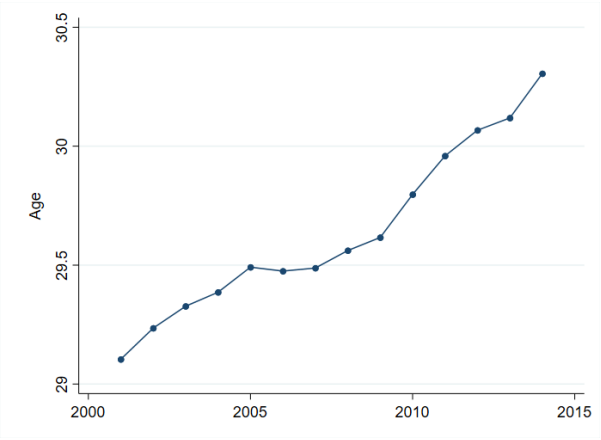
Note. This figure shows gender gap in hours spend on childcare and house chores. Panels (a) and (b) depict the calculated difference in hours and panels (c) and (d) the raw hours. Source: Own calculations based on SOEP data from years 2000 to 2020.

Appendix Section 2

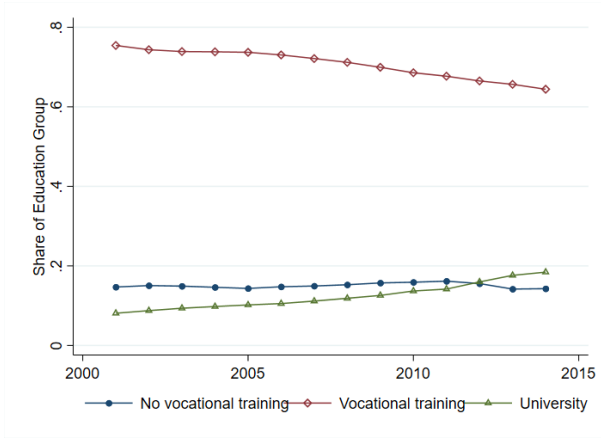
Figure A.5: Consistency Check of Mothers



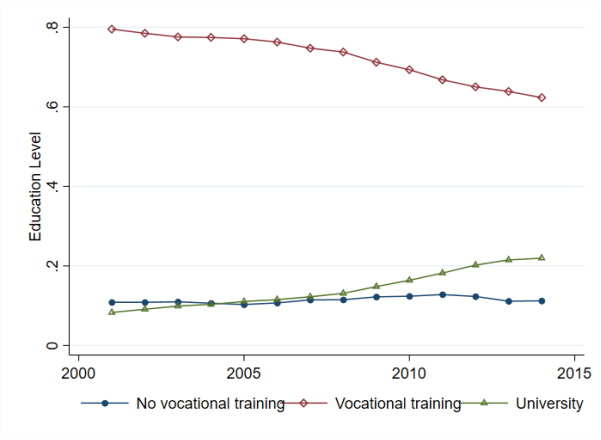
(a) Age



(b) Age



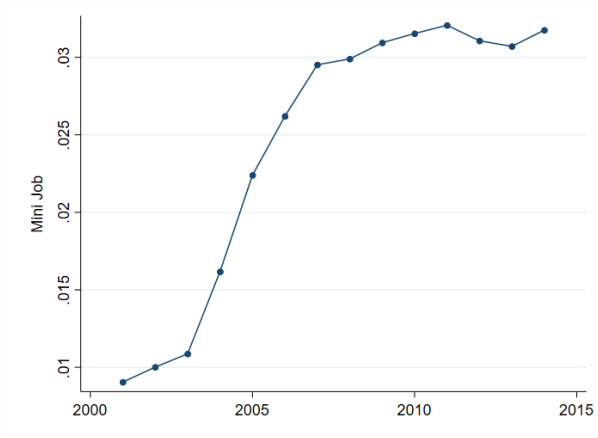
(c) Education Level



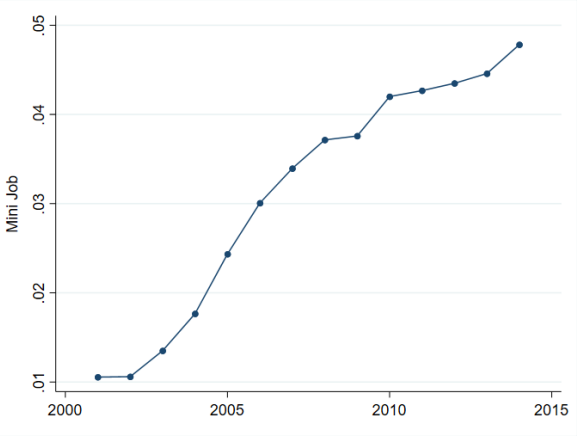
(d) Education Level

Note. Comparing age and educational attainment in the sample of mothers that can be matched to a spouse through the couples identification and those that cannot be matched.

Figure A.6: Consistency Check of Mothers



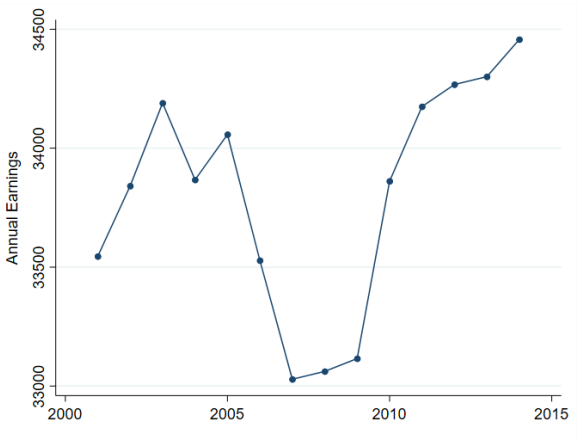
(a) Mini Job



(b) Mini Job



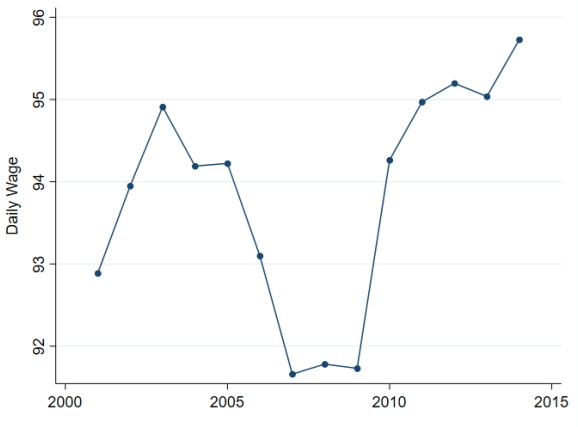
(c) Annual Earnings



(d) Annual Earnings



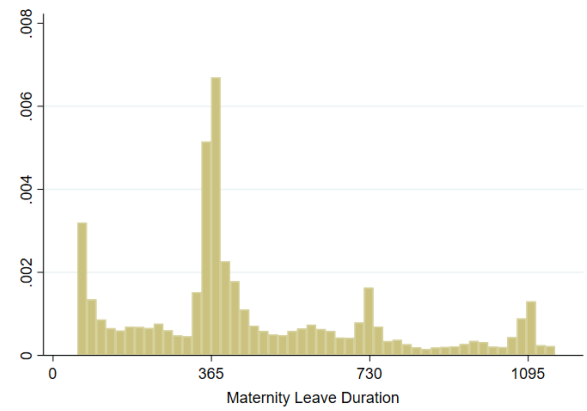
(e) Daily Wage



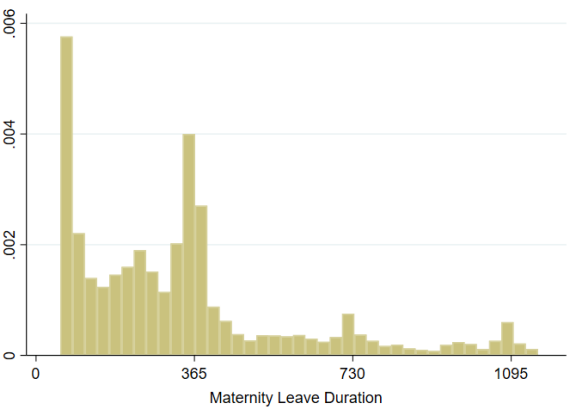
(f) Daily Wage

Note. Comparing minijob take-up, annual earnings and daily wages in the sample of mothers that can be matched to a spouse through the couples identification and those that cannot be matched.

