

Taxing Childcare:  
Effects on Family Labor Supply and Children

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CESIFO WORKING PAPER NO. 3776

CATEGORY 4: LABOUR MARKETS

MARCH 2012

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# Taxing Childcare: Effects on Family Labor Supply and Children

## Abstract

Previous studies report a wide range of estimates for how female labor supply responds to childcare prices. We shed new light on this question using a reform that raised the prices of public daycare. Parents respond by reducing public daycare and increasing childcare at home. Parents also reduce informal childcare indicating that public daycare and informal childcare are complements. Female labor force participation declines and the response is strongest for single parents and low-income households. The short-run effects on cognitive and non-cognitive skills are mixed, but negative for girls. Spillover effects on older siblings suggest that the policy affects the whole household, not just targeted family members.

JEL-Code: J130, J220, J180.

Keywords: childcare, labor supply, cognitive skills, family policy, Germany.

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This version: March, 2012

We thank Iwan Barankay, Thiess Buettner, Janet Currie, Ronny Freier, Nabanita Datta Gupta, Peter Haan, Eckhard Janeba, Takao Kato, David Ribar, Regina Riphahn, Klaus Schmidt, Uta Schönberg, Thomas Siedler, Katharina Spiess, Michele Tertilt, Elu von Thadden, Matthias Wrede and Katharina Wrohlich as well as seminar participants at Arhus Business School, DIW Berlin, University of Dresden, Mannheim, Nürnberg-Erlangen and the Workshop on Natural Experiments and Controlled Field Studies in Holzhausen for helpful comments. We are grateful to the staff at GESIS in Mannheim, the Statistical Office of Germany for their help with the Micro Census and the DIW for their help with the Socio-Economic Panel (GSOEP). Benjamin Bruns and Christoph Esslinger provided outstanding research assistance. We are responsible for all remaining errors.

# 1 Introduction

Female labor supply has increased dramatically in many countries over the past decades (Jaumotte (2003); Boeri (2005)). Employment among women in Germany or Portugal, for example, has increased from less than 50% in 1981 to over 70% in 2001. And yet, there remain large cross-country differences in female employment. While female labor force participation is above 80% in Scandinavian countries, it is only about 60% in some Southern European countries like Italy or Spain.

Many view generous child care policies as a key determinant of the observed cross-country differences (see Jaumotte (2003)) and the dramatic growth of female employment over the last decades (Attanasio et al. (2008)). Proponents of such policies argue that affordable childcare is crucial to encourage female labor force participation and promote economic self-sufficiency, especially among single parents. Pundits, in contrast, think that childcare subsidies distort the allocation of resources and may have negative consequences for child development.

We make use of a recent policy reform in East Germany to shed new light on this important debate and the role of childcare prices for female labor supply. In 2006, the government of Thuringia introduced a new family policy that provides generous subsidies to families that they do *not* send their child to public daycare.<sup>1</sup> The size of the monthly subsidy is substantial: it pays 150 euros if the eligible child is the firstborn and up to 300 euros if the two-year-old is the fourth- or higher-order child. The subsidy is almost twice as large as the average monthly childcare fee, and contributes a non-trivial share (of about 10%) to disposable income in East German families with small children. The structure of the subsidy is such that it declines linearly with the number of hours the eligible child attends public daycare. As such, the subsidy is equivalent to an increase in the hourly price of public childcare (fully compensated by an income subsidy). As a consequence, families using public childcare can buy the same bundle of goods as before the reform. Yet, they might not choose to do so because public childcare has become more expensive relative to other childcare choices. For families not using public childcare, the new policy provides windfall income of at least 150 euros per month.

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<sup>1</sup>In what follows, we label daycare that is publicly subsidized public daycare. Publicly subsidized daycare facilities might be provided by the local community, the Catholic or Protestant churches or non-profit organizations. For-profit childcare centers that would not be eligible for public subsidies are very rare in East Germany. In practice, almost all facilities are run by the communities.

The policy reform generates rare exogenous variation in childcare prices in a setting where public daycare is widely available, a relic of East Germany's socialist past. Using this variation, we analyze the effect of childcare costs on childcare choices, family labor supply and child outcomes. The reform's specific features enable us to directly identify behavioral responses (like the compensated own- and cross-price effects on childcare choices) and policy-relevant parameters (like the elasticity of labor supply with respect to childcare costs).

We have four main findings. Parents respond to the new policy by reducing public daycare of eligible children by 11 percentage points. We find an even stronger decline in informal care provided by friends, relatives and neighbors. Public daycare and informal childcare thus seem to be complements for families with small children. Instead, eligible children are now 9.1 percentage points more likely to be cared for exclusively at home (an increase by about 20%). Mirroring the changes in childcare, labor force participation of the responsible parent (typically the mother) declines as well. Our results imply an elasticity of labor force participation with respect to childcare costs in the range of -0.1 to -0.3.

Second, our evidence suggests that eligible children do not benefit from the increase in home care. On the contrary, girls seem to score substantially worse in the short-run on some cognitive and non-cognitive skills (motor and social skills and skills in daily activities). The observed gender asymmetry is consistent with other studies reporting large benefits of public daycare for girls (Havnes and Mogstad (2011), for example).

Third, we find even stronger responses for economically vulnerable families: the low-skilled, single parents and low-income households. In all three groups, parents are much more likely to take their child out of public daycare and use informal care arrangements or home care instead. Here, informal and public daycare seem to be substitutes (or the income effect is strong enough to dominate any complementarity between the two). The decline of female labor force participation is stronger for low-skilled and low-income households as well. This reduction of female labor supply could threaten their economic self-sufficiency as second earners often supplement family earnings or compensate an unemployment spell of the first earner.

Even more importantly, the policy could threaten the future prospects of children from the most disadvantaged family backgrounds. Prior studies strongly suggest that high-

quality public daycare is particularly beneficial for children from low-educated or low-income family backgrounds (Currie and Thomas (1995); Currie and Thomas (1999); or Gupta and Simonsen (2010); see Almond and Currie (2011) for a comprehensive survey). The observed decline in public daycare in Thuringia would then be bad news for these children's cognitive and non-cognitive development - a situation we know is difficult to compensate later in life (Almond and Currie (2011); Heckman (2006)).

Fourth, we document that the new policy affects the whole family, not just eligible children and their mothers. The new subsidy reduces, for example, male labor force participation but has no observable effect on fertility in eligible households. However, we find spillover effects for older siblings: three and four year-old siblings of eligible children are much less likely to attend public daycare after the introduction of the new policy. Mothers might use their additional time to supervise older pre-school children together with eligible children at home.

Our findings have important lessons for policy makers, especially because the federal government plans to introduce a similar subsidy in all German states in 2013. These lessons are discussed in more detail in the conclusion. Even beyond the particular German setting, our analysis provides valuable insights into the relationship between childcare, family labor supply and child outcomes. Our evidence, for example, suggests that childcare prices (even net of income effects) are an important determinant of female labor supply in advanced economies. As mentioned before, we also show that family policies do not only affect the eligible child but have spillover effects on other family members.

We perform a number of robustness checks to test the validity of our results across alternative specifications and additional controls. An important concern for our identification strategy is the presence of state-specific prior trends; yet, across a variety of specifications, we fail to find evidence for prior trends. A triple differences strategy using older pre-school children to eliminate state-specific common trends yields qualitatively very similar results than the baseline. Further, we run a number of additional specification tests to rule out that changes in preferences or concurrent reforms can explain our results. Finally, we present a range of estimators to correct standard errors as the treatment occurs in a single state. Standard errors are typically slightly larger, but overall comparable, than in the baseline (where we cluster standard errors at the state level). With few exceptions then, our results are robust to alternative specifications.

## 2 Related Literature

How the availability and costs of childcare affect female labor supply and other family choices is a long-standing question in labor economics (e.g. Heckman (1974)). An older, mostly structural literature analyzes labor supply responses to childcare costs (see Anderson and Levine (1999); Connelly (1992); Kimmel (1995); Kimmel (1998); and Ribar (1992) for the United States; Powell (1997) for Canada; Gustafsson and Stafford (1992) for Sweden; and Wetzels (2005) for the Netherlands). Most studies here use reported or imputed childcare costs that families supposedly face or actually pay.<sup>2</sup> In such a setting, the identification of childcare costs on female labor supply is not fully clear. It is therefore not too surprising that estimated labor supply elasticities differ widely ranging from 0 to smaller than  $-1$  (see Blau and Currie (2003) for a recent survey).

