

DISCUSSION PAPER SERIES

IZA DP No. 11687

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## ABSTRACT

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# The Effects of Universal Public Childcare Provision on Cases of Child Neglect and Abuse\*

We investigate the impact of childcare provision on cases of child abuse and neglect in Germany between 2002 and 2014. For identification, we exploit a governmental reform introducing mandatory early child care. The implementation at the county level generated large temporal and spatial variation in childcare coverage. Our measure of child abuse and neglect comes from a unique high-quality administrative data set that covers all child protection cases at the German county level. The estimated ITT effect shows a decline by 0.24 cases per 1,000 children if a county increases childcare slots above the median, which is a reduction of 21.4 percent from the mean. This finding is of high economic relevance given the enormous costs of child abuse and neglect for the society. Our results show that the provision of universal public child care can be an effective policy to prevent part of these costs.

**JEL Classification:** J13, J12, I38

**Keywords:** child abuse and neglect, early child care, prevention

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# 1. Introduction

Child neglect and child abuse are severe problems in many developed countries. For example, in the U.S., the Department of Health and Human Services estimates approximately 683,000 victims in 2015 alone (U.S. Department of Health and Human Services 2017). As child development is often understood as a cumulative process (see, e.g., Cunha et al. 2006; Heckman and Cunha 2007), neglect and abuse, particularly at the beginning of life, lead to lifelong suffering in terms of psychosocial and health problems for the affected children.<sup>1</sup> Due to the long-term nature of these problems, the associated costs for society are high. In addition to direct costs, such as those for childhood health care and child welfare, indirect costs of neglect and abuse may develop due to lower employment rates, lower earnings and tax revenues, and increased crime rates.<sup>2</sup> For the U.S., Fang et al. (2012) and Wang and Holton (2007) estimate average lifetime costs of \$210,012 (in 2010 dollars) per victim of nonfatal maltreatment and aggregated costs of more than 100 billion dollars per year. For the UK, Conti et al. (2017) suggest costs of approximately 90,000£ per case of child neglect. These numbers illustrate that it is in society's best interest to reduce – and ideally eliminate – incidences of child neglect and abuse.

Research on the prevention of child abuse and neglect indicates that some targeted and intensive early childhood interventions can be successful in preventing incidences. These interventions mostly include intensive consulting for disadvantaged families at their own homes, with the goal of reducing caregivers' abusive and neglectful parenting behaviors (e.g., Avellar und Supplee 2013; Eckenrode et al. 2000; Howard and Brooks-Gunn 2009). However, getting access to families at risk is challenging for these programs because families may feel stigmatized. In contrast to targeted and intensive programs, universal public child care supports a wide range of families and is therefore less stigmatizing. Although public child care does not directly focus on reducing child abuse and neglect, it may influence the risk of child maltreatment, as childcare utilization generally replaces home care or informal care. This substitution may increase care quality, parental employment and household income while decreasing the amount of time that children spend with inadequate care givers. Additionally, the use of public child care may allow youth welfare offices to monitor families at risk and to connect those families with targeted and intensive services. However, despite the strong relation between child care and several domains of families' lives – domains that may also affect adverse parenting – causal evidence whether the provision of universal child care can reduce child abuse and neglect is missing.

This is the first paper investigating the effects of a large expansion of public child care for young children on reported cases of abuse and neglect. The expansion resulted from a large reform in Germany

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<sup>1</sup> Various studies document that child neglect and child abuse have lifelong effects on physical and psychological development and health as well as on the social behavior and life satisfaction of the affected individuals, see, e.g., Ammerman et al. (1986), Hildyard und Wolfe (2002), and Springer et al. (2007). The effects of adverse environments at the beginning of life are cumulative because of self-productivities, dynamic complementarities, and sensitive periods in skill development (see Heckman and Masso (2014) or Thiel and Thomsen (2013) for a literature review).

<sup>2</sup> The increased probability of crime due to child maltreatment has been analyzed, e.g. by Currie and Tekin (2012); for other economic outcomes, see Currie and Spatz-Widom (2010).

that included a commitment by the federal government to provide childcare slots for all children below three years of age (*Tagesbetreuungsbaugesetz, 2005; Kinderförderungsgesetz, 2008*).<sup>3</sup> The reform increased childcare availability in West Germany by over 25 percentage points between 2002 and 2014. Prior to the reform, there were very few childcare slots available, and the reform increased availability from approximately every 50<sup>th</sup> child to at least every fourth child. For the purpose of identification, we use the variation in speed and level of the expansion across counties and time as well as differences in the starting point of the expansion in 325 West German counties. Our measure for child maltreatment comes from unique high-quality administrative data that include all cases of child abuse and neglect in West Germany that led to out-of-home placement. For each case, we know the year and the county of the incidence, the age of the neglected child and some information about the case. We merge these data with administrative data about the availability of childcare slots for each county in each year.

Our setting is particularly suitable for this analysis for a number of reasons. First, several studies that investigate other outcomes of the German childcare expansion, such as child development or fertility, show that the variation in the expansion was independent of the characteristics of the counties (e.g., Bauernschuster et al. 2016; Felfe and Lalive 2018). Therefore, this expansion of daycare for children below the age of three provides a natural experiment that enables us to identify causal effects. Second, fees for child care are means-tested and depend on available household income. Free child care is provided for low-income and welfare-receiving families who are at the highest risk of child abuse and neglect (see, e.g., McLoyd 1990; Paxson and Waldfogel 2002). Therefore, self-selection due to budgetary constraints is not very likely, particularly for families at risk. In this respect, the German childcare provision is similar to the U.S. Head Start program, which is also free for low-income or welfare-receiving families (U.S. Department of Health and Human Services 2014). Third, in Germany, the federal government is responsible for the child protection legislation asserting that state or county child protection legislation correlates (intentionally or unintentionally) with childcare availability. Fourth, because the data include the age of the affected child, we have the opportunity to estimate placebo-test models on older children, who were not affected by the childcare expansion. These placebo-tests rule out the possibility that changes in the structure or organization of local youth welfare offices in response to the childcare expansion may have influenced the number of incidences of maltreatment.

We estimate the effects of public childcare provision using difference-in-differences strategies. Following Baker et al. (2008) and Havnes and Mogstad (2011), we use the median of the variation in the speed and size of expansion across counties to define treated and comparison counties. In this way, we can estimate the intention-to-treat (ITT) effect for all children in a county, independently of whether the child actually goes to a childcare center. We further calculate the effect for children in centers (average effect of treatment on the treated, ATT) by scaling the ITT. For the ITT, we find that an increase in the availability of child care above the median reduces child abuse and neglect by approximately 0.24 cases

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<sup>3</sup> This reform was part of the activities of the federal governments to improve family policy in Germany. The main objectives were to achieve equal opportunity, reduce social disparities, and provide better educational prospects for all children.

per 1,000 children, which is a reduction of 21.4 percent from the mean. Due to the still relatively small number of children placed in centers, our ATT estimates are substantially larger, with an approximate reduction in child abuse and neglect of 2 to more-than-3 cases per 1,000 children.

Our results of generalized difference-in-differences models regarding treatment intensity as a continuous measure (see Berlinski et al. 2009; Havnes and Mogstad 2011; Bauernschuster et al. 2016) confirm our results showing that an increase in childcare slots by 10 percentage points reduces cases of child neglect and abuse by approximately 0.33 cases per 1,000 children. We perform a set of robustness checks on our data and find that our results are maintained across various alternative specifications and for different subsamples. Additionally, due to potentially significant dark figures of child neglect and abuse, we may interpret our results as lower bound estimates. The increase in childcare facilities may have increased the detection of child abuse cases, which would have led to more – rather than fewer – cases in the official statistics.

Because, our paper is the first to analyze the effects of expanding public child care for young children on child abuse and neglect, our novel results contribute to many open questions. First, they indicate that not only targeted interventions such as home visiting programs can prevent severe cases of neglect and abuse, but that also general public policies which relieve parents of excessive burdens can prevent these tragic cases. In comparison to the utilization of intensive programs, the utilization of universal childcare slots is not stigmatizing for families at risk leading to a high take up rate of these families. Therefore, the effect of a reduction in child abuse and neglect strengthens support for the policies of those countries that offer publicly funded universal childcare programs, as seen in most European countries, including the U.K., France, Germany, and all Nordic nations. Additionally, the results of this study can influence the discussion in the U.S., which offers no nationwide universal preschool or early childcare programs, but where an important goal of the previous Obama administration's Zero to Five Plan was to create similar initiatives.

Second, because abuse and neglect have strong detrimental effects on children's cognitive and non-cognitive development, our findings add to the more general discussion about the channels through which universal public childcare provision affects child development. The related literature on the overall effects of universal public child care on child development, particularly for younger children, reveals a mixed picture. Baker et al. (2008) and Fort et al. (2016), among others, report negative average effects. Magnuson et al. (2007) find ambiguous effects depending on the outcome considered (e.g., higher aggression but improved cognitive abilities). A number of recent studies show that public child care is beneficial for children from lower SES families (see, e.g., Havnes and Mogstad 2014; Bitler et al. 2015; Peter et al. 2016; Kottelenberg and Lehrer 2017; Cornelissen et al. 2018; Felfe and Lalive 2018). Because child abuse and neglect take place relatively more frequently in low-SES families our study presents a channel through which child care affects child development positively in these families. Our results indicate that childcare utilization has a positive impact on development not only through the increased provision of stimulating nurseries or peers, as many scholars suggest (e.g. Cornelissen et al.

2018 and Felfe and Lalive 2018), but also through a reduction in inadequate parenting or insufficient informal care arrangements.

