Caring Dads? Universal Childcare, Paternity Leave and Fathers' Involvement

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Abstract

Increasing fathers' involvement in childcare is seen as an important strategy to reduce women's child penalties in the labour market and address declining fertility rates in high-income countries. However, very little is known about the extent to which family policies can incentivise parents to share the burden of child rearing more equally. This paper examines the impact of universal, highly subsidised childcare provision — one of the most important measures to support mothers in the labour market – on fathers' involvement across different stages of childhood. For identification, we exploit a major German reform generating large temporal and spatial variation in childcare coverage for children under the age of three, within a policy environment where fathers' early engagement is incentivised through generous paternal leave provisions. Our generalised difference-in-differences estimations show that expanding universal childcare significantly accelerates children's entry into childcare and increases fathers' likelihood of taking paternity leave, in response to mothers' shorter leave durations and earlier reentry into the labour market. Fathers' subsequent caregiving roles remain largely unaffected by the expansion of childcare, whereas women exhibit pronounced labour supply responses at both the intensive and extensive margins, alongside modest reductions in fathers' full-time employment. Overall, increased childcare availability seems to promote a more equal division of parental leave and labour supply; yet the significant policy effort could not substantially alter father's caregiving responsibilities within the family.

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1. Introduction

With the birth of children, women experience significant setbacks in their labour market outcomes and take on a larger share of care and housework obligations (Cortés and Pan, 2023, Kleven et al., 2024a, Goldin et al., 2024). Despite some increases in fathers' involvement in domestic work over the last few decades (Bartova and Keizer, 2020), their participation in child rearing remains low, and mothers continue to be the primary providers of childcare (e.g. Feyrer et al., 2008, Kan et al., 2011). However, in particular fathers' involvement in childcare, rather than housework, seems to hinder greater gender equality in labour market outcomes (Raley et al., 2012, Kleven et al., 2019) and has recently been put forward as a key driver of fertility behaviour in high-income countries (Doepke et al., 2023, Fanelli and Profeta, 2021).

While significant family policies, such as childcare provision and parental leave, aim to support mothers in balancing work and family, empirical evidence suggests their success in narrowing gender gaps remains limited (Kleven et al., 2024b, Olivetti and Petrongolo, 2017, Zoch and Heyne, 2023). We still know very little about the extent to which family policies can incentivise parents to share the burden of child rearing more equally — especially in promoting fathers' involvement as caregivers. While the literature on the effects on fathers' parental leave is growing (e.g. Høgholm Jørgensen and Egholt Søgaard, 2024, Ekberg et al., 2013), the impact of subsidised childcare provision – one of the most important measures to support mothers in the labour market – on fathers' involvement and division of work within household has not yet been examined.

In this paper, we exploit a reform that expanded universal, subsidised early childcare in Germany — creating substantial temporal and spatial variation in childcare coverage — to examine whether childcare provision impacts fathers' involvement in raising children. We analyse this effect across different stages, from initial engagement through parental leave-taking to subsequent responsibilities in child rearing and household labour supply decisions. Our setting specifically promotes early labour market entry of mothers and paternal involvement through designated paid paternal leave. According to standard household decision making models (see Almås et al., 2023, for an overview), the provision of universal, highly subsidised childcare can be seen as a rise in opportunity costs of child rearing for mothers, which can reduce their comparative advantage in childcare and strengthen their bargaining power within households, allowing them to better distribute

domestic tasks according to their preferences. Yet, if gender norms weight heavy on the utility functions or bargaining parameters of parents, public childcare might simply substitute maternal care without substantially altering paternal involvement.[1]

Our empirical analysis primarily relies on rich individual-level data from the DJI Childcare Study (KiBS), which examines childcare needs and arrangements across different stages of childhood. The dataset includes about 86,000 children under the age of three and their parents. Leveraging the varying pace of the childcare expansion across counties, we employ a generalised difference-in-differences approach. The county-level variation in childcare expansion for children under three is largely driven by idiosyncratic shocks to the local supply of new childcare places stemming from lengthy and complex administrative processes when creating additional places, as well as observable predictors of local childcare demand. We, along with previous studies (Bauernschuster et al., 2016, Felfe and Lalive, 2018, Sandner et al., 2024), argue that these shocks are orthogonal to changes in our main outcome: fathers' involvement in childcare.[2]

Our results first show in detail that the expansion of public, subsidised childcare speeds up childcare entry, thereby substantially increasing attendance during children's second and third year of life. The childcare expansion also increased fathers' parental leave take-up. The magnitude of this effect is sizeable: An increase in publicly subsidised childcare of 10 pp increases the share of fathers taking parental leave by 3.4 pp. Most of the increase accrues to fathers taking parental leave for two months after the child's first birthday, while the likelihood of mothers extending leave beyond 12 months decreases by a comparable margin. However, for fathers' continued involvement in caregiving on weekdays for children aged 12 to 35 months, we find no significant effects. Yet, we find suggestive evidence of some reductions in full-time employment among fathers during these ages. Complementary analyses using detailed time-use data shows that fathers with children attending childcare on average start working a little later as many of them drop off their child at childcare, while afternoons and evenings are rarely spend alone

[1] We discuss theoretical considerations and potential mechanisms in detail in Section 2.3.

[2] Several prior studies examine the impact of the German childcare expansion, e.g., on fertility (Bauernschuster et al., 2016), child development (Felfe and Lalive, 2018), child maltreatment (Sandner et al., 2024) and women's labour supply (Müller and Wrohlich, 2020). They all provide evidence on the quasi-randomness of the regional pace of the childcare expansion. We discuss the implications of recent findings on treatment effect heterogeneity and negative weights in the new difference-in-differences literature (e.g. de Chaisemartin et al., 2024, Callaway et al., 2024) when we outline our empirical strategy in Section 4, and provide related robustness in Section 5.5.

with the child and mothers continue to be primary childminder. The main impact of subsidised childcare is on maternal employment, with significant increases in mothers' labour market participation and working hours. These impacts are concentrated among first-time mothers and mothers without a migration background. Overall, our results suggest that publicly subsidised childcare mainly substitutes for maternal caregiving, without substantial lasting effects on fathers' involvement in childcare beyond their parental leave.

Our paper contributes to at least two strands of the literature. First, we shed new light on how family policies impact gender equality. The persistent slow progress toward gender parity in the labour market, coupled with the substantial child penalties faced by women in high-income countries, has generated growing interest in reforms designed to promote a more equitable division of child-rearing responsibilities. Central among such policies are parental leave policies and childcare provision, yet their impact on fathers' involvement remains largely unexplored. The small previous literature has primarily focused on paternity leave policies, with mixed findings regarding its effects on fathers' involvement (Canaan et al., 2022). Some studies find no effects of paternity leave on fathers' involvement in childcare or changes in the allocation of labour supply between parents (e.g., Ekberg et al., 2013, Cools et al., 2015).[3] Other studies suggest that paternity leave increases fathers' engagement in household chores and childcare (e.g., Kotsadam and Finseraas, 2011, Bünning, 2015, Patnaik, 2019, Tamm, 2019, Eerola et al., 2022, González and Zoabi, 2025).[4] However, the effects are often limited to specific household tasks or certain time frames (such as support on weekends). Moreover, the effects depend on the design of the parental leave system (e.g., Duvander et al., 2019, Canaan, 2022), which have also proven to be key for parental leave uptake (e.g., Høgholm Jørgensen and Egholt Søgaard, 2024). Our analysis shifts the focus from paternity leave policies to universal childcare provision – a policy which is commonly regarded as most effective in increasing maternal labour supply – and its potential to impact fathers' involvement. Notably, we consider the interaction between these policies and demonstrate that the provision of subsidised childcare increases fathers' early involvement through higher parental leave

[3]Ekberg et al. (2013) show that one month of exclusive paternity leave in Sweden increased fathers' time off work after birth without affecting fathers' subsequent take-up of leave to care for sick children.

[4]Another set of studies examines the effects of paternity leave, or "fathers' quotas", on marital stability, producing mixed findings depending on the context (Avdic and Karimi, 2018, Olafsson and Steingrimsdottir, 2020, González and Zoabi, 2025).

take-up, aligning with institutional incentives. In addition, our data allow us to examine in detail the duration of fathers' and mothers' parental leave and the child's age at that time. Fathers' parental leave effects are concentrated in the two months following their children's first birthday, during which mothers' leave was substantially reduced. Despite increased paternal leave, the provision of subsidised childcare does not lead to greater paternal involvement in child rearing later on. In the context of the paternal leave literature, our findings show that increased paternal leave does not always correspond with effects on fathers' later involvement. Overall, the findings indicate that while subsidised childcare supports maternal employment, its effect on fostering sustained paternal involvement in child rearing is limited. This suggests that broader structural factors – such as labour market conditions (for example, flexible working hours) and prevailing social norms – play a more significant role in preventing parents from sharing child rearing responsibilities more equally.

Second, our paper contributes to a deeper understanding of the individual and societal benefits of providing universal, publicly subsidised childcare, particularly regarding fathers' involvement – an aspect that has received hardly any attention in the literature. The literature thus far has mostly focused on the effects of childcare expansions on maternal employment and older children (e.g., Havnes and Mogstad, 2011, Baker et al., 2008, Bauernschuster and Schlotter, 2015, Müller and Wrohlich, 2020). Furthermore, studies also explore the effects of universal childcare on fertility (e.g., Bauernschuster et al., 2016), child development (Felfe and Lalive, 2018, Cornelissen et al., 2018, Blanden et al., 2016) or child maltreatment (e.g., Sandner et al., 2024). Gradually, the literature also touched upon fathers' labour market outcomes (Eckhoff Andresen and Havnes, 2019, Huebener et al., 2020, Brewer et al., 2022), with findings suggesting small or negligible effects on paternal employment. In recent years, however, social norms have evolved considerably, as reflected in the rising share of fathers taking parental leave (see Figure 1), potentially leaving large scope for policies to influence paternal labour supply decisions. In addition, studying employment outcomes alone may overlook effects on fathers' caregiving roles if fathers' employment is only weakly correlated with their involvement in childcare, as shown for maternal employment by Hsin and Felfe (2014). Our study addresses this gap in the literature by considering impacts of childcare on fathers' roles in raising children, thereby helping to understand why substantial family policy efforts have had only limited

impact in reducing gender inequality in labour market outcomes after childbirth.

The remainder of this paper is structured as follows: Section 2 describes the institutional setting, outlines the German expansion of subsidised childcare, and discusses potential mechanisms. Section 3 describes the data, and Section 4 explains our empirical approach. Results and robustness checks are reported in Section 5. Section 6 discusses our findings and concludes.

2. Institutional Background and Potential Mechanisms

2.1. Parents' labour supply, division of childcare and parental leave

Over the past 30 years, women's labour force participation has risen significantly in Germany. In the mid-1990s, the employment rate for women aged 15 to 64 was 55 percent; since then, it has increased by nearly 20 percentage points (pp), reaching almost 74 percent in 2023.[5] However, mothers with children under three have much lower participation rates, with only 40 percent employed in 2024 — of whom nearly three-quarters work part-time. 91 percent of employed fathers with children in this age group work full-time (Statistisches Bundesamt, 2025). The division of work within households is gendered and mothers provide the majority of childcare. In recent time-use data, mothers of children aged 12 to 35 months report an average of almost 4 hours of childcare per weekday as their main activity and 8.7 hours overall with the child — twice as much as fathers (own calculation, see Appendix Figure A.1). Notably, fathers only spend one third of the time with their child alone. For fathers, the amount of childcare and the type of activities with the child seem inelastic to the use of childcare (2.2 vs. 1.9 hours of childcare activities when the youngest child attends childcare). Mothers, on the other hand, spend on average almost an hour less with childcare activities on a weekday, when the child attends childcare (4.4 vs. 3.5 hours).[6] The differences become

[5]Female employment rates, particularly for mothers, have historically been low in West Germany, despite the high level of education among women. East Germany has higher maternal employment rates, and women contribute more to household income compared to West Germany (Lippmann et al., 2020, Jessen et al., 2023). Maternal labour supply has converged between East and West Germany in recent years.

[6]The small reduction in time the father spends with the child when the child attends childcare is primarily driven by a decrease in time spent watching the child and playing with the child. For mothers, this difference is primarily driven by a reduction in time spent on body care and watching the child, rather than on activities related to the child's human capital formation. This finding aligns with evidence from Jessen et al. (2022a), which shows that differences in time spent on specific activities – such as reading, talking, and playing with the child – between children attending childcare and those not attending are

even more noticeable when considering not only explicit childcare activities but also the time parents spend with their child present, irrespective of the activity (for mothers 10.1 vs. 7.7 hours, for fathers 5.1 vs. 4.6 hours). While the time survey clearly shows that mothers are the main caregivers in the majority of households, further survey evidence indicates that preferences for the division of childcare between parents differ from the actual allocation. Over 60 percent of mothers wish for childcare responsibilities to be equally divided, while only a quarter are actually sharing the task equally (see Appendix Figure A.2).

Several recent family-oriented policies aim to support parents in balancing work and family life after childbirth. Key initiatives in this regard were the substantial expansion of universal public childcare provision which we use for identification (described in detail in Section 2.2) and the introduction of a new parental leave system in 2006 with benefits covering approximately 67 percent of net income from the 12 months prior to birth.[7] Under this system, couples can share up to 14 months of paid leave: each partner may claim a maximum of 12 months, with an additional two months granted if both parents take leave or in the case of lone parents. Although an equal split is possible, most couples allocate 12 months to mothers and only two months to fathers (see Panel A of Appendix Figure A.3); only 10 percent of fathers claimed more than two months in 2020. Fathers typically take leave immediately after birth and around the child's first birthday (Panel B of Appendix Figure A.3). We use leave-taking behaviour of fathers as a measure of paternal involvement during very early stages of childhood and discuss in Section 2.3 why childcare provision may play an important role in shaping leave-taking decisions within couples. Overall, the share of father's claiming leave has been rising alongside the expansion of universal, highly subsidised childcare for children under the age of three, which we describe in detail in the following (Figure 1).