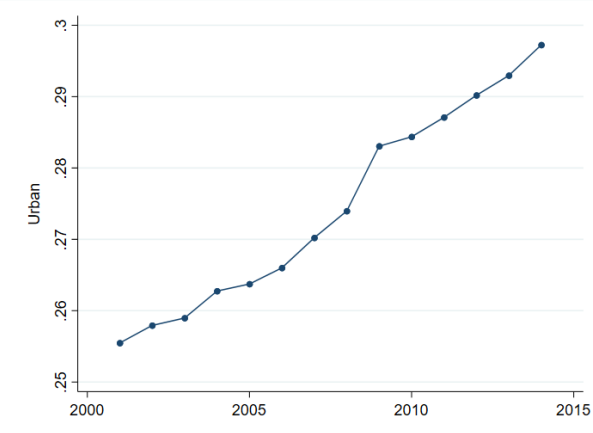
Figure A.7: Consistency Check of Mothers



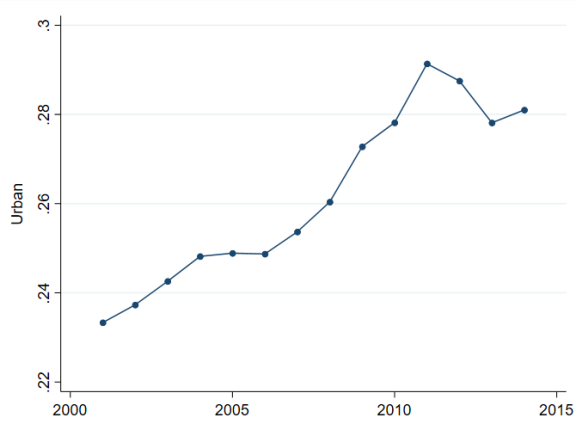
(a) Maternity Leave Duration



(b) Maternity Leave Duration



(c) Urban



(d) Urban

wo_bula	Freq.	Percent	Cum.
1	53,537	4.16	4.16
2	46,042	3.58	7.73
3	145,778	11.32	19.06
4	11,659	0.91	19.96
5	320,173	24.87	44.83
6	122,506	9.51	54.34
7	72,842	5.66	60.00
8	217,886	16.92	76.92
9	280,327	21.77	98.69
10	16,853	1.31	100.00
Total	1,287,603	100.00	

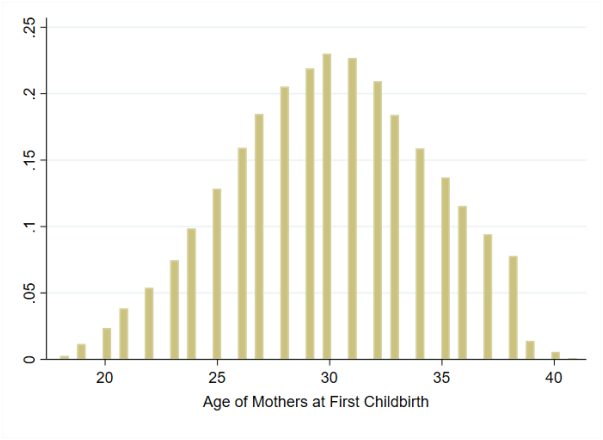
(e) State

wo_bula	Freq.	Percent	Cum.
1	7,091	3.64	3.64
2	6,171	3.17	6.81
3	21,037	10.81	17.63
4	1,578	0.81	18.44
5	50,572	25.99	44.42
6	17,810	9.15	53.58
7	10,486	5.39	58.96
8	35,463	18.22	77.19
9	42,130	21.65	98.84
10	2,265	1.16	100.00
Total	194,603	100.00	

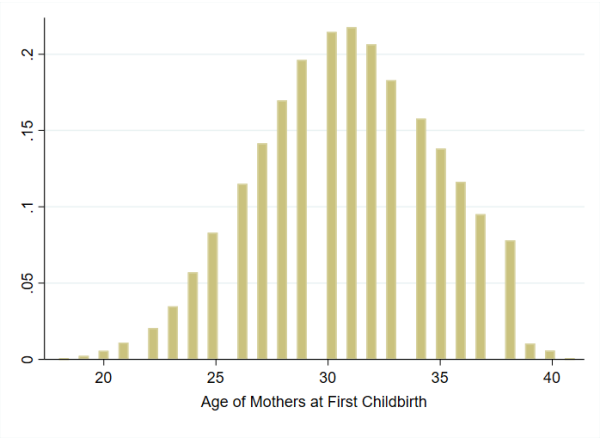
(f) State

Note. Comparing maternity leave duration, urban status and state in the sample of mothers that can be matched to a spouse through the couples identification and those that cannot be matched.

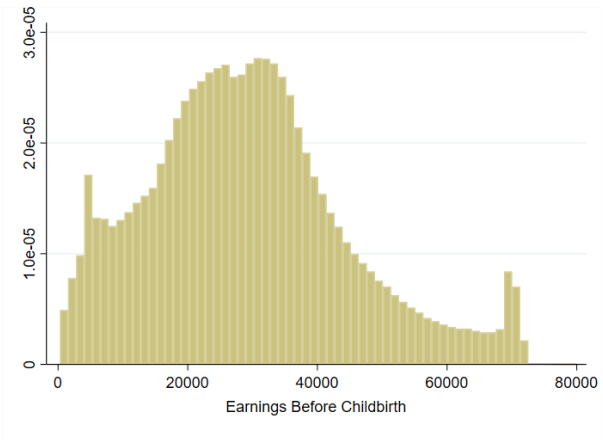
Figure A.8: Consistency Check of Mothers