Finally, our study contributes more broadly to the literature investigating how economic circumstances and public policies affect child abuse and neglect. Starting with the seminal work by Paxson and Waldfogel (2002), many studies revealed relations among economic hardship, absent fathers, working mothers and child abuse and neglect (Berger et al. 2017; Berger and Waldfogel, 2011; Raissian und Bullinger 2017; Slack et al. 2003). These studies rely mostly on correlations or have weaknesses in their measures of child abuse and neglect. Just recently, two studies used small area time variation and administrative data for identification: for the U.S., Brown and DeCao (2018) find that overall unemployment rates increase child neglect. Using data from California, Lindo et al. (2018) show that male layoffs increase child maltreatment, while the opposite is true for female layoffs. Our results make an important contribution to these findings by showing that the provision of public child care creates an opportunity to attenuate the consequences of economic hardship and unemployment.

The remainder of the paper is organized as follows. Section 2 provides some theoretical considerations about the relationship between childcare expansion and child abuse and neglect. Section 3 explains the background of the public childcare expansion reform in Germany and provides details on the institutional settings of our measure of child abuse and neglect. Section 4 describes the data used for the empirical analysis and the identification strategy of the empirical model. The main results are presented in section 5, followed by a set of robustness checks in section 6. The final section provides a discussion and the conclusions.

## **2. Theoretical Considerations of Potential Mechanisms**

Public childcare provision aims primarily at improving equal opportunities for men and women in the labor market and at offering better educational prospects for children. Although such care does not focus directly on increasing parental skills or on reducing child abuse and neglect, it has the potential to reduce – through various channels – the number of incidences of child neglect and abuse. To illustrate these channels, we discuss the two most likely reactions of families if more childcare slots become available: switching from home care to child care and switching from informal care to child care.<sup>4</sup>

Many families switching from home care to child care do not increase labor supply, as shown in studies about international labor supply elasticities with respect to childcare availability (see Baker et al. 2008 for the U.S.; Havnes and Mogstad 2015 for Norway; Bauernschuster and Schlotter 2015, and Busse and Gathmann 2018 for Germany). Therefore, the provision of universal public care may allow

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<sup>4</sup> Informal care includes nannies, fathers, grandparents, partners, older siblings, friends and, in the worst case, the child being left alone. Leaving a small child alone is a direct form of neglect.

some additional leisure for parents to relax and to recover.<sup>5</sup> In research on the origins of child neglect, there is broad agreement that domestic violence against children is rarely a conscious criminal decision of the parents; rather, parental stress and overburden are frequent starting points of an incidence, particularly in families with low socio-economic status, low economic resources, and multiple children.<sup>6</sup> Hence, more parental leisure time is a means by which to mitigate these burdens.

For those families who switch from home care to formal child care and expand their labor supply, household income increases, which may reduce parental stress and provide additional resources for the family, thus helping to avoid child abuse and neglect. Additionally, higher employment may foster certain consistent behaviors, such as a routine daily schedule, and may extend the family's social network. These improved factors may spill over to maternal parenting and may have a preventive effect on child abuse and neglect. However, Paxson and Waldfogel (2002) also discuss the negative effects of employment that may occur if the mother is stressed by her job, has more difficulty making ends meet due to work expenses, and has less energy available for the child at the end of the day.

For those families who switch from informal to formal child care, the quality of care is likely to increase. This may be particularly true in Germany because the law sets high quality standards for public child care.<sup>7</sup> This higher quality may reduce cases of child abuse and neglect. As one mechanism underlying this relation, Lindo et al. (2018) demonstrate that cases of maltreatment and neglect increase if males, as a main source of informal child care, spend more time with children in response to maternal employment expansions. If high quality formal child care is available, mothers will be less dependent on potentially inadequate informal care provided by family members and less dependent on other insufficient care arrangements. Child abuse and neglect may therefore decrease.

Finally, for both groups of parents, i.e., those who have not used either formal or informal child care, formal child care can give parents-at-risk the opportunity to interact with nurseries. This interaction may be a substantial source of support for these families, as an important element of German formal child care is communication with parents to inform them about their children's developmental and learning progress and provide them with educational guidance (Cornelissen et al. 2018). This guidance may increase parental skills and consequently prevent neglect and abuse. Additionally, in allocating childcare slots, child welfare offices may focus particularly on families who are at risk, whether to relieve the families, to monitor them or to obtain access to the families to connect them with other intensive early

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<sup>5</sup> For Germany, Busse and Gathmann (2018) show that childcare supply and childcare utilization, particularly for low-income families, are not related. Cornelissen et al. (2018) show that utilization rates are higher than employment rates for females with preschool-age children.

<sup>6</sup> For example, McLoyd (1990) analyzes the effects of economic hardship for children and shows that "*poverty and economic loss diminish the capacity for supportive, consistent, and involved parenting and render parents more vulnerable to the debilitating effects of negative life events*" (p. 312). In addition, she notes, "*a major mediator of the link between economic hardship and parenting behavior is psychological distress deriving from an excess of negative life events, undesirable chronic conditions, and the absence and disruption of marital bonds*" (p. 312). For Germany, Deutsche Kinderhilfe (2014) comes to a similar conclusion.

<sup>7</sup> The higher quality of formal child care compared with informal child care is also documented in several studies, see, e.g., Datta Gupta and Simonsen (2010), Herbst (2013), or Gathmann and Sass (2018).

childhood interventions to prevent cases of child abuse and neglect, thus reducing the number of child protection cases requested or required.

### 3. Background and Institutional Settings

According to article 19 of the Convention on the Rights of the Child of the United Nations, “*states parties shall take all appropriate legislative, administrative, social and educational measures to protect the child from all forms of physical or mental violence, injury or abuse, neglect or negligent treatment, maltreatment or exploitation, including sexual abuse, while in the case of parent(s), legal guardian(s) or any other person who has the care of the child.*” In line with the Convention, German law defines a child protection case as a temporal placement of a child with a suitable person or in an adequate location if the well-being of the child is in danger. Youth offices, which are organized on a county level, are in charge of initiating a child protection case. In most cases, the local youth office becomes active after parents ask for support by themselves or if a third person reports suspicion of an incidence. After a parental request or a report, a worker from the youth office assesses whether there is persistent danger to the child’s well-being. If this danger persists, the local youth office places the child outside the family. A family judge only becomes involved if parents disagree after the child protection case has been initiated. A child protection case can end with the child returning to the family either without any additional obligations or with obligations, most likely a social worker visiting the family once a week, or in an extreme case, a long-term foster care placement (see Petermann et al. (2014) for details on legal regulation).

In 2014, the last year of our analysis, a total of 48,059 child protection cases were initiated for children under 18 years of age in East and West Germany; of these, 6,770 were children under age 6 (numbers provided by Federal Statistical Office (2015)). For children under age 6, all cases were initiated because of urgent danger. The most important reasons for the initiation of child protection cases in this age group were overburden on parents (59%) and observed child neglect (29.4%). The local youth office requested 78% of the measures, and approximately 9.5% were requested by the parents. Approximately 40.2% of the children returned to their parents after the protection case, in some cases supported by outpatient education aid (10.1%). Approximately 43.7% of the protection cases were shorter than 14 days, and 56.3% lasted longer.<sup>8</sup>

For several reasons, the number of child protection cases is a very reliable proxy for overall incidences of child abuse and neglect. First, in each child protection case, an official authority decided that the well-being of the child was in danger. Therefore, if a child protection case is initiated, a serious harm to the child – rather than a potential danger – always exists. Second, although an unknown rate of unreported cases remains, it is unlikely that the detection rate differs systematically by county. This is the

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<sup>8</sup> Reasons for initiation of a child protection case in the age group 6 to 18 years differ for a number of reasons and are more often related to the child (e.g. unaccompanied migration, delinquency, addiction).

case because in contrast to the U.S., the rules for a child protection case in Germany are defined in the German Social Code Book (*Sozialgesetzbuch*). This law further defines the exact situations in which the well-being of the child is in danger. Therefore, changes in the number of cases between counties should reflect a relation to the total number of child abuse and neglect cases (i.e., the sum of the reported and unreported cases).

To identify the effect of child care on child abuse and neglect, we use Germany's mandatory strong expansion of childcare slots for children under the age of three years. This expansion began in 2005, when the German federal government committed to creating 230,000 additional early childcare slots in West Germany by 2010 (*Tagesbetreuungsbaugesetz*). While Germany had introduced mandatory laws for the provision of universal public care for children between three and six years in 1996, for children under three years of age, day care opportunities hardly existed in the Western federal states before 2005.<sup>9</sup> In 2007, a summit (*Krippengipfel*) of the federal government, the states and the counties reinforced the aim of the 2005 mandate and set the target of a coverage rate of 35 percent by 2013. Finally, the law on support for children (*Kinderförderungsgesetz*), which was enacted in December 2008, announced a legal claim for a slot in early child care for all children aged 1 year by August 2013. Consequently, early childcare availability has increased substantially since then: the coverage rate amounted to 2.4 percent in 2002, 8.0 percent in 2006, 17.5 percent in 2010 and 28.1 percent in 2015, on average, in West Germany.

Care centers are subject to strict quality regulations. These regulations concern opening hours, group size, staff-child ratios, and staff qualifications. Centers are required to remain open for at least four hours, five days per week. Groups can have up to ten children and must be supervised by at least one certified education specialist and one (or two) assistants. The degree required to work as a group leader in a care center requires two years of certified vocational training (in the German apprenticeship system) and at least two years of practice in a care center. During the period under study, care centers were required to comply with the following regulations: over the period under study, groups accommodated an average of 10.1 children, the ratio of children to staff was approximately 3:1, and 61.9% of the employed staff had a degree in early childhood education (Felfe and Lalive, 2018).

