The two Elterngeld reforms in Germany. A success for gender equality in childcare and housework?

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1. Introduction

Although women's employment in Germany has increased significantly in recent decades, women still work part-time more often, earn less per hour and have significantly lower pension incomes than men (Wrohlich 2021, 748). Stimulated by societal problems such as old-age poverty among women, scholars found a strong link between these gender differences in the paid labor market and the gender gap in unpaid care work (gender care gap), which captures, among other things, gender inequalities in time spent on housework and childcare (Wrohlich 2021, 748). Women continue to spend more time on housework and childcare, and there is still a gendered divide between paid and unpaid work (Craig and Mullan 2011, 835). To promote a more equal division of unpaid work between parents, Germany introduced the landmark Elterngeld reform (parental allowance) in 2007, which was further reformed and expanded in 2015. This study aims to examine the causal effects of the two Elterngeld reforms on the childcare and housework time of fathers and mothers separately. The explanatory research question that will be answered is:

What effect did the introduction of the 2007 and 2015 Elterngeld reforms have on the time spent by fathers and mothers on childcare and housework on regular workdays in Germany?

To capture the overall effect of the Elterngeld reforms on these two dependent variables, this study uses a regression discontinuity design (RDD) in which the time spent on childcare and housework of the control group, consisting of parents who gave birth shortly before the introduction of each Elterngeld reform, is compared to the treatment group, which gave birth shortly after the introduction of the reforms. The data used for this study come from the SOEP, the largest and longest running multidisciplinary panel study in Germany (Goebel et al. 2019, 345; SOEP 2020). Due to some constraints in the data, the outcome year for which time spent on childcare and housework is recorded is 2009 for the first Elterngeld reform and 2017 for the second Elterngeld reform. The underlying reasons for this are explained in more detail in the operationalization.

Other scholars have already highlighted that Germany is a particularly interesting case to study the effect of parental leave reforms on time spent on childcare and housework, as in Germany both mothers and fathers have been entitled to parental leave already since the 1980s (Schober and Zoch 2015a, 7). This study draws on a variety of existing theories, both at the micro-level (bargaining theory and transformative perspective) and macro-level (policy designs and welfare state regimes), to derive the hypotheses. As there are conflicting theoretical assumptions in the academic literature about the effects of parental allowance on mothers' childcare time, this study also formulates an exploratory hypothesis.

More specifically, for both Elterngeld reforms this study expects a positive effect on workdays on the time fathers spend on childcare and housework and a negative effect on the time mothers spend on childcare and housework. In this study, however, no evidence was found to support the hypotheses. Given the research design and the analysis of this study, the research question must be answered as follows: No effects of the two Elterngeld reforms on childcare and housework on a regular workday for parents in Germany were found. A number of possible reasons with regard to these results were identified, which are explained in more detail in the analysis section of this paper and are summarized in the conclusion.

This study contributes to the academic literature in three ways, which are explained in more detail in the literature review. *First*, compared to previous studies, this study provides a more complete examination of the time spent by fathers and mothers on childcare and housework for parents from across Germany. *Second*, this is the first study on the effects of the 2015 Elterngeld reform on childcare and housework. In this context, it includes data from the SOEP up to 2017, which extends the time frame compared to previous studies. *Third*, it adds to the literature with a RDD, which to date has only been used to a limited extent by scholars for the analysis of the Elterngeld reforms. Here, it is the first study to use the SOEP data set for the RDD analysis.

Next to the academic relevance of this study, there is also a societal relevance. A multitude of scholars have identified the transition to parenthood as *the* turning point towards a more traditional division of labor and gender inequality in paid and unpaid work (see for example Bünning 2015, 739–40; Grunow, Schulz, and Blossfeld 2012, 303; Kühhirt 2012, 571; Rehel 2014, 110–11; Schober 2014a, 1; Schober and Zoch 2015a, 3; 2019, 158–59; Sievers 2022, 1; Wrohlich 2021, 748). This does not exempt couples who have previously practiced gender equality (Rehel 2014, 111; Grunow, Schulz, and Blossfeld 2012, 303). While many mothers leave the labor force after the birth of a child and their time allocation changes drastically, far fewer fathers stop employment even temporarily, and for most of them their time allocation remains rather stable (Bünning 2015, 739; Kühhirt 2012, 575; Rehel 2014, 110–11).

Because of the negative effects of such gender inequality, scholars have pointed to the importance of policies that target the period after the transition to parenthood and that promote an equal division of unpaid work (Grunow, Schulz, and Blossfeld 2012, 303; Wrohlich 2021, 748). Indeed, several countries have adopted family and particularly parental leave policies to promote fathers' participation in unpaid work (Schober and Zoch 2019, 159). Germany has followed this path, fundamentally changing German family policy with the introduction of the Elterngeld (parental allowance) in 2007 and its reform in 2015 (Huebener et al. 2016, 1166). In Germany, it can be observed that more and more fathers want to be an involved father, taking part in both childcare and housework (Schulz and Rost 2012, 28). While parents are increasingly in favor of a family model with equal division of unpaid work, this is still only implemented by a minority in practice (BMFSFJ 2016).

In view of the societal problems presented, it is apparent that in addition to parents' desire for an equal division of childcare and housework tasks, there is also a clear societal need for greater gender equality in unpaid work. With the ultimate goal of gaining a deeper insight into the persistent gender inequality in Germany and how it could be addressed through policy measures, the following analysis aims to provide a better understanding of the policies already in place in Germany.

This study is structured as follows: Section 2 presents the 2007 and 2015 Elterngeld reforms in more detail; section 3 contains a literature review, presents the theoretical and conceptual framework and illustrates the hypotheses; section 4 presents the data of this study, the research method and some descriptive statistics; section 5 presents the results and contains the analysis of this study; and finally, section 6 provides a conclusion.

2. Parental leave policies in Germany

In an international comparison, the duration of women's interruption of employment after childbirth was found to be above average in Germany, which was linked to the family policy in Germany and in particular the parental leave policy (Huebener et al. 2016, 1162). In 2007, German family policy underwent a paradigm shift from a conservative to a contemporary family policy oriented towards those of social-democratic welfare states (Huebener et al. 2016, 1160–61). The Federal Child-Raising Allowance Act (Bundeserziehungsgeldgesetz - BErzGG) was replaced by the Federal Parental Allowance and Parental Leave Act (Bundeselterngeld- und Elternzeitgesetz - BEEG) (BMFSFJ 2006; 2022b). In 2015, the BEEG was further reformed and expanded (BMFSFJ 2015). Both policy reforms aimed at strengthening the reconciliation of work and family life (BMFSFJ 2022a). Due to the fundamental change in parental allowance (Elterngeld), the two reforms are referred to in the following as the 2007 and the 2015 Elterngeld reform.

After a brief overview of the status quo before the two reforms, the 2007 Elterngeld reform will be presented first, followed by the 2015 Elterngeld reform.

Prior to 2007, parents were entitled to a child-raising allowance, the *Erziehungsgeld*, of 300 euros per month for up to 24 months after childbirth, depending on the family income (Schober and Zoch 2019, 161). This constituted a very long but rather low paid parental leave (Schober and Zoch 2015a, 6) which was granted after a means test (Kluve and Schmitz 2014, 165). In principle, being employed and receiving the child-raising allowance were possible at the same time, as long as the family income did not exceed the means test, but in practice this made it unattractive for many mothers to quickly return to paid employment (Kluve and Schmitz 2014, 165). In theory, fathers could also receive the child-raising allowance, but there were no special incentives such as parental leave months reserved especially for them, so it was almost exclusively taken up by mothers (Kluve and Schmitz 2014, 165).

2.1 2007 Reform: Elterngeld

With the 2007 Elterngeld reform (parental allowance), the so-called *Basiselterngeld* or *Elterngeld* was introduced, which, in general terms, compared to the *Erziehungsgeld*, covered a larger group of individuals, offered a higher pay and a shorter entitlement period, and included incentives for fathers' participation (Kluve and Schmitz 2014, 165).

Firstly, the means test was removed, effectively extending the scope of parental allowance to 100% of families (Kluve and Schmitz 2018, 148). Secondly, in contrast to the previous lump-sum payment, the Elterngeld was designed as an income replacement benefit (Huebener et al. 2016, 1159). More precisely, it replaces the net earned income based on the period of twelve months before the birth of the child with a minimum amount of 300 and a maximum amount of 1800 euros per month. In most cases this represents a 65% replacement, but for parents with a very small income it can represent a replacement of up to 100% (Familienportal 2022). Thirdly, with the introduction of the Elterngeld, the period of entitlement was reduced from up to 24 months to mostly twelve to 14 months, which is a significant reduction (Huebener et al. 2016, 1159). The entitlement period of twelve or 14 months has to do with an unprecedented development in German family policy, the so-called *Partnermonate*, which for the first time explicitly addresses both parents in their family responsibilities (Juncke, Braukmann, and Heimer 2018, 17) and aims to incentivize a partnership ('Partnerschaftlichkeit') in the use of Elterngeld (Samtleben, Schäper, and Wrohlich 2019, 609).

If only one parent receives Elterngeld, the entitlement period is 12 months. However, the entitlement period increases to a total of 14 months if the second parent is involved with *at least* two months of parental allowance, the above mentioned partner months (Partnermonate) (Huebener et al. 2016, 1160). Two important points are to be made here. Firstly, the text of the law does not specify exactly how the entitlement period should be divided between the parents if the maximum of 14 months is to be used. A 12-plus-2 division is the minimum requirement to qualify for 14 months. Any other division, such as a 7-plus-7 division, however, would also fall under the law. Secondly, the wording of the law is gender-neutral and thus does not suggest that in the minimum scenario the mother would necessarily take the 12 months and the father the two partner months (Samtleben, Schäper, and Wrohlich 2019, 609).

However, considering that the child-raising allowance has traditionally been used almost exclusively by mothers, these Elterngeld partner months can be seen as an implicit "father component" through which paternal involvement is encouraged and rewarded with additional Elterngeld months (Juncke, Braukmann, and Heimer 2018, 17). It is therefore not surprising that the partner months were quickly dubbed the "two daddy months", reserved exclusively for fathers (see for example Bünning 2015, 738; Kluve and Tamm 2013; Schober 2014b; Schober and Zoch 2015a; 2019; Tamm 2019).

Before the adoption of the 2007 Elterngeld reform, the partner months were hotly disputed between the coalition partners. While the Social Democratic Party (SPD) favored a 12-minus-2 division in which

parents only receive parental allowance for 12 months if the second parent participates with at least two months, which was declared to be a special incentive for fathers to participate, the Christian Democratic Union (CDU) criticized this as an intervention by the state in the division of labor between parents and prevailed with the two bonus months (12-plus-2) (Bujard 2013, 135–36).

In terms of goals, Bujard noted that there is no official catalogue of objectives for the Elterngeld reform (2013, 133). However, he identified five objectives that are frequently mentioned. In addition to the goals of firstly providing financial security, secondly providing time and space in the family formation phase and thirdly facilitating family formation, he mentions two objectives that concern gender equality and that are of particular interest for this analysis. These are, firstly, promoting the labor force participation of mothers and, secondly, increasing the care participation of fathers (2013, 140). Those two objectives have also been mentioned in other academic publications (see for example Boll, Leppin, and Reich 2011, 1; Huebener et al. 2016, 1159; Kluve and Schmitz 2018, 147; Samtleben, Schäper, and Wrohlich 2019, 608; Spiess and Wrohlich 2017, 44; Unterhofer, Welteke, and Wrohlich 2017, 659–60; Wrohlich and Wittenberg 2017, 668). With regard to the objectives on gender equality, it is also argued that the 2007 Elterngeld reform aimed to change individual attitudes and social norms (Wrohlich and Wittenberg 2017, 668).

2.2 2015 Reform: Elterngeld Plus and Partnerschaftsbonus

In 2015, the BEEG was further developed and a focus was placed on part-time employment. Since then, Elterngeld exists in three forms: *Basiselterngeld* or *Elterngeld* (the Elterngeld introduced by the 2007 reform), *Elterngeld Plus* and *Partnerschaftsbonus* (Juncke, Braukmann, and Heimer 2018, 20).

With Elterngeld Plus, a design flaw of the 2007 Elterngeld reform was corrected, which made it financially unattractive for parents to work part-time while receiving Elterngeld (Wrohlich and Wittenberg 2016, 1167). Parents who already wanted to work part-time while receiving parental allowance, could from then on apply for Elterngeld Plus instead of Elterngeld (Huebener et al. 2016, 1160). The maximum amount of Elterngeld Plus is half of the Elterngeld entitlement, that is, between 150 and 900 euros per month. At the same time, the period of entitlement is extended from 12 months to up to 24 months (Familienportal 2022). Before the 2015 reform, parents who worked part-time for several months at the same time received less parental allowance overall than parents where first one parent and then the other took care of the child (Spiess and Wrohlich 2014, 332). Accordingly, the aim of Elterngeld Plus was to eliminate the financial disadvantage of these parents and to stop the steering effect of the policy towards this "block model" (Spiess and Wrohlich 2014, 332; Unterhofer, Welteke, and Wrohlich 2017, 666). Another objective of Elterngeld Plus was to create incentives for mothers to enter the labor force earlier than in the case of a complete interruption of employment within the framework of Elterngeld, thereby increasing their chances of a stable income from employment in the medium and long term (Spiess and Wrohlich 2014, 332).

Additionally, parents can receive up to four additional months of the Elterngeld Plus entitlement as a partnership bonus (Partnerschaftsbonus) if both parents work part-time between 25 and 30 hours per week during this time (BMFSFJ 2022a). The objective of the partnership bonus is to create incentives for a more equal division of paid and unpaid work between parents and, in particular, to encourage mothers to engage in more extensive part-time work so that not only an earlier but also a more extensive entry into the labor market is achieved (Spiess and Wrohlich 2014, 332).

The following analysis studies the effects of the two Elterngeld reforms on mothers' and fathers' participation in childcare and housework. While the 2007 Elterngeld reform mentions increasing fathers' care participation as an aim, neither reform explicitly refers to both childcare and housework in its objectives. Nonetheless, increasing fathers' participation in childcare and housework while reducing mothers' time for these activities is implicit in other goals of both Elterngeld reforms, as labor market participation and the sharing of family responsibilities are inextricably linked (Geist 2005, 24).

3. Theory and Conceptual Framework

3.1 Literature Review

Within the academic debate, it has been recognized that gender inequalities within the home are related to gender inequalities outside the home (Grunow, Schulz, and Blossfeld 2012, 290) and that a first step toward gender equality is to understand under what conditions partners can achieve an egalitarian division of unpaid work at home (Lachance-Grzela and Bouchard 2010, 767). Since the 2000s, there has been a growing body of academic work examining unpaid domestic work, with varying emphases.