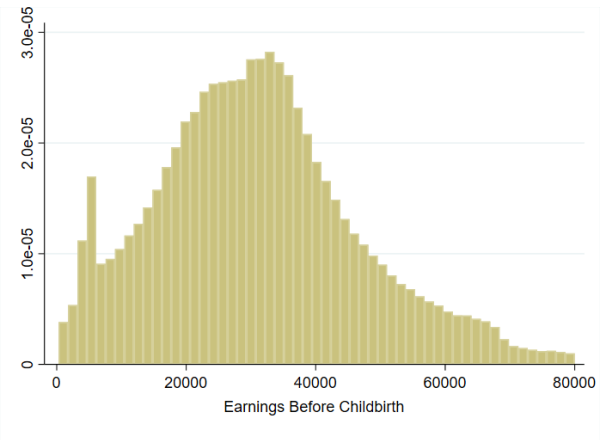
(a) Age Distribution at Birth



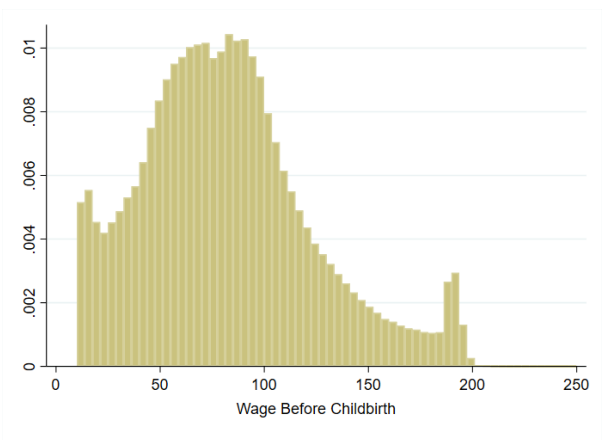
(b) Age Distribution at Birth



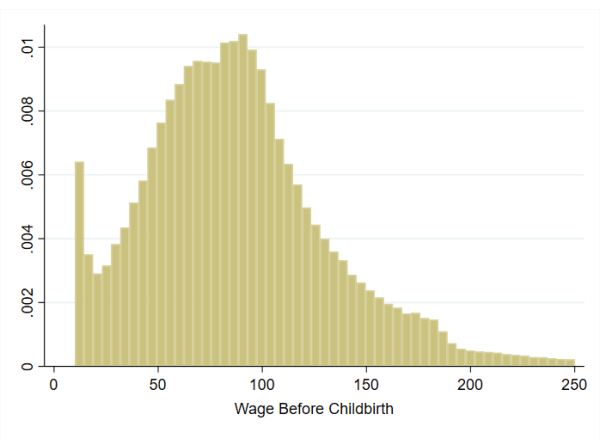
(c) Earnings for Two Years Before Birth



(d) Earnings for Two Years Before Birth



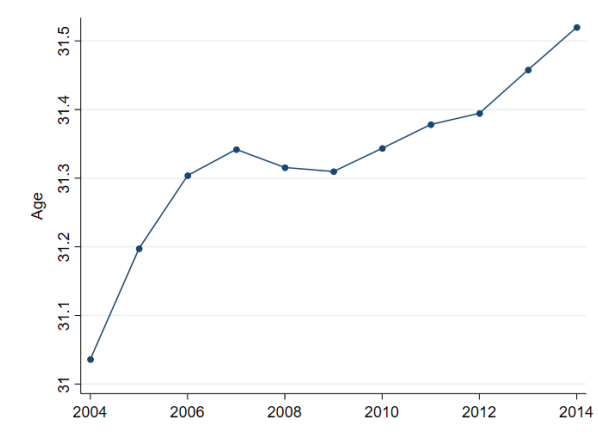
(e) Wage Level for Two Years Before Birth



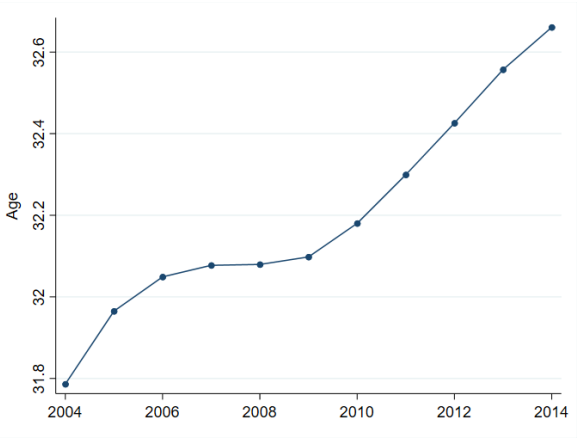
(f) Wage Level for Two Years Before Birth

Note. Comparing age, earnings and wages in the sample of mothers that can be matched to a spouse through the couples identification and those that cannot be matched.

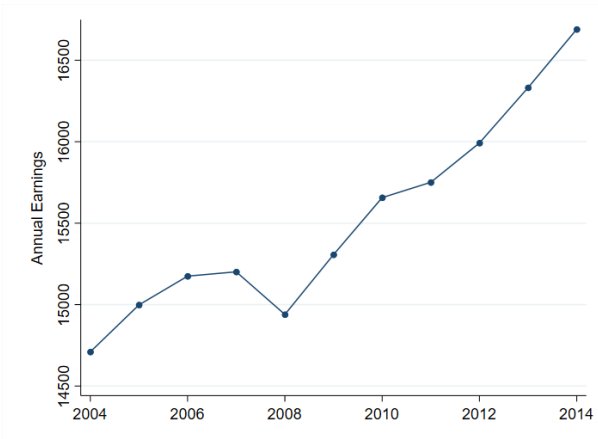
Figure A.9: Consistency Check of Mothers - during 0-3 years after childbirth



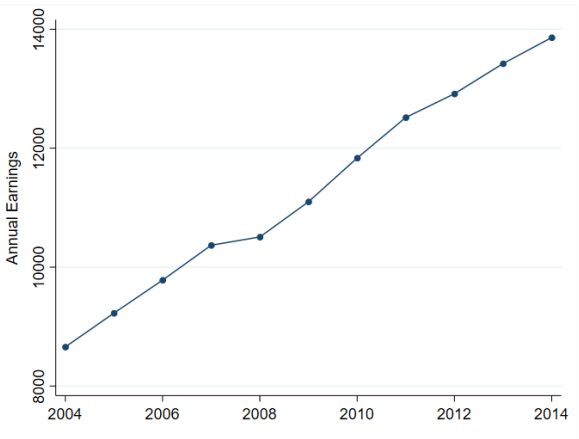
(a) Age



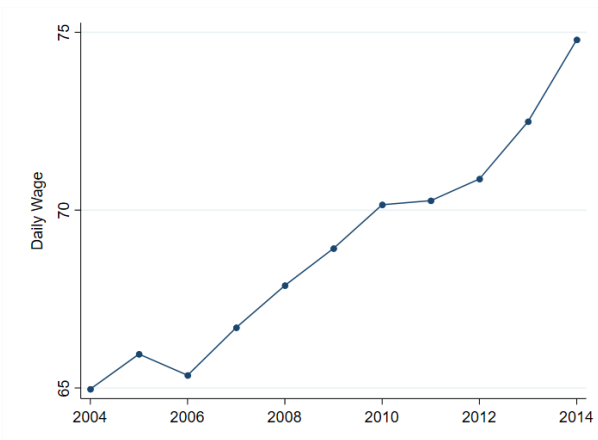
(b) Age



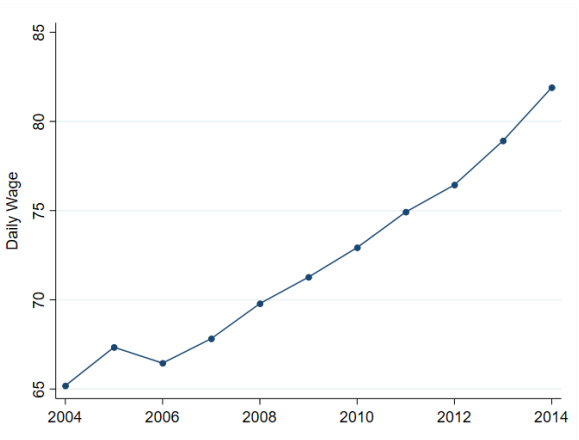
(c) Annual Earnings



(d) Annual Earnings



(e) Daily Wages



(f) Daily Wages

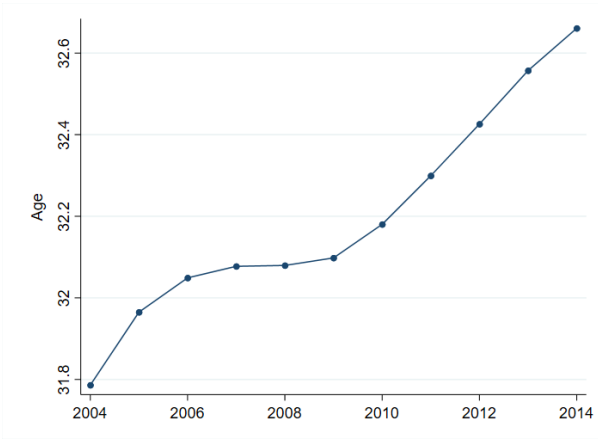
Note. Comparing age, earnings and wages in the sample of mothers that can be matched to a spouse through the couples identification and those that cannot be matched.