Child care in Germany is highly subsidized. In 2006, the total operating costs of child care for children under three years of age amounted to €14.1 billion, with approximately 79% of these expenses covered by public subsidies, 14% by parents and 7% by private organizations. Parental fees are regressive in family size and progressive in family income (means-tested) and range from 0 to 600 euros per month (Bauernschuster et al. 2016). In almost all communities, child care is free for families who receive welfare benefits. In addition, these families are on a priority list and are prioritized in receiving a childcare place. The waiving of fees for welfare families and the preferred slot allocation they receive are

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<sup>9</sup> Although mandatory laws requiring childcare slots for children between three and six years of age were not introduced until 1996, the provision of daycare spaces was already far higher for this age group at that time. Schmitz et al. (2017) report a coverage rate of 78 percent in 1994, which increased up to 93 percent in 2016.

both independent of employment. Therefore, many mothers who are not employed use child care for children below the age of three.

< Figure 1 about here >

In essence, the reform included a commitment by the federal government that all counties in each state had to substantially expand public child care in order to fulfill legal claims to guaranteed childcare slots for all preschool children aged one year and above by August, 2013. Figure 1 shows the expansion at the county level for all years between 2002 and 2014. While in 2002, we observe that the childcare coverage rate was consistently below 5% across virtually all West German counties, in 2014, almost all counties exceeded 20% coverage. However, the graphs further show considerable variation in the expansion across counties – even within the same state. Bauernschuster et al. (2016) note that two thirds of the variation in childcare coverage is attributable to variation within states, while one third is attributable to differences between states.

Bauernschuster et al. (2016) and Felfe and Lalive (2018) explain in detail that this variation results from the process of opening up new childcare slots, which involves many complex and intertwined decisions of authorities at the municipality, county, and state levels. On the one hand, authorities at the municipality level and county level were responsible for assessing local demand for child care, with demographic and economic factors such as current cohort sizes and labor market conditions entering those projections. On the other hand, authorities at the state level had to approve proposals by nonprofit organizations to set up new childcare centers.

This administrative process was prone to problems that varied substantially across counties (e.g., Hüsken 2011). These problems included varying routines and levels of knowledge about the complicated funding system (with subsidies coming from the federal state, the state, and the municipality), shortages in construction land, various regulations for building childcare centers, shortages of qualified childcare workers, serious delays in approval, and final rejections of applications due to noncompliance with regulations. As a result, the growth of childcare slots differed at the county level not only due to some well-defined predictors of local childcare demand but also due to shocks to the local supply of new childcare slots – shocks emanating from lengthy and intricate administrative processes and rules (e.g., Felfe and Lalive 2018). The latter component is arguably orthogonal to expected changes in cases of child abuse and neglect, and it provides the basis for our identification strategy.

One possible worry when investigating the effects of childcare expansion on cases of child abuse and neglect is that childcare expansion changes the organizational structure or the available resources of a

youth welfare office. Both could lead to a situation in which the number of child protection cases declines because the youth welfare office initiates fewer cases, although the rate of parents who neglect or abuse their children remains the same. To address this concern, we use a control group of older children who should also be affected by organizational or resource changes in the youth offices, as older or younger children are not organizationally separated in youth welfare offices.

Another worry may be that childcare expansion influences the individual decisions of youth workers regarding whether a child protection case is necessary. If this is the case, most likely the marginal child will be affected and the probability of a child protection case for that child will decline. For this marginal child, Doyle (2008; 2009) showed that it is preferable if a child protection case is not initiated. Therefore, if a change in the marginal decision of the youth welfare worker does not depend on a change in the living situation of the child, the childcare expansion reform may still have positive effects.

## 4. Data and Empirical Model

### 4.1 Data

We make use of different data sources – specifically merged for this project – to investigate the effects of the large expansion of public child care for children under the age of three on reported cases of child abuse and neglect in West Germany. Administrative data from the Statistical Offices of the German Laender (*Statistische Landesämter*) provide information on public childcare coverage for children under the age of three. These data are available for the year 2002 and annually for the years 2007 to 2014. The empirical analysis is restricted to West Germany for two reasons. First, because it already had high childcare levels as a legacy of the former GDR, East Germany experienced a smaller expansion of public childcare provision during the years of the analysis. Second, numerous changes to East German county border definitions over the years hamper the empirical analysis.

As shown above in Figure 1, childcare coverage for this age group has strongly expanded over the period of analysis (from 2.2 percent on average in 2002 to about 27 percent in 2014), associated with large regional variation in coverage rates (see Appendix I for detailed summary statistics).<sup>10</sup> The statistics directly report childcare coverage and not only the availability of slots. A further implication from Figure 1 is that we observe a shift to the right of the whole distribution of childcare coverage; however, as also shown by Bauernschuster et al. (2016), there is no convergence process between counties. Instead, the standard deviation of coverage rates steadily increases from 2002 to 2014 (see Appendix I for details). This can be attributed to different expansion patterns across counties. Some counties have expanded very slowly, while others have done so very rapidly. Some counties have gradually increased child care over time, some started off strongly but have come to a halt, and still others were delayed by

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<sup>10</sup> There are no administrative data on public childcare provision available for the years 2003 to 2006.

a couple of years but later increased their coverage drastically. Overall, we observe many different types of expansion patterns across counties, resulting in quite strong regional variation.

Measuring child abuse and neglect is challenging because it usually happens in the private domain, particularly for the children in the age group of interest. Therefore, previous literature has relied on several proxies for child abuse and neglect. Some studies use self-reports from surveys (e.g., Berger et al. 2017), while more recent studies from the U.S. (e.g., Raissian und Bullinger 2017, Brown and DeCao 2018, Lindo et al. 2018) use administrative data from the Child Protective Services (CPS) to approximate child abuse and neglect. Self-reported data may be subject to reliability problems. For Germany, Sierau et al. (2017), for example, show that parents who are part of a child protection case often do not report maltreatment in the context of psychological questions. Our outcome of interest, the number of child protection cases, is obtained from the German Child and Youth Welfare Statistic (*Deutsche Kinder- und Jugendhilfe Statistik*) for the year 2002 and annually for the years 2007 until 2014. The statistic reports all individual cases of child protection in a particular year at the county level. For each case, the data include the categorized age of the protected child. Our focus will be on child protection cases up to age 5 (0 to 5 years). For robustness checks of our analysis, we will further consider child protection cases in the group of children aged 6 to 17 years. We aggregate the individual child protection data on county-year cells for the nine available years of data (2002, 2007 to 2014). Because we use child protection cases conducted by youth offices as a proxy for incidences of child abuse and neglect, our study relies on data similar to that from the CPS.

< Figure 2 about here >

The graphs in Figure 2 show the development of child protection cases per 1,000 children based on our data over time (selected years). First, it is important to note the considerable variation in reported incidence rates across counties. Furthermore, we observe a slight increase in reported cases over time. Nevertheless, comparison of the pictures in Figure 2 with those of Figure 1 (childcare expansion) does not reflect a 1:1 ratio of incidence rates to public childcare provision. The overall increase in reporting may therefore reflect numerous causes, such as tighter labor market conditions (implying higher parental stress) (see Morrill and Pabilonia 2015; Page et al. 2017), better overall awareness of child well-being<sup>11</sup> (Witt et al. 2017), or prominent cases of abuse in Germany in the mid-2000s years, which received major

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<sup>11</sup> Corporal punishment of children by parents was outlawed in Germany in the year 2000.

media attention, may play a role.<sup>12</sup> Higher exposure to public childcare provision, which may also lead to increased reports, does not seem to be the foremost reason.

We complete the available information with data from the Statistical Offices of the German Laender (*Statistische Landesämter*) and the Federal Employment Agency (*Bundesagentur für Arbeit*); these data describe the socio-economic situations of the counties. To characterize each county's economic situation, we consider GDP per capita (in 1,000 Euro), unemployment rate, and the share of female employment subject to social security contributions.<sup>13</sup> Further aspects of the socio-economic situation are population density, share of population between 0 and 5 years, share of population between 6 and 17 years, and share of foreign population. In addition, we consider the share of school dropouts (without a degree) and the share of school graduates with a high school degree (Abitur) as crude proxies of low- and high-ability population rates. Finally, because both reporting of abuse and the strictness of the enforcement of child protection laws may be related to political perceptions, we consider the conservative voting share (in federal elections) at the county level. Data availability is very good: there is only one state (Schleswig-Holstein, a smaller state in the north of Germany) that does not provide data on child protection cases in the first year. Unit non-response is very low: i.e., very few counties have missing entries. Overall, our analysis focuses on a final sample of 2,865 county-year cells from 11 German federal states with 35,543 cases of child protection interventions in the age range between 0 and 5 years.

## 4.2 Empirical Model

To identify the effects of public universal childcare provision on child abuse and child neglect, we follow the empirical approach suggested by Baker et al. (2008) and extended by Berlinski et al. (2009), Havnes and Mogstad (2011) and Bauernschuster et al. (2016). We exploit the variation introduced by the expansion of childcare provision over time, which generated differences in available places by cohorts and counties. Several other studies have shown that expansion is exogenous to the characteristics of the counties (Felfe and Lalive, 2018 and Bauernschuster et al. 2016 for the expansion used in this study; Cornelissen et al. 2018, for childcare expansion in the age range of 3 to 6 years).

The most important parameter of interest to measure the direct effect of the provision of public child care on child neglect and abuse would be the average effect of treatment on the treated (ATT), i.e., the change in child neglect and abuse for those children who are placed in childcare centers. Because exact one-to-one data of childcare attendance and occurrences (or non-occurrences) of child neglect and abuse are not available, the county-level data at hand can be used to identify the intention-to-treat effect (ITT) of public childcare provision; the ITT effect is the reduced-form estimate on the incidence rate for all

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<sup>12</sup> In 2010, revelations of abuse scandals in the Roman Catholic Church and in educational institutions triggered a public debate about child maltreatment and generated a range of measures focused on prevention. This debate might have raised awareness about child maltreatment and increased the number of reported cases (see, e.g., Rassenhofer et al. 2015; Witt et al., 2017).