Studies outside Germany have focused, for example, on the gendered division of housework (Bianchi et al. 2000) and childcare (Craig 2006; Craig and Mullan 2011); the link between gender ideology (Bulanda 2004; Davis and Greenstein 2009) or welfare state regimes (Geist 2005) and the division of paid and/or unpaid work; and the effect of working hours in the paid labor market (Hallberg and Klevmarken 2003) or the father staying at home (Chesley 2011) on childcare time. Studies in Germany, for example, have looked at the gendered division of childcare and housework (Samtleben 2019); the effect of marriage on the time spent on housework (Grunow, Schulz, and Blossfeld 2012); the link between birth of a child and the division of market hours, housework and childcare within couples (Kühhirt 2012); and have compared the effects of part-time work and parental leave of fathers on their childcare time (Bünning 2016).

In addition, scholars have been interested in the potential of public policies to promote gender equality. While some scholars examine the impact of hypothetical public policies on the equal division of paid and unpaid work between parents (Bünning and Hipp 2022) or different types of parental leave policies (Brighouse and Olin Wright 2008), others study parental leave policies that have actually been introduced.

Outside Germany, these scholars study the effects of parental leave policies, for example on childcare and/or housework time (Almqvist and Duvander 2014; Boll, Leppin, and Reich 2011; Hook 2006; Lachance-Grzela and Bouchard 2010; Patnaik 2019; Rehel 2014; Schulz and Rost 2012). In Germany, the studies examine the link between the type of parental leave policy and parental involvement (Sievers 2022); what prevents or encourages fathers to take parental leave (Brandt 2017; Geisler and Kreyenfeld 2011; Trappe 2013); and simulate the fiscal costs and expected labor market outcomes of German parental leave policies (Spiess and Wrohlich 2008). Moreover, scholars explore various effects of German parental leave policies, such as the impact on maternal employment (Geyer, Haan, and Wrohlich 2015; Kluve and Schmitz 2014; 2018; Kluve and Tamm 2013) and paternal employment (Kluve and Tamm 2013; Tamm 2019).

The German Institute for Economic Research (DIW Berlin) has further published a series of short reviews in which it assesses the two Elterngeld reforms in terms of their objectives and examines a range of factors such as the financial situation of families, mothers' labor market participation and interruptions of employment, the take-up and division of parental leave between parents, the division of childcare and housework tasks after taking parental leave, fertility and social norms, and identified opportunities for improvement after the introduction of those two reforms (Huebener et al. 2016; Samtleben, Schäper, and Wrohlich 2019; Spiess and Wrohlich 2014; 2017; Unterhofer, Welteke, and Wrohlich 2017; Wrohlich and Wittenberg 2016; 2017; 2019).

In addition, and of particular interest to this study, a number of scholars have examined the effects of German parental leave policies on parents time spent on childcare and/or housework (Bünning 2015; Kluve and Tamm 2013; Schober 2013; 2014a; 2014b; Schober and Zoch 2015a; 2015b; 2019; Streckenbach, Castiglioni, and Schober 2021; Tamm 2019). The following section explains the gaps identified in the existing literature and how this study contributes to the existing literature. For a better overview, three main points are distinguished, for each of which the contribution of this study is explained individually.

First, while the majority of the aforementioned studies examine the effects on both childcare and housework, two of them focus only on the effects on childcare and not on the reform effects on housework (Kluve and Tamm 2013; Streckenbach, Castiglioni, and Schober 2021). Furthermore, while about half of the studies focus on childcare and housework effects, a large number examine only the effects on fathers and do not include reform effects on mothers (Kluve and Tamm 2013; Schober 2014a; Streckenbach, Castiglioni, and Schober 2021; Tamm 2019). Lastly, not all studies include parents from all over Germany in their analysis, but focus only on a sample from western Germany (Schober 2014b) or only on one (Streckenbach, Castiglioni, and Schober 2021) or two (Kluve and Tamm 2013) German federal states.

This study acknowledges these limitations in the current literature and provides an analysis that captures reform effects on both childcare and housework for both mothers and fathers from across Germany.

Second, while the 2007 Elterngeld reform has been studied by all of the aforementioned scholars, none of them has conducted a study on the effects of the 2015 Elterngeld reform on childcare and housework. Linked to this, while other scholars have used data from the German Socio-Economic Panel (SOEP) to examine German parental leave policies in Germany, they have only used data from the SOEP up to the year 2010, (Schober 2013; 2014b), the year 2012 (Bünning 2015; Schober and Zoch 2015a; 2015b; 2019), and the year 2015 (Tamm 2019).

This study has identified this gap in the academic literature and is the first to extend the time frame and include data from the SOEP up to 2017 in its analysis. Accordingly, it is the first to thoroughly examine the effects of the 2015 Elterngeld reform on the time spent by mothers and fathers on childcare and housework.

Third, the majority of the aforementioned studies were interested in the effects on childcare and/or housework for those mothers and fathers who actually made use of the parental allowance, and some studies further differentiated the effects of different durations of leave take-up and whether parental leave was taken alone or jointly with a partner (Bünning 2015; Schober 2013; Schober and Zoch 2015b; 2015a; 2019; Streckenbach, Castiglioni, and Schober 2021; Tamm 2019). In the literature review, however, only one publication could be identified that examined the effects of the 2007 Elterngeld reform on childcare and housework time using a RDD, comparing the outcomes of all parents who gave birth shortly before the reform with those who gave birth shortly after the reform (Kluve and Tamm 2013). In their study, Kluve and Tamm (2013, 1002–3) explore the effects of the 2007 Elterngeld reform on fathers' contributions to childcare. They used data collected specifically for that study, but the population from which the sample was drawn was not considered representative of the German population because it came from two health insurance providers in two federal states in Germany (2013, 994).

The present study finds that the effects of the Elterngeld reform have hardly been investigated with a RDD so far and therefore aims to contribute to the academic literature by presenting another study with a RDD. In doing so, it takes Kluve and Tamm's (2013) analysis as a starting point, but extends it in several ways. First, both times spent on childcare and housework are included as dependent variables in the analysis, which provides a more accurate picture of the impact of the Elterngeld reform on unpaid work. Second, the effects of the reform on both fathers and mothers are included. Third, it uses the SOEP data set, which is considered representative of the German population and with which no RDD on parental allowance reforms has been conducted before. Lastly, it is the first study to use a RDD to examine the effects of the 2015 Elterngeld reform on parents' time spent on childcare and housework.

To summarize, since the 2000s, there has been a growing body of academic literature addressing the issue of gender inequalities and, in particular, the division of unpaid work between parents and parental leave policies. Although academic attention to this topic has increased in Germany, Fichtl et al. (2017, 124) argue that the number of studies for Germany that causally examine the effects of the Elterngeld

reforms is still limited. This study is motivated by the current lack of academic literature and aims to fill the aforementioned gaps. More specifically, this study examines the causal effects of the 2007 and 2015 Elterngeld reforms on parents' time spent on childcare and housework, as these two areas provide a good capture of parents' unpaid work. Thus, the research question of this study is as follows:

What effect did the introduction of the 2007 and 2015 Elterngeld reforms have on the time spent by fathers and mothers on childcare and housework on regular workdays in Germany?

3.2 Theoretical framework

When studying the effects of parental leave reforms on questions of gender equality, scholars have drawn on a variety of theories. In their study, Lachance-Grzela and Bouchard (2010, 771) draw on a number of earlier theoretical approaches by different scholars and divide them in their theoretical framework into micro- and macro-level theories. This division into micro-level theories, which focus on individual characteristics, and macro-level theories, which focus on national and social contexts (2010, 768), seems particularly appropriate when studying gender equality questions, as there seems to be an interplay between the two levels (2010, 777). Prior to this, Geist (2005, 23) already recognized the importance of a division into micro- and macro-level theories.

While the majority of scholars who have so far studied the effects of parental leave policies have exclusively or mainly drawn on micro-level theories (see for example Boll, Leppin, and Reich 2011; Brandt 2017; Patnaik 2019; Rehel 2014; Trappe 2013), this paper is convinced of the role of both micro- and macro-level theories argued for by the authors (Lachance-Grzela and Bouchard 2010, 778) and accordingly uses the same division for its theoretical part. In addition, this paper justifies the use of different theories with the reasoning of previous scholars that none of the established theories alone can explain the division of labor between parents (Schulz and Rost 2012, 29). In the following, the theoretical approaches considered most relevant to answer the research question are introduced.

3.2.1 Micro-level theories

Micro-level theories aim to address questions of gender equality by focusing on the individual characteristics of parents (Lachance-Grzela and Bouchard 2010, 767). In the following, the bargaining theory and the transformative perspective will be introduced.

3.2.1.1 Bargaining theory: housework and childcare tasks

A theoretical approach that is appropriate to study the division of paid and unpaid work between partners, is the economic bargaining theory (Schulz and Rost 2012, 30). It assumes that in a relationship partners have different and possibly conflicting interests and that they negotiate their allocation of time (Hook 2006, 641). The partner that has more resources is in a better bargaining position and can achieve a more favorable bargaining outcome for him or herself and thus avoid unpleasant tasks by delegating them to the partner (Geisler and Kreyenfeld 2011, 89). Having more resources means that one's own

income opportunities in the market are higher than those of the partner (Schulz and Rost 2012, 30). So the partner in the unfavorable bargaining position spends his or her time on these tasks because he or she *has* to do it (Bünning 2015, 741). Renegotiation of the established division occurs when the demand for paid and unpaid work changes or the resources of the partners change (Bünning 2015, 740). One of these moments where the demand structure changes is when partners become parents and because of the birth of the child more time for housework and childcare is required (Bünning 2015, 740). Taking parental leave and the associated potential negative impact on income opportunities due to a disruption in employment are expected to reduce the bargaining power of that individual (Schober 2014a, 3).

Some scholars assume that the bargaining theory does not distinguish between childcare and housework tasks, as both are seen as unpleasant tasks that individuals want to avoid (Geisler and Kreyenfeld 2011, 89; Trappe 2013, 31). Other scholars, however, use bargaining theory in their studies only to explain the division of housework. In some studies, this appears to be because the focus of the work is simply on housework rather than childcare tasks (Bianchi et al. 2000; Grunow, Schulz, and Blossfeld 2012; Schulz and Rost 2012). In other studies, however, scholars address both housework and childcare, arguing that while the theoretical approach captures well that housework is something parents want to avoid, it is less useful in explaining the division of childcare because the nature and predictors of childcare are different (Lachance-Grzela and Bouchard 2010, 769; Rehel 2014, 112). Fathers indeed want to be more engaged in childcare, and so this task is shared more willingly between parents than housework (Almqvist and Duvander 2014, 25; Bünning 2015, 741). Schober and colleagues agree, arguing that parents want to avoid and delegate housework because it is seen as a more "onerous" and less fulfilling task (Schober 2014b, 335; Schober and Zoch 2015a, 10; 2019, 163). Craig and Mullan even go a step further, saying that mothers may not even be willing or able to bargain over childcare and thus delegate and give up childcare tasks (a phenomenon described as 'maternal gate-keeping') (2011, 835).

This paper is convinced by the above arguments for different preferences for childcare and housework tasks and therefore chooses this over theoretical explanations that do not distinguish between them.

3.2.1.2 Transformative perspective

Another theoretical approach that offers insights into decisions to participate in paid and unpaid work is the transformative perspective. One scholar who has defined this theoretical approach with regard to parental leave policies is Bünning (2015, 740), so the following description draws on her insights. The transformative perspective holds that the profound changes in the lives of parents as a result of the transition to parenthood can potentially lead to a change in preferences and their allocation of time. In particular, the potential effect of taking parental leave is to be noted here. According to Bünning (2015, 740), the experience of taking parental leave and being responsible for a new born child gives fathers the opportunity to build a close relationship with their child and learn the skills and develop the confidence required for parenthood.

As a result of taking parental leave, fathers realize that parenting is something that can and must be learned, which challenges the assumption that mothers are naturally better equipped to do so. As a result of these gained experiences, Bünning (2015, 740) argues that fathers' preferences are changing from a desire to pursue primarily paid work in the labor market to a desire to participate more actively in unpaid work at home. Fathers thus reduce their time in paid work and increase their time in childcare and housework tasks as a result of having taken parental leave. This transformative effect is expected to be stronger when the parental leave taken by fathers was longer and when it was taken alone, without the mother (2015, 740). Importantly, fathers spend their time on these tasks because they *want* to do it (2015, 741).

Interestingly, while Bünning (2015, 740) argues that according to the transformative perspective an increased time both in childcare and housework are to be expected, in her description she only gives examples of fathers changing perceptions of childcare. Thus, while the transformative perspective provides a comprehensible theoretical framework for the effects on time spent by fathers on childcare, it would not be surprising if this did not apply to time spent on housework, which would be consistent with the theoretical assumptions of the bargaining theory.

3.2.2 Macro-level theories

Macro-level theories aim to answer questions of gender equality by focusing on national and social contexts (Lachance-Grzela and Bouchard 2010, 767). They argue that structures and culture have an impact on how responsibilities are divided within a family and that it is therefore important to understand them (Lachance-Grzela and Bouchard 2010, 774). In the following, the theoretical approaches on policy design and welfare state regimes will be introduced.

3.2.2.1 Policy designs

At the core of this theoretical approach is the idea that the *design* of a parental leave policy does impact gender equality (Sievers 2022, 1).

More precisely, Brighouse and Wright (2008, 360) made a distinction between three types of policies: equality-impeding, equality-enabling and equality-promoting policies. *Equality-impeding* policies do not reduce but actively perpetuate gender inequalities between parents. Examples of such equality-impeding policies would be parental leave schemes open exclusively to mothers and those offering unpaid parental leave for the parents, the latter having the same effect as unpaid parental leave is in fact mainly taken by mothers (2008, 361). *Equality-enabling* policies make equality for parents possible, but do not explicitly require it to be put into practice. Examples of such equality-enabling policies would be parental leave schemes that offer paid and generous parental leave and that are open to both parents equally. Importantly, these schemes do not provide for individual leave entitlements, leaving it up to the parents whether or not to share the leave equally (2008, 361). Lastly, *equality-promoting* policies do actively encourage and require more gender equality from parents (2008, 361). Examples of such

equality-promoting policies would be parental leave schemes that provide the mother and father with individual leave entitlements which cannot be transferred from one parent to the other. If the father does not take his share of the parental leave, this share is lost. This “use-it-or-lose-it” aspect thus sets strong incentives for fathers to also take parental leave, which is said to promote gender equality (2008, 362). Still more equality-promoting are policies that also require parents to take the parental leave alone, without the other parent present (Sievers 2022, 4).