Appendix Section 3

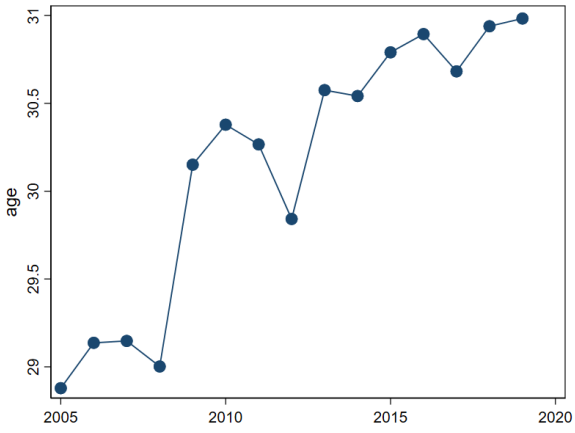
Comparison of Mothers between IEB Couples Sample and Microcensus

- IEB Couples Sample
  - Among mothers identified to have had their first child between 2001-2014, those who are identified as married couples between 2001-2014 (sharing surname and street address, age difference is below 15)
  - Those identified as couples within 3 years after childbirth
  - Those who are employed for one year before childbirth (both mothers and fathers)
- Microcensus sample
  - Families with children born between 2012-2014
  - Have a child under three years in household at year of interview
  - Mother is between 18 and 40 years at birth
  - Both married and unmarried couples in data set
  - Yearly weights used for descriptives
- Values in following figures are mean values for those who had a child aged 0-3 in each calendar year between 2004-2014
- Figures 6-8 are for all mothers regardless of their employment status
- Figures 9-11 are for only mothers employed
- Figures 12-17 are for fathers

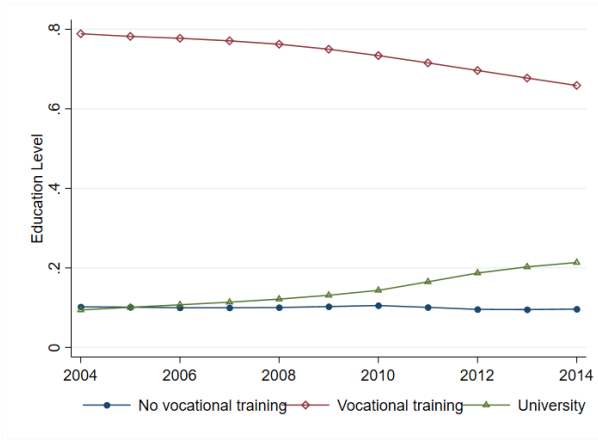
Figure A.10: Consistency Check of Mothers



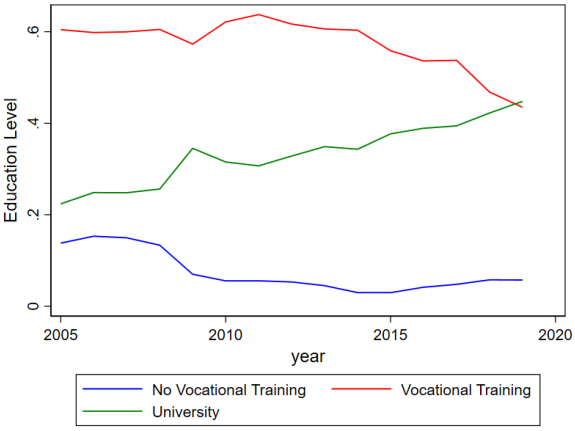
(a) Age



(b) Age



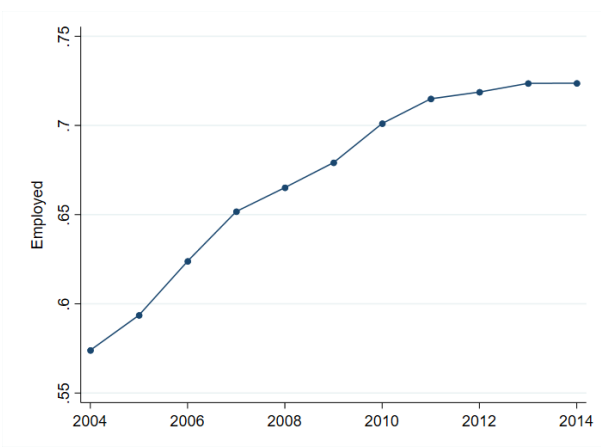
(c) Education



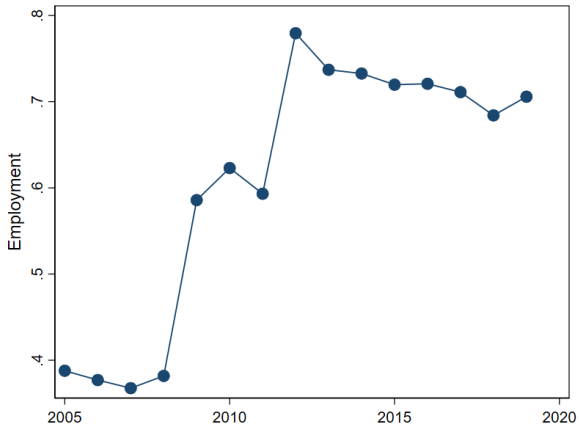
(d) Education

Note. Comparing mothers in the sample of mothers that can be matched to a spouse through the couples identification in IEB data with mothers from Microcensus.

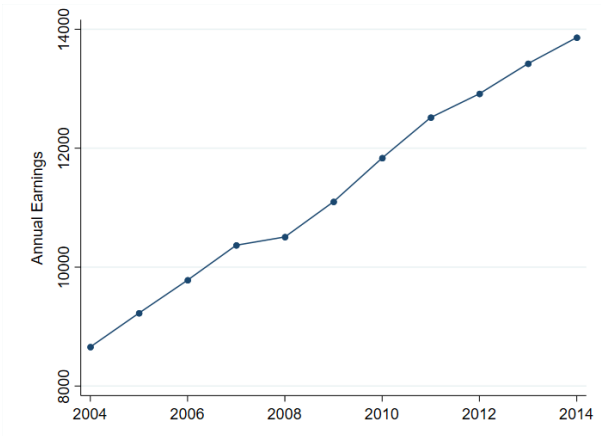
Figure A.11: Consistency Check of Mothers



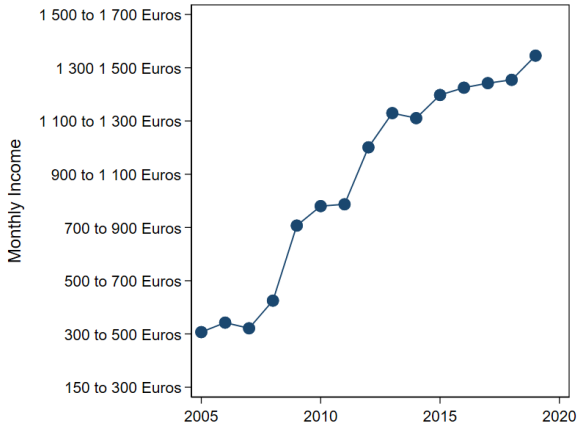
(a) Employment



(b) Employment



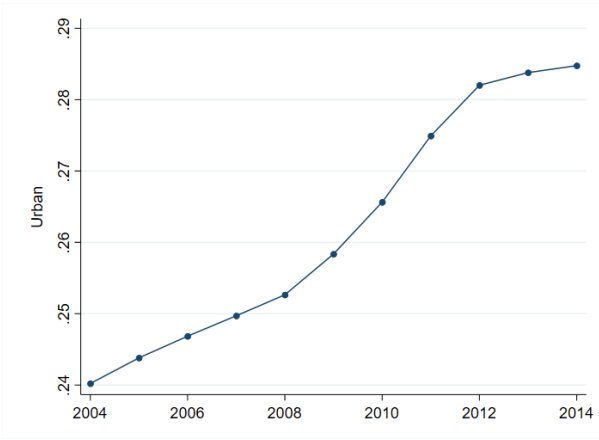
(c) Annual Earnings



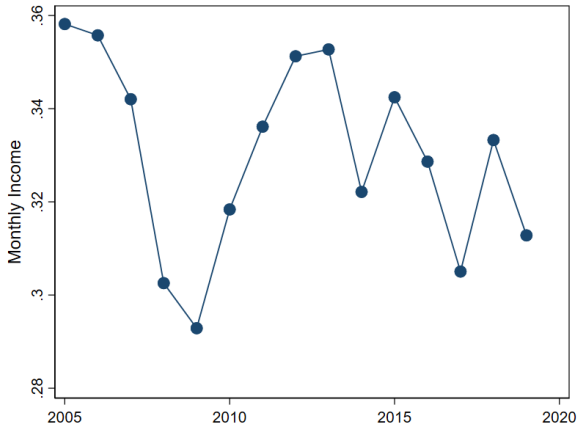
(d) Annual Earnings

Note. Comparing mothers in the sample of mothers that can be matched to a spouse through the couples identification in IEB data with mothers from Microcensus.

