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Does the right to work part-time affect mothers' labor market outcomes?

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Non-technical summary

Research Question

Part-time work regulations differ widely across countries. In recent decades, many OECD countries have passed laws to facilitate the transition from full-time to part-time employment. The perception is that the right to work part-time may help mothers reconcile work with caring for children. This paper studies how the statutory right to work part-time impacts the labor market outcomes of women after childbirth, both in the short run and in the longer run based on a legal change in Germany.

Contribution

The paper contributes to the literature that assesses the impact on maternal labor outcomes of policies designed to help families reconcile work and family life and reduce gender inequalities. Most of these studies analyze the effect of parental leave regulations or the effects of subsidized child care. The paper contributes to this literature by studying the impact of a different family-friendly policy: the right to work part-time. In contrast to the few existing studies on the labor market effects of the statutory right to work part-time, this paper focuses on the group of mothers after birth. The paper provides evidence whether these mothers actually made use of the new right and how this affected maternal longer-run labor market outcomes.

Results

The results show that the law was effective in granting access to part-time work to mothers: part-time employment increased in the short run. In the longer run, the law had a positive effect on maternal employment and labor earnings. Where does the positive labor income effect come from? First, mothers with the right to work part-time were less likely to change the employer so that firm-specific human capital might be retained. Secondly, the reform has increased the level of qualification required in the job of eligible mothers. The combination of the increase in part-time employment and the increase in earnings of eligible mothers is of key importance for policy as it suggests that the reform was not only effective in increasing the flexility of time of mothers after birth and but at the same time might have been helpful in reducing the child penalty that women are facing in the labor market.

Nichttechnische Zusammenfassung

Fragestellung

Die Regelungen zur Teilzeitarbeit sind von Land zu Land sehr unterschiedlich. In den letzten Jahrzehnten haben viele OECD-Länder Gesetze erlassen, um den Übergang von der Vollzeit- zur Teilzeitbeschäftigung zu erleichtern. Die Annahme ist, dass das Recht auf Teilzeitarbeit Müttern dabei helfen kann, Arbeit und Kinderbetreuung miteinander zu vereinbaren. In dieser Studie wird auf der Grundlage einer Gesetzesänderung in Deutschland untersucht, wie sich das gesetzliche Recht auf Teilzeitarbeit auf die Arbeitsmarktergebnisse von Frauen nach der Geburt eines Kindes auswirkt, und zwar sowohl auf kurze als auch auf längere Sicht.

Beitrag

Das Papier leistet einen Beitrag zur Literatur, die die Auswirkungen politischer Maßnahmen zur Vereinbarkeit von Beruf und Familie und zum Abbau geschlechtsspezifischer Ungleichheiten auf die Arbeitsmarktergebnisse von Müttern untersucht. Die meisten dieser Studien analysieren die Auswirkungen von Elternzeitregelungen oder von subventionierter Kinderbetreuung. Die Studie trägt zu dieser Literatur bei, indem sie die Auswirkungen einer anderen familienfreundlichen Politikmaßnahme untersucht: das Recht auf Teilzeitarbeit. Im Gegensatz zu den wenigen bereits existierenden Studien zu den Arbeitsmarkteffekten des Rechts auf Teilzeitarbeit, konzentriert sich dieses Papier auf die Gruppe der Mütter nach einer Geburt. Das Papier analysiert, ob diese Mütter das neue Recht tatsächlich in Anspruch genommen haben und wie sich dies auf die längerfristigen Arbeitsmarktergebnisse von Müttern ausgewirkt hat.

Ergebnisse

Die Ergebnisse zeigen, dass das Gesetz dabei geholfen hat Müttern Teilzeitarbeit zu ermöglichen: Die Teilzeitbeschäftigung nahm kurzfristig zu. Längerfristig wirkte sich das Gesetz positiv auf die Beschäftigung von Müttern und ihr Arbeitseinkommen aus. Woher kommt der positive Effekt auf das Arbeitseinkommen? Erstens wechselten Mütter, mit Recht auf Teilzeitarbeit, seltener den Arbeitgeber, so dass firmenspezifisches Humankapital erhalten bleiben konnte. Zweitens hat die Reform das erforderliche Qualifikationsniveau im Job der anspruchsberechtigten Mütter erhöht. Die Kombination aus der Zunahme der Teilzeitbeschäftigung und dem Anstieg des Arbeitseinkommens von anspruchsberechtigten Müttern ist für die Politik von zentraler Bedeutung, da sie darauf hindeutet, dass die Reform nicht nur die zeitliche Flexibilität von Müttern nach der Geburt erhöht hat, sondern auch dazu beigetragen haben könnte, den negativen Einfluss von Geburten auf die Arbeitsmarktergebnisse von Müttern zu reduzieren.

DEUTSCHE BUNDESBANK DISCUSSION PAPER NO 12/2024

Does the Right to Work Part-Time Affect Mothers' Labor Market Outcomes?*

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Abstract

This paper studies how the statutory right to work part-time affects mothers' post-birth labor market outcomes. I use a differences-in-differences design to investigate a reform in Germany that granted the right to work part-time to employees of firms with more than 15 employees. I find that the reform increased the probability of eligible mothers working part-time in the short run after childbirth, indicating that the law relaxed a binding constraint. In the longer run, the reform had a positive effect on maternal employment and labor income, but did not change part-time status significantly.

Keywords: Female Employment, Part-Time Work, Fertility, Family and Work Obligations

JEL classification: J13, J18, J22, J83

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1 Introduction

In recent decades, many OECD countries have passed laws to facilitate the transition from full-time to part-time employment by extending the legal rights of workers to work part-time and reducing employers' grounds for refusal.[1] With these reforms "governments [...] have sought to promote it [part-time work] as a way to mobilise into the labour market groups with traditionally low labour market participation, such as women with young children" (OECD, 2010). Mothers thus represent a key target group of the policy and the perception is that the right to work part-time may help mothers reconcile work with caring for children. Many developed countries are facing low maternal labor force participation rates, low fertility rates (or both), and a large negative impact of children on the labor market outcomes of women relative to men - the so-called child penalty (Kleven, Landais, Posch, Steinhauer, and Zweimüller, 2019). Thus, addressing the family-work-compatibility is a key issue for economic development, the financial sustainability of social security systems, and gender equality. Despite the strong expansion of rights to part-time work, there is little research that investigates the economic consequences. In particular, the impact on maternal employment is not yet well understood.

The purpose of this paper is to study how the statutory right to work part-time impacts the labor market outcomes of women after childbirth, both in the short run and in the longer run. To study these questions empirically, I focus on a legal change in Germany. On January 1, 2001, a law was implemented that granted employees the right to work part-time (Law on Part-Time Work and Fixed-Term Employment Contracts, §8 TzBfG). Before the reform, employees were only able to reduce their work schedule to part-time work if the employer agreed to it. After the reform, it became much easier to switch from full-time to part-time employment. The employer was only allowed to refuse the request on business grounds. A reform of the parental leave legislation effective on the same date made sure that parents on parental leave were also entitled to work part-time during parental leave.

The introduction of the right to work part-time may affect mothers' labor outcomes after birth in different ways. It could either increase the post-birth labor supply of mothers (at the extensive margin) or decrease it (at the intensive margin). Consider a working mother who finds it optimal to work part-time after childbirth. In the absence of part-time work options, she may either choose to work full-time, which limits the time with her children, or she may choose to stay at home with her children and to drop out of the labor force. Institutions that affect the settings of maternal employment may potentially also spill over to fertility (Lalive and Zweimüller, 2009). This, in turn, may shape longer-run female labor market outcomes as subsequent births

[1] In the early 2000s, the Netherlands and Germany, among others, extended the legal rights of workers to work part-time. In countries like Spain (1999), the United Kingdom (2003), Austria (2004), and Australia (2010), these rights were introduced for parents of young children.

may have further effects on mothers' labor supply. Finally, the right to work part-time could affect maternal post-birth labor income through various channels: Part-time employment may be associated with fewer opportunities for career advancement (see e.g. Manning and Petrongolo, 2008 and Goldin, 2014). If the law increases the probability of working part-time, this could have a detrimental effect on wages. However, if the entitlement to work part-time leads to an earlier return to work after childbirth, this may positively affect women's labor market attachment and thus wages. The law could also have a positive effect on wages, if it makes firm switches or occupational downgrading associated with the transition from full-time to part-time work less likely (Connolly and Gregory, 2008), so that firm-specific and occupation-specific human capital is retained. Based on these considerations, I study the impact of the reform on mothers' return to work, employment and labor income after childbirth.

Analyzing the causal effect of the right to work part-time on mothers' labor outcomes poses the empirical challenge that the policy change may be endogenous to general trends in social norms. Olivetti and Petrongolo (2017) point out that e.g. a societal change towards more gender equality may both increase female labor supply and induce the passage of family-friendly legislation. It is thus important not to attribute the whole increase in female employment to the change in legislation, but to account for the evolution of social norms.

To deal with this challenge, I use a differences-in-differences approach to study the effect of the legal entitlement to work part-time on mothers' labor outcomes up to six years after childbirth, comparing maternal outcomes before the reform to those after the reform. The precondition for requesting part-time work according to the law was that the employer usually had more than 15 employees and that the worker had at least six months of tenure. As only mothers working for employers with more than 15 employees became eligible, I use mothers working in establishments with at most 15 employees prior to giving birth as a control group. This identification approach thus accounts, among other things, for general trends in social norms if they affect women working in smaller and larger firms in the same way.

I rely on longitudinal administrative data from the German social security records. Social security data are particularly suitable for the analysis, because they cover those mothers who are employed before child birth, i.e. those mothers who can benefit from the new right to switch to part-time work. The data includes complete individual employment histories for a large sample of employees and contains precise information on employment, earnings, and job-related characteristics like e.g. the industry and establishment size.

The results show that mothers affected by the reform were more likely to work part-time in the short run. The finding suggests that the law relaxed a binding constraint, i.e. the law seems to have been effective in granting access to part-time employment to those mothers who wanted it. The legal change did not have a significant impact on the probability of mothers returning to work after childbirth in the short-run. This indicates that the short-term increase in the part-time

variable was triggered by mothers who would have returned to full-time work in the absence of the reform rather than by mothers who would have stayed out of the labor market. Part-time status was not affected by the reform in the longer run as the eligible mothers were more likely to upgrade their work schedule from part-time to full-time work in the longer run.

Importantly, I also find a positive reform effect on labor income despite the increase in part-time work. In order to help explain this increase in labor income, I show that the job continuity of eligible mothers increased so that firm-specific human capital could be retained. Secondly, the reform increased the level of qualification required in the job of eligible mothers, indicating that these women were less likely to experience occupational downgrading. This means that mothers with the right to work part-time could return to their old job part-time and did not have to switch to available part-time jobs with lower skill requirements.

In addition, maternal employment probability was positively affected by the legal change in the longer run, which also explains part of the positive income effect. Six years after childbirth eligible mothers were 4.6 percentage points more likely to be employed (10.0% increase relative to the pre-reform mean of the treatment group). The reform increased the time a mother was employed after birth through the first six years by about 2 months. Where did the positive employment effect come from? On the one hand, it is driven by the reform-induced increase in the longer-run return to work probability. On the other hand, given that the return to work effect is smaller than the employment effect, part of the increase in the employment rate seems to be due to a lower number of eligible mothers dropping out of the labor market again after some time. Specifically, my results suggest that dropping out of the labor market was less common in the group of mothers with the right to work part-time because of a lower probability of giving birth to an additional child. The reform decreased the probability of giving birth to an additional child during six years by about 4 percentage points (16%) in the group of mothers who returned to work after giving birth. The positive reform effect on labor income could partly explain the lower probability of additional births in the group of eligible mothers: mothers with the right to work part-time earned higher wages, which increased the opportunity costs of not working and may thereby have decreased the likelihood of quickly dropping out of the labor market again (Jones, Schoonbroodt, and Tertilt, 2010).