<sup>13</sup> Employment subject to social security contributions excludes marginal employment below an income threshold of a monthly salary of 450 Euro.

children rather than just those in child care. The advantage of the ITT over the ATT is that it potentially captures the full impact of public childcare expansion on both participating and non-participating care arrangements; it also captures any peer externalities (see Baker et al. 2008).

In a first step, we apply a difference-in-difference approach and define the treatment group as counties where the provision of child care expanded strongly; the comparison group comprises counties with only minor increases in the provision of public child care. Unlike an exogenous decision rule defining a treatment and comparison group, our approach defines the two groups – or, rather, the more or less treated groups – based on the variation in childcare expansion over the sampled period. Hence, an important condition of the identification design is that the decision about childcare expansion is independent of the expected changes in the child protection cases in each county; this is likely the case given the institutional features of the reform and is further supported by the empirical patterns of childcare expansion and child protection cases (see section 3 above).

Following the related literature, in the main estimation, we separate the sample at the median of the expansion between 2002 and 2014. The 50 percent of counties with above-median expansion are treated counties; the 50 percent of counties with below-median expansion are the comparison counties. Formally, we estimate

$$y_{ct} = \gamma Treat_c + \theta (Treat_c \times Post_t) + \mathbf{X}'_{ct}\beta + \alpha_t + \delta_c + \varepsilon_{ct}, \quad (1)$$

where  $y_{ct}$  are the child protection cases per 1,000 children in county  $c$  at time  $t$ . The dummy variable  $Treat_c$  is equal to 1 if the county is a treatment area,  $Post_t$  is a dummy variable equal to 1 for the years 2008 to 2014 (after reform implementation).  $\alpha_t$  and  $\delta_c$  are year-fixed and county-fixed effects.  $\mathbf{X}'_{ct}$  comprises a set of time-variant factors of the counties that may affect the child protection cases. These factors and the county-fixed effects are considered to control for the counties' different reasons for and circumstances of their childcare expansion. Finally,  $\varepsilon_{ct}$  is the i.i.d. error term. We estimate the model by weighted fixed-effects panel regressions. Weights are calculated on the county population below the age of six. We estimate robust standard errors clustered at the county level.

In answering the empirical question, the focus is on parameter  $\theta$ . This parameter is the average causal effect on child protection cases per 1,000 children in treatment areas (with above-median expansion) in the post-reform period compared to the comparison counties. By construction, this effect averages over the impacts on child protection cases on all children from all counties defined as the treatment area, and it averages across the marginal effects of the additional childcare slots (Havnes and Mogstad, 2011).

Due to the first averaging, the effect is an ITT (see above). To translate the ITT into the ATT, we follow Baker et al. (2008) and rescale the effect estimates by dividing by the probability of treatment. Of course, because no individual-level treatment probability is available, we refer to the conditional county-year probability expressed by the increase in public childcare coverage following the reform in

the treatment group relative to the comparison group (see Havnes and Mogstad, 2011). In the treatment group, the scale-up factor is 0.0844, i.e., families in the treatment group have an 8.44 percentage point-higher probability of receiving a space in child care.<sup>14</sup> The ATT is equal to  $ITT/0.0844$ . However, this computed ATT only represents the true ATT if we assume that each child in a county has equal probability of receiving a childcare slot.

Independently of whether we focus on the ITT or ATT, we interpret our estimation results below as lower-bound estimates of the corresponding effects. Because the issue of child abuse and neglect is subject to a large number of unreported cases (even with a comprehensive administrative framework, such as the one we use), the expansion of childcare centers and slots may induce a higher probability of detection in addition to its positive effects on parental behavior, as explained above. A higher probability of detection in treated counties would therefore reduce the expected positive effect in terms of a lower number of child protection cases due to public childcare provision.

< Figure 3 about here >

For a valid identification, we have to assume a common trend (between treatment and comparison counties) of the outcomes in the absence of the reform. Figure 3 shows the average development of child protection cases conditional on treatment and comparison groups. Panel (a) depicts the path for children below the age of six (our focus group), panel (b) gives the analogous results for children between 6 and 17 years.<sup>15</sup> This latter group should be unaffected by the treatment, i.e., the expansion of child care slots for children under three, and we do not expect a change in child protection cases due to the reform.<sup>16</sup>

The graph for the 0-to-5-year-old children clearly indicates that in both groups, the trends in reported child protection cases moved in parallel until the reform started in 2005 (the scaling with 2002 to 2007 at equal distance from the annual observations thereafter veils the almost-zero increase during that period). After the start of the reform, however, the number of child protection cases in treated counties maintains a lower path compared to the comparison counties; this hints at a potential direct causal effect of the expansion. The development of child protection cases among the unaffected children (6 to 17 years) lends further support for this effect. Although treatment and comparison counties differ in levels and we see a positive trend in the graph, indicating an increase in reported numbers of child neglect and

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<sup>14</sup> The scaling-factors for the treatment definitions used in the robustness checks differ slightly.

<sup>15</sup> Appendix II provides detailed statistics on the development for 0-to-5-year-old children. Appendix III shows the development of cases per 1,000 children.

<sup>16</sup> There may be an indirect effect if they live in families with siblings in the treatment age. For these children, positive effects on parental stress may also translate into less child neglect or less child abuse for older children.

abuse over time, the level differences remain stable. We therefore believe that the common trend assumption holds for counties over time.<sup>17</sup>

The county characteristics and the county-fixed effects in the estimations capture differences in the pace of expansion within a county over time due to changes in perceived protection cases. These changes could occur for a number of reasons, e.g., counties and municipalities are likely to prioritize their tasks and responsibilities for children and adolescents according to changes in composition. For example, youth crime rates that are related to cohort size may be expected to increase if the number of adolescents increases (particularly if they have low education) and would therefore require that youth welfare service engage in more activities targeting these older age groups. To mitigate the potential bias of the estimation, we consider some characteristics meant to approximate related county differences. Differences in the socio-economic composition of the county may affect, on the one hand, the available budget for interventions to prevent child neglect and child abuse, and, on the other hand, the likelihood of these issues occurring. To explicitly take these effects into consideration (in addition to county-fixed effects), we control for the unemployment rate, the nominal GDP, the number of high-school dropouts, the number of high-school graduates (with university admittance qualification), and female labor market participation. For identification, we assume no further systematic deviations between the provision of public child care and the rate of child protection cases conditional on county fixed effects and county time-varying factors.

To investigate the robustness of our main results, we estimate a number of additional models. First, we conduct a placebo test using the number of child protection cases in the age group of 6-to-17-year-old children weighted by the county population between the ages of 6 and 17. As there is no direct link between the expansion of childcare slots for the 0-to-3-year-old children and this group, we expect no (substantial) treatment effects.<sup>18</sup> We conduct this placebo test for the main specification and for all further specifications estimated to support the robustness. We also use alternative definitions of treatment and comparison counties, changing the cut-off in one specification to the 1<sup>st</sup> tertile of childcare expansion and to the 3<sup>rd</sup> tertile in another specification. Furthermore, we distinguish different base periods of the expansion. The first alternative refers to the years 2002 to 2007 and considers the early period around the reform introduction. The second alternative uses differences in the expansion between 2007 and 2009. We interpret the results as a further placebo test because the reform was already in place. Moreover, we estimate the effects for a later post-reform period (2008-2014); comparison of these estimates with those obtained in the main specification gives an indication of the development of treatment effects over time.

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<sup>17</sup> The results of Figures 1 and 2 show that child protection cases are not clustered in certain areas and that the increase over the years is present all over West Germany.

<sup>18</sup> For children aged 6 to 17 with younger siblings (aged 0-5 years), there may be an indirect effect, for example, if the expected effects on parental stress reduce the risk of child neglect or child abuse for all children living in the household.

Finally, we estimate a generalized difference-in-differences model that uses the local childcare coverage rate as a continuous treatment variable (see Berlinski et al. 2009, Havnes and Mogstad 2011, and Bauernschuster et al. 2016). This generalized model exploits the full variation in local childcare coverage and avoids the definition of treatment and comparison groups according to a certain percentile of the expansion paths' distribution. The regression model can be specified as follows

$$y_{ct} = \theta \text{treat\_cr}_{ct} + \mathbf{X}'_{ct}\beta + \alpha_t + \delta_c + \varepsilon_{ct}, \quad (2)$$

where  $\text{treat\_cr}_{ct}$  denotes the childcare coverage rate in county  $c$  at time  $t$ , i.e., a continuous variable. Again,  $\theta$  captures the ITT of the childcare expansion on child protection cases. Following the argumentation of Berlinski et al. (2009) and Bauernschuster et al. (2016), this ITT might be interpreted as the ATT if we assume that the imposed restriction of constant marginal effects of the expansion in public child care holds for all counties (and all children) and that all places are filled (immediately). This assumption is plausible because we consider county-fixed and year-fixed effects in the analysis. To check the robustness of our model, we estimate several specifications with and without the time-varying covariates, as well as a specification that includes quadratic time trends.

## 5. Main Results

Table 1 shows the results of the difference-in-differences estimation from equation 1. The first rows of the table present the coefficients of interest, the interaction between counties with an expansion above the median and the post-treatment period (2008-2014). We present two types of treatment effects: the intention-to-treat effect (ITT) in the first row and the average treatment effect on the treated (ATT) in the row below. Column 1 refers to the estimation results without including time-variant control variables. The coefficients reveal that in the treatment group counties, 0.24 fewer cases of child abuse and neglect per 1,000 children occurred than in the control group counties. This effect size does not look very relevant at first glance. However, considering that the average number of child protection cases over all years and counties per 1,000 children is 1.12, the effect size reflects a decrease in child protection cases of approximately 21.4 percent if the county increased its number of slots above the median expansion rate. The relevance of the effect size is further emphasized by the ATT. It shows that the direct effect of childcare coverage on those children placed would reduce child abuse and neglect by approximately 2.8 cases per 1,000 children. The results in Columns 2 to 4 additionally consider several time-variant county characteristics in the estimation. The coefficients get slightly smaller but are qualitatively comparable to the coefficients obtained from the main specification, and they are relevant in size (ATT: between -2.238 to -1.966 cases per 1,000 children).