Figure A.12: Consistency Check of Mothers



(a) Urban



(b) Urban

wo_bula	Freq.	Percent	Cum.
1	7,091	3.64	3.64
2	6,171	3.17	6.81
3	21,037	10.81	17.63
4	1,578	0.81	18.44
5	50,572	25.99	44.42
6	17,810	9.15	53.58
7	10,486	5.39	58.96
8	35,463	18.22	77.19
9	42,130	21.65	98.84
10	2,265	1.16	100.00
Total	194,603	100.00	

(c) State

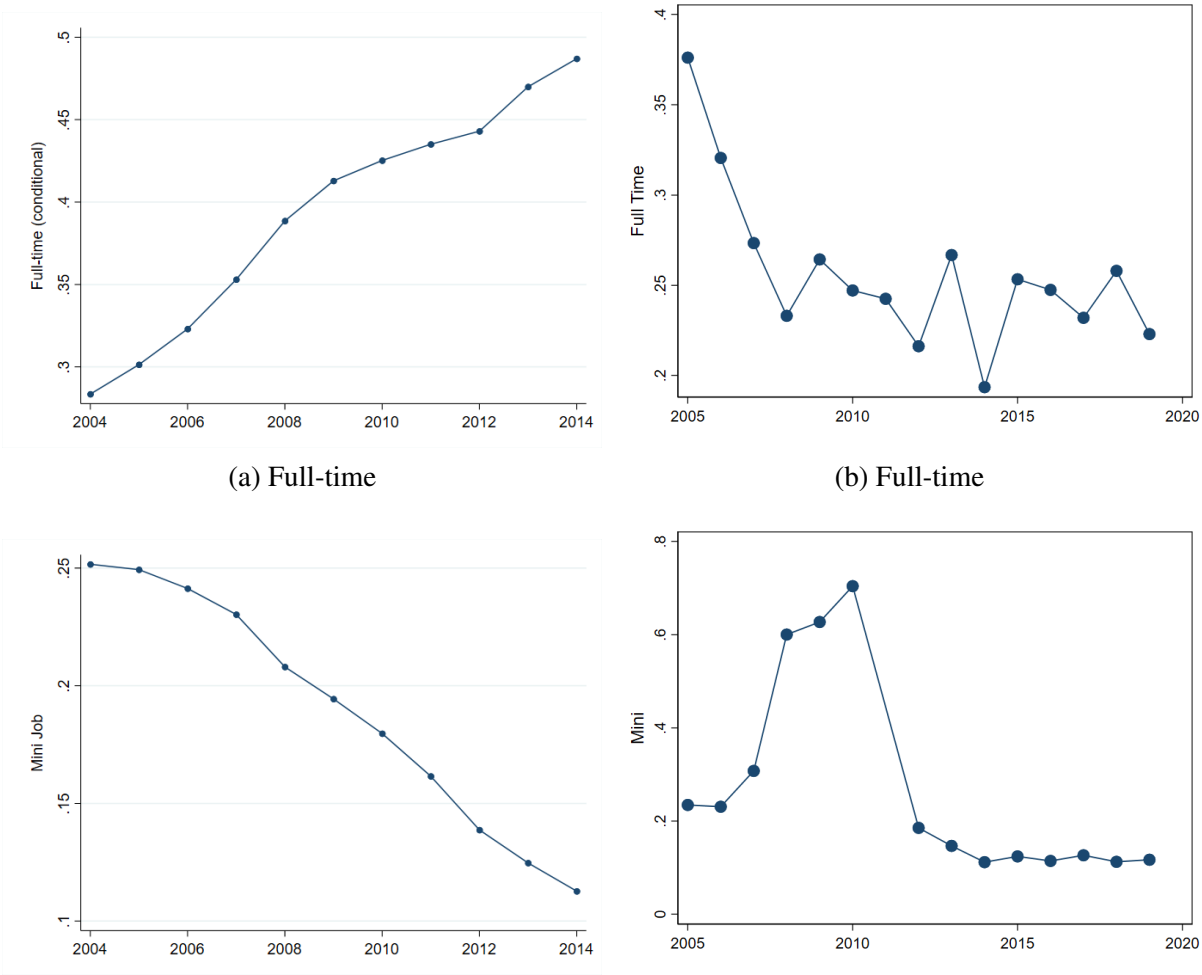
. tab bula

Bundesland	Freq.	Percent	Cum.
Baden-Wuerttemberg	1,819	5.90	5.90
Bayern	1,928	6.25	12.15
Berlin	3,209	10.40	22.55
Brandenburg	373	1.21	23.76
Bremen	6,215	20.15	43.90
Hamburg	2,636	8.54	52.45
Hessen	2,026	6.57	59.02
Mecklenburg-Vorpommern	4,617	14.97	73.98
Niedersachsen	6,540	21.20	95.18
Nordrhein-Westfalen	1,486	4.82	100.00
Total	30,849	100.00	

(d) State

Note. Comparing mothers in the sample of mothers that can be matched to a spouse through the couples identification in IEB data with mothers from Microcensus.

Figure A.13: Consistency Check of Mothers - conditional on being employed



(a) Full-time

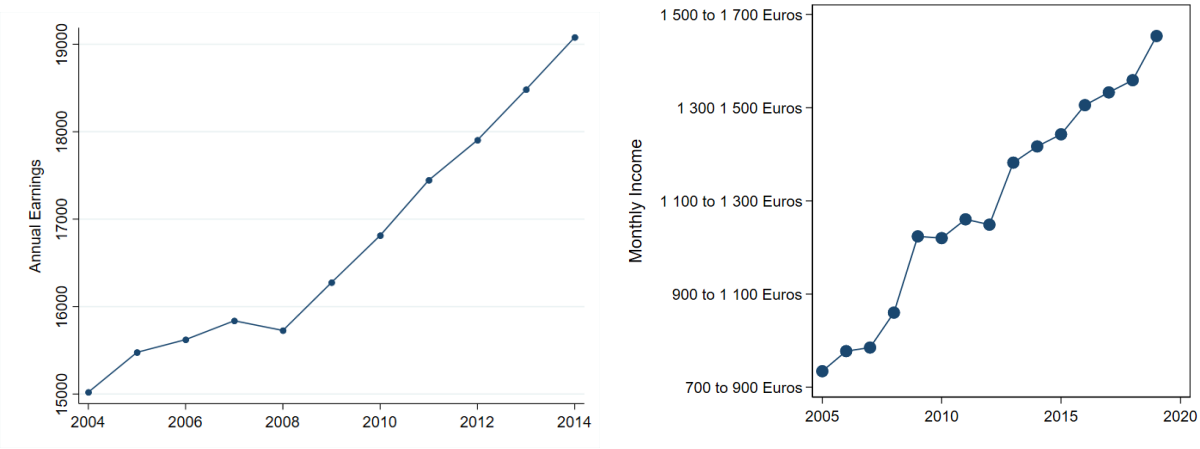
(b) Full-time

(c) Mini Job

(d) Mini Job

Note. Comparing mothers in the sample of mothers that can be matched to a spouse through the couples identification in IEB data with mothers from Microcensus.