Using an event-study approach, I provide evidence in favor of the identifying assumption of parallel pre-trends in the treatment and the control group. My results are robust to various sample specifications. In particular, the results do not change if I restrict the treatment group to mothers working in either small or medium sized firms only to make them potentially more comparable to mothers in the control group. The results are also robust to changes in the definition of the observation period, the exclusion of particular industries or when focusing on West Germany only.

Analyzing the heterogeneity of the effects, I find that the reform effects tended to be stronger

in jobs where part-time work was less prevalent traditionally. Specifically, the effects on maternal labor market outcomes tended to be stronger for mothers with high pre-birth earnings, mothers working in industries with a low part-time share, and mothers working in abstract occupations[2].

The paper contributes to the literature that assesses the impact on maternal labor outcomes of policies designed to help families reconcile work and family life and reduce gender inequalities. Most of these studies either analyze the effect of parental leave regulations (see for instance Ruhm, 1998; Waldfogel, 1998; Albrecht, Edin, Sundström, and Vroman, 1999; Baum, 2003; Baker and Milligan, 2008; Lalive and Zweimüller, 2009; Lalive, Schlosser, Steinhauer, and Zweimüller, 2013; Schönberg and Ludsteck, 2014; Dahl, Løken, Mogstad, and Salvanes, 2016; and Ginja, Jans, and Karimi, 2020), the effects of subsidized child care (see e.g. Gelbach, 2002; Cascio, 2009; Havnes and Mogstad, 2011; and Nollenberger and Rodríguez-Planas, 2015) or of both kinds of family policies (Kleven, Landais, Posch, Steinhauer, and Zweimüller, 2022). I contribute to this literature by studying the impact of a different family-friendly policy: the right to work part-time. In general, parental leave entitlements qualify parents not to work for a certain period after childbirth, during which their job is protected. In contrast, the legal change that I consider gave parents the right to work part-time both during parental leave and afterwards. Moreover, while family policies such as parental leave regulations often meet an intended goal such as enabling parents to spend more time with their children after birth, at the same time they often have a negative or no significant impact on mothers' employment and, accordingly, on their income (see Olivetti and Petrongolo, 2017 for a literature review). This means that gender-inequalities in labor market outcomes are unlikely to be reduced by these measures. In contrast, this paper finds that the right to work part-time helped to increase both part-time employment and earnings of eligible mothers at the same time.

Evidence on the labor market effects of the statutory right to work part-time is still scarce. The literature so far either studies how the right to work part-time affects part-time work and job mobility for the overall group of employees (Munz, 2004; Fouarge and Baaijens, 2009; Schank, Schnabel, and Gerner, 2009) or how women are affected regardless of their motherhood status using either cross country-level data (Blau and Kahn, 2013) or using micro-level data from Spain (Fernández-Kranz and Rodríguez-Planas, 2021). Fernández-Kranz and Rodríguez-Planas (2021) focus on the indirect effects of such policies by answering the question of how employers changed their treatment (in particular their hiring, separation, and promotion) of women of childbearing age relative to young men or older women in response to a Spanish reform that gave parents the right to work part-time. I contribute to this literature by specifically focusing on the group of eligible mothers after birth. I study whether these mothers actually made use of the new right and how this affected maternal longer-run labor market outcomes. This is of

[2]I follow the notion of Adda, Dustmann, and Stevens (2017) to classify occupations.

key interest against the background that parenthood can explain most of the remaining gender inequality in labor earnings.

Finally, this paper contributes to the small literature studying the relationship between part-time work and fertility, which tends to find a positive association between part-time work and fertility (Del Boca, 2002; Ariza, De la Rica, and Ugidos, 2005; and Laun and Wallenius, 2017). I add to this literature by exploiting a natural experiment that entails exogenous variation in the right to work part-time, which allows me to identify how this right affects (higher-order) fertility using the difference-in-difference framework.

The combination of the increase in part-time employment with an increase in earnings of eligible mothers is of key interest from a policy perspective. It suggests that the policy was effective in increasing the flexility of time of mothers after birth and at the same time might have been helpful in reducing the child penalty. The positive effect of the reform on employment and labor earnings is also important given the concern about old-age poverty among mothers in many high income countries. However, there is suggestive evidence that the law might have had a potentially unintended negative impact on higher-order fertility as eligible mothers who returned to work after birth either reduced or postponed additional births. This could potentially be of concern given the below-replacement fertility levels in Germany, just as in many other industrialized countries (see e.g. Doepke and Kindermann, 2019). It is important to keep in mind, though, that I cannot measure the effect of the reform on completed fertility.

The paper is organized as follows. Section 2 describes the institutional setup and provides some theoretical considerations. Next, Section 3 describes the data and outlines the empirical strategy. Section 4 presents the results, the robustness checks, and heterogeneity analysis, and Section 5 concludes.

2 Institutional Background and Mechanisms

2.1 Institutional Context and the 2001 Reform

Part-Time Employment in Germany The incidence of part-time work has traditionally been relatively high in Germany, especially among women. In 2000, the year prior to the reform, 18% of all employees worked part-time.[3] In the group of employed women, the share of part-time workers amounted to 39% in 2000. The incidence of part-time work increases with motherhood in Germany. 51% of all employed women with one child worked part-time in Germany in 2000 and 68% of mothers of two or more children. Overall, 58% of all working mothers had a part-time job.[4] The share of part-time working mothers rose further in the subsequent years.

[3]The numbers in this section are computed on the basis of the German Socio-Economic Panel (SOEP, 2015). Part-time status in the German Socio-Economic Panel is self-reported.

[4]The numbers refer to mothers of children younger than 16 that are living in the same household.

It increased from 58% in 2000 to 66% in 2014. Also, female labor force participation has increased steadily over the last few decades in Germany. While 68% of all women aged 15 to 64 were part of the labor force in 2000, female labor force participation increased to 79% in 2014.

How many hours does a woman typically work in a full-time and a part-time job in Germany? In 2000, the average number of actual hours worked of female part-time employees in Germany amounted to 23 hours per week with a standard deviation of 8.5. In comparison, female full-time employees worked an average of 42 hours per week with a standard deviation of 7.3. Overall, the average number of actual hours worked per employed woman (independent of her part-time/full-time status) was 35 hours per week with a standard deviation of 12 in 2000. In 2014, women in part-time jobs worked an average of 25 hours per week with a standard deviation of 8.6, while the average numbers of hours worked per week of a female full-time worker declined only slightly to 41.

Legal Change on January 1, 2001 On January 1, 2001 the Law on Part-Time Work and Fixed-Term Employment Contracts (§8 TzBfG) came into force, which had been passed by the German government on December 21, 2000. With §8 TzBfG (hereinafter referred to as "general part-time law"), a general entitlement of employees to work part-time was introduced for the first time in Germany. The general part-time law granted employees the right to reduce their contractual working hours if certain pre-conditions were met. Namely, the employee had to have at least six months of tenure in a firm that usually employs more than 15 employees (excluding trainees). The request to reduce working hours, including the desired number of working hours, required 3 months' notice and could be made after the waiting period of 6 months was complete. The employer could only refuse the request to work part-time on business grounds, e.g. if the reduction in working time significantly impaired the organization or operation of or safety in the firm or caused unreasonably high costs.[5] The worker also had the right to choose how to distribute the working hours over the week, which the employer could only refuse on business grounds. Based on the general part-time law, workers did not have the right to return to full-time employment. However, if a full-time position was vacant, the employer had to give priority to part-time employees who had notified the employer that they would like to expand their contractual working hours if the candidates had equal qualifications.

A reform of the parental leave legislation on exactly the same day (January 1, 2001) ensured that parents on parental leave were also entitled to work part-time (§15 BErzGG – referred to

[5]The great majority of employees in Germany has a permanent contract (in 2001, only 6.5% of all employees in Germany had a temporary contract, see https://www.destatis.de/EN/Themes/Labour/Labour-Market/Employment/Tables/atypical-employment-zr.html). Permanent employees with six month of tenure enjoy extensive job protection: firms can only dismiss a worker if there are serious business grounds, person-related reasons or conduct-related reasons.

as "parental leave part-time law") under the pre-conditions that the employer usually employed at least 15 employees, the worker had at least six months of tenure, and the baby was born on or after January 1, 2001. During parental leave, the worker had the right to reduce the working hours to 15 to 30 hours per week for at least three months and the request required 8 weeks' notice, which the employer could only refuse on serious business grounds. Based on the general part-time law, all employees who fulfilled the requirements mentioned above were eligible to work part-time after January 1, 2001, i.e. eligibility was independent of the timing of birth. In contrast, according to the parental leave part-time law, mothers were only able to make use of the right to work part-time during parental leave, if their child was born on or after January 1, 2001.

Please note that this paper will not identify the effects of the general part-time law and those of the parental-leave part-time law separately, but will study the effect of both changes combined.

Parental Leave Policies in Germany and the Legal Change on January 1, 2001 As in virtually all high income countries, parents in Germany can take parental leave after birth. The institutional details of the parental leave policy are important to understand under which circumstances it was advantageous for parents to work part-time on the basis of the general part-time law (§8 TzBfG) or to make use of the parental leave part-time law (§15 BErzGG).

Parental leave legislation in Germany provided employment protection for up to three years after childbirth (of which up to twelve months could be delayed until the child reached the age of eight). However, parental cash benefits were at most paid during the first two years.[6] While about 92% of parents of all newborns in 2000 received parental cash benefits after birth, only about two thirds of these parents still received some parental cash benefits (i.e. 307 euros or less) after the first birthday of the child.

First, whether it was optimal to work part-time during parental leave or to make use of the general right to work part-time, depended on whether a mother wanted to work part-time temporarily or permanently. Parents who worked part-time during parental leave, had to return to their pre-birth work schedule after parental leave had ended. This means, in contrast to the general part-time law, the parental leave part-time law entitled employees to a temporary

[6] In Germany, mothers are not allowed to work for at least eight weeks after childbirth. During this period, they receive their full net labor income. Afterwards, parents on parental leave could receive means tested parental cash benefits if their working hours did not exceed a certain threshold (19 hours a week before January 2001, 30 hours afterwards) and the annual net family income during benefit receipt was not too high. In 2001, the income limits were 51,130 (38,350) euros in two-parent households (single-parent households) during the first six months after birth and 16,470 (13,498) euros afterwards. The threshold increased by 2,454 euros for each additional child. Before January 1, 2001, parental cash benefits for eligible parents amounted to 307 euros for 24 months. Starting from January 1, 2001 eligible parents could choose between 460 euros for 12 months or 307 euros for 24 months. If the annual net family income exceeded the threshold, the amount of 460 euros was reduced by $0.062 * (income - threshold)$ and the amount of 307 euros was reduced by $0.042 * (income - threshold)$.

reduction in working hours (i.e. parents who worked part-time during parental leave returned to full-time work, if they were full-time workers prior to childbirth). However, parents could also combine the two laws and request part-time work based on the general part-time law, if they wanted to keep the reduced work schedule also after parental leave had ended.

Second, while part-time requests could be denied based on business grounds in the case of the general part-time legislation, it was harder to refuse part-time work requests based on the parental leave part-time law. Employers only had the right to deny requests based on *serious* business grounds.

Third, the parental leave part-time law was more restrictive in terms of working hours than the general part-time law. While working hours had to be between 15 and 30 in the case of the parental leave legislation, employees were free to pick any number of working hours in the case of the general part-time law.

2.2 Mechanisms and Outcomes

How does the right to work part-time affect labor market behavior and subsequent childbirths of working mothers? A priori, it is not clear whether the introduction of the right to work part-time increases the post-birth labor supply of mothers or decreases it. Fernández-Kranz and Rodríguez-Planas (2021) argue that it should lead to an increase in maternal employment, because mothers who want to spend more time with their children than is possible with a full-time job can choose part-time work instead of becoming inactive. This would mean that mothers who are eligible to work part-time should be observed to return to work earlier than their counterparts and their employment rate should be higher. We would thus expect a positive effect on the extensive margin of labor supply. At the same time, the right to work part-time could decrease the labor supply of mothers at the intensive margin, i.e. mothers could be more likely to work part-time rather than full-time. To check these hypotheses, I will study the probability of having returned to the labor market by month t after childbirth and the probability of working part-time t months after childbirth as outcome variables.