< Table 1 about here >

Table 2 shows that the ITT and ATT effects of child care on child abuse and neglect are robust to alternative definitions of the treatment. The first row (I) presents a definition in which the post-treatment period includes the years 2007 to 2014 (instead of 2008 to 2014 in Table 1). In row II, the treatment group is defined as counties having a childcare expansion above the mean during the years 2002 and 2007 (instead of 2002 to 2014 in Table 1). Row III reports the estimation results when both definitional changes are applied. For all specifications, the effects remain stable, with similar sizes as when the main definitions are used.

< Table 2 about here >

The next two rows (IV and V) present results when the expansion in the years 2007 to 2009 defines the counties above the median (IV) with the shorter post-treatment period and (V) with the longer post treatment period. Using this definition reduces the effects, and all estimates become statistically insignificant. Finally, the last four rows (VI to IX) present results when the treatment group is not defined by counties that are above the median expansion and above the 1<sup>st</sup> tertile and the 3<sup>rd</sup> tertile. When we only include those counties in the 3<sup>rd</sup> tertile, which strongly expanded the available slots, the effects are larger than in the main specification and are highly significant. Accordingly, when the treatment group is defined by the 1<sup>st</sup> tertile of expanding counties, the treatment effects are smaller and insignificant. Overall, the estimations clearly indicate that the increase in childcare slots in a county has a reducing effect on cases of child abuse and neglect.

## **6. Robustness Analysis: Results**

Tables 3 and 4 present the same estimations as Tables 1 and 2, with the only difference that they include protection cases for children in the age group 6-to-17 years instead of 0-to-5 years. We expect smaller effects for the older children because they are, if anything, affected only indirectly by the childcare expansion. The results show that the coefficients are much smaller and mostly insignificant for the

older children, indicating that older children were not affected by the childcare expansion for children aged 0 to 3 years.

Moreover, the finding indicates that the child youth offices did not change their regulations or behavior in response to the childcare expansion, as it was very unlikely that these changes would be limited to small children. One interesting finding to be noted is that local circumstances – measured by local unemployment rate, share of females in regular employment, GDP per capita, and share of school graduates with a high-school degree – play a more important role for the number of cases of older children than for cases of younger children.

< Tables 3 and 4 about here >

Table 5 presents the results from the estimation of equation 2. The coefficient “*childcare coverage*” presents the effect of a one-percentage point increase in childcare coverage on cases of child protection per 1,000 children. The estimation results show that the corresponding effect is a reduction of 0.033 cases per 1,000 children. Translated to an expansion of approximately 25 percentage points of childcare slots, the effect reflects a decrease of approximately 0.825 child protection cases per 1,000 children. While Column 1 of Table 5 shows the results without including time-variant county characteristics, Columns 2, 3, and 4 present the estimation results from various alternative model specifications. Columns 2 and 3 include different county characteristics. Column 4 includes squared variables.

< Table 5 about here >

The childcare coefficient varies only slightly between the specifications, again demonstrating that the childcare expansion was exogenous to county characteristics. In addition to the specifications in Columns 2 to 4, Appendix IV presents unweighted results. Appendix V provides results with consideration of a quadratic county-time trend included in the estimation. In both specifications, the coefficient of childcare coverage remains significant and even increases in size. Columns 5 to 8 present the same estimations as columns 1 to 4, but the dependent variables are the cases of child protection for children older than 6 to below 18 years. As in Tables 3 and 4, the coefficients of childcare coverage are small and insignificant for this age group. Overall, the robustness checks with the more flexible specification

provided by the continuous effect of the coverage rate confirm the results from the difference-in-differences estimations presented in Tables 1 to 4 above.

## 7. Discussion and Conclusion

This paper investigated the effects of childcare provision on cases of child abuse and neglect. For identification, we used an exogenous expansion of childcare slots for children below the age of three in Germany. Our results suggest that the provision of childcare slots reduces the number of cases of child abuse and neglect in a meaningful and significant way. Our results further show that a large-scale public policy, even one that does not directly aim at preventing abuse and neglect, can have beneficial side effects. This is a novel and relevant finding because some scholars and child welfare organizations propose that only very intensive and focused interventions can prevent tragic incidences of child maltreatment.<sup>19</sup> However, because we cannot show the extent to which direct channels, e.g., less parental overburden or better care quality, or indirect channels, e.g., connection with more intensive early childhood programs, generate those effects, intensive programs remain important for preventing child abuse and neglect.<sup>20</sup>

We propose – as a main channel for the reduction of child abuse and neglect cases – that child care reduces the mental and physical overburden of parents because child care often increases parental leisure time. This channel is particularly likely to exist in Germany because the provision of public childcare slots mainly replaces home care and – to a lesser extent – informal care. Additionally, in Germany, child care is free for low-income and welfare-receiving families, who are at higher risk for child abuse and neglect. Therefore, childcare uptake for these families is high, even when the mothers do not work, and the related stress- and overburden-reducing effects seem to be high.

Our measure of child abuse and neglect has some advantages compared with measures previously used in the literature. First, it comes from an administrative source instead of from self-reports of caregivers. Second, it is available for many years on a small regional level, but in contrast to other countries, the legislation for our measure is made at the federal level instead of the regional level. Finally, because the data include the age groups of the abused or neglected children, we can generate natural control groups. Our results are robust to several specifications and robustness checks, such as different treatment groups, variation in the number of years considered, and time-variant county characteristics. One of our main robustness checks is a placebo test that includes older children, who are at best indirectly affected

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<sup>19</sup> For example, the charity Prevent Child Abuse America advocates that home visiting, early childhood education, and parent education are the most effective interventions to prevent child neglect. While additionally advocating for mental health services to parents, ensuring access for all children to affordable, quality health care and increasing efforts to address social problems such as poverty, the charity does not mention childcare utilization as an effective preventive policy. See <http://preventchildabuse.org/resource/preventing-child-neglect/> for details.

<sup>20</sup> Home visiting programs are the most prominent intensive early childhood intervention to prevent child abuse and neglect. These programs are expanding in the U.S. and in Europe (see, e.g., U.S. Department of Health and Human Services, 2015, Robling et al. 2016, Sandner et al. 2018).

by the childcare expansion. This estimation yields insignificant results and is therefore consistent with our primary results.

Our effect sizes are relevant, indicating that the increase in childcare slots has reduced the number of child abuse and neglect cases by more than 21 percent. The scaled-up ATT calculations show even larger effect sizes if only the small group of children at extreme risk is placed in childcare centers. Under the assumptions of a linear quality increase, full compliance and that most parents who neglect are overburdened and not criminal, this result is not implausible. The larger impacts for counties that more intensively expand child care indicate linearly increasing effects, at least during the first years of childcare expansion. However, it is important to note that if a child attends child care, nurseries will detect cases in which there is no longer any support or connection to a more intensive program that will help the families; in these cases, a child protection case must be initiated directly. Therefore, due to increased detection, child care may also increase the number of cases of abuse and neglect, and our results have to be interpreted as lower bound effects.

Child abuse and child neglect not only cause extreme hardship for the victims but also lead to enormous fiscal costs for society because of the increased need for special education, reduced health and higher welfare receipt. Therefore, our results have a high fiscal relevance even if relatively few abuse and neglect cases can be prevented by providing additional childcare slots. This finding strengthens the argument for further expanding publicly provided childcare and giving subsidies to low-income groups, who are at highest risk of child abuse and neglect.