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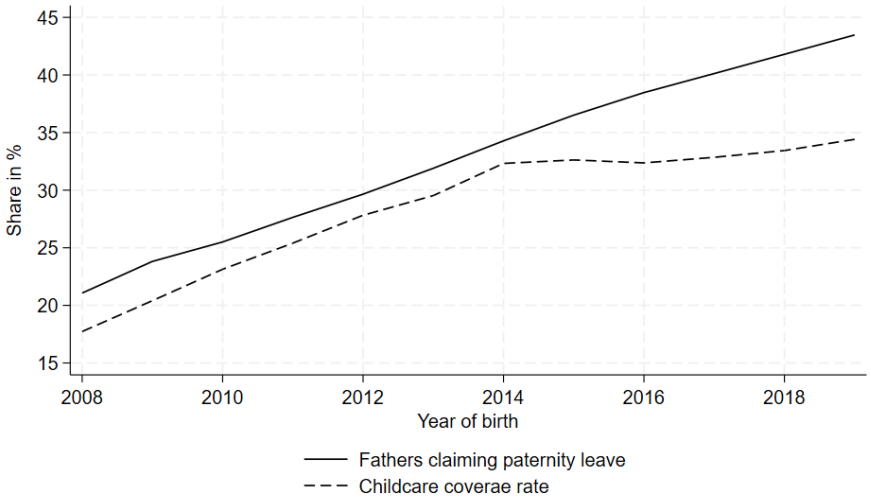
relatively small.

[7] In total, parents can take up to 36 months of unpaid job-protected parental leave (*Elternzeit*).

Fig. 1: Childcare coverage rate for children under three and the share of fathers claiming parental leave benefits over time



Note: The figure plots the share of fathers claiming parental leave and the share of children below age three in childcare.
Source: Own calculations based on Statistisches Bundesamt (2020) and Statistisches Bundesamt (2023).

2.2. The German Childcare Expansion

Childcare in Germany is accessible through a universal and highly subsidised system.[8] It is commonly provided in childcare centres, run either by the local government or by non-profit organisations and serve children from age one to when they enter school, usually at age six. Since the mid-2000s, children aged three until school entry have had high childcare coverage rates exceeding 90 percent, due to the universal childcare entitlement introduced in 1996 for this age group. In contrast, public childcare provision for children under the age of three remained severely rationed or virtually non-existent in West Germany until the mid-2000s. As of 2012, around 28 percent of children under the age of three were enrolled in public childcare, but 39 percent of parents stated a demand for childcare (Alt et al., 2013).

To improve the provision of public childcare for children under the age of three, Germany has passed major policy reforms. The 2005 *Tagesbetreuungsausbaugesetz* (*TAG*) aimed at creating 230,000 additional slots in West Germany, while the 2008 *Kinderförderungsgesetz* (*KiföG*) committed states to gradual expansion and established a legal en-

[8]Public subsidies cover approximately 70 percent of childcare costs, with the remainder covered by income-dependent parental fees. Parental fees, which make up five to ten percent of average earnings are lower than the OECD average and considerably lower than countries with limited public subsidies, such as the United States (OECD, 2023).

titlement for children aged one to three from August 1, 2013. Both laws are key steps toward providing demand-oriented, high-quality childcare for children under three.[9] In consequence of these reforms, Germany experienced a substantial increase in childcare coverage rates for children under the age of three from below 5 percent in 2005 to around 36 percent in 2023 (Figure 1).

But the expansion did not happen uniformly across counties and time. On the contrary, Appendix Figures A.4 and A.5 illustrate considerable variation across counties and time in the level and speed of the expansion. It is also evident that there was no substantial convergence (in levels or expansion speed) between counties in West Germany; on the contrary, we observe a steady increase in the standard deviation (even within states) up until 2014 which stayed on high levels thereafter. The coverage rates are higher in East Germany compared to West Germany and show stronger convergence patterns. However, in both regions, there is substantial and meaningful within-region variation.[10]

Despite the expansion, childcare demand always exceeded the supply of slots, resulting in substantial supply shortages, even at fine regional levels and in later years of the expansion (see Appendix Figure A.6 and Jessen et al. (2020)). Appendix Figure A.6 also shows substantial variation in the amount of excess demand at a given level of childcare coverage, further strengthening the argument that variation in the county-level childcare coverage rate does not appear to reflect different equilibria between supply and demand of childcare, but rather captures the supply of places.

What were the factors driving the variation in the roll-out? As argued in other studies, the key factors determining the speed of the childcare expansion were not only some well-defined predictors of local demand used by local planning authorities but mainly shocks to the local supply of new childcare places emanating from lengthy and intricate administrative processes and rules (see e.g. Bauernschuster and Schlotter, 2015, Sandner et al., 2024, Müller and Wrohlich, 2020). Data on all childcare centres in Germany (see Appendix Figure A.7) indicates that until the mid-2010s, the increase in childcare

[9]The main goal of the reforms was to improve the reconciliation of work and family life, allowing especially mothers to participate more in the labour market. The reforms also aimed to increase fertility and promote early child development. Fathers' involvement in childcare and family responsibilities is not explicitly named as a goal of the childcare expansion reforms.

[10]To increase our estimation power, we keep East Germany in our baseline regressions; however, we assess the robustness of results when focusing on West Germany only and when controlling for converging patterns.

coverage rate primarily occurred through the creation of new groups for children under three within existing centres serving older children. After that, the focus shifted to constructing new centres for all age groups.[11] The process of establishing new centres and groups within existing centres involved various decisions by authorities at municipal, county, and state levels: municipal and county authorities assessed local demand for childcare, taking into account observable demographic factors such as cohort sizes and population movements, as well as economic factors like labour market conditions. Federal state and municipality authorities (mainly the Youth Welfare Office and the State Youth Welfare Office) were responsible for approving proposals for new childcare centres and groups within existing centres. This administrative process faced several obstacles, including varying levels of knowledge about the complex funding system involving the federal government, the federal state, and the municipality. Additionally, some regions suffered from shortages of construction land for new childcare centres, differing building regulations, a lack of qualified childcare workers, and delays in the approval of new centres.[12] As a consequence, the county-level variation in childcare expansion for children under three is largely driven by idiosyncratic shocks to the local supply of new childcare places stemming from lengthy and complex administrative processes when creating additional places, as well as observable predictors of local childcare demand. We, along with previous studies (Bauernschuster et al., 2016, Felfe and Lalive, 2018, Sandner et al., 2024), argue that these shocks are orthogonal to changes in our main outcome: fathers' involvement in childcare. Note however, that we focus on slightly later expansion years than the previous literature.

2.3. Discussion on potential mechanisms

To understand how the provision of subsidised childcare may impact fathers' involvement, it is helpful to consider the theoretical mechanisms behind parents' allocation of their time between paid work and caregiving activities. The traditional division of paid

[11] County-level regression of the childcare coverage rate on the number of childcare centres for the different age groups shown in Appendix Figure A.7, while controlling for county and time FE, confirms this interpretation and can be obtained upon request.

[12] In Germany, there are strict regulatory requirements for childcare centres set by the government of the federal states, including strict hygiene and health standards as well as strict requirements regarding the premises, quantity, and quality of personal and space regulations. For example, groups for children under the age of three cannot exceed 10 children and must be supervised by at least one certified early education specialist and one or two assistants. Furthermore, group rooms within centres must offer at least 2.5 square meters per child.

and unpaid work, often referred to as the male breadwinner model, is rooted in comparative advantage theory (Becker, 1973, 1974); and more recent work on cooperative bargaining models (see Almås et al., 2023, for an overview) and the role of gender norms and identity (see e.g. Bertrand, 2011, for an overview). If mothers take on active caregiving roles early on, they tend to specialise in childcare, while fathers, focusing on the labour market, spend less time with the child. These early disparities, driven either by differences in the costs or capabilities of providing childcare as well as gendered preferences rooted in prevailing gender norms and stereotypes, can create lasting inequalities in parenting roles.

One argument for increased paternal involvement through universal childcare relates to mothers' employment and opportunity costs of child rearing: with better access to childcare mothers may re-enter the labour market sooner and earn higher wages, which can reduce their comparative advantage in childcare. Similarly, in line with non-unitary models of household decision-making, this could strengthen their bargaining power within the household, which allows them to better distribute domestic tasks according to their preferences. Since "primary" childcare activities, such as recreational or educational childcare, are often reported among the most enjoyable activities (e.g. Krueger, 2009), bargaining effects might be particularly strong for so called "secondary" child-related activities which are primarily carried out by mothers (e.g. Bastian and Lochner, 2022, Craig, 2006) and rated as less enjoyable, for example going grocery shopping, preparing a meal or travel with the child present including dropping of and bringing the child to childcare. Descriptive evidence based on time-use data in Appendix Figure A.8, Panel A shows that fathers with children under the age of three who attend childcare spend more time with their child before 8 am compared to fathers whose child does not yet attend childcare, while time-use patterns of both groups evolve similarly during the afternoon and evening (where the majority of time with children is spend with both parents present, see Appendix Figure A.8, Panel B).

The above mentioned mechanism of higher opportunity costs of child rearing could – via anticipation effects or discounting of future earning profile – increase fathers' involvement even before children enter childcare, resulting in a more equal allocation of care and market work from the beginning, e.g. through increased paternal leave and a more equal division of parental leave between the partners. Fathers who engage in more

caregiving from the beginning may strengthen their bonds with the child (Bowlby 1969), further supporting their sustained involvement in childcare.

There are also arguments related to the institutional framework in Germany which can induce greater early involvement of fathers, in particular right after a child's first birthday: In Germany, women must declare the duration of their parental leave seven weeks before starting and commit to a plan for the two years following childbirth. While adjustments are possible later, they generally require employer approval and are often not well received. Additionally, the parental allowance application can only be modified once. The allocation of childcare places – on the other hand – typically occurs at very short notice, and the underlying allocation mechanisms are highly inefficient (e.g. Reischmann et al., 2021), leading to considerable uncertainty and variability in the timing of placement notifications. Appendix Figure A.9 shows that at 11 months of age, 83 percent applied for a childcare slot (in fact at around 3 months of age already around 80 percent of parents applied for a slot), 51 percent have a confirmed slot without attending yet, and 15 percent of children already attend childcare. For households where the mother plans to return to work after the maximum parental allowance period of 12 months, but cannot secure a childcare spot in time, it may be economically sensible for the father to take two months of paid parental leave. This would allow him to stay home with the child and also manage the daycare transition, which typically takes several weeks and is increasingly handled by fathers.

In addition, significant changes in childcare policies and parental leave for fathers can alter prevailing norms regarding the roles of mothers and fathers as caregivers and the employment of mothers of young children (Zoch and Schober, 2018, Farré et al., 2023), which may then translate into increased involvement of fathers in child rearing (Bulanda, 2004).

Yet, there are also arguments as to why subsidised childcare may not alter fathers' involvement. As mentioned above, unlike other types of unpaid work, caring for children is not widely viewed as undesirable work to be avoided or outsourced, even for parents with a stronger attachment to the labour market. The literature on how maternal employment causally affects time devoted to children is scarce. Focusing on unmarried mothers, Bastian and Lochner (2022) show that maternal employment in the US only decreases time spend with children on non-investment related activities such as housework, running

errands, waiting, and relaxing when with their children, while time devoted to investment-related activities with children remains unaffected. This evidence is in line with purely descriptive findings in Appendix Figure A.1.[13] Raley et al. (2012) show that maternal employment is only weakly associated with increased paternal childcare, though it correlates more strongly with fathers' participation in housework. Additionally, a literature in sociology argues that mothers may be reluctant to share childcare responsibilities with other caregivers, including fathers, a phenomenon often referred to as 'maternal gatekeeping' (Allen and Hawkins, 1999). Compared to housework, mothers might experience greater hesitation in relinquishing childcare duties, driven by attachment or concerns over quality. Mothers may also feel guilt about outsourcing childcare, leading them to preserve quality time with their children regardless of their employment status (Hsin and Felfe, 2014). For fathers, the traditional role of breadwinner may still dominate their approach to parenting; some fathers feel they are providing the best care by ensuring their children receive primary care from their mother through their own employment and earnings (Townsend, 2002). Further, concerns about workplace discrimination and financial security might discourage fathers from dedicating more time to childcare (Grunow and Evertsson, 2016, 2019). Given these dynamics, public childcare may primarily substitute maternal care without substantially affecting paternal involvement. Based on these considerations, the effects of subsidised childcare on fathers' involvement in child rearing remain an empirical question. To the best of our knowledge, we are the first empirical study examining the impact of universal childcare on fathers' involvement.

3. Data

Our empirical analyses use large representative survey data on parents and children (KiBS, Lippert et al., 2020) and county-level administrative data on childcare coverages rates (Child and Youth Welfare Statistics, Statistisches Bundesamt, 2023) which we explain in detail in the following. Descriptive statistics of all variables used in the analysis are provided in Appendix Tables A.1 and A.2.

[13]For correlation based evidence on the association between full-time childcare and parental activities see also Jessen et al. (2022a).

3.1. DJI Childcare Study (KiBS)

The Childcare Study (KiBS, Lippert et al., 2020) by the German Youth Institute (DJI) is a large representative survey of parents and children that has been conducted since 2012. It provides rich information on care arrangements, including childcare attendance, parental leave-taking, the division of childcare responsibilities between parents, and parental employment. Each year, it gathers information from over 33,000 parents of children until their transition to secondary school.[14] The survey questions are answered by one family member of the focal child, primarily the mother (89 percent). This family member provides information about themselves and their partner if the responding individual indicates they are in a relationship. While the partner need not be the biological parent, supplementary information in specific waves indicates that the partner is the biological parent in 99 percent of cases in our sample.[15]

In our empirical analyses, we use information from eleven waves conducted between 2012 and 2022. Our main analysis focuses on children between 12 and 35 months at the time of the interview, the age range for which children gained a legal entitlement to a place in childcare in 2013. In addition, we also consider retrospective information from older children, in particular leave-taking behaviour. The samples include children born between 2007 and 2021, i.e., those who were subject to considerable variation in childcare provision.

To estimate the impact of the universal childcare expansion on fathers' involvement and labour supply decisions within households, we study four sets of outcomes. First, we start out by estimating impacts of the expansion on childcare attendance at the individual level to identify which age groups and families are affected by the reform. We are the first to do this, since other studies using the childcare expansion in Germany as exogenous variation (Bauernschuster and Schlotter, 2015, Sandner et al., 2024, Müller and Wrohlich, 2020) were unable to observe childcare attendance in their outcome data.

Second, we assess parental labour supply responses at the extensive and intensive margin to get a comprehensive picture on time allocation decisions within households

[14]The sampling follows a two-stage process, including families from 428 randomly selected municipalities. To achieve a sample that is representative at both the national and federal state levels, KiBS aims to survey at least 100 children across each federal state and age cohort. In households with more than one child, the survey asks about one focal child.