If women who have returned to work after childbirth drop out of the labor force again after some time, e.g. to give birth to an additional child, this would not be captured by the return to work variable. Among others, Lalive and Zweimüller (2009) and Del Bono, Weber, and Winter-Ebmer (2012) show that institutions and events that change the terms of maternal employment may also significantly affect fertility, which, in turn, will shape long-run female labor market outcomes. Therefore, I also study the probability of being employed t months after childbirth. This variable also captures temporary returns to the labor market. The variable "overall number of days worked since childbirth until month t after childbirth" captures the overall reform effect on maternal employment.

Finally, the right to work part-time could affect maternal post-birth labor income through

various channels that go beyond the direct impact of hours worked on earnings. On the one hand, part-time work may be detrimental for career advancement. Results by Manning and Petrongolo (2008) suggest that part-time workers are e.g. less likely to get promoted. Goldin (2014) finds that the desire for time flexibility has a negative impact on earnings especially in the corporate, financial, and legal sector, e.g. for lawyers the hourly fees decline when switching from working full-time to part-time. If women are more likely to work part-time after the introduction of the law, this could thus have a negative effect on wages.

On the other hand, the entitlement to work part-time could also affect labor earnings positively. If the legal claim to work part-time leads to an earlier return to work after childbirth, this may affect women's labor market attachment and human capital accumulation positively and could thus have a positive impact on earnings. Moreover, there is empirical evidence that in a setting without the right to work part-time transitions from full-time to part-time work are often associated with a change in employer (Fernández-Kranz, Lacuesta, and Rodríguez-Planas, 2013) and occupational downgrading for women (Connolly and Gregory, 2008). Women with the statutory right to work part-time who want to reduce working hours can do so without changing occupation and firm, which could affect wages positively as firm-specific and occupation-specific human capital can be retained. These potential wage changes may then also affect the return to work behavior of eligible mothers, their transitions from part-time to full-time work, and their probability of dropping out of the labor market again after some time (Jones et al., 2010). In addition, the reform may affect earnings through a changed selection of mothers into work. A priori, this channel has an ambiguous effect on labor income. Based on these considerations, I will study the effect on mothers' labor earnings t months after childbirth.

Finally, the size of the effects is likely to be heterogeneous across occupations and industries as it may depend on the prevalence of part-time work before the reform. In occupations and industries with low fractions of part-time work, it is more likely that the reform relaxed a binding constraint.[7] I will analyze the heterogeneity in more depth in Section 4.5.

3 Data and Empirical Strategy

3.1 Data

I use administrative panel data from the German social security records (SIAB) provided by the German Institute for Labor Market Research (IAB). This data set consists of a 2% random sample (1,757,925 individuals) drawn from the social security records from 1975 to 2014 (Antoni, Ganzer, and vom Berge, 2016). It records the complete individual work histories (including

[7]Moreover, the size of the effects could depend on other institutional features, such as child care availability. Please see Appendix Section A for some discussion of the role of child care.

unemployment spells and leave of absence) for workers who are covered by the social security system at some point in time, i.e. it excludes civil servants, the self-employed, and military personnel.[8] In addition to its large sample size, the data set has the key advantage of providing precise information on maternal labor force status, gross earnings, and occupation measured at a daily frequency as well as on job-related characteristics like establishment size[9] and industry.

The data set reports whether an employee works full-time or part-time. It does not include information on actual hours worked. The full-time or part-time status of an individual depends on the contractual working hours. Individuals whose contractual working time is lower than the standard working time stipulated in the collective agreement or company agreement are defined as working part-time.[10]

To specify the sample, I select mothers who give birth between January 1, 1994 and December 31, 2001. While births are not directly recorded in the data set, I can observe employment gaps during which the woman receives replacement benefits, such as maternity cash benefits ("*Mutterschaftsgeld*").[11] As women in Germany are required by law to go on leave after birth, births of mothers who were employed before child birth are observable in the data.[12] These are exactly the women of interest, when studying the impact of the policy on maternal labor market outcomes. To capture women of childbearing age, I restrict the sample to women between age 16 and age 40, and younger than 38 for their first (observed) childbirth.[13]

I construct the following main outcome variables: The return to work-variable is equal to one for mothers whose employment after childbirth lasts for at least two consecutive months, and zero otherwise. As for the employment status, I construct an indicator variable which is equal to one if the mother has returned to the labor market and is employed t months after giving birth. I set it to zero otherwise. The variable "Days Worked" adds up the days of all employment spells of the mother since childbirth until month t after childbirth. The part-time status-variable is equal to one for mothers who returned to the labor market and are working

[8] In 2001, 77.2% of all workers in Germany were covered by social security and are thus covered by the data (Schönberg, 2009).

[9] The data set reports the establishment size, while the right to work part-time according to the law is based on the employer size. If anything, this will induce a bias of my estimates towards zero as discussed in Appendix Section B.3.

[10] As the data set only covers marginal employment since 1999, I do not consider it in my analysis. In Germany, the term marginal employment refers to a job in which the labor income does not exceed a maximum amount defined by the law (325 euros per month in 2001) and that is at least partly exempt from social security contributions.

[11] The data is frequently used to analyze questions related to parental leave and maternal labor supply in Germany (see e.g. Dustmann and Schönberg, 2012, Schönberg and Ludsteck, 2014, Welteke and Wrohlich, 2019, and Boelmann, Raute, and Schönberg, 2020).

[12] Although these gaps could potentially either be due to giving birth or because of absence from work due to sickness, Schönberg (2009) demonstrates that it is possible to reliably identify childbirths if the appropriate sample restrictions are imposed: If the sample is restricted to women between age 18 and 40 who are on leave for more than 2 months, 84 % of all leave spells of West Germans are due to childbirths. I follow Schönberg (2009) and Müller, Strauch, et al. (2017) to identify childbirths (see Appendix Section B.4).

[13] Please note that only 1.2% of women who gave birth in Germany between 1994 and 2001 were older than 40 years.

part-time t months after childbirth. It is equal to zero otherwise. I measure labor earnings at a daily frequency, and I set them equal to zero if a woman is not working to take account of potential changes in the selection into employment. I deflate labor earnings by the consumer price index with 2005 as the base year.[14] As for the control variables, in order to improve the quality of the education information in the data set, I follow the imputation procedure proposed in Thomsen, Ludsteck, and Schmucker (2018).

3.2 Empirical Strategy

To evaluate the effect of the reform on maternal labor market outcomes, I use a differences-in-differences design. In the main specification, I compare women giving birth prior to the reform (between January 1, 1994 and December 31, 2000) to those giving birth after the reform (between January 1, 2001 and December 31, 2001). I only use the short post-reform period to minimize the likelihood of potential endogenous reactions of women to the law. In addition, I also provide evidence below that my results do not seem to be driven by these potential selection concerns. I use mothers working in establishments with at most 15 employees as a control group, as employees of these firms did not gain the right to work part-time based on the reform. Mothers working for establishments with more than 15 employees constitute the treatment group. Thus, the sample consists of women who were employed (in establishments with either up to 15 or more than 15 employees) before giving birth and before the reform took place. Section 4.4 shows that the results hardly change if I consider small (or small and medium sized) establishments only.

I estimate the following regression:

$$Y_{it} = \alpha_{0t} + Year_i'\alpha_{1t} + \alpha_{2t}Treat_i + \alpha_{3t}Post_i * Treat_i + X_i'\alpha_{4t} + u_{it} \quad (1)$$

where Y_{it} is the labor market outcome of mothers t months after childbirth i. $Year_i$ are childbirth year-fixed effects. $Post_i$ is a dummy variable that is equal to zero if child i was born before the reform (between January 1, 1994 and December 31, 2000), and one for childbirths between January 1, 2001 and December 31, 2001. $Treat_i$ is equal to one if the mother was employed in an establishment with more than 15 employees prior to birth i and zero otherwise. For the post-reform sample, I assign the treatment status based on the establishment size on the reform date.[15] If the person was not working on this particular date I use the establishment

[14] Given the social security nature of the data, wages are only reported up to the contribution assessment ceiling. However, only 1% of the observations in the sample are affected by this censoring.

[15] The empirical design implies that the analysis is based on incumbent female workers and does not cover the impact of the reform on new female workers, i.e. women who were out of the labor force before the reform and before giving birth and started to work after the reform (and before giving birth). This prevents potential sample selection effects of new workers e.g. into large firms triggered by the reform. Thereby, the study also largely abstracts from indirect reform effects such as changes of firms in hiring new workers.

size of her last job in 2000. Alternatively, in Table 5, I assign the treatment status for the post-reform sample based on the establishment size in September 2000 - the first time the bill was discussed in the news and the results are very robust (see Appendix Section B.5). Finally, X_i' is a vector of mothers' characteristics determined prior to childbirth i, namely age, and age squared, dummies for education levels according to the International Standard Classification of Education (ISCED), log pre-birth earnings, pre-birth full-time status, and one-digit industry fixed effects. Again, for the post-sample, I assign the characteristics on the reform date rather than those directly before going on maternity leave. α_{3t} is the parameter of interest measuring the intention-to-treat effect (ITT).

I run the regression separately by time since childbirth. For the differences-in-differences analysis, I define the pre-reform sample in every regression so as to make sure that the time period since childbirth only covers the pre-reform period, i.e. I only include women who gave birth prior to the reform and for whom I also observe the outcome variables (t months after birth) prior to the reform. For example, if the outcome variable is "return to work 24 months after childbirth" I only include mothers in the pre-reform sample who gave birth on January 1, 1999 or earlier (see Appendix Figure 5) and check whether they have returned to work 24 months after childbirth. I use this strategy because eligibility according to the general part-time law was not assigned based on the timing of birth, but applies to everyone from January 1, 2001 (if eligibility criteria based on tenure and firm size are full-filled), independent of when a child was born. Thus, women giving birth before the reform also gained the right to work part-time on January 1, 2001 if all pre-conditions were met.

The differences-in-differences approach is based on the identifying assumption that, in the absence of the policy change, trends in the labor market outcomes of mothers in the treatment and the control group would have been the same. To check the plausibility of this assumption, I run event study regressions separately by time since childbirth, exploiting my data set at the half-annual level. Using the half-annual level instead of the annual level makes it possible to study the dynamics in more detail. Reformulating Equation (1), I interact $Treat_i$ with half-year dummies and estimate Equation (2) for the period 1994 h1 to 2001 h2.

I run the following regressions:

$$Y_{itp} = \alpha_{0t} + \alpha_{1t} Treat_i + \lambda_{itp} + \sum_{p=1994h2}^{2001h2} \gamma_{tp} Treat_i * Birth_p + X_i' \alpha_{4t} + u_{itp} \tag{2}$$

Y_{itp} is the labor market outcome t months after childbirth of the mother of birth i, who has given birth in period p. λ_{itp} are half-year birth time fixed-effects. X_i' is a vector of mothers' characteristics determined prior to childbirth i as before. The coefficients of the birth period-treatment interaction terms $\sum_{p=1994h2}^{2001h2} Treat_i * Birth_p$ allow for a pre-trend analysis and capture the dynamics of the reform effect.

As described before, for the regressions based on Equation (1), the sample excludes births if the woman gave birth before the reform, but the outcome variable (t months after birth) is observed after the reform. In contrast, these observations are part of the sample for the event study regressions (Equation (2)). The three groups (pre-event group, pre-event birth/post-event outcome group, post-event group) are color-coded in Figure 3. Examining the different groups in the event-study framework is informative to better understand the dynamics of the reform-effect.