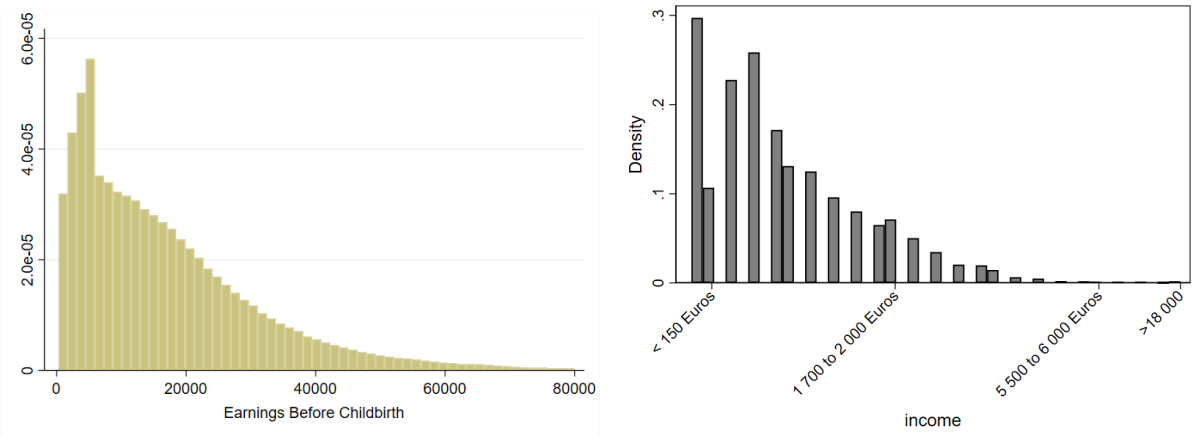
Figure A.14: Consistency Check of Mothers- conditional on being employed



(a) Annual Earnings (b) Annual Earnings

Note. Comparing mothers in the sample of mothers that can be matched to a spouse through the couples identification in IEB data with mothers from Microcensus.

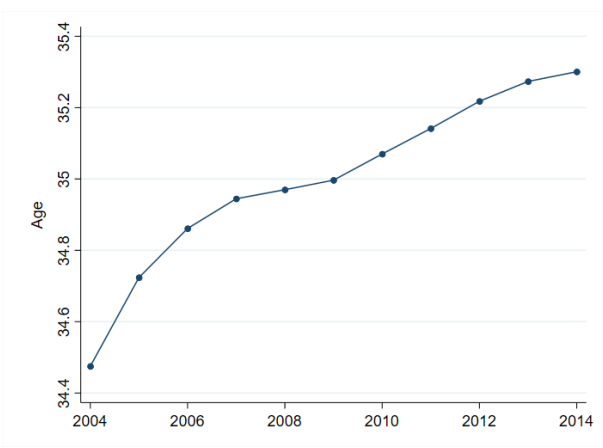
Figure A.15: Consistency Check of Mothers- conditional on being employed



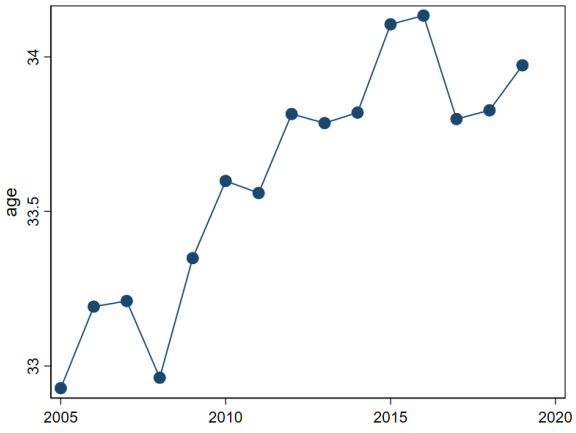
(a) Earnings Dist (b) Earnings Dist

Note. Distribution is drawn for mothers employed who had a child aged 0-3 between 2007-2014.

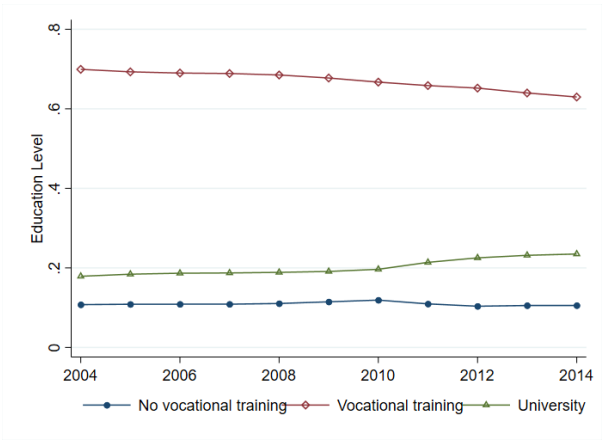
Figure A.16: Consistency Check of Fathers



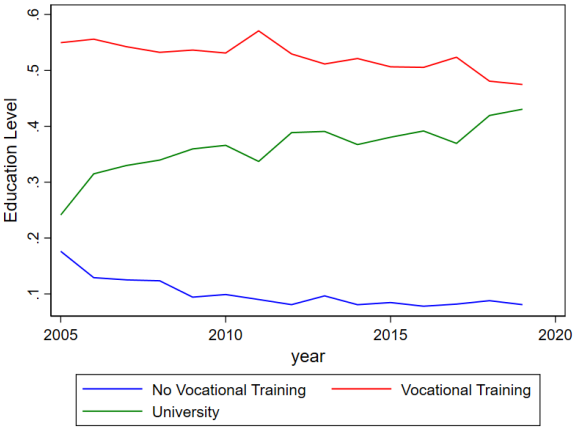
(a) Age



(b) Age



(c) Education



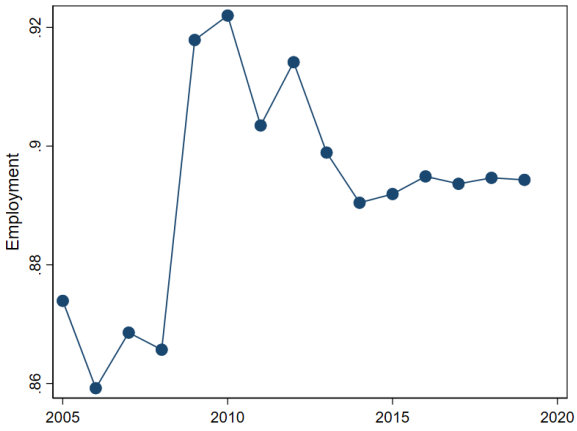
(d) Education

Note. Comparing fathers identified in IEB data with fathers from Microcensus.