The role of policy design in achieving gender equality is also confirmed by other scholars. Bünning and Hipp (2022, 192) show that policy designs that extend individual, non-transferable paid leave entitlements have a positive impact on parents' preferences for gender equality. They argue that fathers are inclined to only claim the share of paid parental leave that is exclusively reserved for them and that would be lost if it were not taken, which is in line with the theoretical insights on equality-promoting policies (2022, 192). Furthermore, a policy design, which for example increases the individual, non-transferable leave entitlement for fathers, makes a normative statement and frames what is socially acceptable thenceforth (2022, 185). However, a policy design with its normative statement does not exist in a societal vacuum and only achieves the desired effect if there is also a simultaneous change in societal norms, which may take longer (2022, 193).

3.2.2.2 Welfare state regimes

At the core of the theoretical approach on welfare state regimes is the idea that societal norms about gender relations are created and perpetuated within welfare state regimes (Geisler and Kreyenfeld 2011, 90). Parents' decisions on the division of paid and unpaid work thus are not made in a “societal vacuum” (Grunow, Schulz, and Blossfeld 2012, 293). It is assumed that societal norms about the appropriate behavior of mothers and fathers might even have a greater influence on decisions than individual characteristics (Geist 2005, 27). Said differently, welfare state regimes are expected to reinforce specific systems of gender relations and divisions of work and care (Gangl and Ziefle 2015, 554).

The idea that there is not one welfare state, but that there are different welfare state regimes has been shaped by Esping-Andersen (van Kersbergen and Vis 2014, 53). In his original classification, Esping-Andersen identified the social democratic, conservative and liberal welfare state regime (van Kersbergen and Vis 2014, 63). Germany was thereby considered to be the archetype of a conservative welfare state regime (Seeleib-Kaiser 2016, 222) where “structures of inequality” (Esping-Andersen 2018, 138) are reproduced especially between family and household types and gender (van Kersbergen and Vis 2014, 63–66).

The German conservative welfare state regime historically had one of the most pronounced male breadwinner cultures which encouraged a division of labor where women specialized in unpaid and men in paid work (Bünning 2015, 739). Thus, family structures in Germany have been characterized by traditional gender roles where the woman is considered “naturally” responsible for childcare and

housework (Geist 2005, 26). After becoming parents, mothers are expected to be the primary caretakers of the children, while from men only a supporting role is expected (Cordero-Coma and Esping-Andersen 2018, 9). The situation is the same for housework, with women also assuming the main responsibility here (Geist 2005, 30). According to the theoretical approach on welfare state regimes, national assumptions about gender are considered to have a substantial impact on men's and women's actual participation in paid and unpaid work (Hook 2006, 655). A welfare state regime can thus create a setting that encourages one specific division of tasks over another (Geist 2005, 26). In the case of the German conservative welfare state regime it has traditionally supported a "gendered allocation of labor" (Lachance-Grzela and Bouchard 2010, 767).

3.3 Conceptual Framework and Hypotheses

After a literature review and an outline of the theoretical framework, this section presents the conceptual framework of this paper, in which I combine aspects of the theoretical approaches mentioned above. This is followed by the formulation of a series of hypotheses, which are presented separately for the 2007 and 2015 Elterngeld reforms.

3.3.1 2007 Reform

As explained above, there was a growing awareness in Germany that a gendered division of paid work is closely related to a gendered division of childcare and housework, which is why the Elterngeld reform aimed to increase mothers' labor force participation and fathers' family participation. Any effects on time spent on childcare and housework should therefore be visible for both mothers and fathers on a regular workday, as gender inequality on these days is related to the social problems underlying the reform. Since regular workdays under German labor law are from Monday to Friday, we expect the reform to have an effect on these days (Jura.cc 2022).

The policy design of the Erziehungsgeld, as introduced above, that was in place prior to the 2007 Elterngeld reform, already contained elements that could be regarded as *equality-enabling*, but the element of equality-promotion was still missing. Although it was open to both parents equally, it did not yet contain any parental leave months specifically reserved for fathers. With the Partnermonate of the 2007 Elterngeld reform, for the first time an *equality-promoting* element was introduced by providing for a non-transferable individual leave entitlement for fathers. This also made a normative statement about what was henceforth considered socially desirable in Germany. According to welfare state regime theory, this shift from the earlier German conservative welfare state regime, in which mothers were expected to have the primary responsibility for childcare and housework, to a more social democratic regime that emphasized the caregiving responsibilities of both parents, created an environment conducive to this new, more equal division of unpaid caregiving responsibilities. This shift towards addressing both parents in their family responsibilities is expected to increase fathers' involvement in

childcare and housework and thus reduce mothers' time spent on these activities, which is in line with the objectives of the reform.

However, the theoretical approaches suggest that the changes in time spent on unpaid care work will be different for childcare and housework, as explained in more detail below.

The *bargaining theory* holds that the increased use of parental allowance by fathers and the decreased use of it by mothers induced by the new policy design leads to a reduction in the bargaining position of fathers and a strengthening of the bargaining position of mothers, which in turn leads to a change in the distribution of time spent on housework. Scholars agree that the change in bargaining positions due to the unpleasant nature of housework should lead to a reduction in mothers' time spent on housework and an increase in fathers' time spent on housework. In line with the arguments of a number of scholars, it seems reasonable to expect this mechanism to work differently for childcare, as this is seen as a more enjoyable task.

Under the *transformative perspective*, it is argued that as a result of the increased take-up of parental leave by fathers due to the equality-promoting policy design, fathers change their preferences for time allocation in favor of childcare instead of paid work. While the same change in preferences could be expected for housework under the transformative perspective, this has not yet been convincingly demonstrated in the academic literature, as described above. This could be explained by the predictions of the *bargaining theory*, according to which housework is generally seen as more onerous than childcare. The combined insights from policy designs, bargaining theory and the transformative perspective lead us to the first two hypotheses regarding the time spent on housework:

> ***Hypothesis 1.1:*** *The 2007 Elterngeld reform has a positive effect on the time spent by fathers on housework on a workday.*
>
> ***Hypothesis 1.2:*** *The 2007 Elterngeld reform has a negative effect on the time spent by mothers on housework on a workday.*

As mentioned earlier, childcare is generally seen as a more enjoyable task than housework, so the expected effect of the reform on childcare should be considered separately from that on housework. For fathers, the *transformative perspective* suggests an increase in time spent on childcare. This positive effect is likely to be greater than the increase in time spent on housework, as fathers do not only spend time on childcare because they have to, but also because they want to. This leads to the third hypothesis:

> ***Hypothesis 1.3:*** *The 2007 Elterngeld reform has a positive effect on the time spent by fathers on childcare on a workday.*

For mothers, the theoretical approaches do not allow for such a clear prediction. On the one hand, the theoretical approaches would suggest that mothers would reduce their time spent on childcare due to the change in bargaining positions and the increased preference of fathers to spend more time on childcare.

On the other hand, however, scholars have found that mothers may be unwilling to give up their childcare responsibilities (maternal gate-keeping), which means that there would be no effect on mothers' time spent on childcare (Craig and Mullan 2011, 835–36). Considering that the reform aimed to increase not only fathers' care participation but also mothers' labor force participation, which implies an increase in mothers' time spent outside the home, a reduction in time spent on childcare, even if only minor, is considered more convincing. In the absence of a clear dominant theory, however, the following fourth hypothesis can be considered exploratory (Toshkov 2016, 292).

> ***Hypothesis 1.4****: The 2007 Elterngeld reform has a negative effect on the time spent by mothers on childcare on a workday.*

3.3.2 2015 Reform

With the introduction of the Elterngeld Plus and the Partnerschaftsbonus as part of the 2015 Elterngeld reform, part-time employment alongside the receipt of parental allowance was actively promoted for the first time. The objective of introducing these part-time elements was to allow parents to work part-time while receiving parental allowance and to enable a more equal division of paid and unpaid work between them. These new elements can be regarded as *equality-enabling*, as they are equally open to both parents, but do not provide each parent with an individual entitlement. As they do not have the quality of an *equality-promoting* policy, the effects of the reform are likely to be smaller than they would have been in such a scenario.

In general, it should further be noted that the 2015 Elterngeld reform did not represent the same fundamental change for German family policy as the previous Elterngeld reform of 2007 and instead, as explained above, was mainly aimed at correcting some design flaws of the previous policy. It thus did not replace the previous policy, but complemented it with the possibility for parents to benefit from Elterngeld Plus and the Partnerschaftsbonus. Accordingly, the effects of this second reform are not expected to be as strong as those of the first reform. Since the theoretical considerations underlying the 2015 Elterngeld reform are very similar to those of the 2007 Elterngeld reform, they are not reproduced here in the same depth.

The *bargaining theory* suggests that part-time employment alongside the receipt of parental allowance would lead to a strengthening of the mother's bargaining position and a reduction of the father's bargaining position. More specifically, with the introduction of the 2007 Elterngeld reform, as explained above, a block model was encouraged in which parents alternate in caring for the child and the father has only the role of supportive caregiver with the two daddy months (12-plus-2 minimum requirement). The 2015 Elterngeld reform instead actively supports a situation where both parents have paid part-time employment and unpaid care responsibilities. Accordingly, mothers are in a stronger bargaining position to opt out of housework and men in a weaker one, which means that the time spent on housework

decreases for mothers and increases for fathers, compared to the situation before the 2015 Elterngeld reform. These insights lead us to the first two hypotheses regarding the time spent on housework:

> ***Hypothesis 2.1:*** *The 2015 Elterngeld reform has a slight positive effect on the time spent by fathers on housework on a workday.*

> ***Hypothesis 2.2:*** *The 2015 Elterngeld reform has a slight negative effect on the time spent by mothers on housework on a workday.*

Regarding the impact on childcare, according to the *transformative perspective*, we would expect fathers' preferences to change as a result of part-time employment from wanting to primarily engage in paid work to being more actively involved in childcare, which leads us to the third hypothesis. Also here, this positive effect is likely to be greater than the increase in time spent on housework, as fathers do not only spend time on childcare because they have to, but also because they want to:

> ***Hypothesis 2.3:*** *The 2015 Elterngeld reform has a slight positive effect on the time spent by fathers on childcare on a workday.*

When it comes to the effects on childcare for mothers, also for the 2015 Elterngeld reform the theoretical approach does not allow for one clear prediction. On the one hand, the *transformative perspective* would suggest that mothers' preferences are evolving from a desire to only care for the child to a more active participation in the paid labor market. On the other hand, while mothers want to participate more actively in the paid labor market, they may still see themselves as the main caregiver of the child and are not willing to give up their childcare responsibilities (maternal gate-keeping). For the same reasons as in the first reform, a reduction in the time spent on childcare, even if minor, is seen as more convincing. The fourth exploratory hypothesis is therefore as follows:

> ***Hypothesis 2.4:*** *The 2015 Elterngeld reform has a slight negative effect on the time spent by mothers on childcare on a workday.*

4. Data and Method

In this part of the paper, I will first introduce the data set for my analysis, second explain and justify my decision to use a regression discontinuity design, third operationalize my hypotheses, and fourth provide some descriptive statistics.

4.1 SOEP Data

The data used for this analysis come from the German Socio-Economic Panel (SOEP-Core v37) which is located at the German Institute for Economic Research (DIW Berlin) (Goebel et al. 2019, 345; SOEP 2020). The SOEP is the largest and longest-running multidisciplinary panel study in Germany, conducted since 1984. Currently, a representative sample of around 30.000 persons in about 15.000

private households is surveyed each year. Because the same respondents are interviewed every year, the SOEP data are well suited for studying societal and group-specific phenomena (DIW Berlin 2022). Analyses with data from this data set can thus provide valid results, as the SOEP is representative of the German population. Topics of the SOEP-Core include among others demography, population and family, work and employment, education and qualification, time use, income as well as migration (SOEPcompanion 2022b).

For this study, data from the individual questionnaire (pl) and the corresponding individual tracking file (ppathl) were used (Kantar Public 2021). While the individual tracking file provides us with information on all individuals who have ever lived in a SOEP household, such as their sex, birth year, birth place, marital status, immigration year and living place in 1989 (year of the fall of the Berlin wall), the individual questionnaire provides us with the direct information of the respondents to the extensive annual question catalogue (SOEPcompanion 2022a). The individual tracking file and individual questionnaire are merged via the identifiers (ID) survey year and individual numbers (SOEPcompanion 2022a).

Of particular interest to this study is the information on childbirths, childcare time and housework time. In the individual questionnaire, individuals are asked annually about childbirths (paneldata.org 2022a; 2022d) and about the time spent on housework and childcare on a regular workday (paneldata.org 2022b; 2022c). In the following, a brief overview of the questions asked in the individual questionnaire is provided, from which the most important variables of interest are derived.

With regard to childbirths, the following question is asked in the individual questionnaire: *"Has your family situation changed since [year of this survey]? Please indicate if any of the following apply to you and if so, when this change occurred."* (Kantar Public 2021, 35; paneldata.org 2022a; 2022d). Those individuals who answered 'yes' to this question and provided an exact month of birth of their child are included in this study. By taking into account the gender of the individual being interviewed, it is possible to determine whether the respondent is a mother or a father. Further details on the specifics of the treatment and control group follow in the next section.

In terms of time spent on childcare and housework, which are the dependent variables of this study, the question in the individual questionnaire is *"What is a typical weekday like for you? How many hours per normal workday do you spend on the following activities?"* (Kantar Public 2021, 4; paneldata.org 2022b; 2022c). Housework is hereby defined as washing, cooking and cleaning (Kantar Public 2021, 4). The data on childcare and housework are therefore the average time spent on these activities on such a day.

However, there are also potential limitations. In the SOEP, times spent on childcare and housework are measured using retrospective survey questions rather than time diaries. This has two potential limitations: first, retrospective surveys may be susceptible to over-reporting compared to time diaries in

which tasks performed are recorded in detail and without a time lag (Kühhirt 2012, 568). Second, if the Elterngeld policies had a stronger effect on norms and attitudes about childcare and housework than on parents' actual practices, the associations with the two reforms may be overestimated (Schober 2014b, 369).

Taking these limitations into account, we can nevertheless be confident about the significance of the results of the present study, since there is no other data set that captures the time spent on childcare and housework and that is as extensive and covers as long a time period as the SOEP. Moreover, these limitations should not pose a threat to validity, as the question from the individual questionnaire is considered to be a quite appropriate and valid measure of time spent on childcare and housework, as shown by the repeated use of this data set and these variables in previous studies (see above).

Moreover, the SOEP-Core does not distinguish between Basiselterngeld, Elterngeld Plus and the Partnerschaftsbonus introduced in the sections on the 2007 and 2015 Elterngeld reforms, and instead only asks about Elterngeld in general (Kantar Public 2021, 21; paneldata.org 2022e). However, this is not of great concern, as the present study is interested in the reform effects of the entire Elterngeld reforms and not in the effects of a single aspect of them.