One advantage of our approach is that we can use quasi-experimental variation in childcare prices induced by the reform to identify its effects on labor supply. Our labor supply estimates are at the lower end of those structural estimates ranging from  $-0.1$  to  $-0.3$ . We also document that the labor supply responses are stronger among economically vulnerable families, the low-skilled and single parents as well as low-income households. The heterogeneity we find helps to reconcile why some of the estimates reported in the literature are larger than others (see, for example, the analysis of childcare subsidies for single mothers in the US by Blau and Tekin (2007)). In addition, our study sheds light on adjustments to childcare costs beyond female labor supply, such as male labor supply, spillover effects on older siblings or fertility choices in eligible households. We find that a policy targeted at one child in the family affects all other children in eligible families as well - an effect which is often ignored in applied work.

In addition, we contribute to a small literature analyzing reforms of childcare subsidies and labor supply in Europe (see Schøne (2004) and Kornstad and Thoresen (2007) for Norway; Piketty (2005) for France; and Lundin et al. (2008) and Brink et al. (2007) for Sweden). These reforms were all implemented at the national level, which makes it difficult to disentangle the impact of the reform from other aggregate changes. In contrast, we exploit a reform in a single state and compare choices of eligible families in the treatment state to the choices of similar families in other East German states.

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<sup>2</sup>One exception is Averett et al. (1997) who exploit the childcare tax credit in the US tax system to estimate labor supply elasticities within a structural framework.

Furthermore, we study a range of outcomes ranging from labor supply to behavioral outcomes and spillover effects on older siblings of eligible children.

Our article is also related to a recent literature analyzing the expansion of childcare availability. Several studies in this literature focus on female labor supply (see Cascio (2009); Gelbach (2002) for the United States; Lefebvre and Merrigan (2008) for Canada; Havnes and Mogstad (2009) for Norway; and Chiuri (2000) for Italy).<sup>3</sup> In our setting childcare is widely available; rather, we use quasi-experimental variation in childcare prices. As such, we analyze adjustments at the intensive margin, while studies of childcare availability are more concerned with the extensive margin. Families might be slower to respond to the expansion of childcare facilities than to price changes in an existing facility. And indeed, we find that female labor supply is more elastic with respect to prices (our setting) than studies find for the availability of childcare (Havnes and Mogstad (2009), for example, report an elasticity of 0.06 for Norway; Chiuri (2000) an elasticity of zero for Italy). Another advantage of our setting is that we can directly identify behavioral parameters of interest, for example, the compensated own- and cross-price elasticities of childcare choices.

Closely related is the study of a comprehensive childcare reform in Canada (Baker et al. (2008)). Like us, the authors exploit policy changes in one state to investigate their effect on labor supply, childcare choices and family well-being. Our setting however, differs from the Canadian context along several dimensions. The Canadian reform is a combination of a decrease in childcare prices and a substantial expansion of childcare availability; in our case, only the hourly price of childcare increased. In addition, the Canadian setup mainly affected middle-income families because low-income families were eligible for the childcare subsidies even prior to the reform).<sup>4</sup> In our case, the price increase affected all families in the reform state. Therefore, we can identify behavioral parameters of interest (like the elasticity of childcare choices and female labor supply with respect to childcare costs) for the average family and economically vulnerable households.

Finally, we contribute to a recent debate in macroeconomics trying to explain the

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<sup>3</sup>A different set of studies have investigated how public childcare attendance affects child development. We only touch on this issue briefly here looking at short-run behavioral outcomes. See Almond and Currie (2011) for an excellent survey.

<sup>4</sup>Furthermore, there seem to have been quality issues with the newly available facilities in Quebec. One potential explanation for the negative effects on child development might then be that children were placed in below-average quality daycare after the reform (see Almond and Currie (2011), p.1452 for a discussion).

dramatic rise in female labor supply over the past decades. One prominent contribution has argued that declining childcare costs are one important explanation for rising female employment in the United States (Attanasio et al. (2008)). Our evidence suggests that female labor supply does respond to childcare prices - and therefore supports the calibrations provided in Attanasio et al. (2008).

### 3 Background and Theoretical Considerations

This section discusses the new policy and its expected consequences for childcare and labor supply choices of families with small children. We also provide evidence that the new policy did not affect the supply of daycare.

#### 3.1 The New Family Subsidy in Thuringia

On July 1 of 2006, the government in Thuringia introduced a new policy for families with small children, the so called “Betreuungsgeld”. Parents of two-year-old children now receive a subsidy if their child does *not* attend a publicly subsidized daycare facility. The size of the subsidy increases with the number of dependable children in the household.<sup>5</sup> Firstborn two-year-old children receive 150 euros per month, roughly equivalent to the federal child benefit available to all families.<sup>6</sup> Second- and third-born eligible children receive 200 and 250 euros per month, respectively. Fourth- and higher-order eligible children even receive 300 euros per month (see table 1). For families in Thuringia, the new subsidy contributes a non-trivial share to household income: on average, the subsidy is about 10% of the median disposable household income in our sample of East German families (with at least one child under the age of three). As shown in table 1, this share is even larger for certain population subgroups. For example, the subsidy contributes between 11% and 22% to disposable household income for single parents. For low-skilled parents with four children, the subsidy may be as high as 29% of disposable household income in East Germany.

If the eligible child is in public daycare full-time (45 hours per week), the full amount

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<sup>5</sup>Dependable children are children under the age of 18; if they attend education full-time, the age threshold may extend to age 27.

<sup>6</sup>For comparison, the federal child benefit for families with one child was 154 euros per month, with four or more children it was only 179 euros per month for the fourth and any additional child in 2006.



of the new subsidy goes to the childcare provider. If the child attends for fewer hours, the facility receives an amount that is proportional to the hours attended; the rest of the subsidy payment goes to the responsible parent. If the child does not attend public daycare, the full subsidy goes to the parents.

The new subsidy replaced the previous child-raising allowance for parents of 2 to 2.5 years-old children in Thuringia.<sup>7</sup> Under the old policy, parents received a monthly subsidy of 300 euros if at least one adult worked less than 30 hours per week and the monthly household income was below a threshold (1,375 euros for two-parent families and 1,125 euros for single parents). Higher-income households received a lower payment or no transfer at all. Hence, the old policy was means-tested (conditional on income) but paid independently of the parents' childcare choices. Under the new policy, all families with eligible children receive the subsidy, but the amount received by the parents now depends on the family's childcare choices. We next discuss how families might respond to this new policy and what parameters we can identify with our analysis.

### 3.2 Theoretical Considerations

The new subsidy effectively increases the hourly price of public daycare for parents. A parent with an eligible two-year-old child in daycare full-time now pays an additional 150 euros per month to the facility. This price increase is substantial considering that parents in Thuringia pay only about 80 euros per month in daycare fees. At the same time, the price increase is fully compensated by a government transfer to all families with eligible children (independent of whether they use public daycare or not).

How would the subsidy affect childcare choices? We should observe both substitution effects (among parents using public daycare) and income effects (among all parents). Parents that would use daycare can still afford the same bundle of goods as prior to the policy. However, they might not choose to do so because public childcare has become more expensive relative to other childcare modes. We thus expect a decline in public daycare attendance among eligible children because the compensated price effect is non-positive.

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<sup>7</sup>This childcare allowance extended a federal policy for all parents with children under the age of two. The eligibility criteria, work requirements and income thresholds were very similar. In January of 2007, the federal government abolished the policy in favor of a generous parental subsidy (*Elterngeld*) for families with newborn children. The parental subsidy is now paid for a maximum of 14 months (if both parents take time off sequentially to care for the child); the subsidy can be as high as 1,800 euros per month (depending on prior earnings).

The impact of the reform on informal childcare and childcare at home depends on two things: whether they are substitutes or complements to public daycare; and the income effect (because all parents receive the subsidy of 150 euros). Informal care by relatives or paid nannies would, for example, be a complement to public daycare if working mothers need to combine both childcare arrangements to cover a full workday. Informal care would be a substitute if cheaper informal care replaces public daycare instead. The additional income might increase informal care (to enjoy parental leisure, for example) or could decrease informal care (if it is an inferior good). Childcare exclusively at home in contrast should be a substitute for public daycare. The income effect should further increase home care (especially if parental care is considered of higher quality than other childcare arrangements). Hence, we would expect the subsidy to increase childcare at home; the effect on informal care in turn is a-priori ambiguous.

How would the new subsidy affect female labor supply in eligible households? Parents who use public childcare face a reduction in the parent's net return from work. In response, the responsible parent (in most cases, the mother) might reduce her labor supply, and possibly use the additional time to care for the child at home. Alternatively, mothers might not adjust their labor supply but switch to informal childcare instead. For working mothers not using public childcare, the transfer is windfall income. The income effect should then reduce maternal labor supply if leisure is a normal good.