[15]Approximately 4 percent of our sample reports being single. In this group, we only have information on childcare attendance and employment, but no details on the division of care.

and to empirically test some of the potential mechanisms outlined in Section 2.3. At the extensive margin, we look at (i) an indicator capturing employment. At the intensive margin, we consider (ii) an indicator of full-time employment (working more than 34 hours a week), (iii) an indicator for long part-time employment (20 to 34 hours), and (iv) an indicator for short part-time employment (less than 20 hours). We examine the employment of both mothers and fathers in the second and third year after childbirth (birth years 2009-2021).

Third, we consider fathers' and mothers' parental leave take-up after childbirth as an indicator of early involvement in child rearing, which could have effects on a more equal division of childcare later on.[16] We use (i) an indicator of whether the father claimed parental leave for his child. In addition, we asses the duration of both parents' parental leave. The duration of fathers' parental leave is categorised into (ii) taking exactly two months of leave and (iii) taking more than two months of leave, while mothers' parental leave is categorised into (iv) taking exactly 12 months of leave and (v) taking more than 12 months of leave. This information is provided retrospectively for each child, with the children being born between 2007 and 2020.[17]

Fourth, we examine the division of childcare responsibilities within the family when the child is between 12 and 35 months old, the ages for which the childcare expansion had the most "bite" (birth years 2011-2021). Parents evaluate the current division of childcare duties on a typical weekday using a five-point scale ranging from 1 (solely the mother) to 5 (solely the father). We use this measure as a continuous, categorical, and indicator variable, where the indicator equals one if the mother is the sole or main caregiver, and zero if childcare is shared equally or primarily undertaken by the father.[18] Evaluating this division on a typical weekday is important, as it often represents the primary time when parents must balance work requirements and childcare. This period helps to assess the challenges parents face in reconciling professional responsibilities with

[16]Indeed, Appendix Figure A.10 shows that in 74 percent of couples where fathers took no leave, mothers were the sole or main caregivers for children aged one to two years, compared to just 36 percent when fathers took more than six months.

[17]We supplement our analysis with information on the parental leave status of both partners during the time of the survey to further characterise the age of the child when the father claimed parental leave and to indicate whether the leave was taken together with the partner or by the father alone.

[18]We supplement the analysis by also using an indicator that takes the value of one when the proximity to the father's workplace was important for the choice of the childcare centre, and zero if it was not mentioned as important. The latter information, however, is only surveyed in a subset of waves (birth years 2011-2018).

family obligations, which is crucial for understanding fathers' overall involvement and its subjective perception. Many policies related to family-work reconciliation are designed with weekdays in mind. For 66 percent of the sample, mothers are the main caregivers.

Unfortunately, other measures of the division of childcare are not available for a sufficient number of survey waves. However, Appendix Table A.3 shows that our measure is strongly correlated with related indicators available in some of our survey waves, including satisfaction with the division of childcare, attitudes toward the optimal allocation of childcare, and the father's workplace proximity.

3.2. Administrative Regional Data

As our main independent variable, we use county-level administrative data provided by the Federal Statistical Office on the childcare coverage rate in each county and year (Statistisches Bundesamt, 2023). This coverage rate is calculated as the number of children enrolled in childcare under the age of three relative to the total population in this age group. Since 2006, childcare centres were required to report data on the number of enrolled children to local authorities as of March 1st each year. Due to persistent excess demand, even at fine regional levels (see Appendix Figure A.6 and Jessen et al. (2020)), this number can be equated to the number of places available for children under the age of three.[19]

In our analysis, we include a rich set of additional county-level information to capture time-varying regional heterogeneity and observable factors taken into account by local planning authorities when assessing local demand for childcare. The regional data is obtained from the regional database maintained by the German Statistical Office and the Federal Institute for Research on Building, Urban Affairs and Spatial Development of the Federal Office for Building and Regional Planning.

Specifically, we include population density, gross domestic product per capita, the share of women and men with *Abitur* (university entrance qualification), detailed population composition measures capturing the proportion of the population within detailed age bins, the share of the population with migration background and the conservative vote share (INKAR, Bundesinstitut für Bau-, Stadt- und Raumforschung, 2023).[20] In

[19]Prior to 2006, this data was collected in four-year intervals and contained the number of places by age group. Population data is measured in December of the preceding year.

[20]For a reasoning why we choose this set of regional controls, see discussion in Section 5.5).

extended regressions, we also include information on county's debt and tax capacity, a measure of net migration and interact pre-expansion childcare coverage rate with year fixed effects following (Blanden et al., 2016). In Section 4, we briefly discuss the intuition for our choice of regional control variables.

4. Empirical Approach

To identify the effects of universal childcare provision for children under the age of three on fathers' involvement, we estimate generalised difference-in-differences models that use the county-level childcare coverage rate as a continuous treatment variable. Thus, we exploit the large variation in the childcare coverage rate across counties and within counties over time, generated by the legally mandated expansion of childcare for children below the age of three in 2008 and the corresponding universal entitlement for childcare for children from age one onward starting in 2013.

More specifically, we estimate two-way fixed effects specifications similar to other studies examining the effects of childcare expansions on fertility (Bauernschuster et al., 2016), mothers labour supply (Müller and Wrohlich, 2020), child development (Felfe and Lalive, 2018, Cornelissen et al., 2018), and child maltreatment (Sandner et al., 2024),[21] which take on the following form:

$$y_{ijb(m)} = \alpha + \delta cr_{j,b+1} + \mathbf{X}'_{ijb}\beta_1 + \mathbf{Z}'_{j,b+1}\beta_2 + \gamma_j + \theta_b + (\mu_m) + \varepsilon_{ijb(m)} \tag{1}$$

$y_{ijb(m)}$ represents outcomes concerning children's childcare attendance, parental labour supply and paternal involvement in childcare for child i in county j born in year b. Outcomes that vary by children's age are indexed by m, referring to children's age in months when they are observed; $cr_{j,b+1}$ denotes the childcare coverage rate for children under the age of three in county j one year after the children's birth, which is the year in which children obtain legal entitlement to a childcare slot. Hence, δ is our coefficient of main interest. We control for a vector X_{ijb} of individual controls which include mother's and

[21] Please note that we refrain from estimating dichotomous DiD models as in Bauernschuster and Schlotter (2015), as our survey data is not available before the expansion started, and thus questions regarding the exact definition of treatment and control group are not straight forward to answer. In addition, using a generalised DiD frameworks allows us to exploit the full variation in local childcare coverage. It however comes at the cost of assuming marginal effects of expansions in public childcare to be constant.

father's education, their age at childbirth (also squared), child's gender, and migration background. γ_j and θ_b are county and birth year fixed effects which account for general time trends and time-constant regional heterogeneity. For outcomes measured at different ages of the child, we additionally include fixed effects for children's age in months (μ_m) to flexibly account for potential age profiles in the outcome. The i.i.d. error term is denoted by $\varepsilon_{ijb(m)}$. Standard errors are clustered at the county level.[22] In addition, we include a vector $Z_{j,b+1}$ of time-varying county-level controls, measured at the same time as our main independent variable. Specifically, the share of women and men with *Abitur*, population density, share of the population with migration background and the conservative vote share, GDP per capita, and the population shares by age groups.

Let us briefly outline the intuition behind our baseline choice of time-varying covariates. One potentially confounding factor could be changes in the education composition of the population or underlying (gender) norms. Studies on parental involvement show that higher-educated parents spend more time with their children (e.g., Guryan et al., 2008) and also demonstrate a more egalitarian division of work and care responsibilities (e.g., Davis and Greenstein, 2009, Raz-Yurovich and Okun, 2024). Although the demand for childcare exceeds the supply of available slots in virtually all counties (see Appendix Figure A.6), better-educated parents may be more effective at pressuring local authorities and childcare providers to expand capacity, which would bias our estimates upwards. Controlling for the share of men and women with university entrance qualification mitigates this issue. Women's educational attainment also captures their labour market attachment. To proxy for cultural attitudes regarding mothers and the family, we control for the share for conservative votes,[23] the migration share, and population density as childcare coverage rates are higher in more urbanised areas, which also tend to have more egalitarian gender norms (e.g. Scheiner et al., 2011).[24] Similarly, counties with higher earnings and better public finance might be better equipped to expand childcare more rapidly. To proxy for available county-level resources to expand childcare coverage

[22]Our main estimations do not use weights. Unlike for descriptive statistics, their use in the estimation of causal effects is debatable (Solon et al., 2015).

[23]We group vote shares for the CDU and AfD as all other major parties are associated with more liberal family policies.

[24]In a further robustness check, we also control for the share of father taking parental leave one year before childbirth on the county level and potential catch-up patterns by interacting cohort dummies with levels of childcare coverage rates in the year 2002 (see Section 5.5).

in our regression models, we include GDP per capita as a control and in extended regressions also control for a county's level of debt and the tax capacity (see Section 5.5). To capture time-varying local demographic factors which are typically used to predict childcare demand, we also carefully control for a county's population age structure by including the population shares by age groups (under 3, 3 - 5, 6 - 17, 18 - 24, 25 - 29, 30 - 49, 50 - 64, 65 and older) and in extended regressions also control for net-migration numbers (see Section 5.5).

Our empirical model estimates the treatment effect of interest δ based on the standard assumption of common trends (conditional on the outlined set of controls) and assuming constant treatment effects across regions and over time (de Chaisemartin and D'Haultfœuille, 2020, Goodman-Bacon, 2021).[25] We assess the validity of this assumption in Section 5.5.

5. Results

5.1. Effects on Children's Use of Childcare

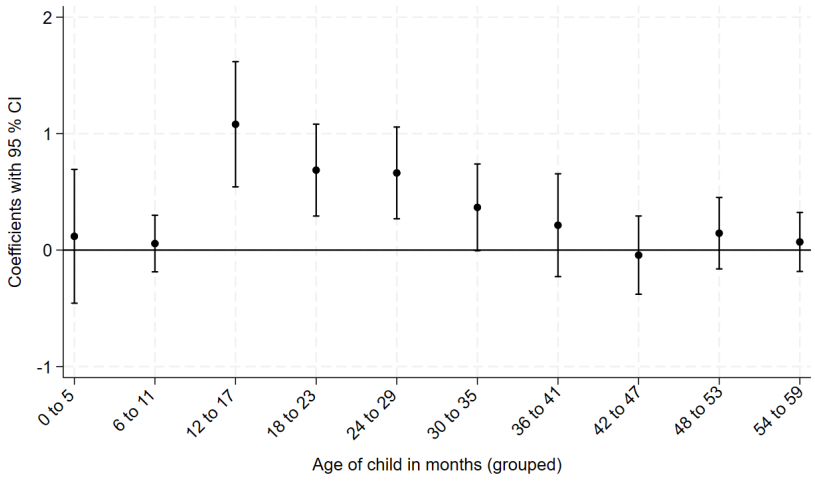
We start out by examining how the childcare expansion affected children's childcare attendance in our representative survey data.[26] Figure 2 presents effects estimated separately by children's age at the time of the interview. It is evident that coefficients turn significant after the first birthday up until three years of age when children transition to groups for children above the age of three, indicating that the expansion significantly accelerated children's entry into childcare between age 12 and 35 months. Note that the effect size – particularly at ages 12 to 29 months (0.7–1.1 pp for a one pp increase in cover-

[25]Recent developments in methods related to difference-in-differences (DiD) with two-way fixed effects estimations highlight the issue of heterogeneous treatment effects when applied to staggered treatment (e.g. Borusyak et al., 2024, de Chaisemartin and D'Haultfœuille, 2020, Callaway and Sant'Anna, 2021, Sun and Abraham, 2021, Goodman-Bacon, 2021). The primary concerns are that treatment effects may vary across groups and over time, leading to biased results. Specifically, because the treatment effects are estimated as weighted sums of the average treatment effects in each group and period, the potential presence of negative weights may lead to a biased linear regression coefficient (de Chaisemartin and D'Haultfœuille, 2020). These issues have also been identified in settings with continuous treatment (e.g. de Chaisemartin et al., 2024, Callaway et al., 2024). While new estimators have been developed to address biased results for discrete treatment, no solutions currently exist for continuous treatment. For our main analysis, we assume homogeneous treatment effects. We perform several robustness checks in Section 5.5 to demonstrate that our results are robust to various alternative model specifications.

[26]Note, that recent studies (Bauernschuster et al., 2016, Sandner et al., 2024, Felfe and Lalive, 2018) using the German childcare expansion as exogenous variation could not observe childcare take-up in their data, i.e. they estimate reduced form regressions and were unable to examine how the childcare expansion affected attendance.

age rate) – is nearly a one-to-one mapping, reflecting the severe shortage of slots available for this age group. Childcare attendance of children below age one and above age three remains unaffected by the expansion of childcare for children below three. These effect patterns align very well with the institutional framework that grants parents parental leave benefits for up to 14 months after childbirth. Moreover, children only gain legal entitlement to a childcare place after their first birthday. Consequently, the demand for childcare in the first year after childbirth is very low. These findings provide strong support for our identification strategy, i.e. identifying effects of universal childcare for children between the ages of one and under three. Yearly numbers are summarised in Appendix Table A.4 and support this interpretation. Overall, for our main sample of children aged 12 to 35 months, an increase of 10 pp in childcare availability leads to an increase in childcare attendance of 6.4 pp (Appendix Table A.5, Column 1). We also examine changes at the intensive margin of childcare attendance in Appendix Table A.5. It is evident that the expansion was primarily driven by children attending childcare full-time (Column 2), while the share of children attending less than 35 hours was not significantly affected (Columns 3 and 4).

Fig. 2: Effects of childcare expansion for children under age three on childcare attendance



Notes: Coefficient estimates with 95 % CI of the childcare rate on childcare attendance from separate estimations of eq. 1 by age. All models include county and birth year fixed effects, as well as individual-level and county-level controls (see Appendix Table A.2). At 12 months old, children gain legal entitlement to a childcare slot. Paid parental leave expires after a maximum of 14 months. The childcare expansion is targeted to increase childcare slots for children between 12 and 35 months.
Source: Own illustration based on data from the KiBS, the Federal Statistical Office, and INKAR.

5.2. Effects on Parental Employment

Before turning to our more direct measures of paternal involvement, we assess parental labour supply responses to the expansion of childcare for children under age three to get a better understanding of the division of paid work within households. Any working time adjustments might also more directly serve as a measure of time spend off the labour market, potentially with children.