4.2 Regression Discontinuity Design

To measure the causal effect of a treatment, there are different methods available to researchers. The one that is often considered the gold standard for producing causal inferences is the randomized controlled trial (RCT) (Toshkov 2016, 166). Here, the researcher is able to randomly assign individuals to the group that receives the treatment (treatment group) and the other group that does not (control group) (Toshkov 2016, 167). Because of this random assignment, the two groups differ only in treatment, so that any differences that can be observed between the groups after the experiment has been conducted can be attributed to the treatment (Angrist and Pischke 2015, 12). In practice, however, using RCTs in political science is often impossible, impractical or controversial from an ethical perspective (Toshkov 2016, 196). Randomising the receipt of parental allowance entitlement in order to identify causal effects on childcare and housework participation, would probably have been considered unethical by many (Toshkov 2016, 197). Researchers, however, have developed other methods to study causal effects when RCTs are not possible.

One such method that allows for the study of parental leave policies when an RCT is not possible is the regression discontinuity design (RDD) which was first introduced in 1960 by Thistlethwaite and Campbell (Lee and Lemieux 2010, 286). In the following, the RDD is introduced and the preference of this method for studying the effects of the Elterngeld reforms on parents' time spent on childcare and housework is justified.

The defining characteristic of a RDD is that it provides us with an "as good as randomized experiment" (Lee and Lemieux 2010, 308). Let us explain this in a little more detail. A RDD allows the study of cases where the treatment status changes abruptly due to a cutoff point (Angrist and Pischke 2015, 175). The variable that determines whether a unit receives the treatment or not is the so-called *running variable*. When this running variable crosses the cutoff point, the treatment is turned on or off (Angrist and Pischke 2015, 151). The idea is that the units are not able to manipulate the running variable, so the variation in treatment around the cutoff point is basically random. Thus, the units have about the same probability of ending up just below the cutoff point (and thus not receiving the treatment) or just above the cutoff point (and thus receiving the treatment) (Lee and Lemieux 2010, 283). This means that the units just below the cutoff point (the control group) can be compared well with the units just above the cutoff point (the treatment group) because they are very similar in their characteristics, except for the fact that one group received the treatment and the other did not (Lee and Lemieux 2010, 281). In the following, the RDD will be explained and visualized in light of the topic of the current study.

4.3 Operationalization

Previously, a number of scholars have used a RDD to study the effects of parental leave policies. Outside Germany, Patnaik (2019) has used a RDD to study the effects of the Quebec Parental Insurance Plan introduced in 2006 on fathers' and mothers' claim rates and leave duration. Within Germany, to date, only a few researchers have used this design to study the effects of parental leave policies. For instance, Kluve and Tamm (2013), presented in the literature review section, used a RDD to study the effects of the 2007 Elterngeld reform on household income, probability of receiving social transfers, mothers' and fathers' employment participation and fathers' contribution to childcare. In addition, Kluve and Schmitz (2014) used this design to study the effects of the 2007 Elterngeld reform on mothers' labor force participation, part-time and full-time employment, permanent contracts, and additional births.

In their studies, Kluve and Tamm (2013) and Kluve and Schmitz (2014) provide evidence for why the 2007 Elterngeld reform is well suited for a RDD. In the following, these arguments are presented and explained in light of the present study on the 2007 Elterngeld reform and after that discussed with respect to the 2015 Elterngeld reform.

4.3.1 2007 Reform

Starting with the 2007 Elterngeld reform, Kluve and Tamm (2013, 985–86) and Kluve and Schmitz (2014, 168) argue that the entry into force of the Elterngeld in 2007 created a natural experiment that allows for comparing parents who gave birth shortly before (control group) with those who gave birth shortly after the policy came into force (treatment group). The reason for this is that the policy was enacted after a fast legislative process, so that none of the parents who gave birth shortly before or after the new policy was put in place knew when they conceived the child that a new policy would be in force when their child was born. The two groups of parents should therefore be similar in all characteristics

except their eligibility for parental allowance (Kluve and Tamm 2013, 985–86). Beyond this, there were no further legal changes at the turn of the year 2006/2007 that could impact the results (Kluve and Schmitz 2014, 168). Thus, by comparing the outcomes of these two groups, it is possible to generate unbiased estimates of the effects of the 2007 Elterngeld reform (Kluve and Tamm 2013, 985–86). Convinced by this line of reasoning, the arguments briefly touched on here are considered in detail in the following.

In line with the earlier findings of Kluve and Tamm (2013) and Kluve and Schmitz (2014), the 2007 Elterngeld reform was indeed passed after a fast legislative process. The bill of the Christian Democratic Union (CDU) and the Social Democratic Party (SPD) was first introduced on June 20, 2006, after which the bill was debated for the first time in the plenary session of the German Bundestag on June 22, 2006 (DIP Deutscher Bundestag 2022b). This reform also first appeared in the news of the Bundestag, Bundesrat, and Bundesregierung on June 21, 2006 (dejure.org 2006). In the most read German newspaper 'Bild' (deutschland.de 2020), the first references to the Elterngeld reform can already be found in mid-April (Bild.de 2006a), but the first article explicitly naming Elterngeld in the title appeared on June 15, 2006 (Bild.de 2006b). Thus, it was not until June 2006 that the Elterngeld reform became really prominent in the media and thus to potential future parents.

To recall, the date proposed in the bill and also adopted in the final version of the law states that the 2007 Elterngeld reform applies to all parents whose child was born on or after January 1, 2007 (Deutscher Bundestag 2006). Assuming a 40-week pregnancy, it therefore seems appropriate to include the last three months of 2006 and the first three months of 2007 in the analysis, since these parents could not have known at the time of conception that the policy would come into effect. This is in line with the findings of Kluve and Tamm (2013, 994) and Kluve and Schmitz (2014, 168).

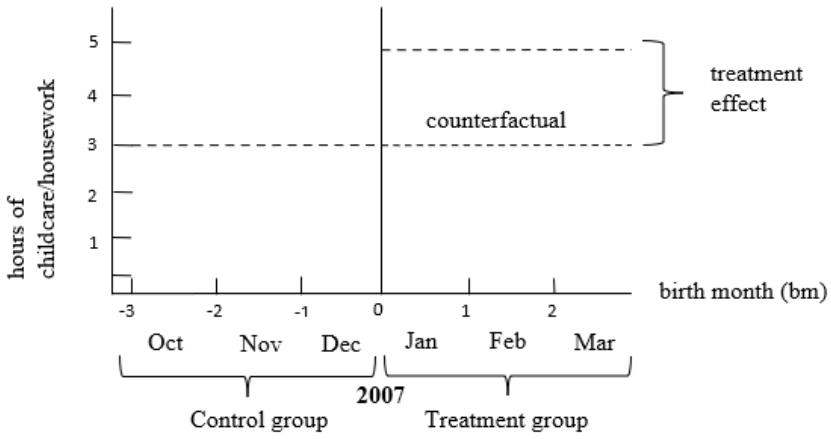
As described above, a basic requirement for a RDD is that parents cannot self-select into the treatment and control groups, which would undermine randomization. Based on the finding of Tamm (2013, 598) that as a result of the 2007 Elterngeld reform a number of births in Germany were indeed postponed from December 2006 to January 2007, Kluve and Tamm (2013, 994) decided to exclude from the analysis those parents who gave birth in December 2006 and January 2007. In a later study by Kluve and Schmitz (2014, 168), the authors do acknowledge that in some cases birth was deliberately delayed around the cutoff date, but they emphasize that in none of the earlier studies were outcomes affected by parents directly around the cutoff date, so December 2006 and January 2007 parents can be included in the analysis. Based on the insights of Kluve and Schmitz (2014, 168), and given the small number of parents in the SOEP data set in the three months before and after the implementation of the 2007 Elterngeld reform, this study also includes parents from December 2006 and January 2007 in the analysis.

To summarize, the idea of a RDD is visualized in figure 1 for the 2007 Elterngeld reform. On the x-axis, one can identify the child's birth month (bm) running variable, which determines whether a parent ends

up in the treatment or control group. When the running variable crosses the starting date of the 2007 reform (January 1, 2007), which is the cutoff point, the treatment is turned on and from that day onwards parents fall under the 2007 Elterngeld reform. Accordingly, parents who got a child in October, November, and December 2006 are in the control group, and parents who got a child in January, February, and March 2007 are in the treatment group. Given this clear turning on of the treatment at the cutoff point, we are dealing with a sharp RDD (Angrist and Pischke 2015, 151; Patnaik 2019, 1025). Because of the fast legislative process of the 2007 Elterngeld reform explained above, the assignment of parents to these two groups can be considered random. In this study, treatment and control groups are differentiated between mothers and fathers. Thus, the effects of the 2007 Elterngeld reform are estimated separately for mothers and fathers.

On the y-axis, one can identify the dependent variables. In this study, the dependent variables are the time spent by mothers and fathers on childcare and housework on a normal workday in 2009. The decision to choose 2009 as the outcome year requires a more elaborate explanation which will be provided in the following paragraph. The jump around the cutoff point away from the counterfactual is considered the treatment effect of the 2007 Elterngeld reform. It is important to note that this treatment effect only captures the local mean impact of the Elterngeld reform for parents near the cutoff point for 2009, and does not capture changes in the behavior of these parents over time (Kluve and Tamm 2013, 985–86; Patnaik 2019, 1012). Moreover, this study with a RDD captures the effect of the entire Elterngeld reform and not the effect of a single element of it (Tamm 2019, 186)

Figure 1: Regression Discontinuity Design - 2007 Elterngeld reform



Source: Inspired by the illustration by Angrist and Pischke (2015, 150) and adapted to the study of the 2007 Elterngeld reform

When conducting a RDD studying the 2007 Elterngeld reform effects on time spent by parents on childcare and housework, it must be decided for which year those reform effects should be captured. In

the following, the different options identified are presented with their advantages and disadvantages followed by an explanation of the decision for the year 2009.

First, when examining the effects of the 2007 Elterngeld reform, the most straightforward approach is to examine the amount of time parents spend on childcare and housework in the year of the child's birth, i.e. for the control group in 2006 and the treatment group in 2007. This would have the advantage of capturing the treatment effect of the 2007 Elterngeld reform for the year in which the 2007 Elterngeld reform was introduced, providing a high degree of certainty that the observed treatment effect is only due to the reform and not to other factors that might affect the control and treatment groups at a later point in time. However, this approach is not possible with the SOEP data. The interviews with SOEP respondents are conducted throughout the year and each respondent to the individual questionnaire is interviewed once a year (Schober 2014b, 358), which means that a number of parents belonging to the treatment and control group were interviewed before the birth of the child, so that time spent on childcare and housework is not recorded for the situation with a new born child.

To give an example: In the control group of mothers (with a child born between October and December 2006), 46,81 percent of mothers reported 0 hours of childcare on a regular workday for the year of birth of the child. It is highly unlikely that mothers spent no time at all caring for a new born child in the year of birth, suggesting that the survey was conducted before the child was born. Taking this limitation into account, a comparison of the time spent on childcare and housework in the year of birth would lead to highly biased results, so that this first approach is not an option for this study.

Second, given the above limitation, the most appropriate alternative approach is to examine parents' time spent on childcare and housework in the year after birth, i.e. for the control group in 2007 and the treatment group in 2008. This would have the advantage that, since the survey of all parents takes place in the year after birth, the time spent on childcare and housework is captured for all parents in the situation after the child's birth. However, there is one crucial limitation that makes this approach unfeasible and which is related to some limitations in the SOEP data that need to be mentioned first. In the SOEP data set, time spent on childcare and housework is recorded on an annual basis, and the data set does not provide data on time use for each individual month (Kantar Public 2021, 4). If this were the case, the limitation explained in the following could be overcome by comparing the time spent by parents on childcare and housework only for certain months and ensuring that the time span between the birth of the child and the month in which the value was recorded is the same for the treatment and control groups.

To explain the limitation, let us recall the basic characteristics of the treatment and control groups. The control group consists of parents whose child was born in October, November or December 2006 and the treatment group consists of parents whose child was born in January, February or March 2007. If we were to compare the recorded responses for the year after birth, i.e. 2007 or 2008, we would be comparing parents of children of very different ages.

Let us specify this: In the case of the control group, we assume that the interview was conducted sometime in 2007. This means that the earliest born children in the control group (those born in October 2006) would be 3 months old in January 2007 and 14 months old in December 2007. The children born latest in the control group (in December 2006) would be one month old in January 2007 and 12 months old in December 2007. In the case of the treatment group, we assume that the interview was conducted sometime in 2008. This means that the earliest born children in the treatment group (those born in January 2007) would be 12 months old in January 2008 and 23 months old in December 2008. The children born latest in the treatment group (those born in March 2007) would be 10 months old in January 2008 and 21 months old in December 2008. Thus, in the control group, the children would be minimum one month and maximum 14 months old, in the treatment group minimum 10 months and maximum 23 months old. The treatment and control groups thus consist of children of very different ages, making the groups not comparable.

First, a large number of the children of parents in the control group are, at the time of the interview, at an age (the first six months after birth) when breastfeeding is advised by both the World Health Organisation (WHO) and the German National Breastfeeding Commission (NSK), i.e. at a time when children need intensive care from their parents (BMEL 2021). While surveys show that only about one in eight children is actually *exclusively* breastfed for at least six months, as recommended by the NSK, nearly nine in ten children have ever been breastfed, and the average duration of breastfeeding in Germany is about eight months (Robert Koch-Institut 2020, 2). All children in the treatment group are already outside the age at which breastfeeding is recommended.

Second, all parents from the control group are still entitled to parental allowance (Basiselterngeld) at the time of the survey, which, as explained above, can be claimed up to and including the 14th month (Huebener et al. 2016, 1159). Most parents from the treatment group, on the other hand, are no longer entitled to parental allowance, as their children are already older at the time of the interview. The parents of the two groups are therefore in very different situations which is likely to lead to biased results, so also this second approach is not an option for this study.

Third, to address the above limitation, there is the option of examining parents' time spent on childcare and housework for both parents in the same year. In the following, both the option of examining parents' time spent on childcare and housework in 2008 and in 2009 are presented and the preference for choosing 2009 is explained.

Let us start with the year 2008: In this option, where the interviews are conducted for both treatment and control groups sometime in 2008, the age of the parents' children in the two groups would still differ, but the age differences would not be as significant as in the second option described above. The children of the parents in the control group would be minimum 13 months and maximum 26 months old, the

children of the parents in the treatment group minimum 10 months and maximum 23 months old.[1] Nevertheless, this option is not ideal because there are more parents in the treatment group who are still entitled to parental allowance at the time of the survey than in the control group. Also, especially in the first year of life, children need a lot of attention from their parents, which is why this phase is described as particularly intense (Vaterfreuden 2022). However, children in the first year of life are only included in the treatment group.

When comparing parents' time spent on childcare and housework in 2009, the problem described above with regard to the parental allowance is no longer present, as neither parents in the treatment group nor parents in the control group are entitled to parental allowance under the 2007 Elterngeld reform. Under this option, children of parents in the control group are minimum 25 months and maximum 38 months old (in their third or at the beginning of their fourth year of life) and children of parents in the treatment group are minimum 22 months and maximum 35 months old (in their third or at the end of their second year of life).[2] Even though the age of the children of parents in the treatment and control groups still differs, these children are not in significantly different phases of life, where, for example, breastfeeding is still required or the parents are entitled to parental allowance.