Our empirical analysis captures the full impact of the policy on all childcare arrangements as well as any externalities on peer groups. Exploiting the variation in childcare prices induced by the new policy in Thuringia, we can directly estimate behavioral parameters of interest to researchers and policy makers. The estimated response for public daycare directly identifies the first derivative of the Hicksian (compensated) demand function for public daycare (i.e. the element of the Slutsky matrix of substitution). For informal and home care, we estimate a combination of the compensated substitution effect (for parents using public daycare) and a pure income effect (for parents not using public daycare). In addition, we can identify how labor supply responds to childcare costs and windfall income, a parameter that is directly relevant for policy-makers.

Note that we only observe the amount of the subsidy, but not the actual childcare expenditures each family incurs per month and child. Consequently, the price elasticities of childcare demand and labor supply we calculate based on our estimates should be

interpreted as a lower bound.<sup>8</sup>

### 3.3 Supply of Public Daycare Remains Unaffected

In the empirical analysis below, we focus on changes in the demand for childcare in response to the new family policy. Yet, the subsidy could have induced adjustments on the supply side as well. For example, childcare facilities might have expanded the number of childcare spaces or lowered childcare fees for parents eligible for the subsidy. If that were true, our empirical analysis would identify a combination of demand and supply responses.

Yet, the available evidence suggests that the new policy had little effects on the supply side. The main reason is that the subsidies received from families with children in daycare are not additional revenues for childcare providers. In fact, the payments received by childcare facilities are exactly offset by a decline in public transfers from the state budget. Since revenues remain unchanged after 2006, we would expect few adjustments on the supply side.<sup>9</sup>

In fact, we observe few changes in the number of places supplied and the opening hours of childcare facilities. Unlike West Germany, there is no rationing of public childcare in Thuringia and East Germany more generally. In each county of Thuringia, the number of childcare places supplied exceeds the number of attending children by on average 14%.<sup>10</sup> After the introduction of the new subsidy, the number of spaces supplied remained constant or increased slightly (Thüringer Landesamt für Statistik (2009)).

We also find no evidence that opening hours changed in response to the new law. Opening hours are generally long in East Germany. In the city of Erfurt, for example, public childcare facilities offer 10 or more hours of childcare each day. Similar daycare hours are observed in many other counties in Thuringia. If anything, the average number

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<sup>8</sup>The elasticities are a lower bound for the following reason: we correctly identify the response to changes in childcare costs. We also observe the fraction of children in each childcare arrangement and actual labor supply of their mothers. However, the actual price of public daycare is unobserved; we approximate it with the size of the subsidy in the post-policy-period, which does not include parental childcare fees.

<sup>9</sup>Before July 1, 2006 childcare facilities received subsidies for each childcare space provided. The subsidy did not depend on the actual attendance of children. Under the new policy, childcare facilities receive subsidies for the number of children attending public childcare facilities. Hence, facilities with an oversupply of childcare slots receive fewer subsidies after the new policy is introduced. One rationale for the reform we study was to subsidize actual attendance rather than the provision of childcare per se.

<sup>10</sup>The number of excess childcare spaces in 2009, for example, varies from 4.7% in Jena to 22.4% in Suhl (Thüringer Ministerium für Soziales, Familie und Gesundheit (2009)).

of hours children attend public daycare has actually increased between 2006 and 2009 (Thüringer Ministerium für Soziales, Familie und Gesundheit (2009)).

Even when childcare spaces and opening hours remain constant, childcare facilities might try to increase (or decrease) the attendance rates of eligible two-year-olds (relative to younger or older children) in order to receive the generous subsidies. However, aggregate statistics do not show any decline in attendance rates of one and three year-old children after the new policy is introduced (Sass (2010)).<sup>11</sup>

We find little indication that childcare quality changed after 2006. Quality of public childcare is, of course, very difficult to measure. Available proxies, like the number of childminders employed and the ratio of childminders to attending children, remain pretty stable over our study period.<sup>12</sup> Childcare facilities are subject to strict state regulations and controls. These state-wide rules prescribe, for example, the educational background of childminders, the maximum number of children per childminder or the minimum amount of space per child; additional requirements regulate hygiene in the facility and the outdoor play areas. If facilities fail to comply with the imposed standards, their public funds are withdrawn and the facility might be closed down. Hence, the available quality proxies and the strict state-wide regulation of childcare facilities suggest no changes in the quality of public childcare provided.

In addition, childcare fees also remain stable after the new policy is introduced. The 2006 law fixed childcare fees in all public facilities at the level of 2005 for two consecutive years (in 2006 and 2007). And even when price changes are observed after 2007, prices go up in some areas and down in others (Jugendämter (2009)).<sup>13</sup> Childcare fees apply to all parents of children in public daycare. Fees are typically set by the provider and hence, vary across counties and even across facilities within counties. Childcare fees mostly vary with family income and the number of preschool children in the household: Low-income households pay no fees, while higher-income household may pay up to 260 euros per

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<sup>11</sup>Attendance rates of one-year-old actually increase from 30% in 2006 to 39% in 2007 to 2009; attendance rates for three-year-old children remain quite stable at 94% in 2006 and 95% in 2007-2009.

<sup>12</sup>There were 8,386 childminders (measured in full-time equivalent) in 2006, 8,177 in 2007, 8,321 in 2008 and 8,764 in 2009. The number of children per childminder stays constant at 10 children between ages two and three over the same period.

<sup>13</sup>While there are state-level guidelines for setting childcare fees in Thuringia, these guidelines specify fee structures but not mandatory fees. The maximum monthly fee was reduced in Jena, for example, from 260 euros in 2006 to 190 euros in 2008. In the county of Nordhausen, in contrast, childcare fees increased from an average of 75.79 euros in 2005 to 86.86 euros in 2008. A more detailed overview on fee structures can be found in Sass (2010).

month and child.<sup>14</sup> Generally, childcare fees contribute only a small share (overall about 18%) to the running costs of a facility. Most of the costs are borne by the local or state government. Furthermore, childcare fees respond little to demand conditions since the vast majority of childcare facilities are non-profit organizations (Thüringer Ministerium für Soziales, Familie und Gesundheit (2009)).

Finally, no further changes in the legislation or regulation of publicly subsidized childcare facilities took place in Thuringia between 2006 and 2007. The only other change that the new family policy of 2006 introduced was that all two-year-old children in Thuringia are now guaranteed a slot in a publicly subsidized childcare facility. Yet, this guarantee has little consequences in practice because, as documented above, there is an excess supply of childcare slots in each county of Thuringia. In sum, the available evidence does not suggest that the new policy has strong effects on the supply side and justifies our focus on the demand side: the eligible families and their children.

## 4 Data and Empirical Strategy

### 4.1 German Socio-Economic Panel

To analyze the effect of the new policy on childcare choices and children, we use data from the German Socio-Economic Panel (GSOEP). The annual panel surveys around 12,000 households about their childcare choices, labor supply, household income and the demographic structure of households. We restrict the analysis to the roughly 3,000 households from East Germany (without East Berlin) since employment opportunities, income levels and childcare provisions differ substantially between East and West Germany.<sup>15</sup>

To focus on the years around the policy change, we further restrict the data to the period from 2000 to 2009. We include in our analysis all families in East Germany with

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<sup>14</sup>In Erfurt, for example, parents with monthly household income of 3,050 euros or more pay 195 euros per month for their child since 2008. In Eisenach, families with monthly household income above 2,500 euros pay 165 euros per month and child. In addition, childcare fees may take into account the number of children a family has in public childcare (childcare fees are typically lower for the second-born child).

<sup>15</sup>For example, female labor supply rates and childcare utilization for children under the age of three are substantially higher in East than in West Germany. We also exclude East Berlin because labor supply and childcare provisions in the capital (combining East and West Berlin) are likely different from the rest of East Germany. In addition, our second data source (the Micro Census) does not distinguish between East and West Berlin. We therefore drop households from East Berlin to keep our sample definition consistent across the two data sources.

at least one 1 or 2 years-old child.<sup>16</sup> Below, we also investigate potential spillover effects of the new policy on older and younger siblings in East German households with a 1-2 years-old child.