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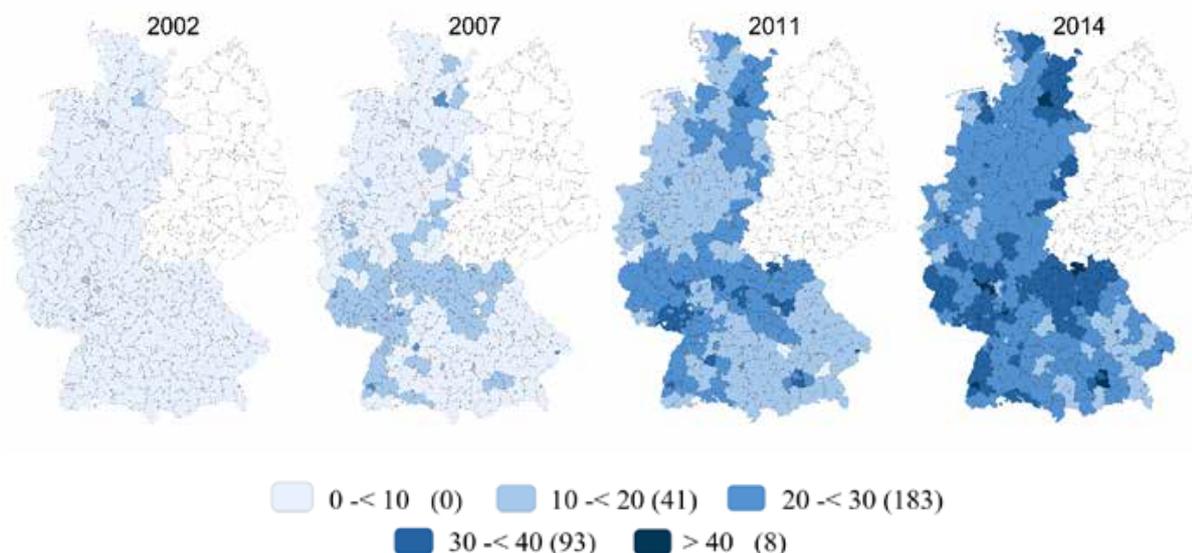
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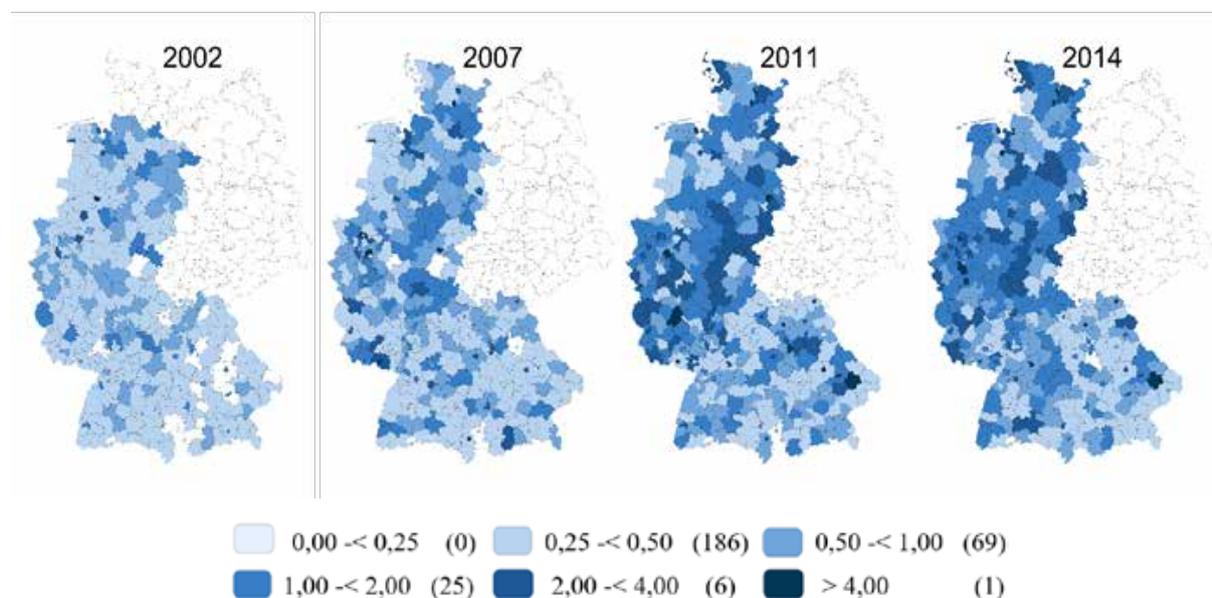
## Figures

**Figure 1: Childcare expansion by county in West Germany between 2002 and 2014.**



Notes: Data provided by the Statistical Offices of the German Laender on public childcare coverage for children under the age of three. Numbers in brackets refer to the number of counties in each class in 2014. Calculations by the authors.

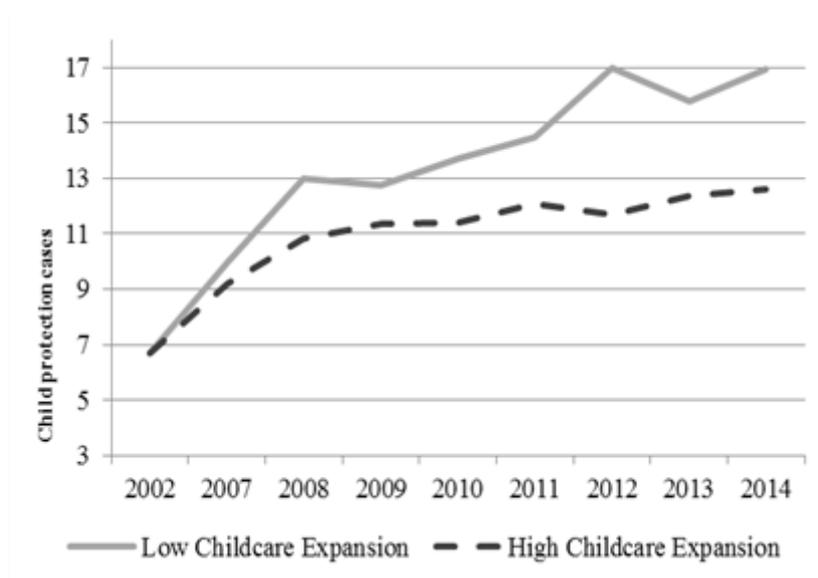
**Figure 2: Child protection cases per 1,000 children by county in West Germany between 2002 and 2014.**



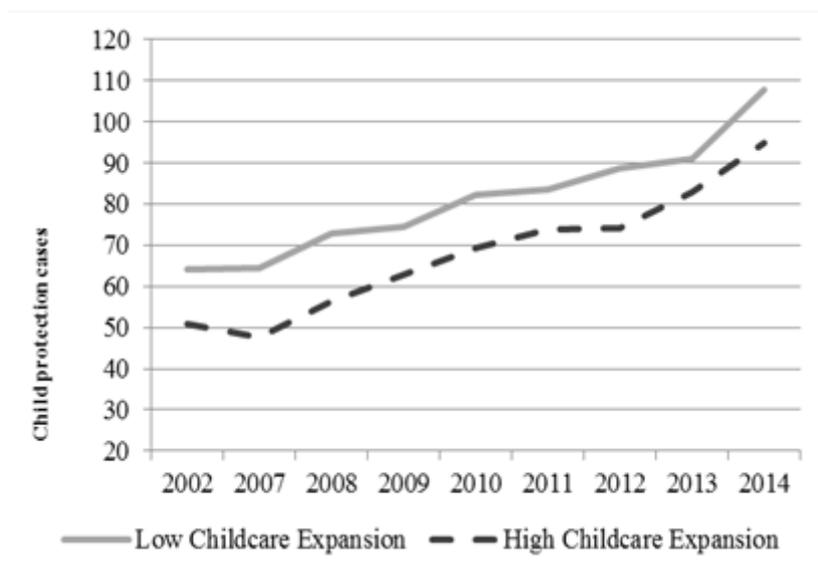
Notes: Data provided by the German Child and Youth Welfare Statistic on individual cases of child protection in a particular year, at the county level, for children under six years of age (per 1,000 children). Numbers in brackets refer to the number of counties in each class in 2002. Calculations by the authors.

**Figure 3: Development of absolute number of child protection cases by year (high expansion vs. low expansion).**

(a) Children between 0 and 5 years



(b) Children between 6 and 17 years



Notes: Data provided by the German Child and Youth Welfare Statistic on individual cases of child protection in a particular year at the county level. Calculations by the authors.

## Tables

**Table 1: Main estimation. Effects of universal public childcare provision on child protection cases (cases per 1,000 children).**

	Cases per 1,000 children (age 0-5 years)			
	(1)	(2)	(3)	(4)
<i>Effects of childcare expansion above median</i>				
Intention-to-treat (ITT)	-0.240** (0.096)	-0.189** (0.096)	-0.187 <sup>z</sup> (0.098)	-0.166* (0.093)
Ave. effect of treat. on the treated (ATT)	-2.842**	-2.238**	-2.214 <sup>z</sup>	-1.966*
Post-treatment period (dummy)	0.982*** (0.099)	1.712*** (0.270)	1.697*** (0.255)	1.558*** (0.277)
GDP per capita in 1,000 Euro		-0.003 (0.010)	-0.004 (0.010)	-0.003 (0.010)
Unemployment rate		-0.061 (0.048)	-0.069 (0.050)	0.148 (0.118)
Share of foreign population		-0.078 (0.051)	-0.077 (0.051)	-0.063 (0.052)
Population density		-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Share of female population in regular employment		-0.108*** (0.034)	-0.106*** (0.034)	-0.083** (0.035)
Share of school drop-outs (w/o degree)			0.017 (0.016)	0.014 (0.016)
Share of school graduates with high-school degree			0.006 (0.006)	0.006 (0.006)
Unemployment rate (squared)				-0.014 (0.009)
Constant	0.560*** (0.053)	7.672*** (1.957)	7.333*** (1.942)	5.125* (2.621)
Year dummies	yes	yes	yes	yes
Average cases per 1000 children over all years			1.1154	
Counties * years	2,860	2,856	2,813	2,813
Weighted observations	29,573,141	29,379,777	28,946,488	28,946,488

Notes: Data provided by the German Child and Youth Welfare Statistic. Estimations are based on fixed-effects panel regressions for the years 2002 to 2014. Treatment is defined by expansion of childcare spaces above the median between 2002 and 2014. The post-treatment period is defined after 2008. ATT is calculated as a scaled ITT based on the increase in childcare coverage in the treatment group relative to the comparison group, i.e.,  $ITT/TT=0.0844$ . See text for further explanations. Weights refer to county population below age 6. Standard errors reported in parentheses are clustered at the county level and robust. Statistical significance indicated by stars (\*  $p<0.1$ , \*\*  $p<0.05$ , \*\*\*  $p<0.01$ ). Calculations by the authors.