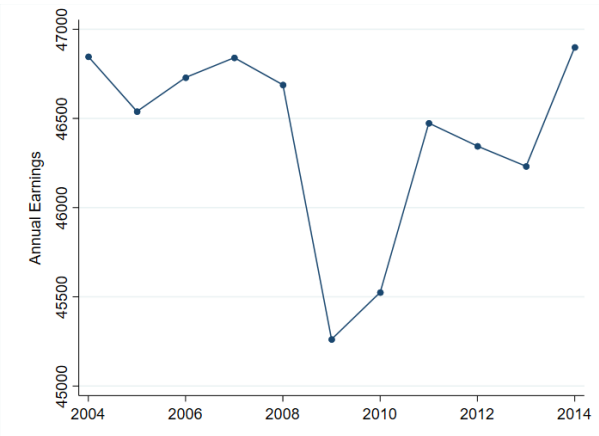
Figure A.17: Consistency Check of Fathers



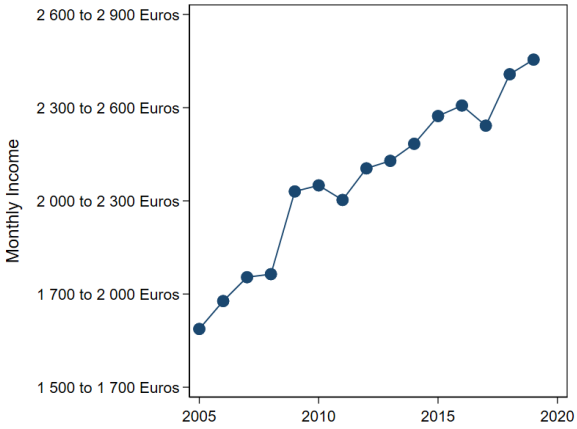
(a) Employment



(b) Employment



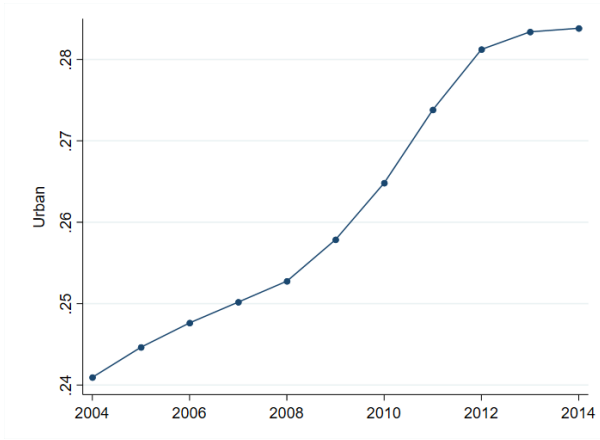
(c) Annual Earnings



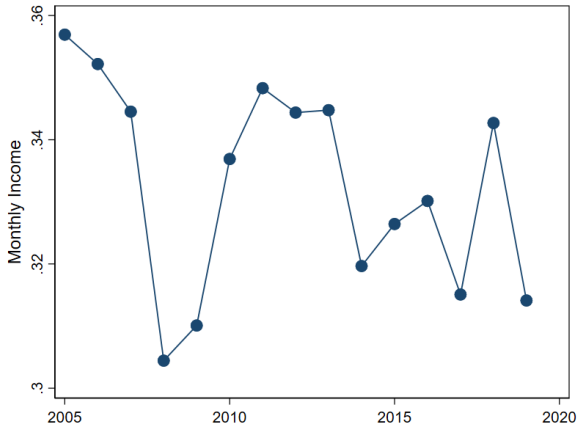
(d) Annual Earnings

Note. Comparing fathers identified in IEB data with fathers from Microcensus.

Figure A.18: Consistency Check of Fathers



(a) Urban



(b) Urban

wo_bula	Freq.	Percent	Cum.
1	7,091	3.64	3.64
2	6,171	3.17	6.81
3	21,037	10.81	17.63
4	1,578	0.81	18.44
5	50,572	25.99	44.42
6	17,810	9.15	53.58
7	10,486	5.39	58.96
8	35,463	18.22	77.19
9	42,130	21.65	98.84
10	2,265	1.16	100.00
Total	194,603	100.00	

(c) State

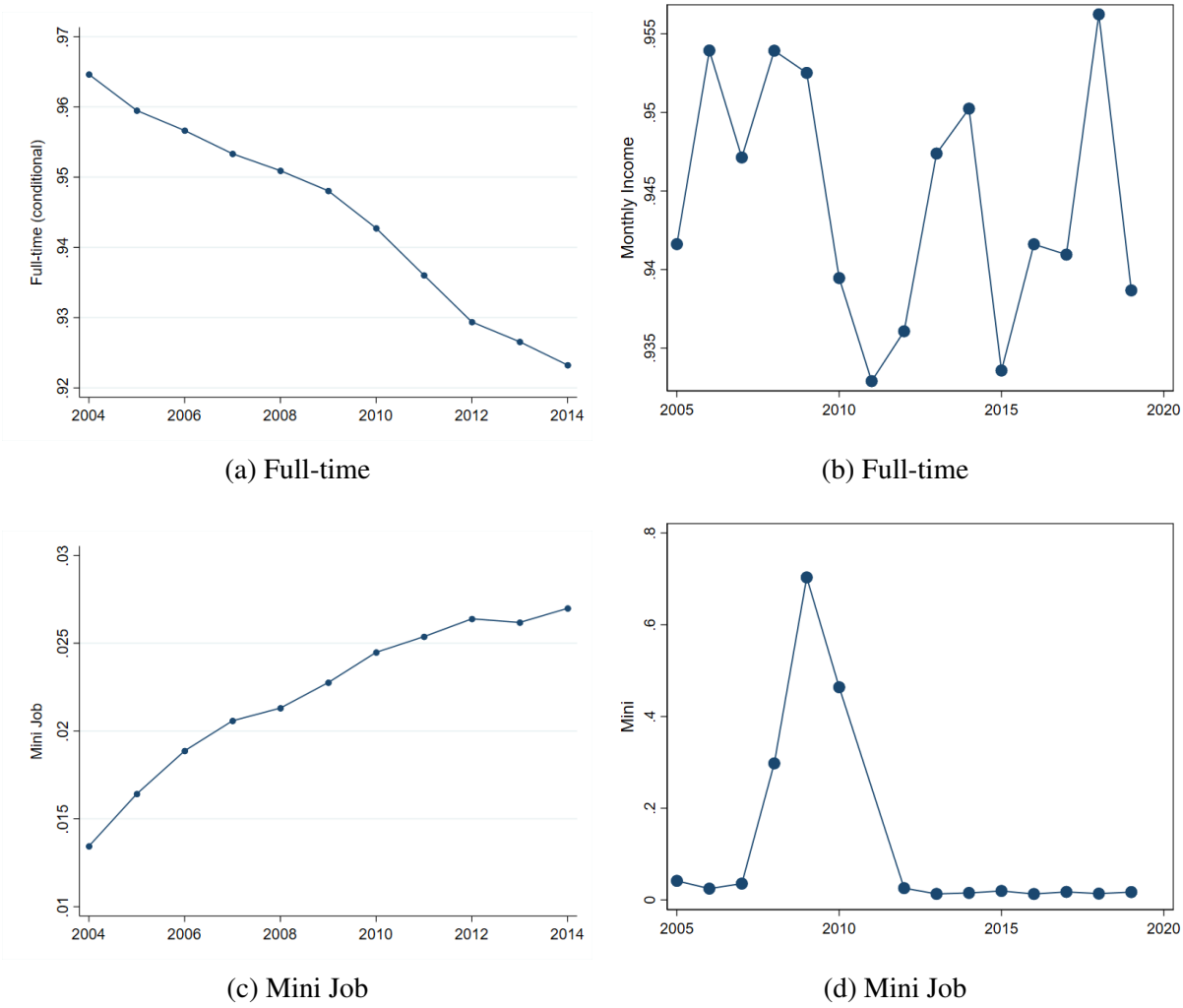
```
. tab bula
```

Bundesland	Freq.	Percent	Cum.
Baden-Wuerttemberg	1,819	5.90	5.90
Bayern	1,928	6.25	12.15
Berlin	3,209	10.40	22.55
Brandenburg	373	1.21	23.76
Bremen	6,215	20.15	43.90
Hamburg	2,636	8.54	52.45
Hessen	2,026	6.57	59.02
Mecklenburg-Vorpommern	4,617	14.97	73.98
Niedersachsen	6,540	21.20	95.18
Nordrhein-Westfalen	1,486	4.82	100.00
Total	30,849	100.00	

(d) State

Note. Comparing fathers identified in IEB data with fathers from Microcensus.