In the GSOEP, parents report whether their children attend public daycare, whether people from outside the household (e.g. relatives, friends, neighbors or a childminder) care for the child or whether childcare is exclusively provided in the home by a member of the household (like parents, grandparents or older siblings) instead. Based on this information, we code a multinomial variable indicating whether a household uses public daycare, any informal care arrangement or childcare at home.<sup>17</sup> We further know whether the responsible parent participates in the labor market or not.<sup>18</sup>

To analyze the effects on child outcomes, we make use of supplementary questions to mothers with newborn children. Since 2003, the questionnaire asks mothers with children born 2003 or later to assess the health as well as her child’s cognitive and non-cognitive skills. Specifically, the mother is asked to assess her child’s motor skills, language ability, social skills and skills in daily activities based on the (adapted) Vineland Social Maturity Scale. Each of the four categories (social, motor, language skills and skills in daily activities) contains five questions covering different aspects of the skill. For each question, the mother states whether the child is able, not able or only partially able to perform a particular task (for example, forming a sentence with multiple words or drawing recognizable figures). Research has shown that maternal assessments yield reliable indicators of a child’s abilities and are often more reliable than formal psychological tests, especially when the child is very young (Schmiade et al. (2011)). Rather than using all 20 items

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<sup>16</sup>Including families with at least one child eligible in the current or coming year, we identify the direct effect of the policy (for two-year-olds) as well as anticipatory changes in childcare (for one-year-olds). Our results are similar if we restrict our sample to eligible two-year-old children though we have a smaller number of observations available in the GSOEP.

<sup>17</sup>Alternatively, we also code binary indicators for the childcare choices in each household. The first variable indicates if the child attends a public childcare facility (and is zero if the child does not attend any public childcare facility). The second indicator is equal to one if childcare is provided by relatives outside the household, friends, neighbors, a nanny or paid childminder. The variable is equal to zero if no such care arrangements are used. We further create two separate variables to distinguish whether the new policy shifts demand for private informal care (relatives, friends or neighbors) rather than paid informal care (by nannies or childminders). The final indicator is equal to one if the child is cared for exclusively in the home. The dependent variable is equal to zero if the household uses a public childcare facility or relies on other forms of non-parental childcare.

<sup>18</sup>The responsible parent is identified as the mother (using a unique identifier in the data), the father in case the mother is absent or another female adult in the household (the grandmother, for example) in case both parents are absent from the household. In 99% of the cases, the responsible parent is the mother or another female adult.

(which are described in more detail in the appendix), we construct a score for each category (language, motor skills etc.) as well as a total score across all categories. In each category, we calculate the unweighted sum of the responses to the individual items. A larger score implies that a child is better able to perform the specific set of tasks.

We describe the treatment variables characterizing the new policy in the empirical strategy section below. To control for child, parent and household characteristics, we also add the age and sex of each child, the demographic structure of the household (household size, number of adults and whether there is an infant (under age 1) living in the household) and characteristics of the responsible parent (age, gender, education, marital status, whether it is a single parent household and whether the parent has foreign citizenship). Table A1 shows descriptive statistics for our variables separately for children in the treatment state (Thuringia) and the rest of East Germany.<sup>19</sup>

## 4.2 German Micro Census

To study labor supply responses, we employ the large samples of the German Micro Census. The Micro Census is an annual cross-sectional survey of a random 1% sample of the population covering about 800,000 individuals each year. The survey asks detailed questions about labor supply and household demographics. As in the GSOEP, we restrict the analysis to households living in East Germany and to families with at least one two-year-old child in the household.

The labor force participation variable is coded as one if a person works full- or part-time, is employed in a job for less than 400 Euros per month, works in a family business or is temporarily employed. A person does not participate in the labor market if she is unemployed, out of the labor force or on parental leave.

Control variables are the age, gender, education, marital status and citizenship of the mother. We further control for the number of children under the age of one in the household since their presence has a strong influence on female labor supply. Table A2 in the appendix shows descriptive statistics for the Micro Census separately for Thuringia and the rest of East Germany.<sup>20</sup>

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<sup>19</sup>The data appendix A.1 provides a more detailed description of our sample and the definition of all variables used in the empirical analysis.

<sup>20</sup>Further details on the construction of the sample and individual variables can be found in data appendix A.2.

### 4.3 Empirical Strategy

We estimate difference-in-difference model comparing childcare and labor supply choices of families with 1-2 years-old children in Thuringia to the rest of East Germany before and after the policy change. The pre-policy period covers the years up to 2005 and the first six months of 2006. The post-policy period spans the time since July, 1 of 2006. More specifically, we run the following model for families in East Germany:

$$Y_{ist} = \alpha_s + \delta_t + \beta * Treatment_{ist} + \lambda' X_{ist} + \varepsilon_{ist} \quad (1)$$

where  $i$  represents the individual child (for childcare and children skills) or parent (for labor supply) in eligible families,  $s$  the state of residence and  $t$  the year.  $Y_{ist}$  denotes labor force participation, child skills (motor skills, language skills, social skills and skills in daily activities) and other outcomes in households with eligible children. For childcare choices, we estimate multinomial logit models whether a household uses public daycare, informal care or exclusive childcare at home (alternatively, we report linear difference-in-difference estimates in the appendix).

The treatment variable  $Treatment_{ist}$  is defined as an interaction effect between an indicator for the post-policy period (which is zero before July 1, 2006 and one thereafter) and a dummy variable if households with a 1-2 years-old child reside in Thuringia (which is zero for households with small children in the other East German states Brandenburg, Mecklenburg-West Pomerania, Saxony and Saxony-Anhalt).

Alternatively, we use the actual subsidy amount for which the household is eligible to define the treatment variable. The second treatment variable is then an interaction effect between the post-policy period and the actual subsidy amount for an eligible household in Thuringia (divided by 100). The subsidy is equal to 150 euros if the eligible child is the first-born in the family, 200 euros for the second-born, 250 euros for the third-born, and 300 euros for the fourth- or higher-order child in the household. The treatment variable is zero for households in the pre-policy period and all households in the other East German states with at least one 1-2 years-old child.<sup>21</sup>

All estimations include state ( $\alpha_s$ ) and year ( $\delta_t$ ) fixed effects as well as child, parent and

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<sup>21</sup>We show in appendix table A5 that using the subsidy as a share of household income (in the current year) as treatment variable in the post-policy period yields similar results to the ones reported in the main tables.



household characteristics  $X_{ist}$ . To control differences in state labor markets, we further include the current unemployment rate and the GDP growth rate in each state as well as both variables squared. We also estimate variants of equation (1) with state-specific linear trends; and we study the dynamics of labor supply and childcare responses by including more flexible interactions between eligibility and dummy variables for the pre-policy period.

The effect of the home care subsidy in equation (1) is then identified from changes in the behavior of parents with eligible children in Thuringia relative to the choices of parents with children of the same age in other East German states after the subsidy is introduced. A potential disadvantage of our identification strategy is that shocks that are specific to Thuringia and coincide with the new policy may bias our estimates even after controlling flexibly for labor market conditions and state-specific trends.

We attempt to address this concern in a number of ways. First, we test for state-specific level differences and trends prior to the policy but fail to find statistically significant differences between treatment and control states.

Second, we use the group of slightly older children (three and four years-old) in a triple difference estimator to purge our estimates from any state-specific shocks that are common across the group of preschool children (children aged one to four). The results are very similar, and even somewhat stronger, to our baseline estimates. Finally, we augment equation (1) to account for shifts in political preferences, state elections and a federal reform of parental benefits in 2007 but find results very close to our baseline. These specification checks are presented after our main results.

Another concern with our difference-in-difference analysis is the correct computation of standard errors. In the baseline, we report standard errors clustered at the state level to account for within-state dependence. Since we only have one treatment state, our standard errors might however, be biased. In the robustness section below, we report a number of alternative estimators for the variance-covariance matrix suggesting that our inference remains valid.

## 5 Empirical Results

### 5.1 Childcare and Female Labor Supply

We first analyze the effect of the new subsidy on childcare choices using multinomial logit models.<sup>22</sup> The top panel of table 2 shows differences in predicted outcomes when the treatment is turned on or off. The omitted base outcome is public daycare.

The first two columns show the results for the eligibility indicator interacted with a post-policy dummy. Hence, coefficients represent percent change in the probability of using the specified childcare mode. The third and fourth columns show results with the actual subsidy amount received (divided by 100) interacted with a post-policy dummy. The coefficients can thus be interpreted as percent changes for an additional 100 euros of subsidy payment. The first specification includes characteristics of the child and responsible parent, controls for unemployment and GDP growth rates as well as state and year fixed effects; even columns add state linear trends.