The latter point, that the reform effects are estimated for a year in which neither parent is entitled to parental allowance anymore, is actually very interesting. In this way, the estimation results do not capture the time spent on childcare and housework in a unique situation where the parents are entitled to stay at home to take care of their child, but they capture the time spent on childcare and housework in a year where the parents no longer receive parental allowance and have returned to a work rhythm. This RDD thus captures the treatment effect of the 2007 Elterngeld reform on parents' childcare and housework time after the period of entitlement to Elterngeld. In conclusion, although the comparison of time spent on childcare and housework in 2009 has some limitations, it still seems to be the best of the above options with the lowest risk of bias in the results.

In addition, scholars have previously found strong evidence that a change in the initial division of family responsibilities such as childcare and housework towards a more egalitarian division as a result of

[1] **Control group:**
The earliest born children in the control group (those born in October 2006) would be 15 months old in January 2008 and 26 months old in December 2008. The children born latest in the control group (those born in December 2006) would be 13 months old in January 2008 and 24 months old in December 2008.
Treatment group:
The earliest born children in the treatment group (those born in January 2007) would be 12 months old in January 2008 and 23 months old in December 2008. The children born latest in the treatment group (those born in March 2007) would be 10 months old in January 2008 and 21 months old in December 2008.

[2] **Control group:**
The earliest born children in the control group (those born in October 2006) would be 27 months old in January 2009 and 38 months old in December 2009. The children born latest in the control group (those born in December 2006) would be 25 months old in January 2009 and 36 months old in December 2009.
Treatment group:
The earliest born children in the treatment group (those born in January 2007) would be 24 months old in January 2009 and 35 months old in December 2009. The children born latest in the treatment group (those born in March 2007) would be 22 months old in January 2009 and 33 months old in December 2009.

parental leave can have persistent effects on parents' decisions about the division of paid work, childcare and housework in later years (Patnaik 2019, 1052–53). One reason why it is difficult to later reverse a pattern of behavior that has developed while receiving parental benefits is that parents' preferences remain out of habit (Patnaik 2019, 1020). This suggests that the reform effects of the two Elterngeld reforms should be observed not only in the few months after the birth of the child when parents are still entitled to Elterngeld, but also afterwards.

Based on the above considerations, my RDD has the following equation for the 2007 Elterngeld reform:

$$Y_{it} = \alpha + \beta\, bm_i + \rho\, Treat_i + \gamma\, Cont_{it} + \varepsilon_{it}$$

Y are the dependent variables of interest, thus the time spent on childcare and housework on a normal workday for the mothers or fathers **i** in year **t** (2009). **α** is the intercept, and **bm** stands for the birth month of a child and is the running variable. This running variable is normalized to 0 for January 2007, where the reform was introduced, and thus takes values −1 for December 2006, 1 for February 2007, etc. **Treat** is the treatment dummy, a binary indicator that takes the value 1 in all months from January 2007 onwards and 0 otherwise. **ρ** is the main parameter of interest in the equation and captures the potential discontinuity effect in Y at the cutoff. **Cont** stands for additional control variables included in the model and **Ɛ** is the error term. Details on the control variables are provided in the section on descriptive statistics.

$$\text{Treatment Dummy } Treat_i = \begin{cases} 1 \text{ if } bm \geq 2007 \\ 0 \text{ if } bm < 2007 \end{cases}$$

Drawing on Angrist and Pischke (2015), this study is aware that the RDD does not automatically guarantee reliable causal estimates. As they suggest, to reduce the likelihood of biased results, this study uses a non-parametric approach in which only points near the cutoff point are observed. The choice of the appropriate range of observations around the cutoff point, called the bandwidth, is a balancing act. While choosing a narrow bandwidth around the cutoff point allows for greater reliability of results by reducing the risk of nonlinearity, including fewer observations also means lower precision because less data is available (2015, 161–62).

The current specification includes all parents who had a child in the last three months of 2006 and the first three months of 2007. Choosing a smaller bandwidth and correspondingly fewer observations is not an option for this study given the already very small sample size (as explained in the descriptive statistics). Choosing a larger bandwidth would allow for the inclusion of more observations, but this would seriously compromise the random assignment into treatment and control groups that forms the core of this RDD. Therefore, despite the associated limitations, this study decides against estimating the

treatment effect of the Elterngeld reform for different bandwidths as robustness checks. The same also applies to the 2015 Elterngeld reform.

4.3.2 2015 Reform

Continuing with the 2015 Elterngeld reform, it needs to be checked if also this reform created a natural experiment that allows for comparing parents who gave birth shortly before (control group) with those who gave birth shortly after the policy came into force (treatment group). As above, this would be the case if none of the parents in both treatment and control group knew when they conceived the child that the new policy would be in force when their child was born. In such a situation, the two groups of parents should be similar in all characteristics except their eligibility for parental allowance (Kluve and Tamm 2013, 985–86), and by comparing the outcomes of these two groups it is possible to produce unbiased estimates of the impact of the 2015 Elterngeld reform.

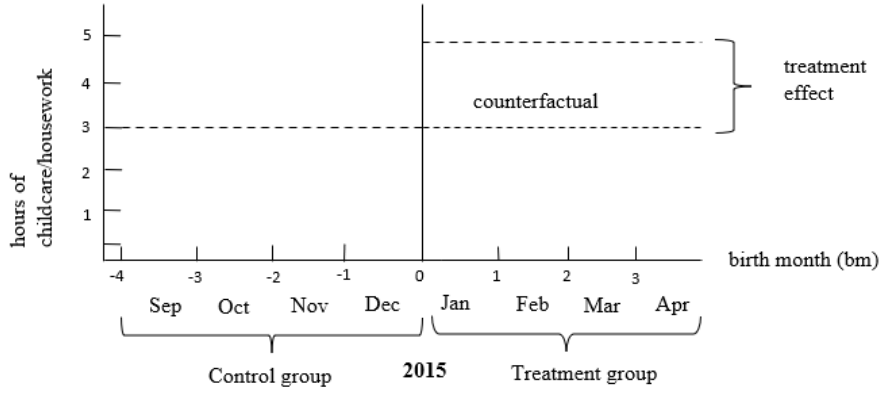
As was the case with the 2007 Elterngeld reform, also the 2015 Elterngeld reform was passed in a fast legislative process. The bill of the Bundesregierung (German government) was first introduced in late summer on August 8, 2014, after which the bill was debated for the first time in the plenary session of the German Bundestag only on September 19, 2014 (DIP Deutscher Bundestag 2022a). This reform first appeared in the news of the Bundestag, Bundesrat, and Bundesregierung on September 15, 2014 (dejure.org 2014). Interestingly, the 2015 Elterngeld reform received significantly less media attention than the previous Elterngeld reform of 2007, as shown by the small number of articles in 'Bild', Germany's most widely read newspaper (Bild.de 2014a). Prior to the adoption of the Elterngeld Plus reform, only two articles titled "Elterngeld Plus" were published that hinted at an entry into force of this reform, although the entry into force had not yet been finalized at that time (Bild.de 2014b; 2014c).

To recall, the date proposed in the bill and also adopted in the final version of the law states that the 2015 Elterngeld reform applies to all parents whose child was born on or after January 1, 2015 (Bundesrat 2014). Assuming a 40-week pregnancy, it therefore seems appropriate to include the last four months of 2014 and the first four months of 2015 in the analysis, since these parents could not have known at the time of conception that the policy would come into effect. Beyond this, a study of the decisions by the German Bundestag shows that there were no further legal changes at the turn of the year 2014/2015 that could impact the results (Deutscher Bundestag Archiv 2014; 2015)

To summarize, the idea of RDD is visualized in figure 2 for the 2015 Elterngeld reform. On the x-axis, one can identify the child's birth month (bm) running variable, which determines whether a parent ends up in the treatment or control group. When the running variable crosses the starting date of the 2015 reform (January 1, 2015), which is the cutoff point, the treatment is turned on and from that day onwards parents fall under the 2015 Elterngeld reform. Accordingly, parents who got a child in September, October, November, and December 2014 are in the control group, and parents who got a child in January, February, March, and April 2015 are in the treatment group. Because of the very fast legislative process

of the 2015 Elterngeld reform explained above, the assignment of parents to these two groups can be considered random. In this study, treatment and control groups are differentiated between mothers and fathers. Thus, the effects of the 2015 Elterngeld reform are estimated separately for mothers and fathers. On the y-axis, one can identify the dependent variables. In this study, the dependent variables are the time spent by mothers and fathers on childcare and housework on a normal workday in 2017. The decision to choose 2017 as the outcome year requires a more elaborate explanation which will be provided in the following paragraph. The jump around the cutoff point away from the counterfactual is considered the treatment effect of the 2015 Elterngeld reform.

Figure 2: Regression Discontinuity Design – 2015 Elterngeld reform



Source: Inspired by the illustration by Angrist and Pischke (2015, 150) and adapted to the study of the 2015 Elterngeld reform

When conducting a RDD to study the effects of the 2015 Elterngeld reform on parents' time spent on childcare and housework, it is necessary to decide for which year these reform effects should be captured. The considerations of the 2015 Elterngeld reform are very comparable to those of the 2007 Elterngeld reform, so similar arguments will not be addressed in the same depth in this section and the focus will be on the unique aspects of the 2015 Elterngeld reform.

First, also for the 2015 Elterngeld reform, it is not possible to examine the time spent by parents on childcare and housework in the year of the child's birth, i.e. for the control group in 2014 and the treatment group in 2015, for the same reasons as mentioned above. Also for this reform, a number of parents belonging to the treatment and control groups were interviewed before the birth of the child, so that the time spent on childcare and housework for the situation with a new born child is not captured.

To give an example: In the control group of mothers (with a child born between September and December 2014), 35,71 percent of mothers reported 0 hours of childcare on a regular workday for the year of birth of the child. It is highly unlikely that mothers spent no time at all caring for a new born

child in the year of birth, suggesting that the survey was conducted before the child was born. Taking this limitation into account, a comparison of the time spent on childcare and housework in the year of birth would lead to highly biased results, so that this first approach is not an option for this study.

Second, the alternative approach for the 2015 Elterngeld reform would be to examine parents' time spent on childcare and housework in the year after birth, i.e. for the control group in 2015 and the treatment group in 2016. However, also in the case of the 2015 Elterngeld reform, this approach is not feasible because we would be comparing parents of children of very different ages.

Let us specify this here as well: In the case of the control group, we assume that the interview was conducted sometime in 2015. This means that the earliest born children in the control group (those born in September 2014) would be 4 months old in January 2015 and 15 months old in December 2015. The children born latest in the control group (those born in December 2014) would be one month old in January 2015 and 12 months old in December 2015. In the case of the treatment group, we assume that the interview was conducted sometime in 2016. This means that the earliest born children in the treatment group (those born in January 2015) would be 12 months old in January 2016 and 23 months old in December 2016. The children born latest in the treatment group (those born in April 2015) would be 9 months old in January 2016 and 20 months old in December 2016. In the control group, the children would therefore be minimum one month and maximum 15 months old, in the treatment group minimum 9 months and maximum 23 months old.

The treatment and control groups thus consist of children of very different ages. The previous arguments regarding breastfeeding and entitlement to parental allowance (Basiselterngeld) also apply here. Since 2013, there has additionally been a legal entitlement to a childcare place for children from the age of one (Die Bundesregierung Archiv 2022). Accordingly, in the control group, very few of the parents are entitled to a place in formal childcare for their children, whereas in the treatment group, many more parents are entitled to send their children to formal childcare. Since parents have to spend considerably less time on childcare when their children are in formal childcare than when they have to be cared for at home, this is likely to lead to biased results. Since the above factors explain that the parents of the two groups are in very different situations and therefore not comparable, the second approach is also not an option for this study.

Third, to address the above limitation, there is also the option with this reform to examine the amount of time spent by parents on childcare and housework for both parents in the same year, i.e. 2016 or 2017, again preferring the latter option.

In the first option, where interviews are conducted for both the treatment and control groups sometime in 2016, the ages of the children of the parents in the two groups would still differ. However, the age differences would not be as significant as in the second option described above. The children of the parents in the control group would be minimum 13 months and maximum 27 months old, and the

children of the parents in the treatment group would be minimum 9 months and maximum 23 months old. [3] Nevertheless, this option is not ideal for the same reasons as for the 2007 Elterngeld reform.

In the second option, where interviews are conducted sometime in 2017 for both the treatment and control groups, children of parents in the control group would be minimum 25 months and maximum 39 months old (in their third or at the beginning of their fourth year of life) and children of parents in the treatment group would be minimum 21 months and maximum 35 months old (in their third or at the end of their second year of life).[4] Under this option, both groups of parents have a legal entitlement to a childcare place for their children, as all children are already more than one year old and neither group of parents is entitled to the Basiselterngeld under the 2015 Elterngeld reform.

However, the two groups differ in their entitlement to Elterngeld Plus, which parents can claim in the 24 months after birth, as explained in the section on the 2015 Elterngeld reform (Familienportal 2022). Whereas in the control group, none of the parents are entitled to Elterngeld Plus, in the treatment group, some parents are theoretically still entitled to it. While this could be a possible limitation, it is not considered very strong in this case, as scholars found that the proportion of parents who received Elterngeld Plus in 2017 after the 14-month period of Basiselterngeld had expired was vanishingly small among fathers and still low among mothers (Samtleben, Schäper, and Wrohlich 2019, 611). In summary, even though the age of the children from parents in the treatment and control group still differ and there is a small difference in entitlement to Elterngeld Plus, those children are not in significantly different phases of life.

The point that the reform effects are estimated for a year where none of the parents are entitled to Basiselterngeld anymore is also very interesting here. In this way, the estimation results do not capture the time spent on childcare and housework in a unique situation where parents are entitled to stay at home entirely to take care of their child due to receiving Basiselterngeld, and instead capture the reform effects where parents have re-entered a work rhythm. While, as mentioned in the last point, some parents in the treatment group are still eligible for Elterngeld Plus, these parents would also already be working, although of course only part-time (Huebener et al. 2016, 1160). In summary, being aware that comparing

[3] **Control group:**
The earliest born children in the control group (those born in September 2014) would be 16 months old in January 2016 and 27 months old in December 2016. The children born latest in the control group (those born in December 2014) would be 13 months old in January 2016 and 24 months old in December 2016.
Treatment group:
The earliest born children in the treatment group (those born in January 2015) would be 12 months old in January 2016 and 23 months old in December 2016. The children born latest in the treatment group (those born in April 2015) would be 9 months old in January 2016 and 20 months old in December 2016.