**Table 2: Alternative models. Effects of universal public childcare provision on child protection cases (cases per 1,000 children).**

		Cases per 1,000 children (age 0-5 years)				
		(1)	(2)	(3)	(4)	
I	Treatment above median, longer post period	ITT	-0.269** (0.118)	-0.192 (0.121)	-0.176 (0.123)	-0.168 (0.121)
		ATT	-3.185**	-2.274	-2.084	-1.989
II	Treatment above median, childcare coverage increase from 2002 to 2007	ITT	-0.176* (0.097)	-0.153* (0.080)	-0.15* (0.085)	-0.121 (0.092)
		ATT	-2.084*	-1.812*	-1.776*	-1.433
III	Treatment above median, childcare coverage increase from 2002 to 2007, longer post period	ITT	-0.230* (0.118)	-0.198* (0.110)	-0.173 (0.112)	-0.147 (0.114)
		ATT	-2.724*	-2.345*	-2.049	-1.741
IV	Treatment above median, childcare coverage increase from 2007 to 2009	ITT	0.012 (0.101)	0.020 (0.097)	0.036 (0.099)	0.058 (0.102)
		ATT	0.142	0.237	0.426	0.687
V	Treatment above median, childcare coverage increase from 2007 to 2009, longer post period	ITT	-0.012 (0.121)	-0.019 (0.117)	-0.022 (0.117)	-0.007 (0.118)
		ATT	-0.142	-0.225	-0.261	-0.083
VI	Treatment above 3rd tertile	ITT	-0.309*** (0.107)	-0.245** (0.101)	-0.24** (0.108)	-0.215** (0.105)
		ATT	-3.521***	-2.792**	-2.735**	-2.450**
VII	Treatment above 3rd tertile, longer post period	ITT	-0.344*** (0.132)	-0.24* (0.144)	-0.228 (0.149)	-0.21 (0.146)
		ATT	-3.920***	-2.735*	-2.598	-2.393
VIII	Treatment above 1st tertile	ITT	-0.114 (0.094)	-0.062 (0.084)	-0.054 (0.085)	-0.035 (0.087)
		ATT	-1.328	-0.722	-0.629	-0.408
IX	Treatment above 1st tertile, longer post period	ITT	-0.122 (0.138)	-0.071 (0.132)	-0.058 (0.132)	-0.053 (0.132)
		ATT	-1.421	-0.827	-0.676	-0.617

Notes: Data provided by the German Child and Youth Welfare Statistic. Estimations are based on fixed-effects panel regressions for years 2002 to 2014. Model specifications are identical to those in Table 1. Treatment is defined by expansion of childcare spaces above median/1st tertile/3rd tertile between 2002 and 2014, unless otherwise stated. Longer post period refers to the post-treatment period from 2007 to 2014. ATT is calculated as a scaled ITT based on the increase in childcare coverage in the treatment group relative to the comparison group; for treatment above median (1st tertile/3rd tertile) expansion, i.e.,  $ITT/TT=0.0844$  ( $0.0858/0.0878$ ). See text for further explanations. Weights refer to county population below age 6. Regressions are based on 29,537,141 observations. Standard errors reported in parentheses are clustered at the county level and are robust. Statistical significance indicated by stars (\*  $p<0.1$ , \*\*  $p<0.05$ , \*\*\*  $p<0.01$ ). Calculations by the authors.

**Table 3: Placebo estimation. Effects of universal public childcare provision on child protection cases (cases per 1,000 children).**

	Cases per 1,000 children (age 6-17 years)			
	(1)	(2)	(3)	(4)
<i>Effects of childcare expansion above median</i>				
Intention-to-treat (ITT)	0.092 (0.170)	0.068 (0.166)	0.057 (0.170)	0.126 (0.159)
Ave. effect of treat. on the treated (ATT)	1.089	0.805	0.675	1.492
Post-treatment period (dummy)	2.213*** (0.228)	2.722*** (0.608)	2.581*** (0.623)	2.124*** (0.692)
GDP per capita in 1,000 Euro		0.045* (0.024)	0.045* (0.024)	0.048** (0.024)
Unemployment rate		-0.245** (0.104)	-0.242** (0.104)	0.449* (0.243)
Share of foreign population		-0.040 (0.148)	-0.056 (0.132)	-0.007 (0.129)
Population density		0.002 (0.003)	0.002 (0.003)	0.003 (0.003)
Share of female population in regular employment		-0.185** (0.076)	-0.172** (0.074)	-0.099 (0.079)
Share of school drop-outs (w/o degree)			0.044 (0.033)	0.033 (0.034)
Share of school graduates with high-school degree			0.022* (0.012)	0.022* (0.012)
Unemployment rate (squared)				-0.044** (0.018)
Constant	2.138*** (0.087)	10.067** (4.388)	8.669* (4.432)	1.614 (5.847)
Year dummies	yes	yes	yes	yes
Average cases per 1000 children over all years			2.5363	
Counties * years	2,860	2,856	2,813	2,813
Weighted observations	68,973,973	68,608,927	67,584,450	67,584,450

Notes: Data provided by the German Child and Youth Welfare Statistic. Estimations are based on fixed-effects panel regressions for the years 2002 to 2014. Treatment is defined by expansion of childcare spaces above the median between 2002 and 2014. Post-treatment period is defined after 2008. ATT is calculated as a scaled ITT based on the increase in childcare coverage in the treatment group relative to the comparison group, i.e.,  $ITT/TT=0.0844$ . See text for further explanations. Weights refer to county population below age 6. Standard errors reported in parentheses are clustered on county level and robust. Statistical significance indicated by stars (\*  $p<0.1$ , \*\*  $p<0.05$ , \*\*\*  $p<0.01$ ). Calculations by the authors.

**Table 4: Placebo estimation – alternative models. Effects of universal public childcare provision on child protection cases (cases per 1,000 children).**

		Cases per 1,000 children (age 6-17 years)				
		(1)	(2)	(3)	(4)	
I	Treatment above median, longer post period	ITT	-0.189 (0.195)	-0.248 (0.213)	-0.196 (0.210)	-0.174 (0.212)
		ATT	-2.238	-2.937	-2.321	-2.060
II	Treatment above median, childcare coverage increase from 2002 to 2007	ITT	0.065 (0.166)	-0.002 (0.153)	-0.004 (0.159)	0.095 (0.154)
		ATT	0.770	-0.024	-0.047	1.125
III	Treatment above median, childcare coverage increase from 2002 to 2007, longer post period	ITT	-0.221 (0.193)	-0.324 (0.218)	-0.261 (0.216)	-0.177 (0.208)
		ATT	-2.617	-3.837	-3.091	-2.096
IV	Treatment above median, childcare coverage increase from 2007 to 2009	ITT	-0.256 (0.163)	-0.223 (0.158)	-0.193 (0.157)	-0.126 (0.155)
		ATT	-3.031	-2.641	-2.285	-1.492
V	Treatment above median, childcare coverage increase from 2007 to 2009, longer post period	ITT	-0.360* (0.188)	-0.342* (0.204)	-0.353* (0.204)	-0.310 (0.203)
		ATT	-4.263	-4.050	-4.180	-3.671
VI	Treatment above 3rd tertile	ITT	-0.105 (0.198)	-0.122 (0.189)	-0.097 (0.197)	-0.014 (0.186)
		ATT	-1.197	-1.390	-1.105	-0.160
VII	Treatment above 3rd tertile, longer post period	ITT	-0.331 (0.220)	-0.425* (0.236)	-0.396 (0.242)	-0.343 (0.243)
		ATT	-3.772	-4.843*	-4.513	-3.909
VIII	Treatment above 1st tertile	ITT	0.111 (0.180)	0.057 (0.169)	0.061 (0.174)	0.123 (0.164)
		ATT	1.293	0.664	9.711	1.433
IX	Treatment above 1st tertile, longer post period	ITT	-0.178 (0.227)	-0.307 (0.249)	-0.273 (0.247)	-0.259 (0.241)
		ATT	-2.074	-3.576	-3.180	-3.017

Notes: Data provided by the German Child and Youth Welfare Statistic. Estimations are based on fixed-effects panel regressions for years 2002 to 2014. Model specifications are identical to those in Table 1. Treatment is defined by expansion of childcare spaces above median/1st tertile/3rd tertile between 2002 and 2014, unless otherwise stated. Later period refers to post-treatment period 2008 to 2014. ATT is calculated as a scaled ITT based on the increase in childcare coverage in the treatment group relative to the comparison group; for treatment above median (1st tertile/3rd tertile) expansion, i.e., ITT/TT=0.0844 (0.0858/0.0878). See text for further explanations. Weights refer to county population below age 6. Regressions are based on 68,973,973 observations. Standard errors reported in parentheses are clustered at the county level and are robust. Statistical significance indicated by stars (\* p<0.1, \*\* p<0.05, \*\*\* p<0.01). Calculations by the authors.

**Table 5: Effects of universal public childcare provision on child protection cases (cases per 1,000 children). Generalized model (equation 2).**

	Cases per 1,000 children (age 0-5 years)				Cases per 1,000 children (age 6-17 years)			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Childcare coverage (ATT)	-0.033 *** (0.012)	-0.027 ** (0.012)	-0.026 ** (0.012)	-0.024 ** (0.011)	-0.025 (0.029)	-0.028 (0.028)	-0.023 (0.029)	-0.015 (0.027)
GDP per capita in 1,000 Euro		-0.004 (0.009)	-0.005 (0.009)	-0.004 (0.009)		0.041 * (0.023)	0.042 * (0.023)	0.046 * (0.024)
Unemployment rate		-0.062 (0.048)	-0.072 (0.050)	0.136 (0.113)		-0.257 ** (0.106)	-0.250 ** (0.106)	0.423 * (0.238)
Share of foreign population		-0.082 (0.050)	-0.079 (0.050)	-0.065 (0.051)		-0.048 (0.148)	-0.063 (0.132)	-0.013 (0.129)
Population density		-0.001 (0.001)	-0.001 (0.001)	0.000 (0.001)		0.003 (0.003)	0.003 (0.003)	0.003 (0.003)
Share of female population in regular employment		-0.099 *** (0.032)	-0.099 *** (0.033)	-0.078 ** (0.034)		-0.169 ** (0.073)	-0.160 ** (0.072)	-0.090 (0.078)
Share of school drop-outs (w/o degree)			0.019 (0.016)	0.016 (0.017)			0.038 (0.033)	0.027 (0.034)
Share of school graduates with high-school degree			0.006 (0.006)	0.006 (0.006)			0.022 * (0.012)	0.022 * (0.012)
Unemployment rate (squared)			-0.013 (0.008)	-0.013 (0.008)				-0.043 ** (0.017)
Constant	0.653 (0.055)	7.328 (1.925)	7.064 *** (1.919)	4.959 * (2.610)	2.195 *** (0.119)	9.391 ** (4.367)	8.228 * (4.378)	1.411 (5.842)
Year dummies	yes	yes	yes	yes	yes	yes	yes	yes
County dummies	yes	yes	yes	yes	yes	yes	yes	yes
Average cases per 1000 children over all years			1.1154			2.536		
Counties * years	2,860	2,856	2,813	2,813	2,860	2,856	2,813	2,813
Weighted observations	29,910,594	29,670,565	29,237,276	29,237,276	69,806,175	69,333,110	68,308,633	68,308,633

Notes: Data provided by the German Child and Youth Welfare Statistic. Estimations are based on fixed-effects panel regressions for years 2002 to 2014 according to equation 2. The coefficient "Childcare coverage" denotes the effect of a one-percentage point increase of childcare coverage on cases of child protection per 1,000 children. See text for further explanations. Weights refer to county population below age 6. Standard errors in parentheses; statistical significance indicated by stars (\* p<0.1, \*\* p<0.05, \*\*\* p<0.01). Calculations by the authors.