Table 1: Effects of childcare expansion on fathers' and mothers' employment (children aged 12 – 35 months)

	Dependent variables: Parental Employment			
	Extensive (> 0 hours) (1)	Full-time (> 34 hours) (2)	Part-time (long) (20 – 34 hours) (3)	Part-time (short) (1 – 19 hours) (4)
Panel A: Fathers' employment				
Childcare coverage below 3 years	0.0213	-0.1755**	0.1685***	0.0241
	(0.0521)	(0.0863)	(0.0635)	(0.0253)
Observations	83,703	82,831	82,831	82,831
Mean of dep. var	0.9542	0.8667	0.0729	0.0120
SD of dep. var	0.2090	0.3399	0.2599	0.1091
Panel B: Mothers' employment				
Childcare coverage below 3 years	0.4571***	0.2293**	0.2951**	-0.0910
	(0.1135)	(0.0950)	(0.1210)	(0.0851)
Observations	92,894	92,722	92,722	92,722
Mean of dep. var	0.6541	0.2111	0.3279	0.1036
SD of dep. var	0.4757	0.4081	0.4695	0.3047

Notes: All models include county and birth year fixed effects, as well as individual-level and county-level controls (see Appendix Table A.2). Robust standard errors clustered at the county level are given in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.
Source: Own calculations based on data from the KiBS, the Federal Statistical Office, and INKAR.

Panel A of Table 1 reports DiD coefficients for fathers of children between 12 and 35 months at the time of the interview, the age range during which their childcare attendance increased significantly. Results indicate that the reform did not affect labour supply of fathers at the extensive margin; however, coefficients in Columns 2 and 3 indicate a shift from full-time to part-time employment of about 17 pp. The magnitude of this effect is large given the overall low share of fathers working part-time. We note, however, that standard errors are quite large and that the significance of this coefficient is a little bit more sensitive to model specification than our other outcomes (see Section 5.5). Time-use patterns in Appendix Figures A.8 further suggest that the shift from full-time to substantial part-time hours among fathers may be driven by their role in dropping children

off at daycare and starting work later.

Results in Panel B of Table 1 show strong maternal labour supply responses at the extensive and intensive margin: If childcare rates increase by 10 pp, mothers' employment increases by 4.6 pp (Column 1). This increase is primarily driven by an increased probability to work full-time of about 2.3 pp (Column 2) and longer part-time hours of about 2.9 pp (20 - 34 hours, Column 3) when increasing childcare provision by 10 pp.[27] The results align with other evidence on positive effects of universal childcare provision on maternal labour supply (Lefebvre and Merrigan, 2008, Bauernschuster and Schlotter, 2015, Müller and Wrohlich, 2020).[28] Paternal labour supply responses, on the other hand, are rarely studied, and when they are, it is usually based on much smaller sources of variation in childcare access (e.g. Huebener et al. (2020) and Brewer et al. (2022) both use variation in childcare fees) than in our setting. Moreover, prior studies often relied on earlier periods when social norms regarding the division of parental labour were still markedly different.[29]

5.3. Effects on Fathers' Parental Leave-Taking and Division of Childcare

We next examine whether the expansion of publicly subsidised childcare for children under three years also affected more direct measures of fathers' involvement and the division of unpaid work within households. To do this, we consider two sets of variables: parent's leave-taking as an indicator of their early involvement, and their subsequent involvement in childcare on a normal weekday.

Table 2, Column 1, shows that the expansion of childcare had a positive effect on the take-up of fathers' parental leave. An increase in publicly subsidised childcare of 10

[27]Predicted probabilities of ordered logit models using theses different employment outcomes as categorical variable are shown in Appendix Figure A.11 and confirm results from separate regressions in Table 1.

[28]Depending on the context, the provision of childcare subsidies or universal childcare can also have very small effects on maternal employment. For example, Havnes and Mogstad (2011) find that the large-scale expansion of subsidised childcare in Norway did not increase maternal employment, but mainly crowded out informal childcare arrangements. Givord and Marbot (2015) find that a 50 percent subsidy to childcare spending introduced in France had only a marginal impact on female labour force participation. Note that results in Müller and Wrohlich (2020) who examine the effects of the same childcare expansion in Germany on maternal employment using data from the German Micro Census, find the strongest effects on mothers' employment participation and extended part-time employment; yet they do not find effects on maternal full-time employment or reductions in short part-time as we do. These differences are likely due to the different expansion periods considered.

[29]The shift from full-time to extended part-time employment for fathers became more pronounced after including the new survey waves from 2021 and 2022 of the KiBS data in our analyses.

Table 2: Effects of an increase in childcare coverage on parental leave take-up and length

	Dependent variables				
	Fathers' parental leave			Mothers' parental leave	
	Take-Up	Exactly two months	More than two months	Exactly 12 months	More than 12 months
	(1)	(2)	(3)	(4)	(5)
Childcare coverage below 3 years	0.4119***	0.3016**	-0.0245	0.3701***	-0.2768**
	(0.1245)	(0.1205)	(0.1002)	(0.1308)	(0.1161)
Observations	65,972	65,972	65,972	59,355	59,355
Mean of dep. var	0.5397	0.3743	0.1413	0.4590	0.3449
SD of dep. var	0.4984	0.4839	0.3483	0.4983	0.4753

Notes: All models include county and birth year fixed effects, as well as individual-level and county-level controls (see Appendix Table A.2). Robust standard errors clustered at the county level are given in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: Own calculations based on data from the KiBS, the Federal Statistical Office, and INKAR.

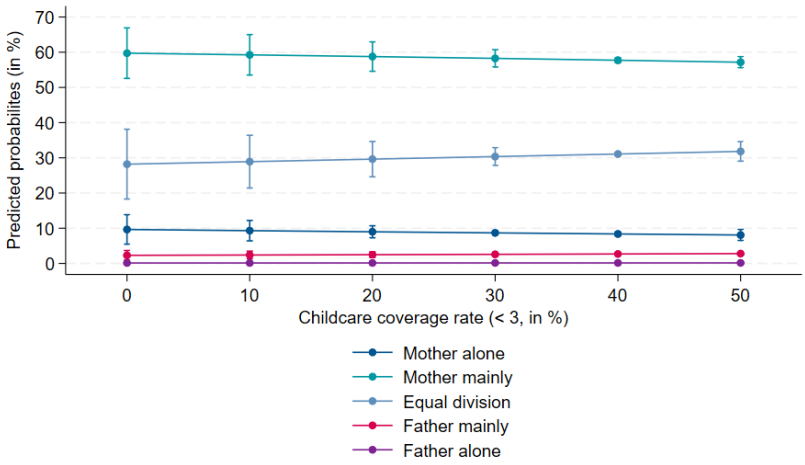
pp increases the share of fathers taking parental leave by 4.1 pp.[30] Most of the increase accrues to fathers taking parental leave for two months (Column 2), which corresponds to the extra two months paid if both parents claim some leave. The effect on parental leave longer than two months is, however, small and even negative (Column 3).

For mothers, we find a significant decrease in leave-taking of more than 12 months of about 2.8 pp if provision of childcare increase by 10 pp (Column 5). Leave-taking of exactly 12 months, on the other hand, increases by a similar amount (Column 4). Supplementary analyses in Appendix Figure A.12 show that the effects on paternal leave are concentrated when the child is about 12 – 14 months old (Panel A), the time-period during which parental leave of mothers is significantly reduced (Panel B) and where we see the largest responses in childcare take-up. Given the substantial uncertainty around the timing of childcare admission (see Section 2.3), this behaviour likely reflects mothers adhering to their plan of returning to work once the maximum paid leave period ends, while fathers take over the daycare transition during their own leave -— a process that typically lasts several weeks and is increasingly assumed by fathers.

Finding positive effects on fathers' parental leave take-up raises the question of whether

[30]As we are using the increase in regional childcare availability to estimate the effects on fathers' involvement, we estimate intention-to-treat effects rather than the effects of actual childcare attendance. However, by utilising our first-stage results from Appendix Table A.4, Column 1, we can consider the childcare expansion as an exogenous instrument for childcare attendance and scale our reduced form findings accordingly. Regarding the impact on fathers' parental leave take-up, we find that if the child attends childcare at age 12 to 35 months, the probability of fathers claiming parental leave rises by 64 pp.

Fig. 3: Predicted probability of division of parental childcare when child is 12 to 35 months old conditional on childcare coverage rate for children below 3 years



Notes: Coefficient estimates with 95 % CI of the childcare rate on division of childcare on a normal working day conditional on different childcare coverage rates. Estimates stem from separate estimations of eq. 1 using ordered logit models. All models include county and birth year fixed effects, as well as individual-level and county-level controls (see Appendix Table A.2).
Source: Own illustration based on data from the KiBS, the Federal Statistical Office, and INKAR.

this is accompanied by increased involvement of fathers in childcare later on. Figure 3 shows predicted probabilities based on a categorical measure of the division of unpaid work between parents on weekdays, ranging from 1 (solely the mother) to 5 (solely the father). The figure presents the predicted probabilities of each outcome category of division of childcare across different values of the county-level childcare rate based on separate estimations of eq. 1 using ordered logit models. In contrast to parental employment (see Appendix Figure A.11), we see little change in care division when provision of childcare increases. Note that we observe a slight increase in the probability of equal division and a corresponding slight decline in situations where the mother is the sole or main caregiver; though differences in coefficients never reach statistical significance. The results are summarised in Appendix Table A.6, where we find no significant effects on a continuous or binary (mother solely or mainly) measure of involvement. The coefficient on our binary measure amounts to about a 1.7 pp decrease in mothers' role as main caregiver when the childcare coverage rate increases by 10 pp. Based on the bounds of our results, we can exclude the possibility that the share of mothers being the main caregivers decreases by more than 5 pp when childcare coverage increases by 10 pp. We also estimate the effects of increased childcare availability by age groups on the binary outcome of whether the mother is the sole/main caregiver. We find no systematic patterns across children's ages

until age 5 (see Appendix Figure A.13).

To complete the picture, we also assess the effects of the childcare expansion on other forms of childcare provided by grandparents or other paid or unpaid care arrangements, such as nannies, au pairs, surrogate grandparents, neighbours, friends, or siblings in Appendix Table A.7. We cannot find any significant effects of the childcare expansion on care arrangements for children between the ages of 12 to 35 months, suggesting that publicly subsidised childcare is mainly substituting maternal care in Germany.

We conclude that increasing the availability of publicly subsidised childcare promoted a more equal division of parental leave and labour supply, but it did not alter the subsequent assessment of who is the main childcare provider on a normal weekday.

5.4. Heterogeneity Analysis

The effects of the childcare expansion on the division of work might differ based on couples' characteristics. To identify potential effect heterogeneity, we interact the childcare coverage rate in eq. 1 with indicators of maternal education, migration background and whether the child is the first born and has younger siblings. Results are reported in Table 3. To improve readability, we focus on the main outcomes.

They show that the childcare expansion has a stronger effect on the attendance of children from lower-educated households and those without a migration background, whereas we do not find significant heterogeneity by children's birth order.[31] It is important to note that attendance rates among children from lower-educated households and those with a migration background have generally been lower, despite parents' desire to enrol their children in childcare (Huebener et al., 2023). In line with a previous study of Jessen et al. (2020), our results suggest that reductions in supply-side shortages increased attendance rates among children of less-educated parents, but not among children with a migration background. This is also in line with evidence that assistance in the search for a childcare place has large effects on the take-up of childcare for lower-educated families (Hermes et al., 2025).

The effects on parental employment and leave-taking of fathers are also significantly smaller for parents with a migration background (Panel B of Table 3). The impact on maternal employment and leave-taking are larger for mothers with higher education

[31] Please note that the interaction coefficient for the presence of younger siblings is quite imprecisely estimated, also due to lower sample size as this information is not available in some survey waves.

Table 3: Heterogeneity: Effects of childcare expansion on fathers' involvement by parental education and children's sex

	Dependent variables				
	Childcare attendance at 12 – 35 months (1)	Father works full-time (2)	Maternal employment (3)	Father took 2 months of leave (4)	Mother took 12 months of leave (5)
Panel A: By mothers' education					
Coverage × Mum *Abitur*	-0.4408***	0.0584**	-0.0832*	-0.0400	-0.2134***
	(0.0364)	(0.0259)	(0.0434)	(0.0331)	(0.0332)
Observations	85,280	74,855	84,993	59,303	52,985
Panel B: By parent's migration background					
Coverage × At least one parent born abroad	-0.1985***	-0.1794***	-0.2731***	-0.0912*	-0.0250
	(0.0548)	(0.0398)	(0.0450)	(0.0503)	(0.0461)
Observations	93,541	82,831	92,894	65,972	59,355
Panel C: By Child being firstborn					
Coverage × Child firstborn	-0.0435	0.0014	-0.0797***	-0.0878***	0.0372
	(0.0302)	(0.0213)	(0.0307)	(0.0299)	(0.0409)
Observations	79,613	72,082	79,089	56317	50,841
Panel D: By presence of younger siblings					
Coverage × Younger siblings present	-0.6719	-0.0852***	0.0579	-0.1337***	-0.0803*
	(0.5607)	(0.0320)	(0.0498)	(0.0409)	(0.0423)
Observations	76,710	69,631	76,216	54,149	48,783

Notes: All models include county and birth year fixed effects, as well as individual-level and county-level controls (see Appendix Table A.2). In Columns 1 to 3 , children are 12 – 35 months old at time of outcome measurement. Robust standard errors clustered at county level are given in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: Own calculations based on data from the KiBS, the Federal Statistical Office, and INKAR.

than for mothers without a university entrance qualification. However, the effects on fathers full-time employment are significantly larger for fathers with a higher education partner.[32] These heterogeneities may be explained by differences in gender role attitudes (Davis and Greenstein, 2009, Raz-Yurovich and Okun, 2024), by higher baseline levels of fathers' leave-taking and part-time work in families with higher education or without a migration background (e.g. Bünning and Pollmann-Schult, 2015, Geisler and Kreyenfeld, 2018), or by varying speeds of adaptation to new cultural values (e.g. Hook and Paek, 2020).