[4] **Control group:**
The earliest born children in the control group (those born in September 2014) would be 28 months old in January 2017 and 39 months old in December 2017. The children born latest in the control group (those born in December 2014) would be 25 months old in January 2017 and 36 months old in December 2017.
Treatment group:
The earliest born children in the treatment group (those born in January 2015) would be 24 months old in January 2017 and 35 months old in December 2017. The children born latest in the treatment group (those born in April 2015) would be 21 months old in January 2017 and 32 months old in December 2017.

the time spent on childcare and housework in the year 2017 still comes with certain limitations, it seems to be the best option of the ones considered above with the least risk of bias in the results.

Based on the above considerations, my RDD has the following equation for the 2015 Elterngeld reform:

$$Y_{it} = \alpha + \beta\, bm_i + \rho\, Treat_i + \gamma\, Cont_{it} + \varepsilon_{it}$$

Y are the dependent variables of interest, thus the time spent on childcare and housework on a normal workday for the mothers or fathers **i** in year **t** (2017). **α** is the intercept, and **bm** stands for the birth month of a child and is the running variable. This running variable is normalized to 0 for January 2015, where the reform was introduced, and thus takes values −1 for December 2014, 1 for February 2015, etc. **Treat** is the treatment dummy, a binary indicator that takes the value 1 in all months from January 2015 onwards and 0 otherwise. **ρ** is the main parameter of interest in the equation and captures the potential discontinuity effect in Y at the cutoff. **Cont** stands for additional control variables included in the model and **Ɛ** is the error term. Details on the control variables are provided in the section on descriptive statistics.

$$\text{Treatment Dummy } Treat_i = \begin{cases} 1 \text{ if } bm \geq 2015 \\ 0 \text{ if } bm < 2015 \end{cases}$$

4.4 Descriptive Statistics

4.4.1 2007 Reform

For the 2007 Elterngeld reform, as indicated above, the sample consists of mothers and fathers who gave birth to a child in October, November and December 2006 (control group) and in January, February and March 2007 (treatment group). The full sample of fathers includes 87 fathers, of whom 54 fathers are in the control group and 33 fathers are in the treatment group. The full sample of mothers includes 99 mothers, of whom 59 are in the control group and 40 are in the treatment group. Note that these sample sizes are quite small. However, due to the necessary restricted study period of October 2006 to March 2007, it was not possible to include a larger number of observations with this data set. As explained above, it is important to keep this limitation in mind when interpreting the results of this study.

Tables 1 and 2 provide the descriptive statistics for the sample of fathers and for the sample of mothers of the 2007 Elterngeld reform together with t-tests on the differences-in-means between the treatment and control groups.

The selection of covariates that were included in these descriptive statistics is consistent with those used by other scholars in previous studies of parental leave reforms (Kluve and Schmitz 2014; Kluve and Tamm 2013; Patnaik 2019; Schober and Zoch 2019; Tamm 2019). These include the partnership in the

year of birth distinguishing between spouse[5], life partner[6], and no partner in household; the age of the parent in the year of birth; whether the parent is considered German born or immigrant in the SOEP[7]; whether the parent is from East or West Germany, was outside Germany during the fall of the Berlin Wall (1989), or was born after the fall of the Wall (only for the 2015 Elterngeld reform); whether the parent has a higher education degree[8]; employment status in the year before birth, distinguishing between full-time and part-time employment; working hours[9] and income[10] in the year before birth for full-time and part-time workers, distinguishing between employed and self-employed; the number of older children; and finally, the age difference between the youngest two children.

In this study, Welch's t-test was used to compare the means of the control and treatment groups for both reforms, as some scholars argue that this test should be used as the default test. They claim that it performs generally as well as other t-tests and works best when the sample sizes and variances are unequal between the two groups (Lakens 2015; Ruxton 2006, 688–90). If the two Elterngeld reforms indeed created a natural experiment, we should observe no or only few covariate differences between treatment and control group (Kluve and Tamm 2013, 994). As you can see in tables 1 and 2 for the 2007 Elterngeld reform, both groups are balanced in their core covariates, with only a few exceptions. Those exceptions, which are significant at a 1 percent and 5 percent level, are partnership in the year of birth (spouse and no partner in household) for fathers and higher education degree and the full-time employment status in the year before birth for mothers. This paper therefore argues that the natural experiment is valid in the case of the 2007 Elterngeld reform, but nonetheless presents estimates of the reform effects controlling for covariates.

[5] In this study, the covariate 'spouse' includes individuals who have a spouse or a registered partnership, as these are treated equally in the SOEP, as well as individuals who are most likely to have a spouse or a registered partnership.
[6] In this study, the covariate 'life partner' includes individuals who have a life partner, as well as individuals who are most likely to have a life partner.
[7] In the SOEP, persons are considered to be German born if they were born in Germany or immigrated to Germany before 1950.
[8] In the SOEP, higher education degrees are defined as a degree from a University of Applied Sciences, University, Technical University, Dual University, Professional Academy, and other higher education institutions, and doctorate and habilitation.
[9] In the SOEP, working hours are defined as the working hours per week including overtime.
[10] The selected variable captures the gross wage for employees and the gross amount of self-employment income for the self-employed.

Table 1: Descriptive Statistics for fathers of the 2007 Elterngeld reform

	Control Group Father OND 2006			Treatment Group Father JFM 2007			
Variable	**No. Obs.**	**Mean**	**Standard Deviation**	**No. Obs.**	**Mean**	**Standard Deviation**	**t-stat**
Partnership in the year of birth (spouse)	47	0.617	0.491	29	0.828	0.384	-2.082**
Partnership in the year of birth (life partner)	47	0.234	0.428	29	0.172	0.384	0.65
Partnership in the year of birth (no partner in household)	47	0.149	0.36	29	0	0	2.837***
Age in the year of birth	54	32.833[11]	8.273[12]	33	33.152	5.608	-0.457[13]
Immigrant	54	0.093	0.293	33	0.152	0.364	-0.787
German born	54	0.907	0.293	33	0.848	0.364	0.787
In East Germany during the fall of the Wall (1989)	54	0.333	0.476	33	0.273	0.452	0.595
In West Germany during the fall of the Wall (1989)	54	0.556	0.502	33	0.606	0.496	-0.459
Abroad during the fall of the Wall (1989)	54	0.111	0.317	33	0.121	0.331	-0.140
With higher education degree	54	0.093	0.293	33	0.212	0.415	-1.449
Employment status in the year before birth (Full-time)	40	0.725	0.452	30	0.7	0.466	0.225
Employment status in the year before birth (Part-time)	40	0.025	0.158	30	0.033	0.183	-0.200
Working hours in the year before birth	30	47.613[14]	152.529[15]	22	45.046	112.6933	0.698[16]
Income in the year before birth	41[17]	2709.731[18]	---	25	2597.520	---	---
For employees	35	2767.314	1748.664	22	2579	1228.225	0.477
For self-employed	6	2373.833	1234.551	3	2733.333	2579.406	-0.229
Number of older children	54	0.37	0.653	33	0.424	0.561	-0.408
Age difference between youngest two children in months (in years)	16	42.375 (3.531)[19]	20.109 ---	13	34.077 (2.840)	14.683 ---	1.283 ---

Note: Significance levels are indicated for a 10% level, a 5% level** and a 1% level***.*

[11] Calculated as follows:
1. for control group: 2006 (birth year of child) - 1973.167 (birth year of father) = 32.833;
2. for treatment group: 2007 (birth year of child) - 1973.848 (birth year of father) = 33.152

[12] The standard deviation is the standard deviation of the year of birth of the parent

[13] The t-test was conducted for the year of birth of the parent

[14] The value in the data set was taken times 10, therefore I divide the result by 10: e.g. 476.133 / 10 = 47.613. Then the result was rounded to three decimal points.

[15] The standard deviation is the standard deviation of the year of the original working hours: e.g. 476.133, not 47.613

[16] The t-test was conducted for the original working hours: e.g. 476.133, not 47.613

[17] Sum of observations of employed and self-employed parents

[18] Calculated as the weighted sum of the gross income of employees and the gross income of the self-employed: e.g. [(2767.314 * 35) + (2373.833*6)] / 41 = 2709.731415. Then the result was rounded to three decimal points.

[19] Calculated as follows: e.g. 42.375 months * (1/12) = 3.531 years

Table 2: Descriptive Statistics for mothers of the 2007 Elterngeld reform

	Control Group Mother OND 2006			Treatment Group Mother JFM 2007			
Variable	**No. Obs.**	**Mean**	**Standard Deviation**	**No. Obs.**	**Mean**	**Standard Deviation**	**t-stat**
Partnership in the year of birth (spouse)	48	0.708	0.459	38	0.711	0.46	-0.022
Partnership in the year of birth (life partner)	48	0.188	0.394	38	0.158	0.37	0.358
Partnership in the year of birth (no partner in household)	48	0.104	0.309	38	0.132	0.343	-0.385
Age in the year of birth	59	30,525[20]	7.722[21]	40	30.85	6.974	-0.452[22]
Immigrant	59	0.102	0.305	40	0.25	0.439	-1.856*
German born	59	0.898	0.305	40	0.75	0.439	1.856*
In East Germany during the fall of the Wall (1989)	59	0.339	0.477	40	0.275	0.452	0.675
In West Germany during the fall of the Wall (1989)	59	0.542	0.502	40	0.5	0.506	0.41
Abroad during the fall of the Wall (1989)	59	0.085	0.281	40	0.225	0.423	-1.840*
With higher education degree	59	0.068	0.254	40	0.225	0.423	-2.108**
Employment status in the year before birth (Full-time)	43	0.512	0.506	38	0.289	0.46	2.071**
Employment status in the year before birth (Part-time)	43	0.14	0.351	38	0.079	0.273	0.872
Working hours in the year before birth	28	37.15[23]	148.089[24]	14	44.107	159.014	-1.367[25]
Income in the year before birth	31[26]	1584.451[27]	---	26	1589.154	---	---
For employees	26	1688.038	1101.443	21	1486.571	1246.312	0.580
For self-employed	5	1045.8	352.1906	5	2020	1397.14	-1.512
Number of older children	59	0.407	0.673	40	0.45	0.597	-0.336
Age difference between youngest two children in months (in years)	19	40.053 (3.338)[28]	19.651 ---	16	31.875 (2.656)	14.156 ---	1.427

Note: Significance levels are indicated for a 10% level, a 5% level** and a 1% level***.*

[20] Calculated as follows:
1. for control group: 2006 (birth year of child) - 1975.475 (birth year of mother) = 30.525;
2. for treatment group: 2007 (birth year of child) - 1976.15 (birth year of mother) = 30.85

[21] The standard deviation is the standard deviation of parent's year of birth

[22] The t-test was conducted for the year of birth of the parent

[23] The value in the data set was taken times 10, therefore I divide the result by 10: e.g. 371.5 / 10 = 37.15. Then the result was rounded to three decimal points.

[24] The standard deviation is the standard deviation of the year of the original working hours: e.g. 371.5, not 37.15

[25] The t-test was conducted for the original working hours: e.g. 371.5, not 37.15

[26] Sum of observations of employed and self-employed parents

[27] Calculated as the weighted sum of the gross income of employees and the gross income of the self-employed: e.g. [(1688.038 * 26) + (1045.8*5)] / 31 = 1584.451226. Then the result was rounded to three decimal points.

[28] Calculated as follows: e.g. 40.053 months * (1/12) = 3.338 years

4.4.2 2015 Reform

For the 2015 Elterngeld reform, as indicated above, the sample consists of mothers and fathers who gave birth to a child in September, October, November and December of 2014 (control group) and in January, February, March and April of 2015 (treatment group). The full sample of fathers includes 119 fathers, of whom 61 fathers are in the control group and 58 fathers are in the treatment group. The full sample of mothers includes 146 mothers, of whom 72 are in the control group and 74 are in the treatment group. Note that, also here, the sample sizes are quite small, although they are larger here compared to the first reform. However, due to the necessary restricted study period of September 2014 to April 2015, it was not possible to include a larger number of observations with this data set. It is important to keep this limitation in mind when interpreting the results of this study.

Tables 3 and 4 provide the descriptive statistics for the sample of fathers and for the sample of mothers of the 2015 Elterngeld reform together with t-tests on the differences-in-means between the treatment and control groups.

For the 2015 Elterngeld reform, the same covariates were included in the descriptive statistics as for the 2007 Elterngeld reform.

Also, with the second reform, it must be checked whether it really constitutes a natural experiment. As you can see in tables 3 and 4 for the 2015 Elterngeld reform, both groups are balanced in their core covariates, and there are no exceptions that are significant at a 1 percent and 5 percent level. This paper therefore argues that the natural experiment is valid in the case of the 2015 Elterngeld reform, but nonetheless presents estimates of the reform effects controlling for covariates.

Table 3: Descriptive Statistics for fathers of the 2015 Elterngeld reform

	Control Group Father SOND 2014			Treatment Group Father JFMA 2015			
Variable	**No. Obs.**	**Mean**	**Standard Deviation**	**No. Obs.**	**Mean**	**Standard Deviation**	**t-stat**
Partnership in the year of birth (spouse)	58	0.724	0.451	57	0.772	0.423	-0.5861
Partnership in the year of birth (life partner)	58	0.224	0.421	57	0.14	0.35	1.1613
Partnership in the year of birth (no partner in household)	58	0.052	0.223	57	0.035	0.186	0.4346
Age in the year of birth	61	35.377[29]	6.195[30]	58	35.397	6.434	-0.8457[31]
Immigrant	61	0.311	0.467	58	0.259	0.442	0.6345
German born	61	0.689	0.467	58	0.741	0.442	-0.6345
In East Germany during the fall of the Wall (1989)	61	0.131	0.34	58	0.121	0.329	0.1705
In West Germany during the fall of the Wall (1989)	61	0.492	0.504	58	0.569	0.5	-0.8385
Abroad during the fall of the Wall (1989)	61	0.279	0.452	58	0.241	0.432	0.4605
Born after the fall of the Wall (1989)	61	0.066	0.25	58	0.069	0.256	-0.0732
With higher education degree	61	0.197	0.401	58	0.138	0.348	0.8557
Employment status in the year before birth (Full-time)	56	0.786	0.414	49	0.816	0.391	-0.3892
Employment status in the year before birth (Part-time)	56	0.054	0.227	49	0.061	0.242	-0.1662
Working hours in the year before birth	47	42.947[32]	93.007[33]	43	43.449	92.94	-0.2559[34]
Income in the year before birth	53[35]	3315.452[36]	---	48	3150.646	---	---
For employees	51	3337.627	1929.412	43	3189.093	1798.33	0.3858
For self-employed	2	2750	1060.66	5	2820	1382.751	-0.0720
Number of older children	61	0.426	0.865	58	0.259	0.48	1.3152
Age difference between youngest two children in months (in years)	17	47.471 (3.956)[37]	38.651 ---	14	49.929 (4.161)	17.274 ---	-0.2352

Note: Significance levels are indicated for a 10% level, a 5% level** and a 1% level***.*

[29] Calculated as follows:
1. for control group: 2014 (birth year of child) - 1978.623 (birth year of father) =35.377;
2. for treatment group: 2015 (birth year of child) - 1979.603 (birth year of father) = 35.397

[30] The standard deviation is the standard deviation of the year of birth of the parent

[31] The t-test was conducted for the year of birth of the parent

[32] The value in the data set was taken times 10, therefore I divide the result by 10: e.g. 429.468/ 10 = 42.947. Then the result was rounded to three decimal points.