We find a strong decline in informal care arrangements. Parents reduce the demand for informal care by about 25 percentage points. This suggests that informal care is largely a complement for public daycare possibly because parents combine formal and informal childcare to cover maternal working hours.<sup>23</sup> Based on the actual subsidy amount and the estimates in Table A3 (column (4)), the implied (compensated) cross-price elasticity for informal care is with -0.31 quite inelastic.<sup>24</sup>

Our informal care variable subsumes very different childcare providers - neighbors, friends and paid nannies - into a single measure. Separate specifications for informal childcare (by friends, neighbors or other family members) and more formal (and typically paid) childcare (by childminders or nannies) are shown in table A3 (columns (5) and (6) and (7) and (8), respectively). It turns out that the whole effect is driven by a decline in informal care by relatives, neighbors and friends. In contrast, we find no economically or statistically significant change in the utilization of paid childminders or nannies.

As expected by theory, public daycare declines by about 11 percentage points. The

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<sup>22</sup>Using separate linear probability or probit models of each childcare mode instead yields very similar results (see table A3 and table A5 in the appendix).

<sup>23</sup>An alternative interpretation would be that informal care is a complement but an inferior good whose demand declines with rising income. This seems less plausible though.

<sup>24</sup>The mean actual subsidy in our sample is 1.96 (equivalent to a subsidy payment of 196 euros). The share of households using some kind of informal care in the data is 0.39. Hence, the cross-price elasticity is:  $-0.061 * 1.96 / 0.39 = -0.31$ .

implied compensated own-price elasticity of demand is around  $-0.3$ .<sup>25</sup> While the coefficients in columns (1) and (2) in table A3 are all negative as expected, only two are significant at the 5% level.

The inelastic response might underestimate the full response because we estimate the price effect on the propensity to attend public daycare (i.e. the extensive margin). Hence, we ignore any adjustments on the intensive margin, the number of hours children attend formal daycare. The bottom panel of Table 2 shows that both full-time and part-time attendance in public daycare decline though the effects are no longer statistically significant when we include state-specific trends.

Mirroring the decline of public and other non-parental childcare use, we find a strong increase in childcare provided at home. The linear difference-in-difference estimates (from table A3) suggest an increase by 9.1 percentage points implying that the share of parents who rely exclusively on childcare within the household increases by a sizeable 20%.<sup>26</sup> This positive effect for home care is the combination of an income effect (among parents not using public daycare) and a substitution effect (from parents switching from public daycare to homecare in response to the subsidy). Overall, the implied effects are very similar whether we define the treatment based on the indicator or the actual subsidy payment.

We next turn to the question how female labor supply responds to the new policy. Traditionally, the link between maternal employment and the use of formal daycare is not very strong in Germany. In West Germany, for example, about 30% of mothers whose children attend public daycare are not employed (Wrohlich (2011)). Table 3 shows linear difference-in-difference estimates of equation (1) where the dependent variable is now labor force participation of the mother (in the Micro Census) or of the responsible parent, typically the mother (in the GSOEP). We find that labor force participation rates decline with the introduction of the new policy by a sizeable 11.2 percentage points or 20%.<sup>27</sup> The implied labor supply elasticity at the extensive margin is inelastic (ranging from  $-0.1$  to  $-0.3$ ).<sup>28</sup>

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<sup>25</sup>The effect on public daycare in table A3 is  $-0.063$ . The average attendance rate of 1-2 years-old in the GSOEP is 0.308. Hence,  $-0.109/0.308 = -0.35$  for the subsidy dummy and  $-0.039 * 1.96/0.308 = -0.25$ .

<sup>26</sup>In our sample, 47.5 percent of households rely exclusively on care by parents or other household members. Thus,  $0.093/0.475 = 0.196$  with state trends.

<sup>27</sup>In the Micro Census sample, 55.8% of women with eligible two-year-old children work. Thus,  $-0.112/0.558 = -0.201$  with state trends.

<sup>28</sup>Based on the Micro Census and estimates using the subsidy amount, we get  $-0.028 * 1.96/0.558 =$

Yet, despite an inelastic labor supply, the subsidy is substantial enough to trigger sizeable adjustments in employment. Does the decline in employment also mean that parents spend more time with their children? The available data in the GSOEP seem to suggest that. One question asks adults to report the number of hours they spend on childcare (though we do not know whether the additional time is spent with the eligible child). The reform seems to have increased the time spent with children by about 1-1.5 hours per day though the estimates are too noisy to reach statistical significance at conventional levels (not reported).

## 5.2 Heterogeneity of Effects in the Population

So far, we have analyzed the average effect in eligible families but these estimates could mask substantial heterogeneity in the population. In particular, we expect the responses be stronger for economically disadvantaged families like low-skilled and single parents as well as low-income households because the subsidy contributes a large share to their disposable household income. The heterogeneity of effects is also important for policymakers who might be concerned about the economic self-sufficiency of vulnerable families and the human capital of the next generation. We thus estimate variants of equation (1) where we specify our treatment variable as a triple interaction effect. The treatment is now the interaction between an eligibility dummy (or the subsidy amount), a post-policy dummy and an indicator for the respective population subgroup: single mothers, low educated mothers, households in the bottom quintile of the (East German) income distribution and foreign households.

Table 4 shows results for childcare choices and female labor supply among single mothers, low-educated parents and low-income households.<sup>29</sup> The first specifications (in odd columns) report the coefficient on the treatment dummy. The second specifications (in even columns) show results for the subsidy amount divided by 100. As before, the first set of coefficients can be interpreted as percentage changes and the second set as the effect of an additional subsidy of 100 euros. All our specifications in table 4 include state-specific trends.

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–0.098. Recall that the elasticity combines the price effect (for parents using daycare) and the income effect (for all parents).

<sup>29</sup>Unfortunately, the small population of foreigners in East Germany (only about 3 percent in our data) prevent us from a more detailed analysis of childcare choices among foreigners in the GSOEP data.

In the top panel, marginal effects from a multinomial logit model report the effect on childcare choices; the bottom panel reports linear difference-in-difference estimates for female labor force participation. We find that all subgroups (low-skilled and single parents and low-income households) substitute away from public daycare (see also table A4 in the appendix) and rely more on home care and informal childcare instead. The adjustments are especially large among single and low-skilled parents.

The increase in informal care is the opposite of the response in the whole sample (see table 2) which suggests two possible interpretations: either, informal care and public daycare are substitutes among low-skilled and single parents as well as low-income households; or, they are complements (as in the full sample), but more than compensated by a large positive income effect. Given that the subsidy contributes a large share of disposable income for low-skilled parents and low-income households, the latter interpretation seems more likely.

Turning to labor supply, we can include the sample of foreign households (where at least one adult is a citizen from outside the European Union) exploiting the larger sample size in the Micro Census. The bottom panel shows that all groups reduce their labor force participation. The decline is especially pronounced for low-skilled parents and low-income households.<sup>30</sup>

### 5.3 Male Labor Supply, Spillovers and Child Outcomes

We next study whether the new policy affects other members of the family: fathers, older children and potential younger siblings in eligible households. Table 5 reports the results from estimating equation (1) where the dependent variables are now male labor supply and labor force participation of the mother in the years after the subsidy is received. Furthermore, we study the probability of having an additional child and whether an older sibling attends public daycare. In all cases, the sample is restricted to families with at least one 1-2 years-old child. As before, we report results for the treatment dummy in the top panel and for the actual subsidy payment (divided by 100) in the bottom panel (each interacted with a post-policy indicator).

For male labor supply, we find a slight reduction in male participation rates (by about

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<sup>30</sup>The data on time spent on childcare (not reported here) seem to suggest that single parents and low-skilled parents use the additional time for childcare; mothers from low-income households seem to enjoy more leisure instead.

3 percentage points) but a small increase in hours worked (by about 3%) among working men in eligible families.

We next investigate whether the new policy reduced female labor supply permanently. Mothers might delay their labor market re-entry beyond the year when their child receives the subsidy. Using the panel nature of the GSOEP, we re-estimate equation (1) where the dependent variable is labor force participation in  $t+1$  or  $t+2$  for women with eligible children in year  $t$ . The evidence for delayed labor market re-entry is not very strong; labor force participation rates of mothers with eligible children are still lower one year later (though only statistically significant at the 10% level). Two years after the year of eligibility, labor force participation rates between treatment and control groups are no longer statistically different.

Turning to fertility decisions, we find no (economically or statistically) significant effect of the subsidy on the probability of having a newborn in the year of eligibility or the year after. This result suggests that fertility does not respond much to the additional income from the current subsidy.