There could be a potential concern to the validity of the identification strategy, if women altered their plans to have children based on eligibility to the right to work part-time. My analysis is based on the sample of mothers. The estimations could be biased if women self-selected into motherhood based on the treatment status, i.e. based on working for a small or a large firm. As I only consider births in the year 2001 for the post-reform period, most of the women were already pregnant on the reform date. Moreover, in Section 4.4 I do a robustness check where I restrict the post-reform period to the first 40 weeks of 2001 only (corresponding to average length of gestation) to further increase the likelihood that the women in my post-reform sample were already pregnant on the date of the reform, and the results hardly change. In addition, in Appendix Section B.6 I study the evolution of the number of births in the treatment and control groups (relative to the number of women of childbearing age in large and small establishments) before and after the reform. The estimation results do not suggest a significantly different evolution of births in the treatment and the control group after June 2001 (i.e. about 9 months after the first announcement of the law.)

To further check for concerns of systematic sample selection, I compare mothers giving birth before and after the reform, in the treatment and control groups in terms of their pre-determined observable characteristics. If these pre-determined characteristics are significantly different, this could also suggest some systematic selection into treatment. Appendix Table B.4 presents the results from estimating differences-in-differences regressions based on Equation (1), using the different control variables from the baseline specification as the dependent variable. Appendix Table B.4 suggests that differences are small and statistically insignificant. Finally, in Section 4, I report estimation results with and without controls. As the estimated coefficients in specifications with and without controls are very similar, this also suggests that sample selection (at least in terms of observable characteristics) does not drive the results, and points to the exogeneity of the reform.

Table 1 shows summary statistics on the pre-birth characteristics of mothers for the full sample, the treatment group, and the control group. Overall, the sample includes 51,512 births.[16]

[16] Appendix Table B.1 provides some summary statistics on the establishment size.

Table 1: Summary Statistics: Pre-Birth Characteristics

Variable	Full Sample	Treated	Control
Age (Years)	29.58 (4.62)	29.86 (4.59)	28.91 (4.65)
Full-Time (0/1)	0.78 (0.41)	0.77 (0.42)	0.81 (0.39)
Education (ISCED: 1/5)	3.86 (0.73)	3.85 (0.76)	3.90 (0.64)
Daily Earnings (Euros)	70.29 (138.77)	76.38 (132.39)	55.56 (152.13)
Firm Tenure (Years)	4.61 (3.86)	4.89 (3.98)	3.93 (3.45)
Labor Market Experience (Years)	6.87 (4.24)	7.08 (4.28)	6.35 (4.11)
No. of Observations	51,512	36,446	15,066

Notes: The table reports the mean and the standard deviation of each pre-birth characteristic for the full sample, the treatment group and the control group. Standard deviations are in parentheses.

4 Results

Section 4.1 and Section 4.2 present the main differences-in-differences estimation results of the right to work part-time on mothers' labor market outcomes up to six years after childbirth. Table 2 reports the main results of estimating Equation (1) considering outcome variables 18, 36, and 72 months after childbirth for specifications with and without individual level control variables. Figure 1 displays the evolution of the reform's effect on the different outcome variables from 12 to up to 72 months after childbirth graphically. In Section 4.3, I study the parallel trends assumption and the dynamics of the effect using an event study approach. Next, Section 4.4 shows the robustness of the results and Section 4.5 presents evidence on the heterogeneities of the effects.

4.1 Labor Supply

Return to Work Probability and Part-Time Status First, I check the hypothesis that the right to work part-time increased the probability that a mother had returned to work by month t after childbirth. The dependent variable is equal to one if a woman had returned to the labor market for at least two consecutive months by month t after childbirth, and zero otherwise. The first row of Table 2 and Panel (A) of Figure 1 show the results for the return to work probability. While the estimated coefficients are insignificant in the short run, there is a positive, statistically significant reform effect on the return to work probability in the fifth and sixth year after childbirth. How to reconcile the positive long-run effect on the return-to-work probability with the fact that job protection after birth only lasted for three years? In Germany, it was quite common that women who had the wish to have another child tried to get the second before the

three years employment protection ended in order to prolong it for another three years. In this case, the mother would still be protected by the employment protection in year five or six after the first birth and she could make use of the new right to return to work part-time.

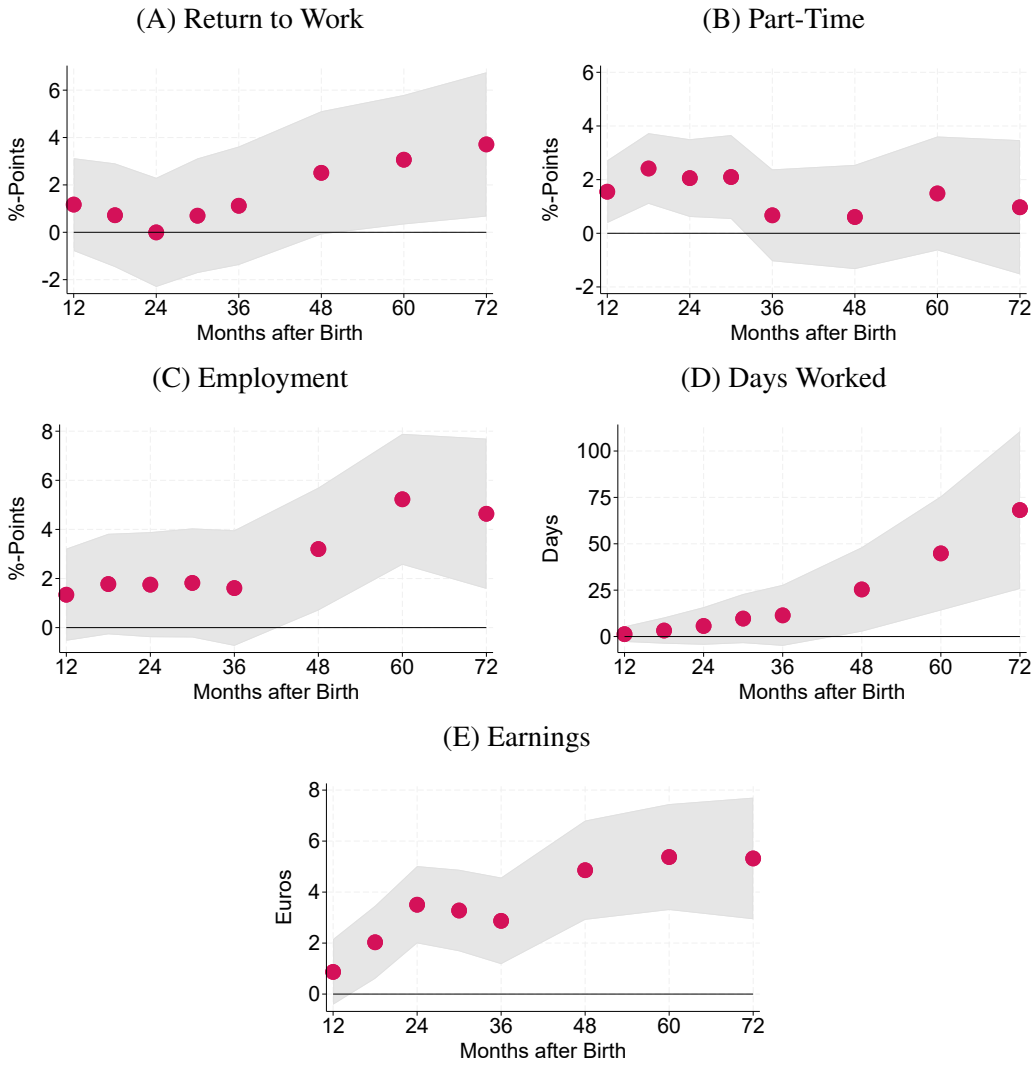
Did women use the right to work part-time to reduce their working hours to part-time employment? The second row of Table 2 and Panel (B) of Figure 1 show the impact of the reform on the part-time status. The dependent variable is equal to one if the woman worked in a part-time job t months after birth, and zero otherwise. The results show that the law increased the likelihood of mothers working part-time in the first 30 months after childbirth. Table 2 reports that mothers in the treatment group were 2.4 percentage points more likely to work part-time 18 months after birth after the reform. The fact that part-time work became more prevalent among eligible mothers after the reform indicates that the law relaxed a binding constraint, i.e. the law seems to have been effective in granting access to part-time employment to those mothers who wanted it. Moreover, interpreting the results on the return to work probability and the part-time status jointly suggests that the short-term increase in the part-time variable was triggered by mothers who would have returned to full-time work in the absence of the reform, rather than by mothers who would have stayed out of the labor market.

The reform did not have a significant longer-run effect on part-time status. One possible reason is that the right to work part-time made mothers not only more likely to work part-time in the short run, but made them also more likely to upgrade hours to a full-time job later on. To shed some light on this question, I estimate the probability of increasing working hours from part-time to full-time employment for the subsample of mothers who returned to the labor market with a part-time job. To do so, I use Equation (1) and set the outcome variable equal to one if the mother has switched from part-time to full-time employment at least once between birth i and year six after childbirth. The results suggest that eligible women were more likely to switch from part-time to full-time work during the first six years after giving birth (see Appendix Table C.1).[17]

As described above, the baseline analysis of part-time employment status includes both employed and non-employed individuals. Appendix Figure C.1 complements the baseline findings with the result based on employed mothers only. The results are qualitatively in line with the baseline findings; however, the standard errors increase due to the smaller sample size.

[17]This finding may also help to explain the result that the part-time work status was unaffected in the longer run, despite the slight increase in the return to work probability in years five to six after childbirth: Even if the higher return to work probability of eligible mothers in years five to six after birth was associated with a higher probability of working part-time, the overall effect on part-time status in the longer run may be insignificant if eligible mothers who returned in years one to four after childbirth were more likely to have switched from part-time to full-time work in the meantime. One possible reason for the increased probability of switching from part-time to full-time work for mothers with the right to work part-time could be better job opportunities. Figure 2 presents evidence that eligible women were less likely to suffer from occupational downgrading and had a higher job continuity.

Figure 1: Labor Market Behavior over Time



Notes: The dots plot the coefficients of the interaction term $Post_i * Treat_i$ in Equation (1) for the different outcome variables specified at the top of the sub-figures t months after birth (x-axis). The results are based on OLS estimations. Individual controls are age, age squared, dummies for ISCED education levels, log earnings, full-time status, and dummies for the one-digit firm industry of mothers determined prior to childbirth i. The gray areas represent 90% confidence intervals.

Table 2: Labor Market Behavior

Time since Birth	18 Months		36 Months		72 Months	
	No Controls	Controls	No Controls	Controls	No Controls	Controls
Return to Work	0.013	0.007	0.017	0.011	0.041**	0.037**
	(0.014)	(0.013)	(0.015)	(0.015)	(0.019)	(0.019)
Part-Time	0.028***	0.024***	0.014	0.007	0.019	0.010
	(0.009)	(0.008)	(0.011)	(0.010)	(0.016)	(0.015)
Employment	0.022	0.018	0.020	0.016	0.050**	0.046**
	(0.013)	(0.012)	(0.015)	(0.014)	(0.019)	(0.019)
Days Worked	5.568	3.233	16.644	11.418	82.026***	68.178***
	(4.362)	(4.295)	(10.107)	(9.987)	(26.241)	(25.837)
Earnings	2.158**	2.031***	2.981***	2.872***	5.620***	5.320***
	(0.898)	(0.872)	(1.057)	(1.033)	(1.482)	(1.449)

Notes: Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The results are based on OLS estimations of Equation (1). Robust standard errors are reported in parentheses. The "No Controls"-specification does not include any controls. In the "Controls"-specification, I control for the following characteristics of mothers determined prior to childbirth i: age, age squared, dummies for ISCED education levels, log earnings, full-time status, and dummies for the one-digit firm industry.

Employment Probability Next, I study the effect of the reform on the probability of being employed t months after childbirth. In contrast to the return to work probability, the employment status also takes it into account if mothers return to work after childbirth temporarily and drop out again after some time.