[33] The standard deviation is the standard deviation of the year of the original working hours: e.g. 429.468, not 42.947

[34] The t-test was conducted for the original working hours: e.g. 429.468, not 42.947

[35] Sum of observations of employed and self-employed parents

[36] Calculated as the weighted sum of the gross income of employees and the gross income of the self-employed: e.g. [(3337.627* 51) + (2750*2)] / 53 = 3315.4523296. Then the result was rounded to three decimal points.

[37] Calculated as follows: e.g. 47.471 months * (1/12) = 3.956 years

Table 4: Descriptive Statistics for mothers of the 2015 Elterngeld reform

	Control Group Mother SOND 2014			Treatment Group Mother JFMA 2015			
Variable	**No. Obs.**	**Mean**	**Standard Deviation**	**No. Obs.**	**Mean**	**Standard Deviation**	**t-stat**
Partnership in the year of birth (spouse)	70	0.686	0.468	71	0.704	0.46	-0.2370
Partnership in the year of birth (life partner)	70	0.2	0.403	71	0.211	0.411	-0.1644
Partnership in the year of birth (no partner in household)	70	0.114	0.32	71	0.07	0.258	0.8949
Age in the year of birth	72	31.917[38]	5.477[39]	74	32.568	4.737	-0.4114[40]
Immigrant	72	0.375	0.488	74	0.243	0.432	1.7267*
German born	72	0.625	0.488	74	0.757	0.432	-1.7267*
In East Germany during the fall of the Wall (1989)	72	0.208	0.409	74	0.243	0.432	-0.5016
In West Germany during the fall of the Wall (1989)	72	0.347	0.479	74	0.419	0.497	-0.8874
Abroad during the fall of the Wall (1989)	72	0.278	0.451	74	0.23	0.424	0.6632
Born after the fall of the Wall (1989)	72	0.125	0.333	74	0.081	0.275	0.8678
With higher education degree	72	0.111	0.316	74	0.162	0.371	-0.8952
Employment status in the year before birth (Full-time)	66	0.379	0.489	64	0.375	0.488	0.0442
Employment status in the year before birth (Part-time)	66	0.197	0.401	64	0.203	0.406	-0.0870
Working hours in the year before birth	38	36.303[41]	103.49[42]	37	36.162	104.55	0.0585[43]
Income in the year before birth	43[44]	2038.954[45]	---	43	2017.14	---	---
For employees	41	2060.366	1238.837	43	2017.14	1154.048	0.1653
For self-employed	2	1600	1979.899	0	0	0	---
Number of older children	72	0.417	0.9	74	0.324	0.552	0.7451
Age difference between youngest two children in months (in years)	19	42.632 (3.553)[46]	36.922 ---	21	44.714 (3.728)	16.947 ---	-0.2253

Note: Significance levels are indicated for a 10% level, a 5% level** and a 1% level***.*

[38] Calculated as follows:
1. for control group: 2014 (birth year of child) - 1982.083 (birth year of mother) = 31.917;
2. for treatment group: 2015 (birth year of child) - 1982.432 (birth year of mother) = 32.568

[39] The standard deviation is the standard deviation of parent's year of birth

[40] The t-test was conducted for the year of birth of the parent

[41] The value in the data set was taken times 10, therefore I divide the result by 10: e.g. 363.026 / 10 = 36.303. Then the result was rounded to three decimal points.

[42] The standard deviation is the standard deviation of the year of the original working hours: e.g. 363.026, not 36.303

[43] The t-test was conducted for the original working hours: e.g. 363.026, not 36.303

[44] Sum of observations of employed and self-employed parents

[45] Calculated as the weighted sum of the gross income of employees and the gross income of the self-employed: e.g. [(2060.366*41) + (1600*2)] / 43 =2038.953628. Then the result was rounded to three decimal points.

[46] Calculated as follows: e.g. 42.632 months * (1/12) = 3.553 years

5. Analysis

In this section of the paper, the results of this study are presented, followed by a critical discussion of the results in light of the hypotheses presented above. The results and discussion will be provided separately for the 2007 and 2015 Elterngeld reforms.

As described above, this paper presents estimates of reform effects both without covariates and controlling for a number of covariates that have already been presented in detail in the descriptive statistics. To allow for a more refined assessment of the regression results, a set of more precise dummy variables was created for the covariates of age of the parent, working hours, income, number of older children and age difference between the two youngest children. How this was done and a justification for the precise division is given in the following.

First, four dummy variables were created for the age of the parents, the first capturing those under 18, the second those from 18 to 24, the third those from 25 to 35 and the fourth those from 36 onwards. This division was made because of the different stages of life that parents are likely to be in. Teenage parents younger than 18 are likely to benefit more from family networks than older parents (Schober 2013, 314). Those aged 18 to 24 are likely to be in the study phase, those aged 25 to 35 are likely to have already entered the labor market, and those aged 36 or older are above the national average age of parents at first and second births (Statistisches Bundesamt 2022).

Second, four dummy variables were created for working hours, the first capturing less than 20 hours, the second from 20 to 35 hours, the third from more than 35 to 40 and the fourth more than 40 hours working hours per week. The division is justified by the fact that all employment between 20 and 35 hours per week includes the predominant part-time models Classic and Classic Vario (DAHAG 2021) and work of more than 35 and up to 40 hours is considered full-time employment in Germany (Arbeitsrechte 2022).

Third, three dummy variables for income were created, the first capturing a monthly gross income of 2203 euros or less, the second capturing more than 2203 and less than 5600, and the third capturing 5600 euros or more, since in Germany individuals with a gross income of 2203 euros or less per month are considered low-income earners (DIA 2019) and individuals with a gross income of 5600 euros or more per month are considered among the wealthiest individuals in Germany (Merkur 2022).

Fourth, three dummy variables were created for the number of older children, the first capturing 0, the second capturing 1 to 2 and the third capturing 3 and more, as the time parents spend on childcare and housework has been shown to be lower for parents with only one child than for parents with several children and especially for ‘large’ families (Bujard et al. 2019).

Lastly, the age difference between the youngest two children is divided between first up to one year, second, more than one year and up to four years and third, more than four years considering that taking

care of two children that have not yet reached primary school age in the case of an age difference of up to 1 year is more time consuming than when the older child has already reached that age (Berlin.de 2022).

5.1 Results

In the following, tables 5 to 12 present the regression results of the estimating equation outlined above separately for mothers and fathers for the two dependent variables childcare time and housework time. To recall, parents who gave birth in the months before the introduction of the Elterngeld reforms are compared to those who gave birth in the months after the introduction. For all regressions, model 1 shows the results without including the covariates and the other models show the results after including the covariates.[47]

Before presenting the regression results, another limitation should be mentioned. For the outcome years 2009 and 2017, data on childcare and housework were not available for all fathers and mothers of the original sample who had a child during the study period. Accordingly, for the 2007 Elterngeld reform, 72 observations are left for childcare time and 69 observations for housework time for fathers and 84 observations for childcare and housework time for mothers. For the 2015 Elterngeld reform, 92 observations are left for childcare time and 89 observations for housework time for fathers and 116 observations for childcare and housework time for mothers. This reduces the sample size of this study, which could affect the reliability and validity of the estimates of the current study. These potential limitations need to be taken into account when analysing the results. However, as explained above, it was not possible to include a larger number of observations in this data set due to the necessary restricted study period.

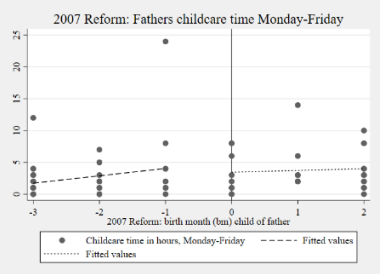
5.1.1 2007 Reform

To start, in figure 3 scatterplots are presented separately for both childcare and housework time and for mothers and fathers. As previously in figure 1, one can identify the dependent variables childcare and housework time for 2009 on the y-axis and the intervals of the running variable (birth month of the child) on the x-axis. 0 hereby represents January 2007, the cutoff point for the 2007 Elterngeld reform. Figure 3 gives us a first impression of whether there might be any cutoff effects. While there appears to be a small discontinuity at the cutoff point for mothers' and fathers' childcare time and fathers' housework time, the visual analysis does not allow us to definitively say whether there is indeed a significant treatment effect.

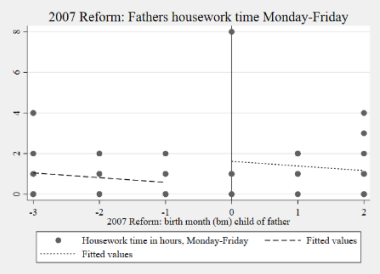
[47] Control variables include: partnership; age of the parent; German born or immigrant; East Germany, West Germany, abroad, birth after the fall of the Wall; higher education degree; employment status; working hours; income; number of older children; age difference between the youngest two children.

Figure 3: Scatterplots 2007 Elterngeld reform

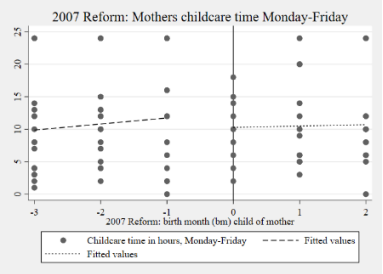
Fathers: Childcare time Monday-Friday



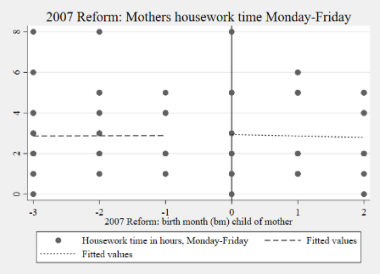
Housework time Monday-Friday



Mothers: Childcare time Monday-Friday



Housework time Monday-Friday



To determine whether there were significant treatment effects, tables 5 to 8 present the regression results for the 2007 Elterngeld reform. Table 5 presents the regression results for fathers' childcare time. As can be observed, the reform effect on fathers' childcare time is not statistically significant in model 1, where no covariates were included, and becomes slightly statistically significant at a 10 percent level in model 6 after including all the covariates presented above. The observed coefficient is positive, which would be consistent with the hypothesis that the 2007 Elterngeld reform should have a positive effect on fathers' childcare time on a workday. What conclusions we can draw from these regression results is explained in more detail in the following.

While on the one hand the inclusion of control variables can strengthen the validity of the research and help to avoid biased results due to omitted variables, on the other hand it can also come with certain limitations (Bhandari 2021). Especially when the sample size is small, as in the present study, and a large number of control variables are included, the explanatory power of the coefficient is likely to be compromised because of the partitioning (Labovitz 1965, 243). Taking this limitation into account, this slightly significant coefficient should be viewed with great caution, as no overly strong conclusions should be drawn from it.

Tables 6 to 8 present the regression results for fathers' and mothers' housework time and mothers' childcare time. Contrary to the hypotheses presented above, the results for the 2007 Elterngeld reform show no significant reform effects for 2009 for these variables of interest. Accordingly, this study finds no evidence to support the hypotheses. Potential reasons for these insignificant results are given below.

Given the limited space and the lack of statistical significance, the following regression tables, with the exception of table 5, do not report all covariates individually, but only the coefficient after the inclusion of all covariates (model 2).

Table 5:

2007 Elterngeld reform - Effect on childcare time: Fathers

VARIABLES	(1) Model 1 No covariates	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Treatment 2007 Reform Father	1.061	1.514**	1.522**	1.519*	1.629*	1.633*
	(0.888)	(0.754)	(0.759)	(0.788)	(0.867)	(0.969)
Spouse		-0.680	-0.0467	-0.179	0.449	0.812
		(0.939)	(1.110)	(1.119)	(2.030)	(2.076)
Life partner		1.116	1.054	0.998	1.087	1.516
		(1.188)	(1.252)	(1.296)	(2.246)	(2.254)
No partner		1.679	0.293	0.260	0.791	0.839
		(3.294)	(2.224)	(2.292)	(3.303)	(3.459)
Age parent 18-24 years			5.710	5.719	4.967	4.828
			(3.536)	(3.612)	(3.847)	(3.996)
Age parent 25-35 years			1.027	1.199	1.107	1.102
			(0.726)	(0.780)	(1.001)	(1.039)
German born				0.666	0.725	0.644
				(1.344)	(2.000)	(2.436)
East				-0.479	0.133	0.119
				(1.523)	(2.028)	(2.586)
West				0.147	0.793	0.573
				(1.236)	(2.045)	(2.604)
Higher education					-0.798	-0.602
					(0.969)	(1.060)
Full-time					2.221	2.666
					(3.531)	(4.296)
Part-time					1.391	1.573
					(4.514)	(5.315)
Working hours ≥ 20 to 35					0.910	0.166
					(5.499)	(7.144)
Working hours >35 to 40					-2.220	-2.411
					(2.705)	(3.280)
Working hours >40					-3.057	-3.481
					(3.085)	(3.881)
Gross income ≤2203€					-0.0779	-0.0636
					(2.003)	(2.087)
Gross income >2203€ to <5600€					-0.696	-0.563
					(1.575)	(1.658)
Gross income ≥5600€					-0.977	-1.179
					(1.544)	(1.737)
Number older children 0						-0.839
						(1.671)
Number older children 1 to 2						-2.233
						(1.397)
Age Difference ≥1 to ≤4 years						0.347
						(1.341)
Constant	2.698***	2.606***	1.399	0.858	0.592	1.617
	(0.627)	(0.800)	(1.083)	(1.539)	(2.463)	(3.666)
Observations	72	72	72	72	72	72
R-squared	0.019	0.066	0.173	0.179	0.219	0.237

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6:

2007 Elterngeld reform - Effect on housework time: Fathers

VARIABLES	(1) Model 1 No covariates	(2) Model 2 With all covariates
Treatment 2007 Reform Father	0.503	0.629
	(0.341)	(0.459)
Constant	0.854***	0.349
	(0.155)	(1.128)
Observations	69	69
R-squared	0.037	0.185

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7:

2007 Elterngeld reform - Effect on childcare time: Mothers

VARIABLES	(1) Model 1 No covariates	(2) Model 2 With all covariates
Treatment 2007 Reform Mother	-0.187	1.302
	(1.481)	(1.800)
Constant	10.69***	12.57*
	(1.068)	(6.433)
Observations	84	84
R-squared	0.000	0.317

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8:

2007 Elterngeld reform - Effect on housework time: Mothers

VARIABLES	(1) Model 1 No covariates	(2) Model 2 With all covariates
Treatment 2007 Reform Mother	-0.0139	-0.127
	(0.412)	(0.539)
Constant	2.875***	-0.126
	(0.252)	(1.652)
Observations	84	84
R-squared	0.000	0.310

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

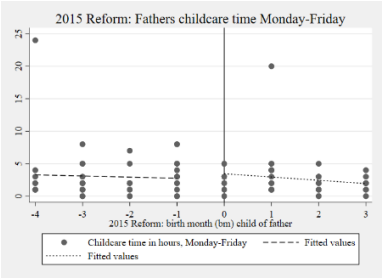
5.1.2 2015 Reform

Also, for the 2015 Elterngeld reform, in figure 4 scatterplots are presented separately for both childcare and housework time and for mothers and fathers. As previously in figure 2, one can identify the dependent variables childcare and housework time for 2017 on the y-axis and the intervals of the running variable (birth month of the child) on the x-axis. 0 hereby represents January 2015, the cutoff point for the 2015 Elterngeld reform. Figure 4 gives us a first impression of whether there might be any cutoff effects. While there appears to be a small discontinuity at the cutoff point for mothers' and fathers' childcare time and fathers' housework time, the visual analysis does not allow us to definitively say whether there is indeed a significant treatment effect.