The subsidy might have spillover effects on childcare choices for older children. Parents who care for their two-year-old at home might also reduce childcare outside the home for other pre-school children. To investigate this possibility, we define an indicator whether a three or four years-old living in a household with a 1-2 years-old sibling attends public daycare. The final column in table 5 shows that there are substantial spillover effects on older children: parental demand for public childcare declines by 30 percentage points, a decline of 34%.<sup>31</sup>

Taken together, these results imply substantial adjustments to the new policy in terms of labor supply and childcare for the full sample as well as specific subgroups. The welfare effects of these adjustments are not clear-cut as they depend, among other things, on the (relative) benefits of alternative childcare arrangements for child development. For example, we observe a shift from public daycare and informal care to home care in the whole sample. This shift might be beneficial for the average child if home care (by the parents) is of higher quality than public or informal childcare. It could be worse for a child's development if home care is of low quality, for example, because the child is left

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<sup>31</sup>On average, public childcare attendance of 3-4 years-old children is 87.3% in East Germany. Hence,  $-0.299/0.873 = -0.343$ .

alone in the home.

We can get some suggestive evidence from the mother’s assessment of the motor skills, language ability, social skills and skills in daily activities of her child. For each category, we construct a score (from the unweighted sum of the responses to the 5 individual questions in each category). Larger scores imply that the child is better able to perform the specific set of tasks. The score in each subcategory ranges from 0 (the mother answers no for each item) to 10 (mother reports the ability for each of the 5 items). We also calculate a total score as the unweighted sum across all tasks with the maximum score being 40. Table 6 reports variants of equation (1) where the scores for the children are now the dependent variables. As is many other child development studies (see Almond and Currie (2011), for a survey), the sample size is rather small; the results thus need to be interpreted with caution. The first specification includes all the controls from previous tables; the second specification adds state-specific trends. We further report in table 6 the mean score in the whole sample and the percentage change with the new policy. The results for the whole sample do not suggest strong effects: some scores (like social skills) improve, though others (like motor skills) get worse. The size of the effects are however, small and none of them (with one exception) reaches statistical significance.

However, we find negative effects of the new policy for girls. Motor and social skills as well as the ability to perform certain daily activities drop substantially for girls. The only skill that improves somewhat is language. These results suggest that the new policy could be detrimental to gender equality.<sup>32</sup> This evidence fits well into the literature reporting large benefits of formal daycare, especially for girls (see Havnes and Mogstad (2011) for recent evidence and Almond and Currie (2011) for a comprehensive survey). Unfortunately, the small GSOEP sample inhibits an investigation of how persistent these effects are. Yet, recent research suggests that the benefits from public daycare are large and highly persistent over time (Havnes and Mogstad (2011); Heckman et al. (2006)).

What are the likely effects for children from vulnerable backgrounds? The existing literature seems to come to the conclusion that high-quality public daycare benefits children, especially from low-income and less-educated families (see Felfe and Lalive (2010)

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<sup>32</sup>An alternative interpretation of these findings is that a mother who spends more time with her children reports differently on the abilities of her child, for example, because she has more time to observe her child. A valid concern in principle, it does not explain why this change in maternal perspective would affect girls more than boys.

for Germany, Havnes and Mogstad (2011) for Norway and Almond and Currie (2011) for a general survey and discussion of Head Start and the Perry Preschool Experiments, in particular). The observed shift away from public daycare in vulnerable families would then imply even more detrimental effects for children from the least favorable family backgrounds. Thus, the policy might be most harmful for children who are likely to fall behind in their development - a situation which is very difficult to compensate later in life (Heckman (2006); or Almond and Currie (2011)).

## 6 Robustness Analysis

An important concern of our identification strategy is that differential trends or other changes that precede or coincide with the new family policy in Thuringia might bias our results. This section provides a range of specification tests that investigate, but fail to corroborate such concerns.

We first test for prior differences in childcare or labor supply choices in Thuringia. Specifically, we add dummy variables for the two years and four years prior to the reform to our specification. For all outcome variables, prior differences in Thuringia are economically small and never statistically significant from zero (as shown in table 7). We next include a differential prior trend in Thuringia for the years immediately preceding the policy change (2002-2005). Again, we find no economically or statistically meaningful effect. Prior differences or trends can thus not explain our findings.

An alternative strategy to address the concern of state-specific trends is to find a suitable control group within each state. In our case, we can use households with slightly older children (3-4 years-old) in East Germany to eliminate state-specific shocks.<sup>33</sup> We thus compare changes in childcare choices (and labor supply) between younger and older children in Thuringia before and after the policy relative to the rest of East Germany. Our triple differences strategy eliminates all state-specific trends or other time-varying shocks that are the same for preschool children (between the ages one to four). The triple differences estimates in table 8 are even somewhat stronger than our baseline results. As before, we find a shift away from informal childcare to parental childcare and a decline

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<sup>33</sup>Strictly speaking, the older age group is assumed to be unaffected by the policy reform. In table 6, we reported that public childcare attendance dropped for 3-4 years-old children with 1-2 years-old siblings in the household. This negative effect implies that our triple differences strategy actually underestimates the true effect of the reform on public childcare for eligible 1-2 years-olds.



in labor force participation.

Even in the absence of differential prior trends, other confounding changes might bias our results. In our period under study, the federal government introduced a new parental leave program (*Elterngeld*) with generous payments to parents of newborn children born on or after January 1, 2007. For up to 12 months (up to 14 months if the father takes time off work for at least 2 months as well), the parent receives 67% of previous net earnings up to a maximum of 1800 euros. If this new federal policy affects all East German parents in a similar way, it will be absorbed by year fixed effects. To check for differential responses of families in the treatment state Thuringia, we add an indicator for the introduction of the federal parental subsidy to our specification. Appendix table A5 shows that adding the federal policy has little effect on our estimates.<sup>34</sup>

Another concern could be that some omitted factor may be responsible both for the reform and any observed changes in childcare and labor supply. One argument might be that the electorate in Thuringia has become more socially conservative over time. Voters would then support a new family policy and simultaneously reduce the demand for public childcare (in favor of parental care). To control for such simultaneous shifts in political preferences, we include an indicator for the state election in Thuringia that occurred in June of 2004 (roughly two years prior to the reform). We find similar results though one coefficient loses statistical significance. In addition, we control directly for the political preferences by including a measure of the party supported by the parent (only available in the GSOEP). We again fail to find any independent effect of party preferences on childcare choices.

We also assess the robustness of our results to alternative functional forms and different sample definitions. Instead of the actual subsidy amount, households might base their decisions on the relative size of the subsidy. Using the interaction between the post-policy period and the subsidy divided by current household income yields similar results to the baseline. Next, we investigate whether our results are sensitive to functional form assumptions. For all binary dependent variables, we estimate probit models. The marginal effects show very similar results to the baseline. The final specification of appendix table A5 restricts the GSOEP sample to families who have at least one eligible

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<sup>34</sup>Saxony, a neighboring state, introduced a subsidy similar to the one in Thuringia in 2007 for 1-2 years-old children. To avoid confounding effects, appendix table A5 shows estimates without Saxony in the control group. The results are again similar to the baseline.

two-year-old child. The results are very similar to the larger sample shown in table 2.<sup>35</sup>

Finally, our estimation strategy relies on policy changes in a single state which raises the question of how to compute correct standard errors. Our main results are based on standard errors that are clustered at the state level. This approach does however, not account for the small number of clusters. Table A6 shows alternative approaches to calculate standard errors in that case. We rerun variants of equation (1) with standard errors clustered at the state-year level. Further, we include separate state clusters for the pre- and post-policy period to allow for breaks in the temporal dependence of the error term over time. We further implement an estimator to allow for temporal and within-state dependence of the error term (Bester et al. (2010)). The standard errors in table A6 are somewhat larger than in our baseline but do not invalidate our inference. Alternatively, one can use a wild bootstrap procedure to estimate standard errors with state-dependent errors and a small number of clusters (Miller et al. (2008)). This procedure generates p values similar to the ones shown in table A6. Overall, our alternative calculations of the standard errors do not change our qualitative conclusions. In sum, the article’s main findings are, with few exceptions, robust across our additional specification checks.

## 7 Conclusion

This article studies the impact of childcare prices on childcare utilization, family labor supply and child well-being. Our empirical analysis is based on a reform of family policy in the East German state of Thuringia. The reform’s specific features enable us to estimate the compensated own-price effect and cross-price effects of childcare choices as well as the elasticity of labor supply with respect to childcare costs.

We show that raising prices for public childcare reduces the demand for public daycare in the general population. Declines in public daycare attendance are especially dramatic for children from low-skilled, single parent and low-income families. For cognitive and non-cognitive skills, we find that the new policy in Thuringia has substantially negative effects for girls. To the extent that children from disadvantaged family backgrounds

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<sup>35</sup>One might also worry about selective migration of eligible families to Thuringia in order to take advantage of the new subsidy. In that case, our estimates would not represent behavioral changes in eligible households but rather a change in the mix of eligible households living in Thuringia. However, migration both to and out of Thuringia especially for families with children under the age of 5 is extremely low and does not increase or decrease after the introduction of the new family policy.

benefit the most from attending public daycare, these behavioral responses should be a concern to policy-makers.