As depicted in row three of Table 2 and Panel (C) of Figure 1, the right to work part-time had a positive effect on the employment probability in months 48 to 72 after childbirth. Six years after birth, eligible mothers were 4.6 percentage points more likely to be employed. Evaluated against the corresponding pre-reform employment rate of mothers in the treatment group of 46%, this estimate implies a 10% increase in the employment probability of women entitled to work part-time. Employment probability was unaffected in the short run. The variable "Days Worked" summarizes the overall effect of the reform on maternal employment (row 4 of Table 2 and Figure 1, Panel (D)). In line with the results on employment probability, the law had a positive and significant effect on the number of days worked by eligible mothers in the longer run, but the effect is insignificant in the short run. The reform increased employment of eligible mothers through the first six years by about 2.2 months (68 days), which corresponds to an increase of about 9.7% in terms of the average number of days worked in the first six years after birth of the treatment group in the pre-reform period (698 days).

What is driving the increase in employment probability of eligible mothers? On the one hand, part of the effect is due to the longer-run increase in the return to work probability of eligible mothers. However, the employment effect is larger than the return to work effect in years four to six after childbirth. This suggests that, on the other hand, also a lower likelihood of eligible women of dropping out of the labor force after their temporary return is driving the

employment effect. As described before, these drop-outs are not captured by the return to work variable, but are included in the effect on the employment probability. One reason to drop out again after a temporary return to the labor market are additional births.

Higher-Order Fertility Did the right to work part-time change the timing and the likelihood of having additional children? The data set only allows to identify further births if the woman returned to work between the two births. For this sample of mothers, I study the impact on higher-order fertility, exploiting the panel structure of the data set. The results are displayed in Figure 2, Panel (C). While the differences-in-differences estimate is close to zero one year after birth, it turns negative and significant from 18 months after birth onward. Six years after birth, eligible mothers were 4.2 percentage points less likely to have dropped out of the labor market (after their temporary return) to give birth to an additional child. This corresponds to a 16% decrease relative to the pre-reform mean of the treatment group (26%). While the longer-run effect suggests that not only the timing of births, but also the number of births might have been affected, one would have to observe the completed fertility cycle to give a final answer to this question.

The negative effect on additional births is in line with the findings on labor supply described above. I find a positive reform effect on the likelihood of being employed of eligible women, which is only partly due to an earlier return to work. The results in this section suggest that the positive employment effect is partly driven by the lower probability of eligible women of dropping out of the labor market after a temporary return, to give birth to an additional child.[18] Why could the reform have induced eligible mothers to change their higher-order fertility? The findings are consistent with the interpretation that the right to work part-time increased the labor market earnings of eligible mothers and thus their opportunity costs of not working. This in turn may have reduced the incentive for eligible mothers to drop out of the labor market as compared to those mothers without the right to work part-time (Jones et al., 2010).

4.2 Labor Market Income

Row 5 of Table 2 and Panel (E) of Figure 1 explore the effects of the right to work part-time on earnings. The dependent variable measures the average daily earnings t months after childbirth. I set them as equal to zero if the woman was not employed t months after childbirth to capture the selection into employment. The statutory right to work part-time had a positive and significant effect on the labor earnings of mothers after childbirth both in the short run and in the longer run. Six years after childbirth, the daily earnings of eligible mothers were on average

[18] Please note that it is not possible to directly compare the size of the coefficients in Figure 1, Panel (B) (Employment) and Figure 2, Panel (C) (Additional Births). The estimates in Figure 1, Panel (B) are based on the whole sample of mothers, whereas estimates in Figure 2, Panel (C) are based on the sample of mothers who have returned to work after childbirth.

5.32 euros higher. This effect is partly driven by a higher probability of being employed. In Appendix Figure C.2, Panel (B) I also plot the coefficients of the differences-in-differences estimations using the daily earnings as the outcome variable based only on the sample of women who were employed t months after childbirth. Also when considering employed mothers only, the positive effect on labor earnings persists both in the short run and in the longer run.

Firm Continuity and Skill Level As argued in Section 2, the reform could have affected labor earnings positively if mothers with the right to work part-time were less likely to change employer when switching from full-time to part-time work (Fernández-Kranz et al., 2013) or if they were less likely to experience occupational downgrading (Connolly and Gregory, 2008).

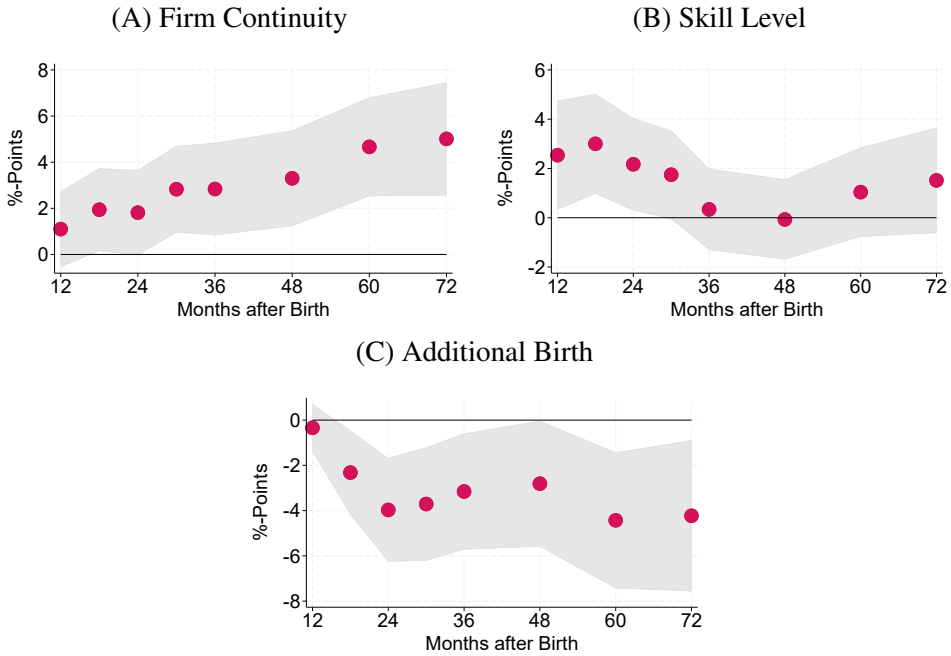
In Figure 2, Panel (A) I plot the results of estimating Equation 1 using a dummy-variable as the outcome variable that is equal to one if the mother was working for the pre-birth employer t months after childbirth i and zero otherwise. The results suggest that the introduction of the right to work part-time had a positive effect on firm continuity. While the effect is partly driven by the higher employment probability of eligible women, the effect on firm continuity is significantly different from zero in the short run too, in contrast to the effect on employment probability. Moreover, the coefficients are larger in the case of firm continuity compared to the coefficients on employment probability.[19] The increase in employer continuity could thus have affected labor earnings positively through a positive effect on firm-specific human capital.

To shed some light on the occupational skill requirements of mothers after childbirth, Panel (B) of Figure 2 studies the impact of the reform on the level of skill requirements mothers face in their jobs. The data set includes a categorical variable, which summarizes the level of skill requirements of a job as reported by the employers. Based on this information, I generate a dummy variable that is equal to 1 if the job of a mother t months after childbirth i requires her to perform either skilled, complex or highly complex tasks. The dummy is equal to 0 if the job entails unskilled or semi-skilled tasks. Panel (B) of Figure 2 plots the results of estimating the differences-in-differences regression with the skill-level dummy as the dependent variable. In contrast to Figure 2, Panel (A), the sample underlying Panel (B) only consists of those mothers who are employed in month t after childbirth i. The figure shows that the reform had a positive and significant effect on the skill level of mothers' occupations after childbirth in the short run. Two years after childbirth eligible mothers were 2.3 percentage points more likely to be working in a job which required at least skilled tasks instead of unskilled or semi-skilled tasks. There is no significant effect in the longer run. This could either mean that the reform did not affect the level of tasks required in the job in the longer run or this could be due to the binary (and

[19] Three years after birth, the legal change increased the probability of working for the same firm by 2.8 percentage points, while the share of women who were employed increased by only 1.6 percentage points. Six years after birth, the reform effect on firm continuity is 5 percentage points and 4.6 percentage points in the case of employment probability.

thus relatively rough) measure of skill levels.[20] The finding of a positive reform effect on the occupational skill level in the short run is consistent with the idea that the right to work part-time may have reduced the prevalence of occupational downgrading of women who want to work part-time after childbirth, as eligible mothers had the opportunity to return to their old job and they were able to do so with a reduced number of working hours. Moreover, the increase in the skill level of eligible mothers after childbirth may be associated with a positive effect on occupation-specific human capital and may, thus, have contributed to the positive reform effect on labor earnings depicted in Panel (E) of Figure 1.

Figure 2: Firm Continuity, Skill Level, and Additional Births



Notes: The dots plot the coefficients of the interaction term $Post_i * Treat_i$ in Equation (1) for the different outcome variables specified at the top of the sub-figures t months after birth (x-axis). The results are based on OLS estimations. Individual controls are age, age squared, dummies for ISCED education levels, log earnings, full-time status, and dummies for the one-digit firm industry of mothers determined prior to childbirth i. The gray areas represent 90% confidence intervals.

4.3 Event Study

In order to study the pre-trends and show the dynamics of the reform effect in more detail, I use an event study approach and estimate Equation (2) separately by time since childbirth. Figure 3 shows the effect of the right to work part-time on the outcome variables 18 months and 72 months after child-birth.

[20] Appendix Figure C.3 plots the results if the sample also includes mothers who are not employed (coded as zero) and uses the categorical skill level (ranging from 1 to 4) as outcome variable.

As described in Section 3, eligibility according to the general part-time law was not assigned based on the timing of birth, but depended on the time of observation. Thus, women giving birth before the reform also gained the right to work part-time on January 1, 2001 if all pre-conditions were met. The dark grey dots in Figure 3 refer to the pure pre-event group, i.e. to the labor outcomes of women who gave birth before January 1, 2001 and did not gain the right to work part time until 18 (72) months after childbirth. The light grey triangles refer to the labor market outcomes of those observations that were partially affected, because the mother gave birth before the reform date, but the reform happened during the first 18 (72) months after childbirth. These are the observations not considered in the difference-in-difference analysis, because they cannot clearly be grouped into the pre- or post-event group. However, studying them in the event-study framework is informative to better understand the dynamics of the reform-effect. Finally, the red diamonds refer to the pure post-reform group, i.e. to births after the reform (and thus also outcomes measured after the reform).

The graphical evidence supports the parallel trends assumption for the pre-reform period. For this purpose, the graphs in the left column of Figure 3, referring to outcomes 18 months after birth, are particularly informative, because of the long pre-period. The estimates (dark grey dots) fluctuate around zero without a clear trend and are for the very most part not significantly different from zero. The estimates for the births in the year 2001 (in red) are in line with the results shown in Figure 1 and Table 2 and show a statistically significant positive short-run effect on the part-time status, a positive and significant long-run effect on the return to work probability, the employment probability, and the number of days worked and both a positive short- and a long-run effect on labor income. It seems that the reform effect has picked up especially for births in the second half of 2001.

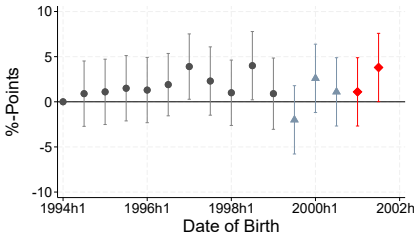
Interestingly, the light grey triangles show that the effect on the labor market outcomes of women who gave birth before the reform and gained the right to work part-time at some point during the first 18 (72) months is largely insignificant. This could indicate that the decision on when and in which job to return to work is largely made before the birth of the child. In this case, the labor market outcomes of mothers who only became eligible at some point after birth may not be as strongly affected by the reform. Figure 3 shows, that only the employment probability (Panel (F)) and the labor income (Panel (J)) 72 months after childbirth of mothers who gave birth in the year 2000 are positively affected. These mothers thus gained the right to work part-time when the child was at most one year old and enjoyed the right to work part-time for the time until the child turned six.