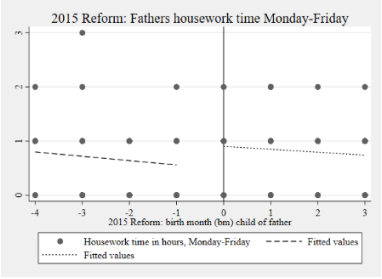
To determine whether there were significant treatment effects, tables 9 to 12 present the regression results for the 2015 Elterngeld reform for fathers and mothers time spent on childcare and housework. Contrary to the hypotheses presented above, the results for the 2015 Elterngeld reform show no significant reform effects for 2017 for any of these variables of interest. This study thus finds no evidence to support the hypotheses. Potential reasons for these insignificant results are given in the following.

Figure 4: Scatterplots 2015 Elterngeld reform

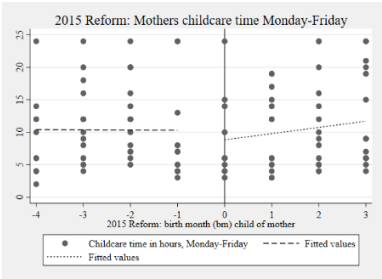
Fathers: Childcare time Monday-Friday



Housework time Monday-Friday



Mothers: Childcare time Monday-Friday



Housework time Monday-Friday

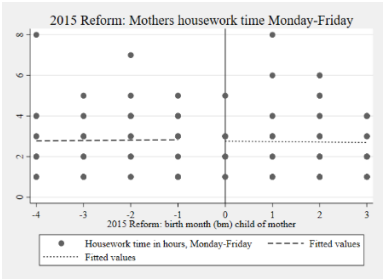


Table 9:

2015 Elterngeld reform - Effect on childcare time: Fathers

VARIABLES	(1) Model 1 No covariates	(2) Model 2 With all covariates
Treatment 2015 Reform Father	-0.311	-0.296
	(0.714)	(0.391)
Constant	3***	20.30***
	(0.554)	(0.391)
Observations	92	92
R-squared	0.002	0.832

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10:

2015 Elterngeld reform - Effect on housework time: Fathers

VARIABLES	(1) Model 1 No covariates	(2) Model 2 With all covariates
Treatment 2015 Reform Father	0.152	0.146
	(0.148)	(0.145)
		(0.478)
Constant	0.667***	0.854***
	(0.105)	(0.145)
Observations	89	89
R-squared	0.012	0.390

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11:

2015 Elterngeld reform - Effect on childcare time: Mothers

VARIABLES	(1) Model 1 No covariates	(2) Model 2 With all covariates
Treatment 2015 Reform Mother	0.0626	0.325
	(1.217)	(1.238)
Constant	10.36***	13.32**
	(0.849)	(5.821)
Observations	116	116
R-squared	0.000	0.228

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 12:

2015 Elterngeld reform - Effect on housework time: Mothers

VARIABLES	(1) Model 1 No covariates	(2) Model 2 With all covariates
Treatment 2015 Reform Mother	-0.0787	0.120
	(0.291)	(0.278)
Constant	2.800***	2.903***
	(0.213)	(0.583)
Observations	116	116
R-squared	0.001	0.336

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In this study, based on the theoretical assumptions, a series of hypotheses were formulated regarding the effects of the two Elterngeld reforms on parents' childcare and housework time. However, this study fails to find statistically significant results on the childcare and housework time of mothers and fathers for the 2007 and 2015 Elterngeld reforms (with the exception of the slightly significant results for fathers' childcare time after the 2007 Elterngeld reform). How can these insignificant results be explained?

First, when considering the number of fathers who actually made use of Elterngeld, we observe that for the 2007 Elterngeld reform from the 33 fathers in the treatment group, only five of them actually made use of it (around 15 percent) (paneldata.org 2022e). This percentage matches the results of other scholars (Huebener et al. 2016, 1163). Bearing in mind that this research design was interested in the reform effects of the Elterngeld reforms on all parents in Germany and that the treatment group thus included all fathers who gave birth shortly after the entry into force of the Elterngeld reforms, it is understandable that no significant effects could be observed for all parents given the small number of fathers who actually took advantage of the reform. Considering that the reform effects of fathers and mothers are interrelated, i.e. that a reduction in mothers' time spent on unpaid care tasks can only be expected if the father fills this gap by spending more time on these activities himself, the insignificant reform effects for mothers are also understandable. In 2015, also only around 20 percent of fathers in the treatment group made use of the Elterngeld.

Second, Kluve and Tamm (2013, 1004) in their paper already found that the 2007 Elterngeld reform was not reflected in a significant change in fathers' contributions to childcare in the first year after birth. They suggest that this is because most men receive only two months of Elterngeld and this period is too short to cause effects in childcare time. Other scholars using SOEP data also confirmed that not only in 2007, when the first Elterngeld reform was introduced, but also still in 2015, when the second Elterngeld reform was introduced, the vast majority of fathers received only up to two months of Elterngeld and

the vast majority of mothers received up to 12 months of Elterngeld (Samtleben, Schäper, and Wrohlich 2019, 611). Given the theoretical insights on policy designs, it can be argued that the 12-plus-2 minimum requirement of the two Elterngeld reforms seems to have made a normative statement that this division is socially acceptable and desirable. This is consistent with the findings of other scholars who have confirmed the establishment of such a norm (see for example Samtleben, Schäper, and Wrohlich 2019; Unterhofer, Welteke, and Wrohlich 2017; Wrohlich and Wittenberg 2016; 2017). This is also in line with the findings of other scholars who have found that fathers generally only take the leave that is explicitly reserved for them in a policy (in Germany, this would be the two "daddy months") (Bünning and Hipp 2022, 192; Kluve and Tamm 2013, 984; Schober 2014b, 352).

Third, Samtleben, Schäper, and Wrohlich (2019, 608–10) have found that since the introduction of Elterngeld Plus in 2015, more mothers and fathers combined the receipt of parental allowance with part-time employment, but the absolute proportion of fathers receiving Elterngeld has not increased compared to the period before this reform. Moreover, only about one percent of all parents made use of the Partnerschaftsbonus. Given this, it is not surprising that the introduction of the 2015 Elterngeld reform, which aimed to promote a more equal division of paid and unpaid work, had no significant effect on the time spent on childcare and housework.

Fourth, the lack of significant results with respect to the exploratory hypothesis, which predicted a reduction in mothers' childcare time as a result of the two Elterngeld reforms, may be due to the "maternal gate-keeping" described above, i.e. the phenomenon that mothers may be unwilling to give up their childcare responsibilities. However, in order to be able to say with certainty whether this was really the reason, further research would have to be conducted to investigate exactly this.

Fifth, as explained above, the introduction of the Elterngeld made a normative statement about what was socially desirable in Germany from then on and created an environment that was conducive to a more equal division of childcare and housework, which was considered a shift away from the traditional conservative welfare state regime. It is important to keep in mind, however, that prior to this there was a long tradition of gendered division of labor in Germany, and that changing societal norms may take longer than implementing a new policy. Given that, as noted above, these national beliefs about gender can have a substantial impact on individuals' actual behavior, it is not surprising that for parents who had a child shortly after a new policy was introduced, there were no significant reform effects for mothers and fathers in terms of time spent on childcare and housework.

6. Conclusion

The research question that this study aimed to answer was: *What effect did the introduction of the 2007 and 2015 Elterngeld reforms have on the time spent by fathers and mothers on childcare and housework on regular workdays in Germany?*

To answer this research question, this study used a regression discontinuity design (RDD) in which the time spent on childcare and housework of the control group, consisting of parents who gave birth shortly before the introduction of the respective Elterngeld reforms, was compared with the treatment group, which gave birth shortly after the introduction of the reforms. The data for this analysis came from the SOEP, the largest and longest-running multidisciplinary panel study in Germany.

Based on the bargaining theory and the transformative perspective (micro-level theories) as well as theoretical insights on policy designs and welfare state regimes (macro-level theories), a number of hypotheses were formulated. The same reform effects were thereby predicted for both the 2007 and the 2015 Elterngeld reforms. However, since the second reform did not represent the same fundamental change for German family policy as the previous one and also did not contain equality-promoting elements, it was expected that the reform effects would be smaller for the second Elterngeld reform. More specifically, this study expected a positive effect on workdays on the time fathers spend on childcare and housework and a negative effect on the time mothers spend on childcare and housework.

Contrary to the hypotheses, the results for the 2007 and 2015 Elterngeld reforms do not show any significant reform effects for the outcome years 2009 and 2017, respectively. The only exception is the slightly significant positive result after including all covariates for father's childcare time for the 2007 Elterngeld reform, which would be in line with the hypothesis. However, as explained in more detail in the analysis, no strong conclusions should be drawn from this given the small sample size of the present study and the large number of covariates included. In sum, therefore, this study finds no evidence to support the above hypotheses and, to answer the research question, no effects of the two Elterngeld reforms on childcare and housework time were found.

Several possible reasons for these insignificant results have been identified, the most important of which are briefly outlined again here. *First*, only a minority of fathers actually took advantage of the Elterngeld reforms in the observed period. Considering that the reform effects of fathers and mothers are interrelated and that this study was interested in the effects of the Elterngeld reforms on all parents who gave birth in Germany during the study period, the insignificant results are understandable. *Second*, as argued by other scholars, most fathers only take the minimum required two months of Elterngeld, which is too short a period to expect significant results in terms of time spent on childcare and housework. *Third*, given the long tradition of a gendered division of paid labor and unpaid care activities, and the fact that changing societal norms can take longer than implementing a new policy, it is not surprising

that we do not observe significant effects on childcare and housework time shortly after the introduction of both reforms.

As explained above, the micro-level theories underlying this study, such as bargaining theory and the transformative perspective, have often been used by other scholars in their analyses of the effects of parental leave policies and have found support in a variety of academic publications. However, this study has shown that these theories alone cannot fully explain our social reality. Insights from macro-level welfare state regime theory, which highlights the potentially long-lasting influence of societal norms and the impact of national beliefs about gender on the actual behavior of parents, are important for a more complete understanding of the effects or, in this case, the lack of effects of family policy reforms. This is in line with earlier observations by other scholars that attention should be paid to both micro-level and macro-level theories.

As indicated earlier, there are some limitations of this study that should be restated here. *First*, we need to mention the small number of observations in the samples for both the 2007 and 2015 Elterngeld reforms, which might undermine the validity of this research, but which was unavoidable due to the necessary restricted study period.

Second, the SOEP does not provide data on the time spent on childcare and housework for each individual month, but only the average time spent on these activities per year, which made it impossible to capture possible treatment effects in a RDD for a period that was close to the implementation of the policies (for example, in the year after the birth or one year after the birth of the child). It could be that there were indeed effects on childcare and housework during the period when parents were entitled to parental allowance, but that these effects disappeared when both parents returned to employment.

Third, the SOEP measures time spent on childcare and housework using retrospective survey questions rather than time diaries, the latter of which would provide more precise and valid estimates of the time spent on these activities.

Fourth, the SOEP does not distinguish between Basiselterngeld, Elterngeld Plus and the Partnerschaftsbonus, which would be interesting if one wanted to investigate not only the reform effects of the entire Elterngeld reform, but a single aspect of it to allow for more precise conclusions about the effects of the reforms.

Given the limitations of this study, there are several avenues for future research. In particular, exploring the research question with a data set that would provide more detailed information on the time spent by parents on childcare and housework, as well as on the type of Elterngeld received, would provide more precise insights into the effects of the two Elterngeld reforms as a whole, and possibly any single aspect of them, on the time spent by parents on these two dependent variables. In addition, it would be interesting if future studies focused on the potential treatment effects of the two reforms over a longer period of time to be able to detect changes in parents' behavior over time.

Finally, since this was the first study to specifically examine the effects of the 2015 Elterngeld reform on childcare and housework time, further studies that also focus on this and, for example, use a different research method or data set, could contribute to a deeper understanding of this reform.

Drawing on the insights of other researchers who have also examined the Elterngeld reforms in Germany, this paper suggested possible reasons for the insignificant results in this study. Although further research would be needed to confirm that these factors are indeed driving the insignificant results in this study, the lack of fathers claiming Elterngeld and the fact that of those receiving Elterngeld, the majority only claims the low number of two months of Elterngeld, are well-known problems in the academic literature on German family policy (see for example Samtleben, Schäper, and Wrohlich 2019). While the increase from about three percent of fathers receiving the previous Erziehungsgeld in 2006 to almost 40 percent receiving Elterngeld at the time of the 2015 Elterngeld reform can be considered a success, it is important to keep in mind that this is still less than half of all fathers, and that of these fathers, more than three-quarters claim Elterngeld for only the minimum required two partner months. Given that among mothers, receipt of Elterngeld is consistently above 90 percent and the majority of mothers receive up to 12 months of Elterngeld, there is still much room for improvement among fathers (Samtleben, Schäper, and Wrohlich 2019).

In light of the evidence mentioned above that fathers tend to claim only the share of paid parental leave that is exclusively reserved for them, it has been suggested by various scholars (see for example Samtleben, Schäper, and Wrohlich 2019; Sievers 2022) that individual, non-transferable paid leave entitlements for fathers should be gradually expanded if policymakers are truly interested in moving closer to real gender equality in childcare and housework for parents in Germany. However, as always, it is not just one element but the entire coherent "family policy mix" that will lead to positive societal outcomes (Spiess and Wrohlich 2008, 586).

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