With respect to birth order, the results in Panels C and D show that fathers' responses in terms of full-time employment and leave-taking, as well as mothers' likelihood of shorter

[32]Regardless of parental education, the effects on mothers being the main caregiver are small and insignificant. Results can be obtained upon request.

leave periods, are significantly smaller when a younger sibling is present. Similarly, when the child is a first-born, mothers' labour supply responses and fathers' leave-taking are also significantly smaller, likely reflecting an anticipation of having additional children.

Overall, the findings indicate that the effects on parental employment and leave-taking vary systematically by parental education, migration background, and the child's birth order. These differences are likely driven by prevailing gender role attitudes and adaptation to gender norms, pre-existing disparities in baseline levels of employment and leave-taking, (anticipated) family composition, and unequal access to childcare, as reflected in heterogeneous effects on attendance following expansions in supply.

5.5. Robustness Checks

To test the robustness of our findings, we conduct several robustness checks for our main outcomes. First, we examine the sensitivity of our findings to alternative model specifications that particularly address concerns regarding time-varying heterogeneity on the county level, as well as the potential confounding influence of contemporaneous regional (primarily state-level) childcare and family policies coinciding with the expansion and potentially affecting paternal involvement.[33] They are reported in Table 4, Panel A.

First, we estimate models both without the rich set of county-level covariates and with an extended set that not only controls for net migration, county debt, and the tax capacity, but also flexibly accounts for pre-expansion differences in childcare coverage by including the 2002 coverage rate interacted with cohort fixed effects. By adding this term we control for the fact that the childcare expansion could be systematically related to the pre-treatment levels of childcare coverage in a way that is time-variant and correlated with our outcomes of interest (see Blanden et al. (2016) for a similar approach). In addition, this helps us to capture the convergence patterns which we observe in East Germany (Appendix Figure A.5). Reassuringly, results are very similar across specifications.Second, we incorporate state-fixed effects, thus only exploiting within state-variation in the childcare expansion and potentially controlling for other family and educational policies such as the abolishment of fees at the state level or the introduction and abolition of state parental allowance (Gathmann and Sass, 2018) during our period of study. Coefficients are not statistically different from our baseline results, however, we

[33]Note that we are not concerned about general time trends and time-invariant differences across counties biasing our results, as these are absorbed through time and county-fixed effects.

Table 4: Robustness checks for main outcomes

	Dependent variables				
	Childcare attendance at 12 – 35 months (1)	Father works full-time (2)	Maternal employment (3)	Father took 2 months of leave (4)	Mother took 12 months of leave (5)
Main specification	0.6434***	-0.1755**	0.4571***	0.3016**	0.3701***
	(0.1418)	(0.0863)	(0.1135)	(0.1205)	(0.1308)
Observations	93541	82,831	92,894	65,972	59,355
Panel A: Model specifications					
Without control variables	0.9461***	-0.0903	0.5507***	0.3997***	0.6173***
	(0.1364)	(0.1074)	(0.0902)	(0.1380)	(0.1255)
Observations	93,541	82,831	92,894	65,972	59,355
Extended set of control variables	0.6593***	-0.2411**	0.4359***	0.2790**	0.3290**
	(0.1837)	(0.0966)	(0.1564)	(0.1344)	(0.1514)
Observations	88626	78,172	87,994	61,836	55,803
Include state fixed effects	0.3535**	-0.1440	0.1028	0.2296	0.4995***
	(0.1473)	(0.1042)	(0.1531)	(0.1420)	(0.1713)
Observations	93,535	82,826	92,888	65,968	59,351
Include pre-birth paternal PL share (county level)	0.6684***	-0.1774**	0.4559***	0.2999**	0.3889***
	(0.1387)	(0.0895)	(0.1133)	(0.1256)	(0.1436)
Observations	92,066	81,400	91,415	63,713	56,896
Panel B: Sample restrictions					
Only West Germany	0.5850***	-0.1434	0.4356***	0.4456***	0.0851
	(0.1987)	(0.1015)	(0.1608)	(0.1714)	(0.1874)
Observations	61,213	54,221	60,839	40,625	35,175
Only counties with > 24 observations per year	0.6625***	-0.1869	0.3790***	0.1594	0.2489*
	(0.1762)	(0.1203)	(0.1436)	(0.1465)	(0.1468)
Observations	73,144	61,803	72,486	52,951	46,330
Only counties with excess demand	0.6518***	-0.1462	0.3706***	0.3586**	0.2866*
	(0.1537)	(0.0924)	(0.1289)	(0.1402)	(0.1587)
Observations	84,773	75,165	84,169	59,214	52,896

Notes: All models include county and birth year fixed effects. Except for Rows 1 and 2 of Panel A, all models include individual-level and county-level controls (see Appendix Table A.2). In Columns 1 to 3 , children are 12 – 35 months old at time of outcome measurement. In Panel B, Row 3, the sample consists only of observations from counties with significant excess demand. This is determined by calculating the mean of the difference between the demand from parents for childcare slots and the child's actual attendance of childcare for those under 3 years old for each county and birth year combination. Observations in the lowest quartile of county-level unmet demand for children below 3 in the year following birth are excluded. Robust standard errors clustered at county level are given in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: Own calculations based on data from the KiBS, the Federal Statistical Office, and INKAR.

note that the coefficient on maternal employment and father's leave-taking of exactly two months (the coefficient on father's leave-taking overall remains large 0.37 and statistically significant) loses statistical significance also due to larger standard errors and slightly

lower magnitude.[34] As a final check, we include the share of fathers taking leave in the year preceding the child's birth. This control variable serves a dual purpose: It captures prevailing social norms regarding leave-taking and fathers' involvement. It also helps to address potential concerns of reverse causality, namely the direct effect of paternal leave behaviour on the demand for, and potentially also the supply of childcare slots. Coefficients remain unchanged.

In Panel B of Table 4, we asses how sensitive our results are to various sample adjustments that might bias our main findings. First, we focus only on West Germany and remove East German counties from the analysis, to address any remaining concerns about time-varying heterogeneity between East and West Germany that we can not account for by including the rich set of county correlates and flexibly controlling for pre-expansion coverage rates. Coefficients are very similar in magnitude (and significance) with the exception of mothers' leave-taking of exactly 12 months. This might be due to several reasons: It could be that prevailing social norms regarding maternal caregiving are too strong to evoke changes in mothers' leave-taking, and that fathers' parental leave therefore tends to occur only in conjunction with that of mothers. In addition, we note that the mean of this variable is much lower in West Germany, thus the response relative to the mean (though not significant due to large standard errors) is fairly similar.

Second, we restrict the sample to counties with at least 25 observations per birth year, to prevent results from being biased or noisy due to counties with few observations.[35] Coefficients slightly decrease in magnitude but, with the exception of leave-taking of fathers of exactly two months (the coefficient on father's leave-taking overall remains large

[34] We also include control variables for the share of all-day childcare slots in the county, as an increase in the availability of all-day slots was initiated during our time period (see, e.g., Felfe and Zierow, 2018). This makes sure that our estimates reflect the impact of childcare provision rather than the impact of full-time slots (vs. half-day slots). The increase in all-day care is sufficiently orthogonal to the childcare expansion we are studying, such that we draw the same conclusions. Results can be obtained upon request.

[35] We also run regressions excluding all large cities with more than 500,000 inhabitants to reduce within-county heterogeneity in our sample. Results remain similar. Results are also similar when excluding the survey years 2020 to 2022 (waves 9, 10 and 11) from our sample, as they fell within the COVID-19 pandemic, which had a significant impact on care arrangements, the division of childcare, and parental employment during that time (e.g., Del Boca et al., 2020, Jessen et al., 2022b). Results are very similar. Our results remain robust when accounting for potential selective moving patterns by excluding observations in which the county code changes between survey waves for children repeatedly observed. The results also prove robust to altering the sample with respect to the cohorts considered in the analysis, further strengthening the assumption of homogenous treatment effects across units and across time periods. All these additional robustness checks can be obtained upon request.

0.36 and statistically significant at the 10 percent level), remain similar in significance. Lastly, we run regressions including only counties with excess demand[36] to make sure that our identifying variation reflects supply-side shortages rather than other underlying heterogeneity across counties and over time. Results are very similar.

6. Conclusions

This paper examines whether the expansion of publicly subsidised childcare can incentivise parents to share the burden of child rearing more equally – especially in promoting fathers' involvement as caregivers. We build on a policy environment in Germany that was redesigned to promote maternal employment and fathers' engagement through the orchestrated provision of parental leave, paternal quotas, and the subsequent legal entitlement to subsidised childcare. Our identification of causal effects of childcare is based on exogenous regional variation in the expansion of childcare slots for children under the age of three. We find that expanding universal childcare significantly accelerates children's entry into childcare and increases fathers' likelihood of taking paternity leave, in response to mothers' shorter leave durations and earlier reentry into the labour market. Fathers' subsequent caregiving roles remain largely unaffected by the expansion of childcare. However, we find modest declines in fathers' full-time employment, alongside pronounced labour supply responses among mothers at both the intensive and extensive margins.

On the one hand our findings support the notion of a "stalled gender revolution," reflected in stagnating improvements in paternal childcare engagement and persistent gender gaps in the labour market despite substantial policy efforts to increase fathers' involvement in child rearing (Raley et al., 2012, Zoch and Heyne, 2023, Kleven et al., 2024b). Childcare provision seems to primarily serve as a substitute for maternal care rather than facilitating a substantial redistribution of childcare responsibilities between parents. On the other hand, the modest shifts from paternal full- to part-time employment and increased leave-take up are in line with more promising findings from "daddy months" and "fathers' quotas" of parental leave on fathers' involvement (Kotsadam and Finseraas, 2011, Patnaik, 2019, Eerola et al., 2022, González and Zoabi, 2025). However,

[36]Calculated as the county-level average of demand minus supply of slots, similar to (Jessen et al., 2020).

we do not find the initial increases in paternal leave take-up caused by the childcare expansion to materialise in substantial increased paternal involvement later on.[37] One explanation is that most previous papers find that changes in fathers' engagement relate to housework; increases in paternal childcare often occur on weekends (Tamm, 2019). We explicitly focus on fathers' involvement in *childcare* on a *weekday*, margins that are probably most relevant to understand persistent gender gaps in labour markets.

The small effects on fathers' involvement may also be explained by the generally small associations between maternal employment and fathers' childcare. Working mothers may not wish to reduce their time with their children as much as they would with housework. They may experience feelings of guilt from outsourcing childcare to external providers, leading them to maintain quality time with their children despite their employment as suggested by our time-use analysis. If the missing reallocation of childcare work lies outside women's preferences, the provision of childcare and its effects on maternal employment can result in what is commonly referred to as a "double shift" for mothers who are simultaneously employed and primarily responsible for childcare and household tasks.

We note that our findings do *not* imply that universal childcare cannot be beneficial in supporting more gradual adjustments in gender role attitudes and in promoting gender equality in unpaid-work over a longer time horizon. Zoch and Schober (2018) show that the expansion of childcare shifts gender norms and attitudes primarily of mothers. Actual behaviour can deviate from newly prevailing norms, but one would expect that behaviour adjusts to new norms gradually over time. This would not be reflected in our estimates that focus on the immediate effects of childcare provision on fathers' involvement in child rearing.

In sum, our analyses shed new light on the interplay between different family policies and show that substantial family policy efforts can alter the division of paid-work within households, yet they fail to bring about significant changes in the division of unpaid work, particularly in fathers' caregiving responsibilities.

[37]For Germany, Bünning and Pollmann-Schult (2015) show that fathers increased their involvement in childcare even after short leaves. However, fathers' choice of parental leave length may be correlated with their preferences for childcare or housework, which the fixed-effects approach may not fully account for without an exogenous source of variation in the length of fathers' parental leave.

Declaration of Generative AI in the Writing Process

During the preparation of this work, the authors used editGPT and ChatGPT to enhance readability and check the language. Following the use of this tool, the authors reviewed and edited the suggestions as needed. They take full responsibility for the content of the published article.

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Appendix

A.1. Tables

Table A.1: Descriptive statistics: Outcome variables

	Mean (1)	SD (2)	Min (3)	Max (4)	Obs (5)
Panel A: Sample of parents with child 12 – 35 months					
County-level childcare coverage (< 3)	31.24	0.13	6.90	64.80	94,401
Individual childcare attendance					
Attendance	63.84	48.05	0	1	94,194
1 – 25 hours	13.82	34.51	0	1	93,856
26 – 35 hours	20.45	40.33	0	1	93,856
> 35 hours	29.66	45.67	0	1	93,856
Maternal Employment					
Employment	65.49	47.54	0	1	93,532
Full-time	21.35	40.98	0	1	93,356
Part-time long	32.71	46.92	0	1	93,356
Part-time short	10.30	30.39	0	1	93,356
Paternal employment					
Employment	95.42	20.91	0	1	84,149
Full-time	86.70	33.95	0	1	83,271
Part-time long	7.26	25.95	0	1	83,271
Part-time short	1.20	10.87	0	1	83,271
Division of childcare					
Childcare division (1-5)	2.28	0.66	1	5	57,392
Mother cares solely	8.57	27.99	0	1	57,392
Mother cares mainly	57.47	49.44	0	1	57,392
Equal division	31.07	46.28	0	1	57,392
Father cares mainly	2.74	16.33	0	1	57,392
Father cares solely	0.15	3.85	0	1	57,392
Proximity to father's work relevant for Kita	34.07	47.40	0	1	24,955
Panel B: Retrospective outcomes					
Paternal leave-taking					
Father took leave	53.90	49.85	0	1	65,715
Father: Exactly 2 months	37.38	48.38	0	1	65,715
Father: More than 2 months	14.13	12.14	0	1	65,715
Mother: Exactly 12 months	45.98	24.84	0	1	59,197
Mother: More than 12 months	34.46	22.59	0	1	59,197

Notes: Means are presented as percentage shares when no unit is specified.
Source: Own calculations based on data from the KiBS and the Federal Statistical Office.