4.4 Robustness Checks

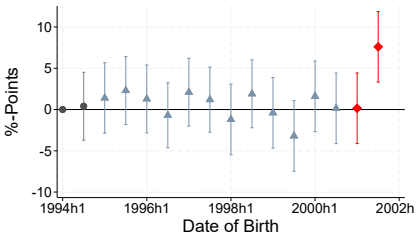
Alternative Identification of Births The data set from the German social security records does not allow a direct distinction to be drawn between women who are absent from work due

Figure 3: Event Study by Time Since Childbirth

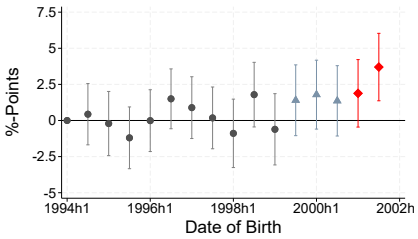
(A) Return to Work after 18 Months



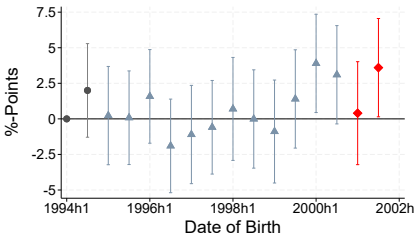
(B) Return to Work after 72 Months



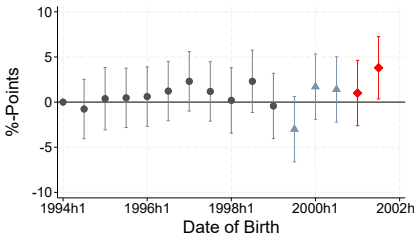
(C) Part-Time after 18 Months



(D) Part-Time after 72 Months

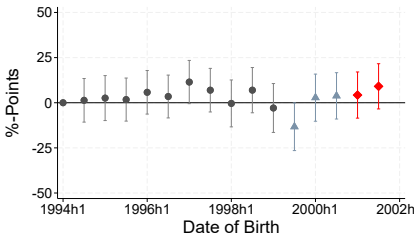


(E) Employment after 18 Months

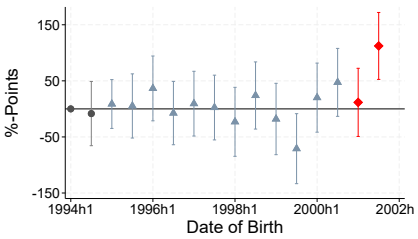


(F) Employment after 72 Months

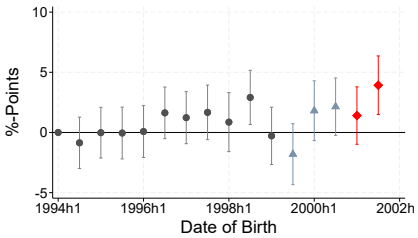
(G) Days Worked after 18 Months



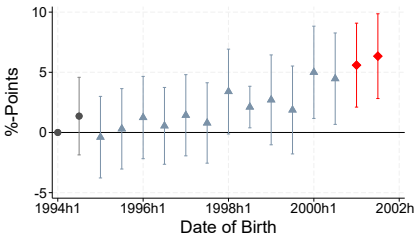
(H) Days Worked after 72 Months



(I) Income after 18 Months



(J) Income after 72 Months



Notes: The graphs plot the coefficients of the birth period-treatment interaction terms in Equation (2) 18 and 72 months after childbirth. The dark-grey dots refer to the pre-reform group (pre-reform birth & pre-reform outcome measured t months after birth), the light grey triangles refer to the pre-reform birth and post-reform outcome group, and finally, the red diamonds refer to the post-reform group (post-reform birth & post-reform outcome measured t months after birth)). The results are based on OLS estimations. Individual controls are age, age squared, dummies for ISCED education levels, log earnings, full-time status, and dummies for the one-digit firm industry of mothers determined prior to childbirth i. The bars represent 90% confidence intervals.

Table 3: Robustness: Alternative Identification of Births

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Time since Birth		18 months			36 months			72 months	
Sample	Age ≤ 35	West	Industry	Age ≤ 35	West	Industry	Age ≤ 35	West	Industry
Return to Work	0.003	0.004	0.008	0.007	0.013	0.013	0.038*	0.051**	0.038**
	(0.014)	(0.014)	(0.014)	(0.016)	(0.016)	(0.015)	(0.020)	(0.020)	(0.019)
Part-Time	0.022***	0.017*	0.025***	0.002	0.002	0.008	0.011	0.001	0.012
	(0.008)	(0.009)	(0.008)	(0.011)	(0.012)	(0.011)	(0.016)	(0.016)	(0.015)
Employment	0.017	0.011	0.018	0.013	0.016	0.018	0.054***	0.055***	0.045**
	(0.013)	(0.013)	(0.013)	(0.015)	(0.015)	(0.015)	(0.020)	(0.020)	(0.019)
Days Worked	2.168	1.517	3.208	8.434	7.526	11.667	66.526**	77.272***	65.860**
	(4.374)	(4.725)	(4.353)	(10.275	(10.666)	(10.124)	(26.734)	(27.287)	(26.231)
Earnings	1.699*	1.319	1.959**	2.192**	2.166**	2.981***	5.536***	5.258***	5.135***
	(0.884)	(0.914)	(0.888)	(1.081)	(1.089)	(1.049)	(1.499)	(1.534)	(1.472)

Notes: Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The results are based on OLS estimations. Robust standard errors are reported in parentheses. Individual controls are age, age squared, dummies for ISCED education levels, log earnings, full-time status, and dummies for the one-digit firm industry of mothers determined prior to childbirth *i*. The columns "Age < 35" refer to the specification where individuals older than 35 are dropped from the sample. The columns "West" refer to the specification where individuals who work in East Germany are dropped from the sample. The columns "Industry" refer to the specification where I drop industries with the highest prevalence of long-term sickness spells, namely agriculture, forestry and construction.

to a childbirth or due to long-term sickness, as described in Section 3. The main sample consists of women younger than 40 who are absent from work for at least 14 weeks (obligatory maternity leave period) in order to capture women who are on maternity leave. Moreover, I impose a gap between two adjacent births of at least 32 weeks. In this section, I impose even stricter rules to further raise the probability of capturing women on maternity leave only.[21] First, I impose the additional restriction that women must be at most 35 years old at the time of birth to be included in the sample. As described by Meyer, Wenzel, and Schenkel (2018), the likelihood of long-term illness strongly increases with age. Restricting the sample to women younger or equal to 35 years should thus decrease the number of women in the sample who are absent from work due to long-term illness. This restriction leads to a decline of about 11% in the sample size. The results are displayed in Table 3, columns (1), (4), and (7). In columns (2), (5), and (8) of Table 3, I drop mothers working in East Germany from the sample, as Schönberg (2009) suggests that the precision of birth identification is higher for West Germany. This restriction leads to decline of about 17% in the sample size. Finally, the prevalence of long-term sickness spells varies by industry. Long-term sickness spells are most prevalent in agriculture, forestry and construction (see Meyer et al., 2018). Therefore, I run a further robustness check, where I drop these industries from the sample. As the fraction of women working in these areas is low, this only reduces the sample size by 2%. The results can be found in Table 3, columns (3), (6), and (9). The findings are robust to all three additional sample restrictions. While the size of the coefficients varies slightly, qualitatively the results are unchanged.

[21] This comes at the cost of an increased likelihood of removing true maternity leave spells from the sample.

Alternative Observation Period In this section, I analyze the sensitivity of the results to the definition of the post-reform period. As discussed in Section 3, women could potentially self-select into the treatment group by basing their decision to have a child on the law. Although I do not find evidence for this concern in the checks presented in Section 3, I investigate this further here. I restrict the post-reform period to the first 40 weeks of 2001 (corresponding to the usual length of gestation) to further increase the likelihood of the women already being pregnant at the reform date. Figure 4 shows that the results hardly change. Given the lower number of observations in the post-reform period, standard errors tend to increase slightly. Also, the coefficients tend to be slightly smaller, which could either be evidence for some minor selection effects, but which is also consistent with the idea that it may take some time for mothers to adjust their behavior in response to the reform. Still, the results are qualitatively unchanged.

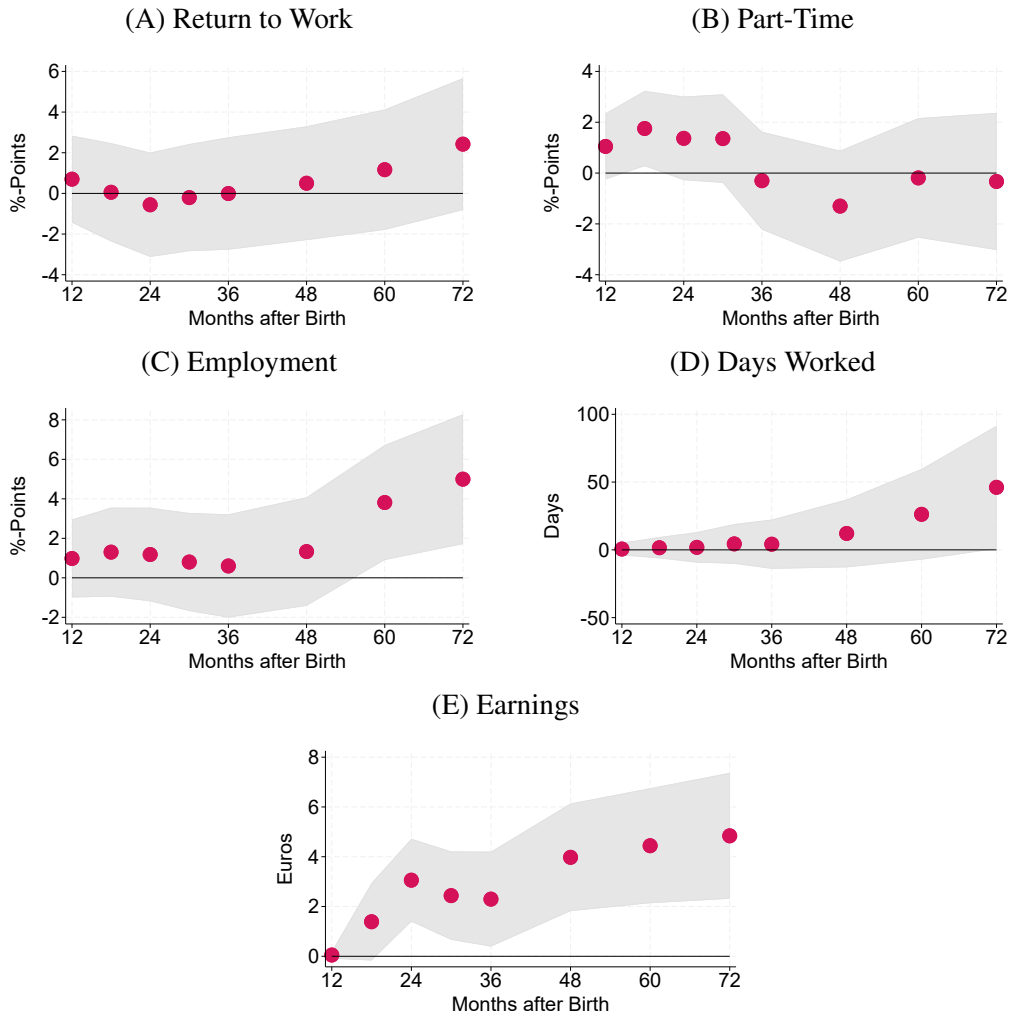
Alternative Classifications of the Treatment Group Next, I check the robustness to the treatment definition. According to the part-time law, the right to work part-time is determined based on the *usual* number of employees in the firm. Given that the treatment status in my analysis is based on the number of employees at one particular point in time[22], I also check whether small fluctuations in the establishment size around the threshold of 15 employees affect the results. For this purpose, I exclude establishments with 13 to 18 employees from the sample. Appendix Table C.2 shows that the results are hardly affected based on this donut-hole specification.