Further, we find substantial substitution effects away from informal care by relatives, friends or neighbors to childcare in the home by parents or other household members. Low-skilled and single parents and low-income households, in contrast, actually rely more on informal childcare after the reform. If informal care arrangements are less beneficial for children than parental childcare, the policy could have the most negative effects for children from the most disadvantaged family backgrounds.

We document spillover effects for older siblings of eligible children. Attendance rates of 3-4 years-old siblings decline by a substantial 30%. These results suggest that we cannot limit the effects of the new policy to eligible children alone. Instead, we need to take into account the responses of all family members in the household. In contrast, we find no effect on fertility in eligible households. Fertility seems therefore not responsive to these smaller income subsidies which is important for policy-makers because fertility rates have fallen below replacement levels in Germany and in several other European countries.

All parents with eligible children reduce their labor supply and the decline is especially pronounced among low-skilled parents and low-income households. The policy's effect on labor force participation seems to be temporary however and to disappear at most two years after receiving the subsidy.

Our findings have important lessons for policy makers. As mentioned in the introduction, the federal government plans to introduce a subsidy for one-year-old children in all German states in 2013. The planned subsidy is very similar to the one implemented in Thuringia which makes our policy reform a good testing ground.<sup>36</sup> We would expect similar responses in all other East German states where public daycare is widely available. The situation is somewhat different in West Germany where public daycare is rationed (Wrohlich (2006)) and female labor force participation is lower than in East Germany (Hanel and Riphahn (2011)). In 2008, the federal government has initiated a large expansion of public childcare in West Germany. To the extent that rationing will

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<sup>36</sup>The federal subsidy will be available for one-year-old children, while the subsidy in Thuringia was (until August of 2010) available for two-year-old children. The effect on one-year-old children might be stronger or weaker than for two-year-olds depending on the elasticity of public childcare and female labor supply to childcare costs in the respective age groups.

be eliminated by 2013, the experience from Thuringia is also applicable to West German families. However, we expect responses in West Germany to be somewhat smaller because incomes and childcare fees are higher than in East Germany. If rationing still persists in West Germany after 2013, the expected response in childcare might be smaller because of an excess demand for public daycare.

Even beyond the particular German setting, our analysis provides valuable insights into the relationship between childcare, family labor supply and child outcomes. First, our results suggest that public daycare and informal care are complements among the average family with small children (and possibly substitutes for low-skilled and single parents and low-income households). In contrast, public daycare and exclusive care by the parents or other household members are substitutes. Second, our evidence suggests that childcare prices alone (net of income effects) are an important determinant of female labor supply in advanced economies. Third, we provide evidence that family policies do not only affect the eligible child but have spillover effects on other children in the household.

Finally, we can use our estimates to calculate the fiscal costs associated with the policy. For our calculation, we focus on the cost side and abstract from the revenue effects associated with lower female labor supply (hence, our estimates will underestimate the true cost of the subsidy). After the reform, the government pays a windfall subsidy to all families even those not using public childcare. The cohort of two-year-old children in Thuringia has a size of about 12,700 of which 25% do not attend public daycare. The average subsidy amount in our sample is 196 euros (since the subsidy increases in the birth order of the eligible child). As a consequence, the new policy requires additional expenditures of 622,300 euros ( $0.25 * 12,700 * 196$  euros) for the state government.

At the same time, the government also saves money because some families stop sending their child to daycare. Running costs in a public daycare facility are about 440 euros per month per slot of which parental fees cover about 80 euros (Thüringer Ministerium für Soziales, Familie und Gesundheit (2009)). The remaining costs of 360 euros are mostly borne by the government. According to our estimates, the decline in public childcare is at most -11% which implies about 1,000 fewer children in public daycare. Hence, the government saves at most 377,190 ( $0.11 * 9,525 * 360$  euros) in the short run. Taken together, the new policy implies additional costs of 245,110 euros per year for the state

government of Thuringia.<sup>37</sup>

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<sup>37</sup>Additional savings might be incurred because we did not include investments costs in daycare facilities in the calculation; furthermore, the government could save additional funds because it now subsidizes the number of utilized childcare spaces (rather than the number of spaces provided). Given an average excess capacity of 14% on average, these additional savings could be substantial.

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## **A Data Appendix**

### **A.1 German Socio-Economic Panel (2000-2009)**

The German-Socio Economic Panel is a household survey that has been conducted annually since 1984. Our basic sample consists of all private households in East Germany that have at least one valid observation. We exclude all households from the capital Berlin because of its special status and also to be consistent with the Micro Census. To focus on the period around the policy change in July of 2006, we restrict the data to the survey years from 2000 to 2009. Our broader sample consists of all households with at least one child under the age of six; for our main analysis, we further restrict the sample to families with (at least one) 1-2 years-old child.



*Childcare variables:* Our main dependent variables are from the longitudinal data on children (kidl.dta). In addition to gender and age, the survey asks what type of educational institution (school, kindergarten or other daycare facility) each child under the age of 16 currently attends (or if the child does not attend any). Based on this information, we code whether a child attends a public childcare facility or not. We denote all childcare facilities that are publicly subsidized as public facilities; publicly subsidized childcare facilities may in fact be provided by the local community, a church, company or other non-profit organizations.

If the child attends an educational institution, the parents are asked whether the child attends only in the morning, only in the afternoon or the whole day. Based on this information, we define whether a child attends childcare full-time or not. Note that the variable is missing for children who do not attend any public daycare or other educational institutions.

The survey also inquires about regular childcare provided by persons outside the household. These external providers could be relatives not living in the household, neighbors, friends or a paid childminder. We define an indicator variable equal to one if any type of informal childcare is used. The variable is coded as zero if no informal childcare is used. In some specifications, we also distinguish whether the care is provided informally by a relative, friend or neighbor or whether it is purchased on the informal market from a childminder or nanny. Information about these informal sources of childcare is available in each year except 2003.

Finally, we define the variable home care as equal to one if no public or informal childcare outside the household is reported. Hence, home care does not necessarily imply that all childcare is provided by the parents because it includes childcare by people living in the same household (like grandparents, au-pairs or older siblings, for example). The variable is equal to zero if the child attends public childcare or is cared for by other people outside the household. In the empirical analysis, we will control for household size and number of adults in the household to account for differential access to informal childcare provided by additional household members.

In our main specification, we coded childcare as exclusive categories. However, some children attend both informal and public childcare. The results are qualitatively similar if we use separate indicators for each childcare mode and thus allow for multiple childcare modes used.

The wording of the childcare questions has changed slightly over time. Until 2004, the survey asked whether the child currently attends a childcare facility, is cared for by a childminder (“Tagesmutter”) or attends primary school. Later in the survey, the parents are then asked about childcare provided in addition to the ones mentioned. Since 2005, the survey only asks whether the child currently attends a childcare facility or primary school and about any additional sources of childcare provision (friends, neighbors, relatives or additional paid care). To the extent that these changes have an impact on parents’ responses, these are absorbed in our analysis by year fixed effects.

*Child outcomes:* Since 2003, mothers of newborn children (born in 2002 or later) answer an supplementary questionnaire about their pregnancy, their personal situation and the health, cognitive and non-cognitive skills of the newborn child (BIOAGE01). The children and their mothers are then followed over time. The data on child outcomes for 1-2 years-old are available since 2004/2005 (in BIOAGE01 and BIOAGE03). We use the questions on social, language and motor skills and skills for daily life to assess the short-run effects of the new policy on outcomes for eligible 1-2 years-olds. The questionnaire

asks: "For parents it is always a big event when their child learns something new. Please tell us what those new things are in the case of your child". Then, a list of skills is presented. The skills are a version of the Vineland Social Maturity Scale adapted to the constraints of a general household survey. Social skills cover the following tasks: child calls familiar people by name; child plays games with other children; child participates in role playing games; child shows liking for certain playmates; child calls his/her own feelings by name. For motor skills, the set of skills are: child walks down the stairs forwards; child uses door handle to open doors; child climbs jungle gyms and other high playground equipment; child uses scissors to cut paper; child draws recognizable figures; For language skills, we have: child understands brief instructions; child forms sentences with at least two words; child speaks in full sentences of at least four words; child listens attentively to a story for at least 5 minutes; child can relate simple messages. And the set of skills in daily activities is: child eats with spoon without making a mess; child blows nose without assistance; child uses the toilet to do number two; child can put on pants and underpants correctly; child brushes teeth without assistance. For each question, the mother assesses the ability of her child on a 3-point scale: 1=yes, 2=to some extent and 3=no. From the individual items, we construct a score for the four categories by summing over the answers to each item coding as 0 if the child cannot perform the skill, as 1 if the child partially and as 2 if the child fully performs the skill. Each score ranges from a minimum of 0 to 10. We also calculate a total score as the unweighted sum over the four categories; the total score then ranges from 0 to 40. Note that cognitive and emotional skills are only measured at age 5 and 6 and therefore cannot be analyzed here.