## Appendix

### Appendix I: Childcare coverage over time.

Year	Counties	Mean	S.D.	Min	Max
2002	325	0.022	0.002	0.000	0.130
2007	325	0.094	0.044	0.022	0.284
2008	325	0.118	0.047	0.034	0.340
2009	325	0.142	0.049	0.036	0.344
2010	325	0.171	0.053	0.071	0.360
2011	325	0.200	0.060	0.000	0.378
2012	325	0.222	0.059	0.110	0.392
2013	325	0.242	0.060	0.113	0.432
2014	325	0.270	0.058	0.139	0.469

Note: Data provided by the German Child and Youth Welfare Statistic. The figures show mean childcare coverage rates across West German counties as well as standard deviations, median, minimum, and maximum values. All information is provided for the years 2002 and 2007 to 2014. Calculations by the authors.

### Appendix II: Absolute cases of child protection in counties with high and low childcare expansion.

Year	Age: below six			Age: below six		
	(lower expansion)			(higher expansion)		
	Counties	Mean	S.D.	Counties	Mean	S.D.
2002	144	6.68	11.63	140	6.70	15.75
2007	156	9.83	14.23	160	9.21	18.79
2008	157	12.98	18.04	162	10.83	17.36
2009	158	12.74	16.84	161	11.37	17.62
2010	155	13.73	17.16	162	11.40	18.81
2011	156	14.46	17.70	162	12.09	19.22
2012	157	17.00	27.49	161	11.70	19.71
2013	158	15.78	26.78	162	12.39	17.65
2014	159	16.93	26.63	162	12.60	20.48

Notes: Data provided by the German Child and Youth Welfare Statistic on absolute individual cases of child protection in a particular year, at the county level, for children under six years of age. Calculations by the authors.

### Appendix III: Cases of child protection per 1,000 children aged below 6 years and between 6 and 17 years.

Year	Age: below 6 years			Age: between 6 and 17 years		
	Counties	Mean	S.D.	Counties	Mean	S.D.
2002	287	0.5017	0.7512	287	1.5918	1.9542
2007	320	0.8713	1.1206	320	1.8108	2.5174
2008	323	1.0908	1.1774	323	2.1435	2.2243
2009	323	1.1254	1.0765	323	2.3009	2.6163
2010	320	1.2001	1.2214	320	2.5463	2.7846
2011	322	1.3218	1.3470	322	2.7299	2.9388
2012	322	1.2504	1.1891	322	2.8405	3.0685
2013	324	1.2878	1.2208	324	2.9831	3.3749
2014	324	1.3193	1.2598	324	3.7640	5.9962
All years		1.1154	1.1907		2.5363	3.3195

Notes: Data provided by the German Child and Youth Welfare Statistic on absolute individual cases of child protection in a particular year on the county level of children under six years of age. Calculations by the authors.

**Appendix IV: Effects of universal public childcare provision on child protection cases (cases per 1,000 children). Generalized model, unweighted.**

	Cases per 1,000 children (age 0-5 years)				Cases per 1,000 children (age 6-17 years)			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
<b>Childcare coverage</b>	-0.018 ** (0.008)	-0.018 ** (0.008)	-0.017 ** (0.008)	-0.015 * (0.008)	-0.007 (0.022)	-0.009 (0.023)	-0.006 (0.024)	-0.003 (0.024)
GDP per capita in 1,000 Euro		-0.005 (0.012)	-0.005 (0.012)	-0.003 (0.012)		0.016 (0.015)	0.013 (0.015)	0.013 (0.015)
Unemployment rate		-0.099 ** (0.048)	-0.110 ** (0.048)	0.011 (0.085)		-0.231 ** (0.117)	-0.229 * (0.117)	-0.123 (0.296)
Share of foreign population		-0.100 ** (0.046)	-0.090 * (0.048)	-0.079 (0.050)		-0.131 (0.087)	-0.123 (0.083)	-0.111 (0.087)
Population density		-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.002)		0.000 (0.003)	-0.002 (0.003)	-0.003 (0.004)
Share of female population in regular employment		-0.078 *** (0.029)	-0.075 ** (0.030)	-0.068 ** (0.034)		-0.190 ** (0.087)	-0.161 * (0.091)	-0.154 (0.104)
Share of school drop-outs (w/o degree)			0.004 (0.017)	0.001 (0.017)		0.049 * (0.028)	0.049 * (0.028)	0.044 (0.028)
Share of school graduates with high-school degree			0.003 (0.005)	0.003 (0.005)		0.001 (0.005)	0.001 (0.009)	0.000 (0.009)
Unemployment rate (squared)			-0.008 (0.006)	-0.008 (0.006)				-0.007 (0.014)
Constant	0.542 *** (0.051)	7.099 *** (1.822)	7.274 *** (1.885)	6.689 *** (2.440)	1.673 *** (0.090)	12.927 ** (5.252)	10.989 ** (5.308)	9.783 (6.350)
County dummies	yes	yes	yes	yes	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes	yes	yes	yes
Share of population	no	no	yes	yes	no	no	yes	yes
Share of population (squared)	no	no	no	yes	no	no	no	yes
Average cases per 1000 children over all years								
Observations (counties * years)	2,860	2,856	2,813	2,813	2,860	2,856	2,813	2,813

Notes: Data provided by the German Child and Youth Welfare Statistic. Estimations are based on fixed-effects panel regressions for years 2002 to 2014 according to equation 2. The coefficient “Childcare coverage” denotes the effect of a one-percentage point increase of childcare coverage on cases of child protection per 1,000 children. See text for further explanations. Standard errors in parentheses; statistical significance indicated by stars (\* p<0.1, \*\* p<0.05, \*\*\* p<0.01). Calculations by the authors.

**Appendix V: Effects of universal public childcare provision on child protection cases (cases per 1,000 children). Generalized model, unweighted and time trends.**

	Cases per 1,000 children (age 0-5 years)				Cases per 1,000 children (age 6-17 years)			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
<b>Childcare coverage</b>	-0.017 ** (0.008)	-0.017 ** (0.008)	-0.017 * (0.009)	-0.016 * (0.008)	-0.012 (0.018)	-0.013 (0.020)	-0.009 (0.020)	-0.009 (0.020)
GDP per capita in 1,000 Euro		-0.003 (0.012)	-0.004 (0.012)	-0.003 (0.012)		0.021 (0.016)	0.017 (0.016)	0.014 (0.016)
Unemployment rate		-0.100 ** (0.050)	-0.108 ** (0.050)	0.004 (0.081)		-0.288 ** (0.128)	-0.280 ** (0.132)	-0.445 (0.314)
Share of foreign population		-0.098 ** (0.047)	-0.092 * (0.050)	-0.084 * (0.050)		-0.116 (0.092)	-0.107 (0.086)	-0.114 (0.090)
Population density		-0.002 (0.001)	-0.002 (0.002)	-0.002 (0.002)		0.001 (0.003)	-0.002 (0.003)	-0.003 (0.004)
Share of female population in regular employment		-0.068 ** (0.030)	-0.066 ** (0.031)	-0.063 * (0.033)		-0.190 * (0.098)	-0.156 (0.101)	-0.166 (0.112)
Share of school drop-outs (w/o degree)			-0.005 (0.018)	-0.007 (0.018)			0.017 (0.032)	0.019 (0.032)
Share of school graduates with high-school degree			0.004 (0.005)	0.004 (0.005)			0.009 (0.006)	0.008 (0.006)
Unemployment rate (squared)				-0.007 (0.006)				0.009 (0.014)
Constant	0.299 *** (0.066)	6.063 *** (1.984)	6.197 *** (2.124)	6.157 ** (2.438)	1.370 *** (0.110)	12.301 * (6.469)	9.626 (6.444)	9.537 (7.090)
Time trends (quadratic polynomial)	yes	yes	yes	yes	yes	yes	yes	yes
County dummies	yes	yes	yes	yes	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes	yes	yes	yes
Share of population	no	no	yes	yes	no	no	yes	yes
Share of population (squared)	no	no	no	yes	no	no	no	yes
Average cases per 1000 children over all years			1.1154				2.5363	
Observations (Counties * years)	2,860	2,856	2,813	2,813	2,860	2,856	2,813	2,813

Notes: Data provided by the German Child and Youth Welfare Statistic. Estimations are based on fixed-effects panel regressions for years 2002 to 2014 according to equation 2. The coefficient "Childcare coverage" denotes the effect of a one-percentage point increase of childcare coverage on cases of child protection per 1,000 children. See text for further explanations. Standard errors in parentheses; statistical significance indicated by stars (\* p<0.1, \*\* p<0.05, \*\*\* p<0.01). Calculations by the authors.