One concern may be that women working in very large companies are systematically different from women working in small companies. If these differences are persistent over time, they do not violate the validity of the differences-in-differences estimates. It would only be problematic if these differences changed over time. The balance test in Appendix Table B.4 does not detect major changes in terms of observable characteristics. However, to tackle this concern further I restrict the sample to women working in small establishments. Table 4 presents results for the sample of small establishments with up to 50 employees only (following the definition of small firms by the IfM, Bonn). This specification corresponds to a regression discontinuity difference-in-differences design (RD-DID) evaluated at the 15 employee threshold.[23] Table 4 also presents the results for the sample of women working in establishments of up to 50 employees using the donut hole specification, i.e. excluding establishments with 13 to 18 employees. The findings for these sample specifications are in line with the main results. Only the standard errors increase due to the decrease in sample size. The results for the sample of women

[22] As described in Section 3, I consider the number of employees prior to birth for women in the pre-reform sample and the number of employees at the reform date for women in the post-reform sample.

[23] Please note that I cannot use January 1, 2001 as the discontinuity threshold because eligibility according to the general part-time law was not assigned based on the timing of birth, but depended on the time of observation. Thus, women giving birth before the reform also gained the right to work part-time on January 1, 2001 if all pre-conditions were met.

Figure 4: Robustness: Alternative Observation Period



Notes: The dots plot the coefficients of the interaction term $Post_i * Treat_i$ in Equation (1) for the different outcome variables specified at the top of the sub-figures t months after birth (x-axis). The results are based on OLS estimations. Individual controls are age, age squared, dummies for ISCED education levels, log earnings, full-time status, and dummies for the one-digit firm industry of mothers determined prior to childbirth i. The gray areas represent 90% confidence intervals. The post-reform sample is restricted to mothers giving birth in the first 40 weeks of 2001.

working in small and medium sized establishments (i.e. establishments with less than 500 employees (following the definition of the IfM Bonn)) are shown in Appendix Figure C.4. Again, the results are robust.

Table 4: Small Establishments Only

Time since Birth	18 Months		36 Months		72 Months	
	All	Donut Hole	All	Donut Hole	All	Donut Hole
Return to Work	0.004	0.006	0.011	0.010	0.042	0.055*
	(0.018)	(0.020)	(0.021)	(0.023)	(0.026)	(0.028)
Part-Time	0.021*	0.021*	−0.003	−0.006	−0.003	−0.006
	(0.011)	(0.012)	(0.014)	(0.015)	(0.021)	(0.022)
Employment	0.021	0.024	0.004	0.000	0.041	0.050*
	(0.017)	(0.019)	(0.020)	(0.021)	(0.026)	(0.028)
Days Worked	1.934	3.129	5.366	8.137	62.979*	85.083**
	(5.843)	(6.202)	(13.802)	(14.712)	(36.122)	(38.807)
Earnings	1.860	2.403*	1.191	0.986	6.033***	5.630***
	(1.290)	(1.401)	(1.426)	(1.519)	(2.000)	(2.102)

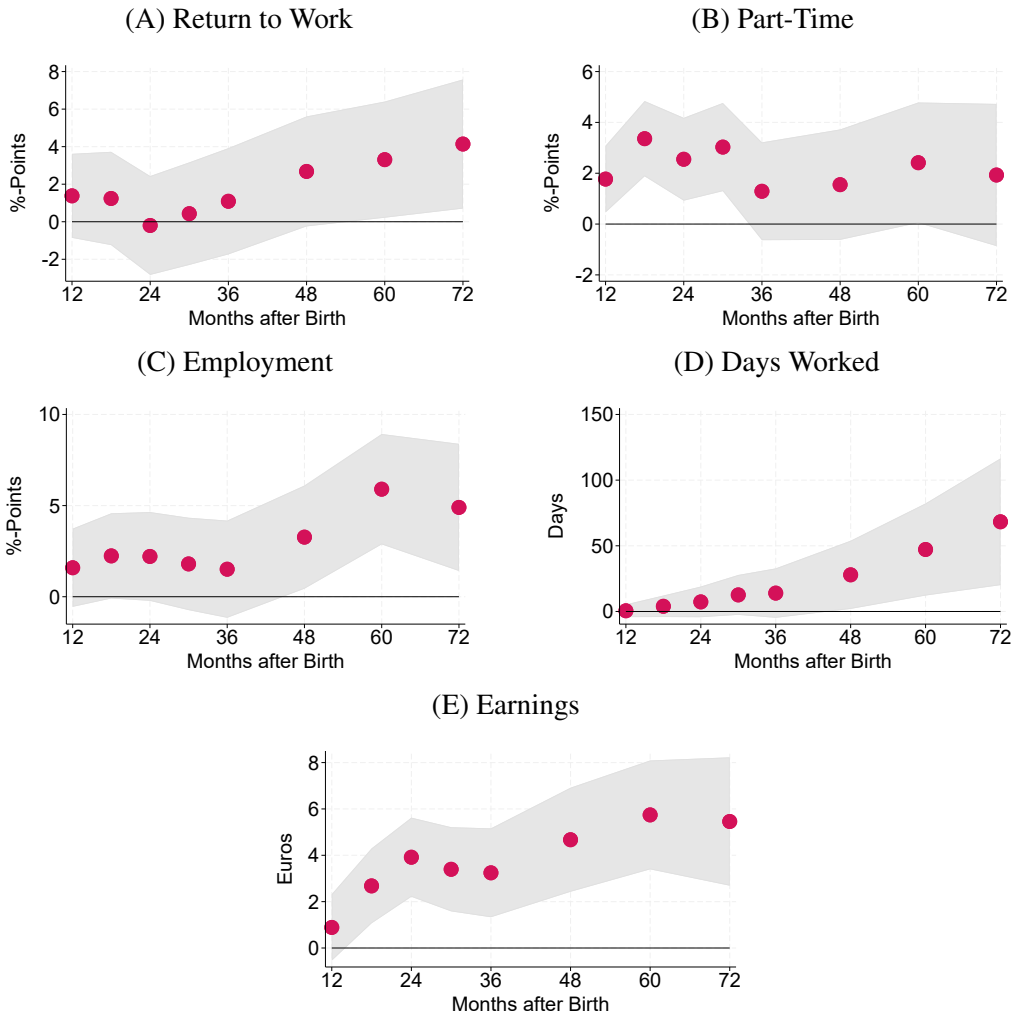
Notes: Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The results are based on OLS estimations of Equation (1). Robust standard errors are reported in parentheses. The sample consists of small establishments (i.e. up to 50 employees, following the definition by the IfM Bonn) only. In columns labeled "All", all establishments with up to 50 employees are included. In the columns labeled "Donut Hole", I focus on establishments up to 50 employees, but excluding those with 13 to 18 employees. I control for the following characteristics of mothers determined prior to childbirth *i*: age, age squared, dummies for ISCED education levels, log earnings, full-time status, and dummies for the one-digit firm industry.

Next, I study the sensitivity of the results with regards to the distinction between establishment size and employer size. As described in Section 3, the data set includes information on the establishment, whereas the right to work part-time is assigned based on employer size. Mothers working in establishments with at most 15 employees which belong to a firm with more than 15 employees in total, may be assigned to the control group by mistake, whereas they are actually part of the treatment group. If anything, this will bias the estimates towards zero.

The importance of the distinction between firm and establishment is likely to vary across industries. For example, Kaas and Kimasa (2021) show that in the sectors of manufacturing, mining, and quarrying, among the firms with more than 20 employees, more than three fourths are single-unit firms. In contrast, small branches are likely to be relatively prevalent in other sectors, e.g. the retail sector, which means that the difference between establishment size and employer size could be of special importance in this sector. To explore this further, I run a sensitivity check, where I exclude women who are working in the retail sector before giving birth. Figure 5 reports the results. The results are robust to this specification. Coefficients tend to be slightly larger in absolute values, in line with the argument of a bias towards zero of the baseline results introduced by the difference between firm and establishment definition.

Finally, women may switch the employer in response to the reform to become eligible to

Figure 5: Robustness: Excluding the Retail Sector



Notes: The dots plot the coefficients of the interaction term $Post_i * Treat_i$ in Equation (1) for the different outcome variables specified at the top of the sub-figures t months after birth (x-axis). The results are based on OLS estimations. Individual controls are age, age squared, dummies for ISCED education levels, log earnings, full-time status, and dummies for the one-digit firm industry of mothers determined prior to childbirth i. The gray areas represent 90% confidence intervals. The sample excludes mothers working in the retail sector before giving birth.

Table 5: Anticipation: Treatment based on Establishment Size in September 2000

Time since Birth	18 Months	36 Months	72 Months
Return to Work	0.011	0.013	0.036**
	(0.014)	(0.016)	(0.019)
Part-Time	0.035***	0.013	0.016
	(0.009)	(0.011)	(0.016)
Employment	0.025	0.015	0.053***
	(0.013)	(0.015)	(0.019)
Days Worked	3.429	13.069	70.807***
	(4.585)	(10.635)	(26.765)
Earnings	2.733***	2.895***	6.091***
	(0.933)	(1.113)	(1.504)

Notes: Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The results are based on OLS estimations of Equation (1). Robust standard errors are reported in parentheses. I control for the following characteristics of mothers determined prior to childbirth *i*: age, age squared, dummies for ISCED education levels, log earnings, full-time status, and dummies for the one-digit firm industry.

work part-time, i.e. they may switch from small firms to firms with more than 15 employees. Most importantly to address this concern in all analyses, I group mothers who give birth after the reform into the treatment and the control group based on the establishment size on or before the reform date, so that the treatment status is pre-determined. If women have anticipated the reform, they may have already changed the employer before the actual policy change took place. Therefore, I checked German newspapers for articles about the planned introduction of the general right to work part-time. The first articles discussing the bill were published mid-September 2000. Therefore, I run robustness checks, where I assign the treatment status for the post-reform sample based on the establishment size in September 2000. The results are very robust (see Table 5) and do not suggest any anticipation effects.

4.5 Heterogeneity

Before the reform, mothers were able to reduce their post-birth work schedule to part-time work if the employer agreed to it. After the reform, it became much easier to switch from full-time to part-time employment as the employer was only able to refuse the request on business grounds. Therefore, I would expect that the reform had a stronger impact on mothers working in jobs where part-time work was traditionally less prevalent. In these jobs, it is more likely that the reform relaxed a binding constraint.

Part-time work is especially concentrated in the service sector (restaurants, education and health- and social work) in Germany (Bundesagentur für Arbeit, 2018) and in low-income jobs. Adda et al. (2017) split their sample by occupation type into routine, manual, and abstract occupations and demonstrate that part-time work is much more prevalent among manual and routine workers than in abstract occupations. In this section, I check the heterogeneities of

the reform effects based on the pre-birth income of women, the full-time share in the pre-birth industry, where the mother was employed, and based on pre-birth occupation.