Table A.2: Descriptive statistics: Control variables (sample with parents of child 12 – 35 months)

	Mean (1)	SD (2)	Min (3)	Max (4)	Obs (5)
Panel A: Individual level controls					
Maternal education: School-leaving certificate					
Basic degree	3.78	19.08	0	1	94,401
Intermediate degree	21.32	40.96	0	1	94,401
University entrance quali. (*Abitur*)	69.26	46.14	0	1	94,401
No/other degree	1.01	10.00	0	1	94,401
Missing	4.63	21.01	0	1	94,401
Paternal education: School-leaving certificate					
Basic degree	2.72	16.27	0	1	94,401
Intermediate degree	7.53	26.40	0	1	94,401
University entrance quali. (*Abitur*)	27.58	44.69	0	1	94,401
No/other degree	0.41	6.36	0	1	94,401
Missing	61.75	48.60	0	1	94,401
At least one parent born abroad	17.44	37.95	0	1	94,401
Migration background missing	2.43	15.38	0	1	94,401
Child female	48.65	49.98	0	1	94,401
Maternal age at birth (in years)	32.18	4.78	14	60	94,401
Paternal age at birth (in years)	35.22	5.08	15	79	94,401
Missing paternal age	27.69	44.75	0	1	94,401
Child's age at interview (in months)	22.91	6.84	12	35	94,401
Panel B: County-level controls					
Population density (inhabitants per km^2)	533.16	695.48	35.34	4868.01	94,401
GDP p.c. (in €1,000 per inhabitant)	35.33	15.77	12.74	195.64	94,401
Share of men with *Abitur*	28.53	09.05	0	68.07	94,401
Share of women with *Abitur*	36.04	10.26	0	72.17	94,401
Share of immigrants	09.00	05.30	0.66	38.97	94,401
Vote share conservative party (CDU)	42.72	08.58	18.25	63.47	94,401
Share of population below 3 years old	02.61	00.31	1.75	3.60	94,401
Share of population 3 – 5 years old	02.61	00.26	1.76	3.60	94,401
Share of population 6 – 17 years old	10.99	01.24	6.81	16.01	94,401
Share of population 18 – 24 years old	7.60	1.55	3.63	14.18	94,401
Share of population 25 – 29 years old	5.88	1.40	2.17	11.50	94,401
Share of population 30 – 49 years old	25.69	1.98	20.37	33.99	94,401
Share of population 50 – 64 years old	22.75	2.28	16.35	29.16	94,401

Notes: Means are presented as percentage shares when no unit is specified.
Source: Own calculations based on data from the KiBS and INKAR.

Table A.3: Correlations of main outcomes of fathers' involvement with alternative measures of fathers' involvement

	Dependent variables					
	Proximity to dad's workplace matters for childcare choice (dummy) (1)	Satisfaction with childcare division (scale 1 - 6) (2)	Unsatisfied with childcare division (dummy) (3)	Optimal childcare division (scale 1 - 5) (4)	At least equal division is optimal (dummy) (5)	Higher involv. would help reconciliation (dummy) (6)
Division of childcare (scale 1 - 5)	0.1127***	0.6844***	-0.1573***	0.3578***	0.2875***	-0.2013***
	(0.0030)	(0.0137)	(0.0038)	(0.0051)	(0.0037)	(0.0057)
Observations	55,026	22,996	22,996	22,869	22,869	12,381
Spearman's ρ	0.1637***	0.3492***	-0.2668***	0.4390***	0.4164***	-0.2989***
Mother is main caregiver	-0.1489***	-0.9748***	0.2088***	-0.4622***	-0.4090***	0.2984***
	(0.0042)	(0.0153)	(0.0042)	(0.0055)	(0.0045)	(0.0076)
Spearman's ρ	-0.1567***	-0.3446***	0.2323***	-0.4035***	-0.3919***	0.2908***
Observations	55,026	22,996	22,996	22,869	22,869	12,381

Notes: The table shows how our main outcomes measuring fathers' involvement—namely, the continuous scale of childcare division on a weekday from 1 (mother cares alone) to 5 (father cares alone) and a dummy variable that is 1 if the mother is the main caregiver and 0 otherwise—are correlated with other variables related to childcare division. For each variable pair, OLS regression coefficients, where all models include fixed effects for birth year and individual-level controls (see Appendix Table A.2, Panel A), are provided, with robust standard errors given in parentheses. Additionally, Spearman's ρ is reported. Column 1 shows the correlation to a dummy variable that is 1 when the proximity of the father's workplace was important for the parents' choice of a childcare centre and 0 if it was not stated as important. Columns 2 and 3 report the correlation with the mother's satisfaction regarding the division of childcare. In Column 2, satisfaction is measured on a scale from 1 (not at all satisfied) to 6 (completely satisfied), while in Column 3, it is represented as a dummy variable that is 1 if the mother is unsatisfied with the division (indicated by a value between 1 and 3) and 0 if a value higher than 3 is reported. In Columns 3 and 4, outcomes are correlated with a variable providing information on the desired or perceived optimal division of childcare. In Column 4, this is indicated by a scale from 1 (mother cares alone) to 5 (father cares alone), while in Column 5, it is represented as a dummy variable, with 1 indicating that at least an equal division (values 3-5) is desired and 0 if otherwise (values 1 and 2). Finally, Column 6 presents correlations with a dummy variable indicating whether higher involvement of the father would facilitate the mother's reconciliation of work and family (1 for yes, 0 for no). The samples are not restricted to a certain age group. *** p<0.01, ** p<0.05, * p<0.1.
Source: Own calculations based on data from the KiBS.

Table A.4: Effects of childcare expansion on childcare attendance

	Dependent variables: Childcare attendance by age			
	Main sample	First three years separately		
	12 – 35 months	0 – 11 months	12 – 23 months	24 – 35 months
	(1)	(2)	(3)	(4)
Childcare rate under 3 years	0.6434***	0.0712	0.8388***	0.4975***
	(0.1418)	(0.1053)	(0.2036)	(0.1422)
Observations	93,541	28,653	51,415	42,126
Mean of dep. var	0.6363	0.0831	0.5246	0.7726
SD of dep. var	0.4811	0.2761	0.4994	0.4192

Notes: All models include county and birth year fixed effects, as well as individual-level and county-level controls (see Appendix Table A.2). Robust standard errors clustered at county level are given in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: Own calculations based on data from the KiBS, the Federal Statistical Office, and INKAR.

Table A.5: Effects of childcare expansion on intensive margin of childcare attendance

	Dependent variables: Childcare attendance (age 12 – 35 months)			
	Attendance (> 0 hours)	Full-time (> 35 hours)	Part-time (ext.) (26 – 35 hours)	Part-time (1 – 25 hours)
	(1)	(2)	(3)	(4)
Childcare rate under 3 years	0.6434***	0.4274***	0.1311	0.1046
	(0.1418)	(0.1601)	(0.1713)	(0.1120)
Observations	93,541	93,205	93,205	93,205
Mean of dep. var	0.6363	0.2945	0.2039	0.1389
SD of dep. var	0.4811	0.4558	0.4029	0.3458

Notes: All models include county and birth year fixed effects, as well as individual-level and county-level controls (see Appendix Table A.2). Robust standard errors clustered at county level are given in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: Own calculations based on KiBS, the Federal Statistical Office, and INKAR.

Table A.6: Effects of an increase in childcare coverage on fathers' involvement (children aged 12 – 35 months)

	Dependent variables		
	Division of childcare on a weekday (continuous, only mother [1] to only father [5])	Mother is main caregiver	Proximity to father's workplace is important for Kita choice
	(1)	(2)	(3)
Childcare coverage below 3 years	0.1367	-0.1762	0.0434
	(0.2303)	(0.1641)	(0.2836)
Observations	57,612	57,612	25,052
Mean of dep. var	2.2844	0.6604	0.3406
SD of dep. var	0.6620	0.4736	0.4739

Notes: All models include county and birth year fixed effects, as well as individual-level and county-level controls (see Appendix Table A.2). Robust standard errors clustered at the county level are given in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: Own calculations based on data from the KiBS, the Federal Statistical Office, and INKAR.

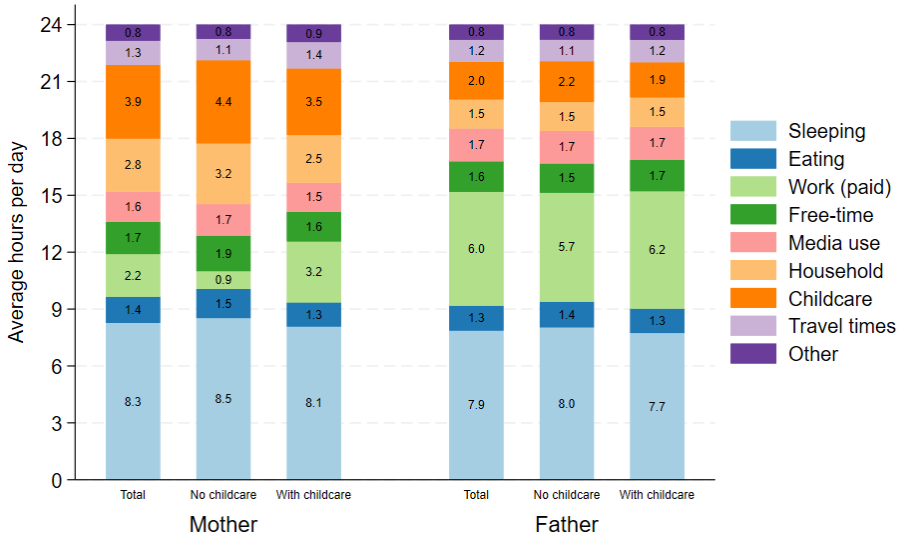
Table A.7: Effects of childcare expansion on other care arrangements (age 12 – 35 months)

	Dependent variables: Other care arrangements		
	Grandparents normally care	Grandparental care hours	Other care arrangements
	(1)	(2)	(3)
Childcare coverage below 3 years	-0.0312	-1.4951	-0.1606*
	(0.1406)	(2.3776)	(0.0913)
Observations	91,501	51,592	93,750
Mean of dep. var	0.4635	3.3243	0.1446
SD of dep. var	0.4987	6.9805	0.3517

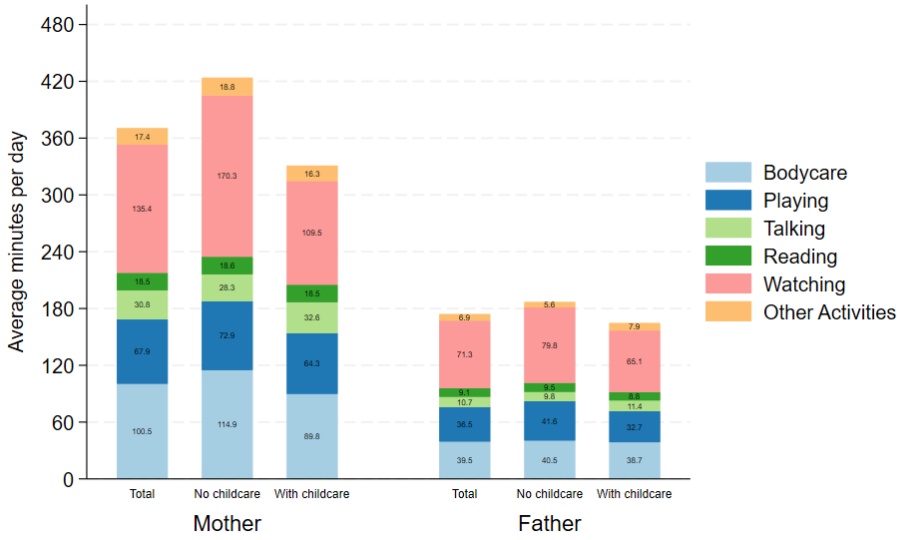
Notes: All models include county and birth year fixed effects, as well as individual-level and county-level controls (see Appendix Table A.2). Robust standard errors clustered at county level are given in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: Own calculations based on data from the KiBS, the Federal Statistical Office Germany and the INKAR database.

A.2. Figures

Fig. A.1: Parents total time-use and time spend with childcare



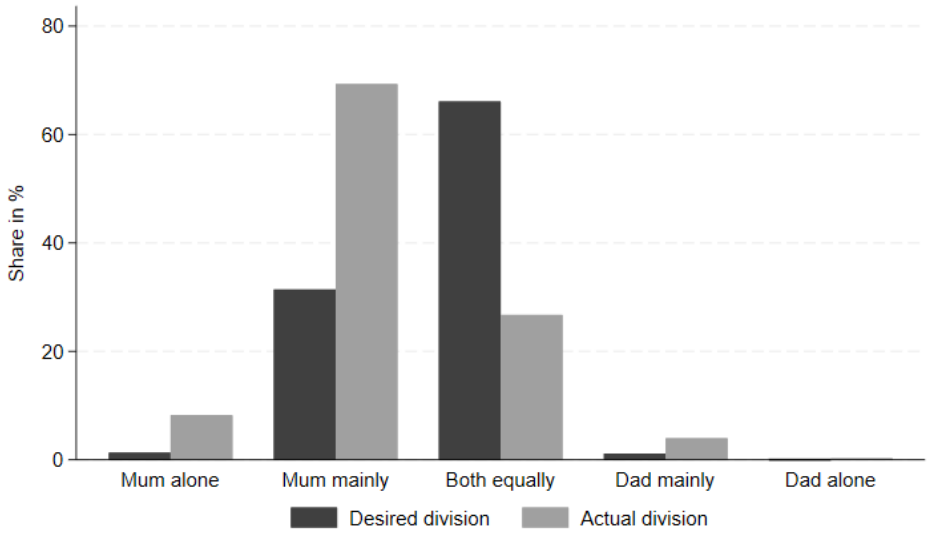
A: Parental time-use by childcare attendance



B: Parental childcare activities by childcare attendance

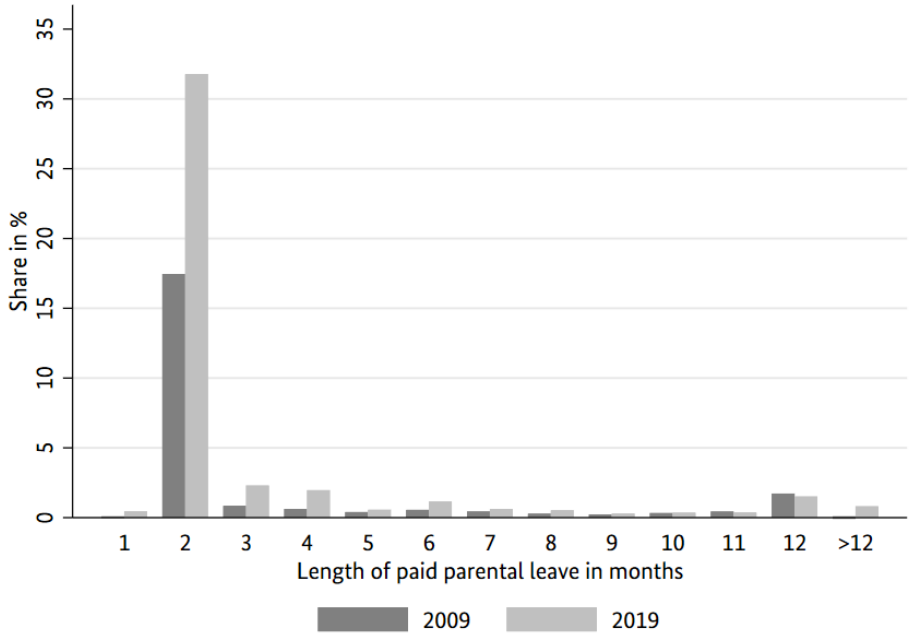
Notes: Based on 2022 time-use survey data, the graphs show how mothers and fathers allocate weekday time, overall and by childcare attendance of the youngest child (aged 1–2). Subfigure A reports only main activities, which sum to 24 hours. Figure B includes both main and secondary childcare activities, resulting in overall childcare time that exceeds that in Subfigure A. Childcare in this figure includes only the activities explicitly stated by parents as their main or secondary activity; it does not account for other activities during which the child is present. Therefore, the time spent together with the child each day would be higher. Means are based on 2,156 observations.
Source: Own illustration based on data from the survey of the time use of the population 2022 of the statistical offices of the Federation and the Länder.