Figure A.19: Consistency Check of Fathers- conditional on being employed



(a) Full-time

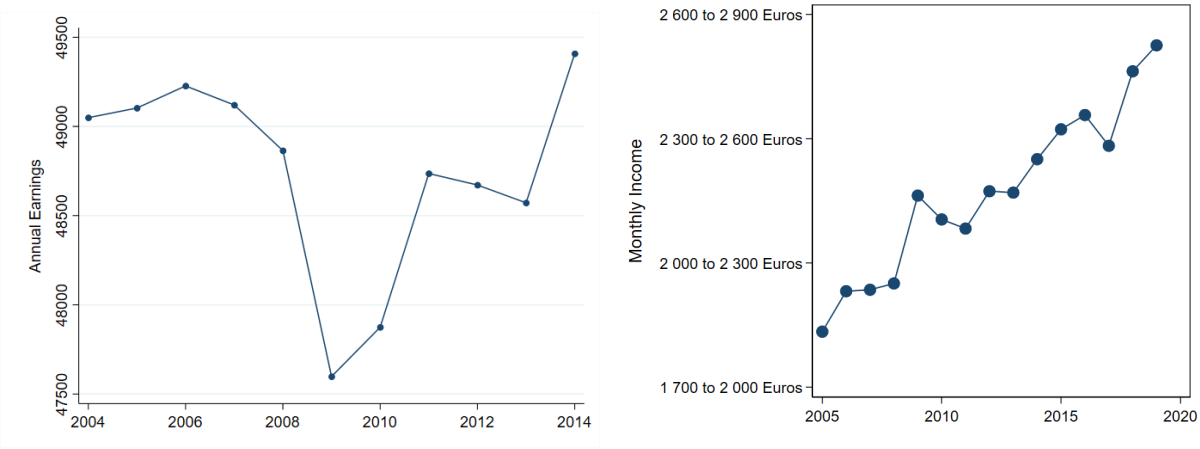
(b) Full-time

(c) Mini Job

(d) Mini Job

Note. Comparing fathers identified in IEB data with fathers from Microcensus.

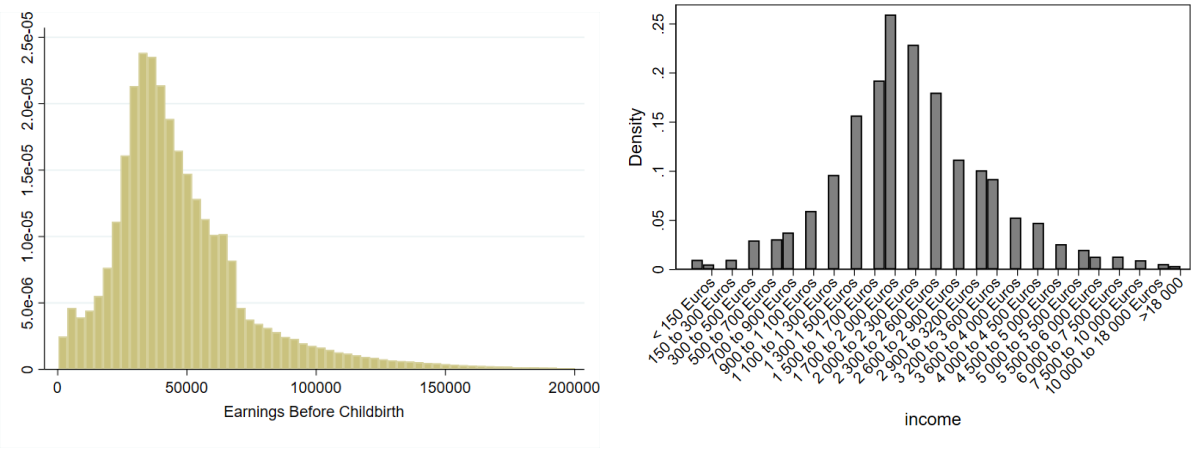
Figure A.20: Consistency Check of Fathers- conditional on being employed



(a) Annual Earnings (b) Annual Earnings

Note. Comparing fathers identified in IEB data with fathers from Microcensus.

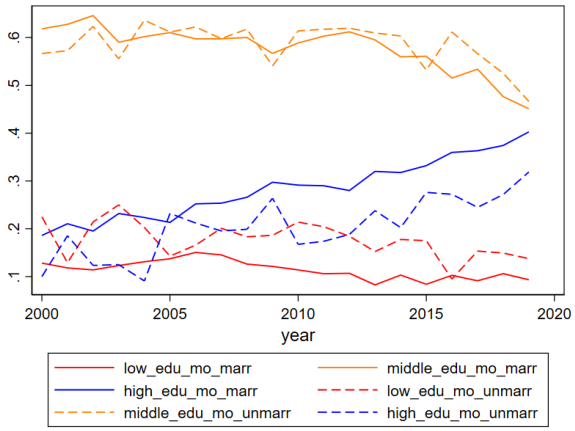
Figure A.21: Consistency Check of Fathers- conditional on being employed



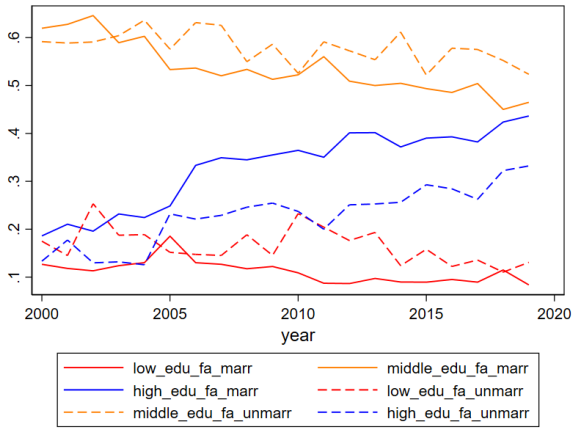
(a) Earnings Dist (b) Earnings Dist

Note. Comparing fathers identified in IEB data with fathers from Microcensus.

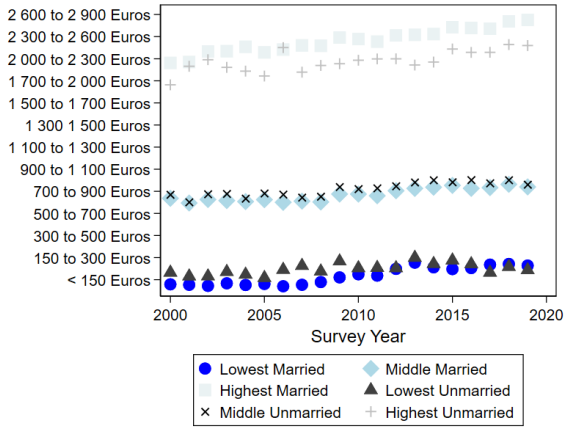
Figure A.22: Comparison graphs married and unmarried Mikrozensus



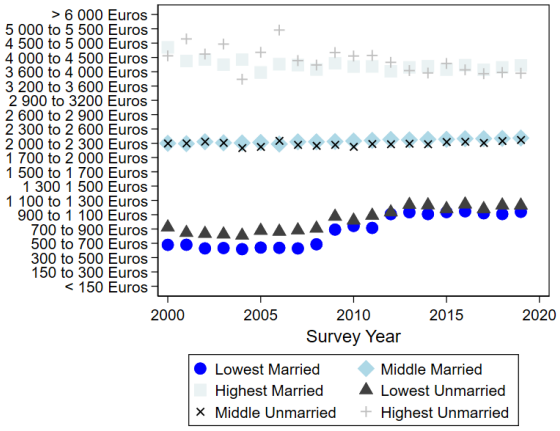
(a) Education Mothers



(b) Education Fathers



(c) Household Income Mothers



(d) Household Income Fathers

Note. Comparing married and unmarried couples in educational attainment and income.