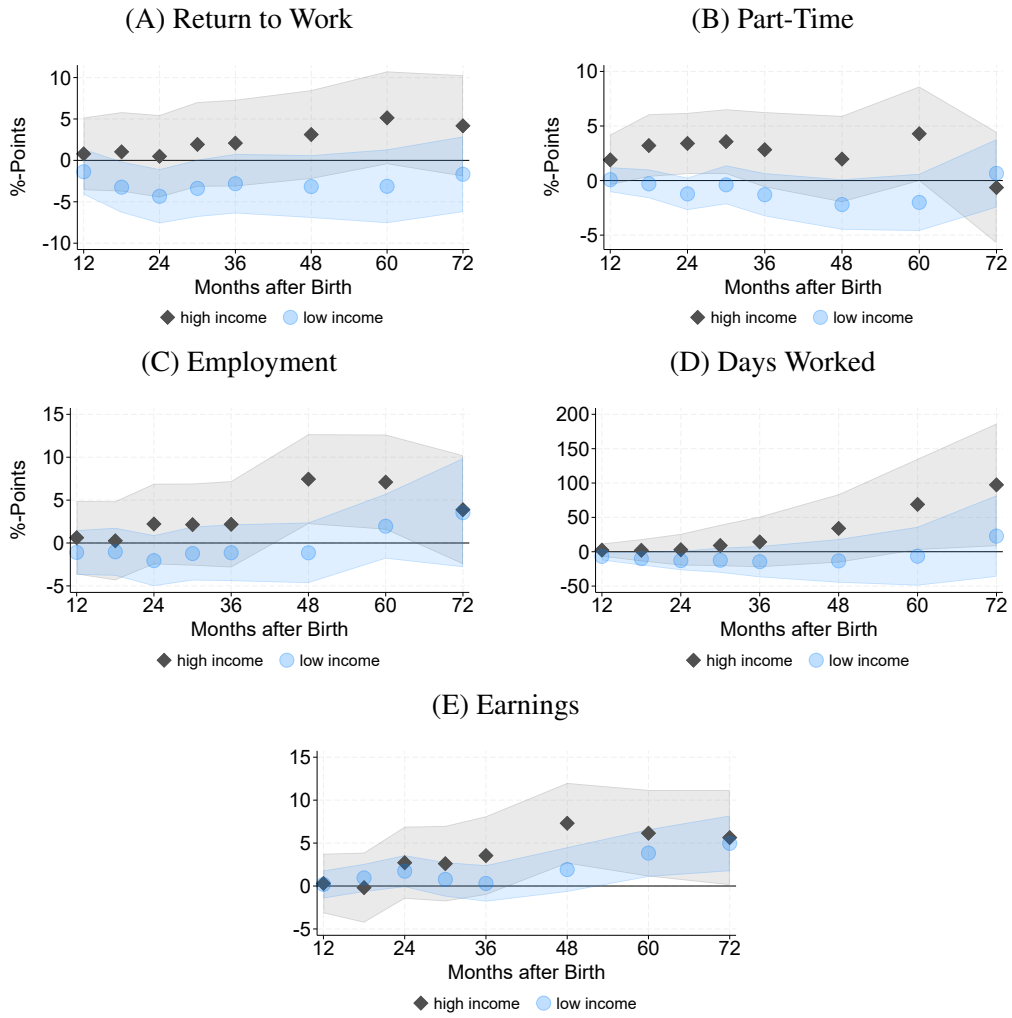
Figure 6 displays the results of estimating Equation (1) separately for high-income and low-income earners. The sample is split at the median pre-birth income of mothers who worked full-time before giving birth. Only mothers who worked full-time before giving birth are considered in the analysis. Figure 7 shows the heterogeneities by the share of full-time workers per three-digit industry. I consider the industry in which the mother was working before giving birth. The sample is split at the median full-time share.

Finally, in Appendix Figure C.5 I split the sample according to the occupation before giving birth, following the categorization used by Adda et al. (2017), among others. Their categorization of occupations is based on the task-based approach by Autor, Levy, and Murnane (2003) and is supposed to "reflect the trade-off between careers that offer a higher wage but punish interruptions and careers that imply lower profiles but also lower atrophy rates" (Adda et al., 2017). Adda et al. (2017) suggest splitting occupations into those that require mostly analytical or interactive tasks, those that mostly require manual tasks, and those in which tasks are mostly routine-based.[24] The authors show that workers in manual and routine occupations have more part-time work experience than workers in abstract occupations, while full-time work experience is higher for workers in abstract occupations. Therefore, I split the sample into mothers with occupations in which tasks are mostly abstract and mothers with non-abstract occupations (i.e. manual or routine occupations).

In line with my hypothesis, the right to work part-time tends to have a stronger impact on the labor market outcomes of mothers with jobs where part-time work has been less common traditionally. However, results become less stable and are less precisely estimated due to the lower number of observations in the split samples. The evidence suggests that mothers with below-median pre-birth income, those who worked in industries where part-time work was relatively prevalent, and those working in manual or routine occupations were only very mildly affected by the reform. The lion's share of the blue dots in Figure 6, Figure 7, and Appendix Figure C.5 which represent the reform effects for these women, are close to zero and statistically insignificant. In contrast, the reform effect on the probabilities of return to work, on maternal employment as well as on labor earnings tend to be stronger for mothers with higher pre-birth income, those working in industries with a high full-time share, and those in abstract occupations. The evidence on the heterogeneities in the effect on part-time work is less clear-cut.

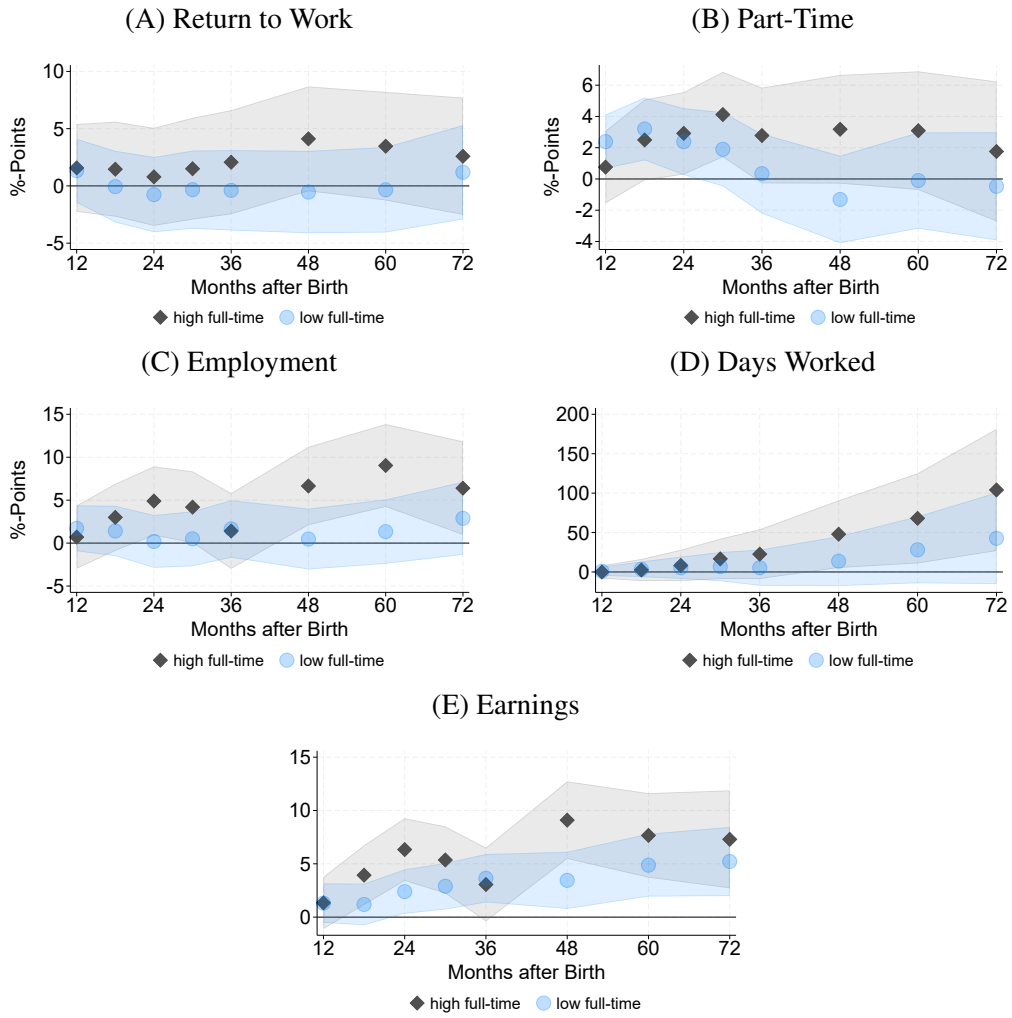
[24]The authors argue that the requirements of abstract occupations (e.g. medical assistants) are likely to change faster and require a more regular updating of skills than manual (e.g. hairdresser) and routine occupations (e.g. shop assistants). Following Adda et al. (2017); Dustmann, Ludsteck, and Schönberg (2009); Black and Spitz-Oener (2010); and Gathmann and Schönberg (2010), I sort two-digit occupations into analytical, routine and manual occupations. For this purpose, I use the information on tasks performed on the job included in the data from the German Qualification and Career Survey 1985/86 (BIBB, 2016). Please see Adda et al. (2017) for more details on the procedure.

Figure 6: Heterogeneity by Income



Notes: The diamonds and the dots plot the coefficients of the interaction term $Post_i * Treat_i$ in Equation (1) for the different outcome variables specified at the top of the sub-figures t months after birth (x-axis), for the high-income sample and the low-income sample, respectively. The results are based on OLS estimations. Individual controls are age, age squared, dummies for ISCED education levels, log earnings, full-time status, and dummies for the one-digit firm industry of mothers determined prior to childbirth i. The bars represent 90% confidence intervals.

Figure 7: Heterogeneity by Full-Time Share



Notes: The diamonds and the dots plot the coefficients of the interaction term $Post_i * Treat_i$ in Equation (1) for the different outcome variables specified at the top of the sub-figures t months after birth (x-axis), for the high full-time share sample and the low full-time share sample, respectively. The results are based on OLS estimations. Individual controls are age, age squared, dummies for ISCED education levels, log earnings, full-time status, and dummies for the one-digit firm industry of mothers determined prior to childbirth i. The bars represent 90% confidence intervals.

5 Conclusion

This paper studies the impact of a German law that gave the statutory right to work part-time to employees of firms with more than 15 employees on maternal labor market outcomes after giving birth. I find evidence that the law was effective in granting access to part-time work to those who wanted it: part-time employment increased in the short run. In the longer run, the law had a positive effect on maternal employment and labor earnings. Mothers with the right to work part-time were less likely to change the employer which could have affected labor earnings positively through a positive effect on firm-specific human capital. The reform also increased the skill level required for the job of eligible mothers in the short-run, which could mean that eligible mothers were less likely to experience occupational downgrading and could be a second reason for the positive labor income effect. However, the law led to a reduction or a postponement of higher-order births for women who returned to work after giving birth.

In terms of policy implications, the combination of an increase in part-time work after birth and the positive reform effect on earnings stands out. It means that the reform did not only increase the flexility of time of mothers after birth, but the positive reform-impact on labor earnings suggest that this kind of policy can also be helpful in addressing the child penalty that mothers in many high income countries are facing in the labor market after giving birth. However, the reform might have had a potentially unintended negative impact on (higher-order) fertility[25], which may be of concern given below-replacement fertility levels in Germany.

A large number of OECD countries adjusted their part-time work regulations during the last few decades and introduced laws which grant employees the right to reduce their working hours. The results in this paper may thus also be of interest in a non-German context. The findings show that the right to work part-time can have a strong impact on maternal labor market outcomes. Moreover, reform effects could potentially be expected to be even larger in countries where part-time work was less prevalent before the introduction of the right to work part-time than in Germany.

In my analysis, I only consider a relatively short post-reform period of one year. If the introduction of the law is associated with information frictions or implementation frictions, the effects of the reform are likely to grow further over time. These kinds of policies are also likely to have a larger impact on the labor market outcomes and fertility of younger cohorts not considered in this analysis who can still adjust many life course decisions such as educational and occupational choices (see Adda et al., 2017 and Wiswall and Zafar, 2018).

Finally, on January 1, 2019, the German government introduced a law that further extends

[25] As previously emphasized, this is only suggestive evidence as I only observe higher-order fertility of women who returned to the labor market after their previous birth. Moreover, my results refer to higher-order births up to six years after the previous birth. This means, that it is theoretically possible that women only postponed further births and the total number of children born is unaffected.

the rights of employees granted by the general part-time law discussed in this paper. The new law allows temporary part-time work with a right of return to the previous working time. This means that employees not only have the legal right to downgrade hours, but also have the right to upgrade hours later on. It is for future research to study how this extension of rights changed the incentives of mothers and affected the take-up rate of part-time work, longer-run labor market outcomes and fertility.

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