Fig. A.2: Actual and desired division of childcare

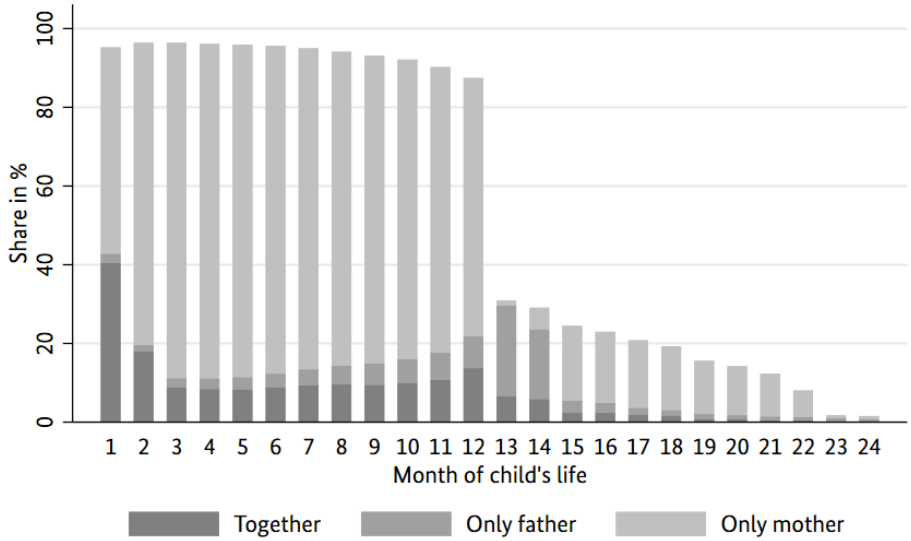


Notes: The figure illustrates the division of childcare that mothers express as their preference, alongside the actual distribution of childcare responsibilities between parents, represented as shares of each category. This information is derived from the 2022 survey.
Source: Own calculation based on KiBS data.

Fig. A.3: Paternity leave in Germany



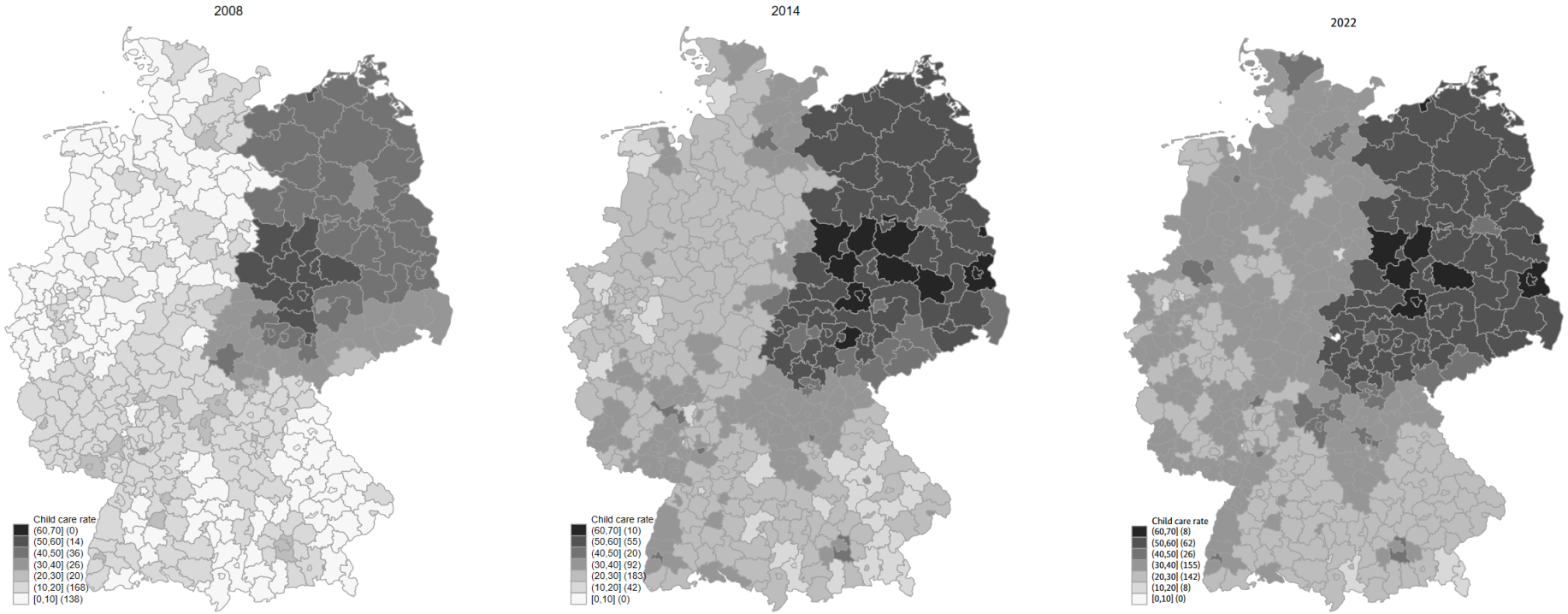
A: Duration of paternity leave benefits for children born 2009 and 2019



B: Allocation of parental leave by child age in 2019

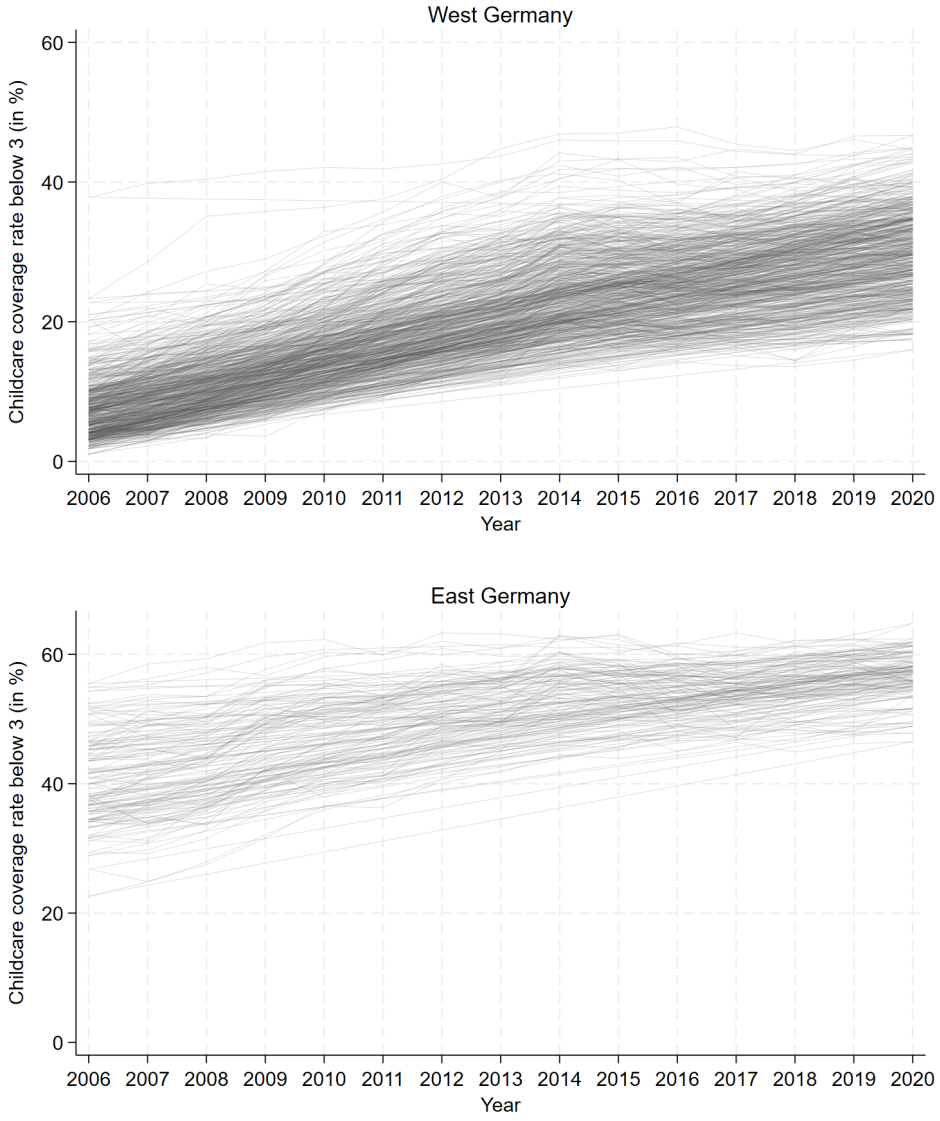
Source: Customised statistics on parental leave benefit receipts from the Federal Statistical Office retrieved from Brehm et al. (2022).

Fig. A.4: Childcare coverage rates for children under the age of three over time by county



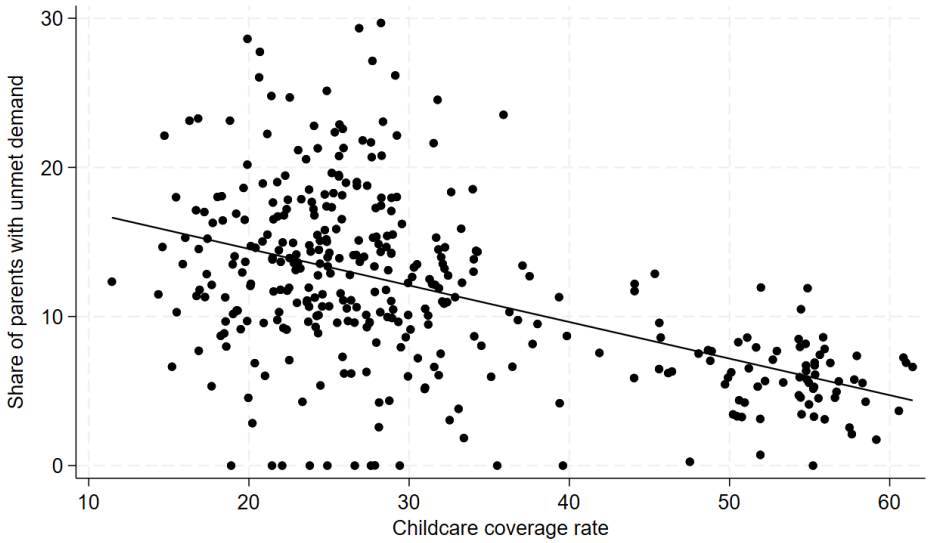
Source: Own illustration using data from the Federal Statistical Office.

Fig. A.5: Childcare coverage rates for children under the age of three over time by county



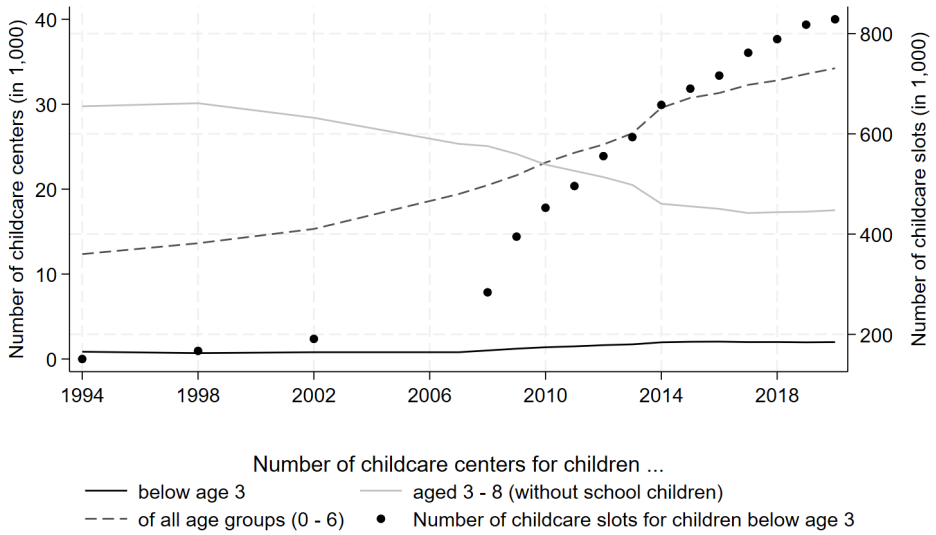
Source: Own illustration using data from *"Kinder und tätige Personen in Tageseinrichtungen und in öffentlich geförderter Kindertagespflege"* for the years 2006 to 2020 of the Federal Statistical Office.

Fig. A.6: Excess demand and childcare coverage rate on county level



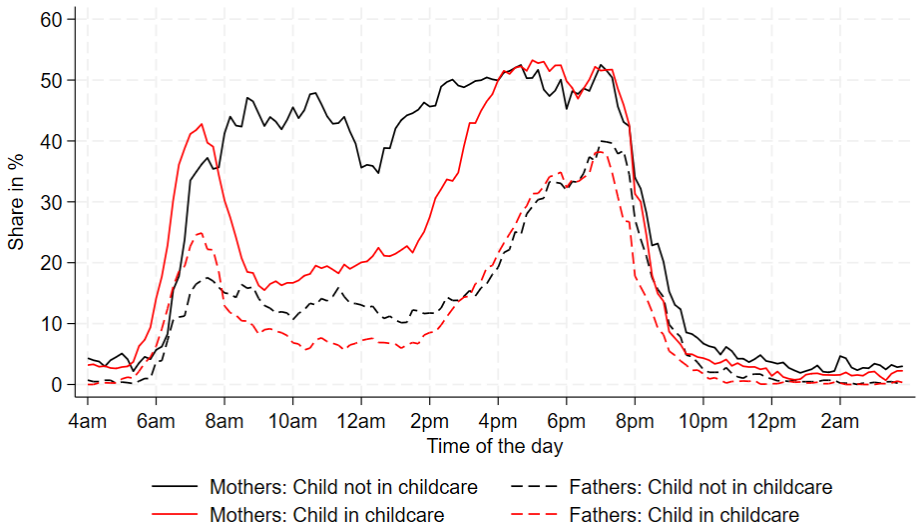
Notes: The figure shows the share of parents with unmet demand (parents indicate demand for childcare but child is not attending childcare) and the share of children attending childcare on a county-level collapsed across the years 2012 to 2022.
Source: Own calculation based on KiBS data.

Fig. A.7: Number of childcare centres and slots over time

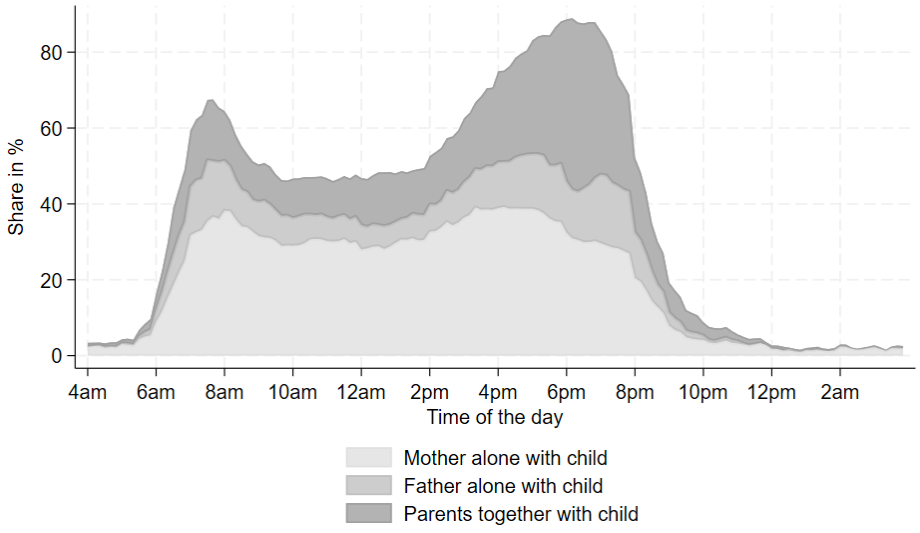


Notes: The figure shows the the number of childcare centres for different age groups and the number of slots for children below age three. Childcare centres for all age groups include both groups for children under three and groups for older children.
Source: Statistisches Bundesamt (1994 - 2020).

Fig. A.8: Daily time use patterns by childcare attendance



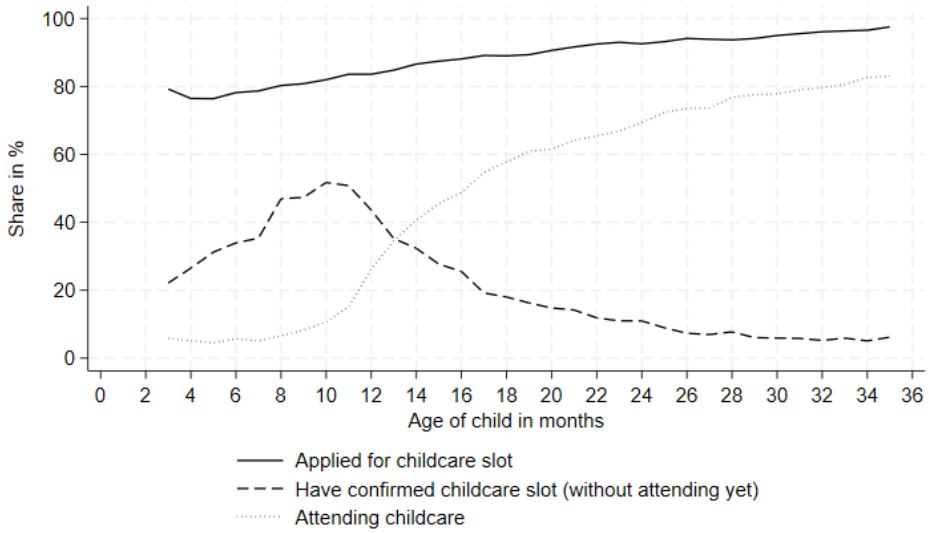
A: Parental childcare by childcare attendance



B: Time spent with child

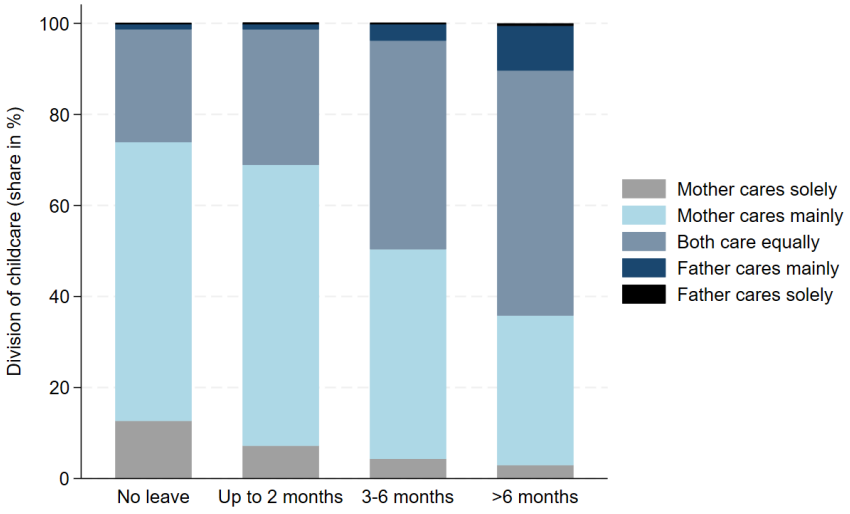
Notes: Subfigure A shows the share of parents reporting a childcare activity (either as a main or secondary activity) throughout the day. The shares of mothers and fathers are presented, grouped by whether the youngest child attends childcare. Subfigure B displays the share of parents who reported having a child present during their activities over the day. It illustrates both the shares of mothers and fathers who stated they were alone with the child, as well as the share where both the child and the partner were present during the activity. Both figures are based on 2022 time-use survey data, considering parents with the youngest child aged one to two years old, surveyed on a weekday, resulting in 2,156 observations.
Source: Own illustration based on data from the survey of the time use of the population 2022 of the statistical offices of the Federation and the Länder.

Fig. A.9: Timing of application for children and attendance in Germany



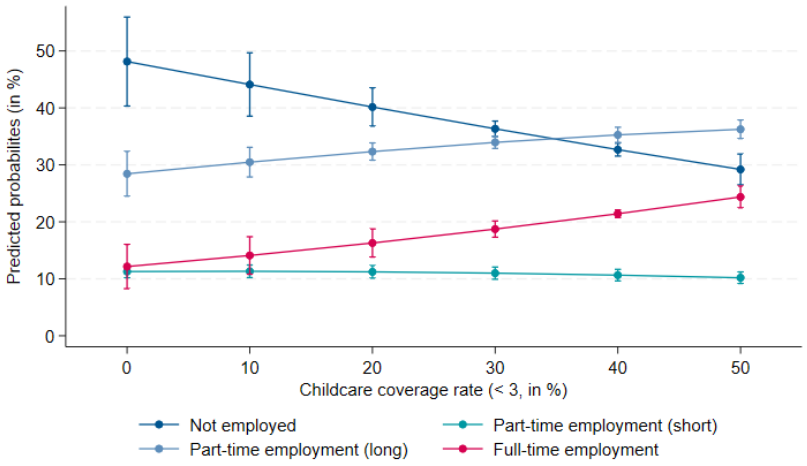
Notes: The figure shows the share of parents who have submitted at least one application for a childcare slot, the share who have secured a confirmed slot (though the child has not yet started attending), and the share whose child is already attending childcare, by the child's age in months.
Source: Own calculation based on KiBS data.

Fig. A.10: Division of childcare by fathers' parental leave length

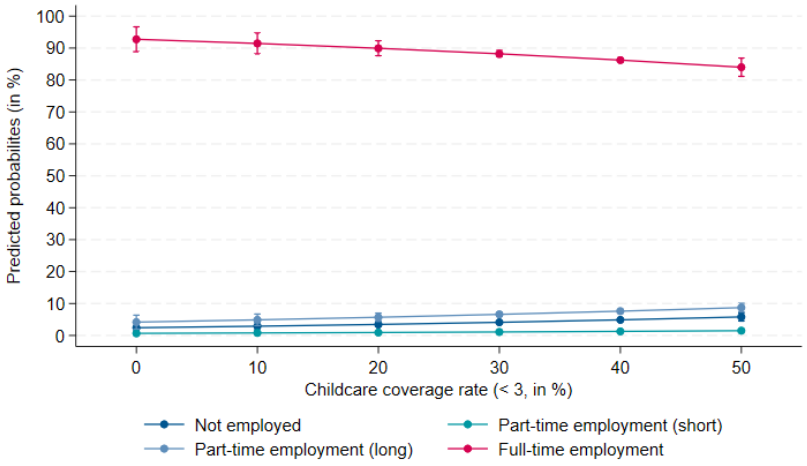


Notes: The figure shows the average division of parental childcare when the child is between 12 and 35 months old by the take-up and duration of fathers' parental leave.
Source: Own calculations based on KiBS data.

Fig. A.11: Predicted probability of parental employment when child is 12 to 35 months old conditional on childcare coverage rate for children below 3 years



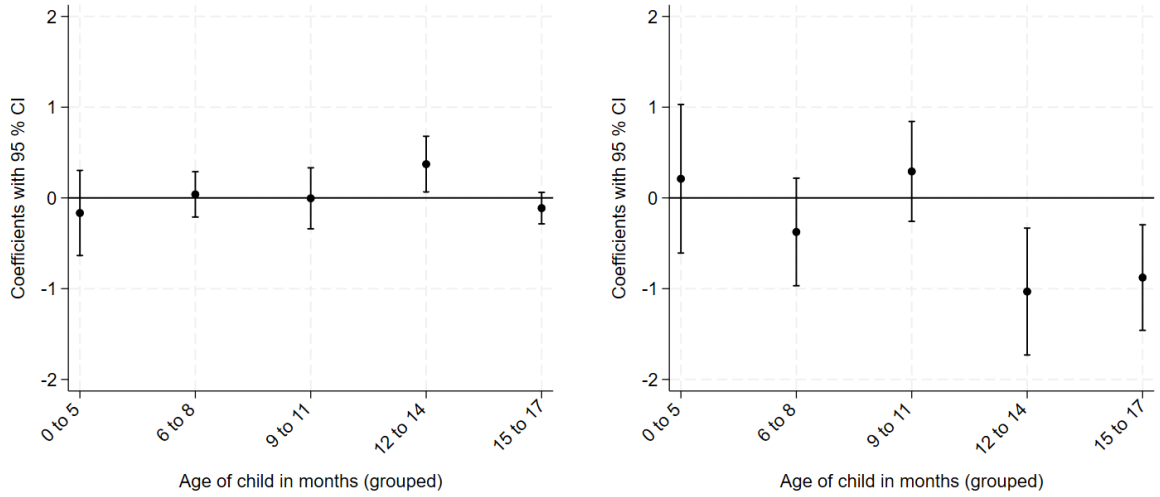
A: Maternal employment



B: Paternal employment

Notes: Coefficient estimates with 95 % CI of the childcare rate on parental employment categories conditional on different childcare coverage rates. Estimates stem from separate estimations of eq. 1 using ordered logit models. All models include county and birth year fixed effects, as well as individual-level and county-level controls (see Appendix Table A.2). The scale of the y-axes differs between subfigures A and B.
Source: Own illustration based on data from the KiBS, the Federal Statistical Office, and INKAR.

Fig. A.12: Effects of childcare expansion for children under 18 months on parental leave take-up

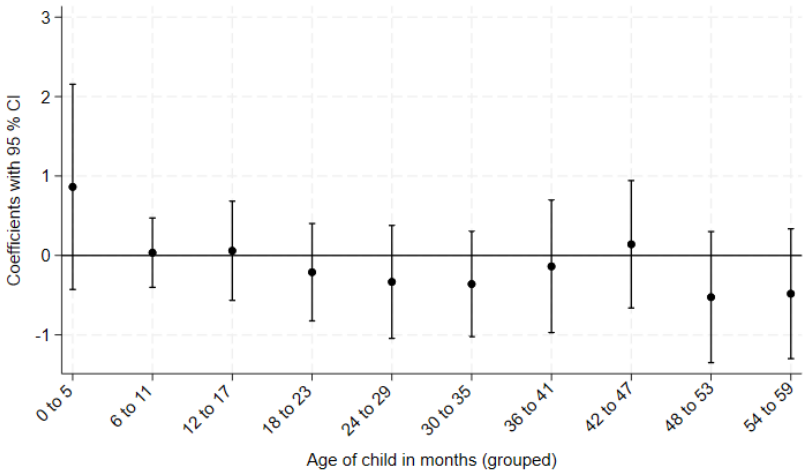


A: Father currently on parental leave

B: Mother currently on parental leave

Notes: Coefficient estimates with 95 % CI of the childcare rate on parental leave take-up. Estimates stem from separate estimations of eq. 1 by age. All models include county and birth year fixed effects, as well as individual-level and county-level controls (see Appendix Table A.2).
Source: Own illustration based on data from the KiBS, the Federal Statistical Office, and INKAR.

Fig. A.13: Effects of childcare expansion for children under age three on mothers' role as main caregiver



Notes: Coefficient estimates with 95 % CI of the childcare rate on an indicator of mothers being the main or sole caregiver on a weekday. Estimates stem from separate estimations of eq. 1 by age. All models include county and birth year fixed effects, as well as individual-level and county-level controls (see Appendix Table A.2).
Source: Own illustration based on data from the KiBS, the Federal Statistical Office, and INKAR.