*Parental and household variables:* In addition to the child-level information, we use household characteristics like the number and age structure of the children and the number of adults in the household. As a measure of household income, we use monthly disposable household income measured in euros (deflated to 2006 prices). The specific question asks about the total sum of all income sources of the household adjusted for taxes and other contributions ("verfügbares Haushaltseinkommen"). If the answer is missing, the person is asked to estimate the net monthly income of the household. For the analysis on the subsample of low-income households, we include all households in the bottom 20th percentile of the East German income distribution (in the sample with at least one child under the age of 6).

To control for characteristics of the parent (or caretaker), we also code the age, education, marital status and labor supply variables. For marital status, we distinguish three categories: single (never married), married or in a long-term partnership and divorced or widowed. Single parents are identified from variables characterizing the household type (typ1hh, typ2hh).

Educational attainment is defined as the highest educational level achieved. We define a person as low-skilled if she has no vocational training and no high-school degree ("Abitur"). A person is defined as medium-skilled if the highest educational degree is vocational training or a high-school degree ("Abitur"). Finally, the person is high-skilled if she has a tertiary degree from a university or technical college. Further, the household is coded as foreign if at least one responsible parent has a citizenship from a country outside the European Union.

We code labor force participation equal to one if the individual works full- or part-time, is employed marginally ("geringfügig beschäftigt"), is currently in school or vocational training.

To merge the parental information to the child record, we need to define the relevant

caretaker of the child in the household. The survey contains an identifier for the mother of each child; if the identifier and hence mother is missing, we select the father of the child; if both parents are absent in the household, we choose a female adult (presumably a relative or close friend). In our sample, in more than 99% of all cases the responsible parent is the mother or another female adult living in the household.

*Treatment variables:* We define three treatment variables. The first one is a simple indicator variable equal to one if the household resides in Thuringia in the post-policy period and zero if the household resides in another East German state except Berlin (Brandenburg, Mecklenburg-West Pomerania, Saxony or Saxony-Anhalt) or for all households in the pre-policy period.

The second variable exploits the specific rules of the new policy in Thuringia. Specifically, the second treatment variable is equal to 150 euros if the eligible child lives in Thuringia and is the firstborn in the family, 200 euros if the eligible child lives in Thuringia and is the second-born, 250 euros if the eligible child lives in Thuringia and is the third-born, and 300 euros if the eligible child lives in Thuringia and is the fourth or higher-order child in the household. We then rescale the variable by dividing by 100. The second treatment variable is equal to zero for children in the other four East German states. As an additional robustness check, we also define the subsidy as a share of disposable household income.

*Aggregate economic controls:* To control for state-specific labor market shocks, we include the state unemployment rate defined as percentage of registered unemployed people to the total number of employed persons. To control for the broader economic situation in each state, we also include the growth rate in GDP from the national accounts data.

Sample sizes are reported at the bottom of appendix table A2. Once we condition on households with eligible children aged 2 in Thuringia in the years 2000 to June of 2006 (per-policy period) and since July 2006 (post-policy period), the sample size becomes quite small. We therefore run our analysis for two samples: for children aged 2 (currently eligible children) and for children aged 1 and 2 (children eligible in the current and following year). The first category is the actual treatment group in the current year. The analysis for children aged 1 and 2 capture current and anticipated effects on children eligible in the current year and those eligible in the following year respectively. Our results do not depend on which definition of the treatment group is used(see appendix table A3).

## **A.2 German Micro Census (2000-2008)**

The German Micro Census (“Mikrozensus”) is a repeated cross-section of a 1% random sample of the German population. Since 1991, the Micro Census also covers the East German states. We use the scientific-use file which consists of a 70% subsample of the original survey covering about 800,000 individuals per year.

Our sample consists of all households in East Germany with at least one child under the age of six. However, we exclude households from Berlin because of its special status. To focus on the period around the policy change in Thuringia in July of 2006, we restrict our sample to the survey years from 2000 to 2008. As we are interested in labor supply responses, we exclude all parents under 18 years of age, those still in school or parents who have never worked before. Our basic sample consists of mothers with two-year-old children in East Germany. In additional specifications, we consider fathers of two-year-old

children and mothers with 3-4 years-old children as well.

*Labor supply variables:* Our first outcome of interest is the employment status, that is whether the individual is employed or not. Our definition of employment includes persons who work for less than 400 euros per month, work in a family business or work in a job temporarily. A person is not employed in the current year if she is either unemployed or out of the labor force.

The wording of the question on labor force participation has broadened over time. Until 2004, the survey asks whether a person works for pay in the current week (“Waren Sie in der Berichtswoche erwerbs- oder berufstätig?”). Since 2005 the question is whether a person has been working for pay or has been engaged in an income generating activity in the previous week (“Haben Sie in der vergangenen Woche eine bezahlte bzw. eine mit einem Einkommen verbundene Tätigkeit ausgeübt? Dabei ist es egal, welchen zeitlichen Umfang diese hatte.”).

The change in wording matters especially for individuals on parental leave. Until 2004, all parents on parental leave are counted as employed. Since 2005 individuals on parental leave are coded as a separate employment status. In particular, parents on parental leave for up to three months (or with a replacement income of at least 50% since 2007) are counted as employed. Parents on parental leave for more than three months are counted as non-employed. Ideally, these changes in definition should have been implemented in all states in 2005 and hence, would be absorbed by year fixed effects.

However, this was not the case. According to the Federal Statistical Office of Germany (personal communication), many interviewers did not employ the new coding of parental leave (and the distinction between short and long parental leave) in 2005. In some states, interviewers used the old definition in 2005 whereas in others, they used the new definition. To avoid this inconsistency, we report our main results for the subset of years from 2005 to 2008. Further, we code labor force participation as zero for all individuals on parental leave. This recoding should make little difference for male labor supply.

*Parental and household variables:* To control for characteristics of the parent, we include their age, marital status, education and citizenship. Marital status is defined by three dummy variables denoting a single parent, a parent who is married or in a civil partnership, and a parent who is either widowed or divorced.

The educational attainment of the parent is defined as low-skilled if the parent has no vocational degree and at most a lower secondary school degree. The parent is medium-skilled if she has a vocational degree or high school degree (“Abitur”); and she is high-skilled if she has a university or college degree. Finally, we code the citizenship as a binary indicator equal to one if the parent has a citizenship outside the European Union; the variable is zero for German citizens and citizens of the European Union member states.

Household income refers to disposable income (including labor earnings, income from self-employment, rental income, pensions and transfers) of all household members net of all taxes, contributions and transfers and deflated to 2006 prices using the consumer price index. The income variable is recorded in 24 income categories and top-coded at 18,000 euros per month. We use the midpoint of each category to convert household income into a continuous variable. To control for the presence of young children, we further code the number of children aged 0 or 1 in the household.

*Treatment variables:* The variables characterizing the new family policy in Thuringia are defined as in appendix A.1.

*Aggregate economic controls:* The variables controlling for general economic conditions are defined as in appendix A.1.

**Table 1: The Home Care Subsidy in Thuringia since July 1, 2006**

|   | Monthly Amount | Whole Sample | Percent of Monthly Household Income |                |            |
|---|----------------|--------------|-------------------------------------|----------------|------------|
|   |                |              | Low Education                       | Single Parents | Low Income |
| Eligible 2 years-old is 1st child           | € 150          | 7%           | 15%                                 | 11%            | 16%        |
| Eligible 2 years-old is 2nd child           | € 200          | 10%          | 20%                                 | 14%            | 22%        |
| Eligible 2 years-old is 3rd child           | € 250          | 12%          | 24%                                 | 18%            | 27%        |
| Eligible 2 years-old is 4th (or more) child | € 300          | 14%          | 29%                                 | 21%            | 33%        |

*Notes* : The table summarizes the new Betreuungsgeld (home care subsidy) that was introduced in the state of Thuringia on July 1, 2006. The subsidy applies to all children aged 2. If a family does not send an eligible child to a publicly subsidized childcare, the parents receive a monthly subsidy which varies with the birth order. If the family sends the child to a childcare facility, the subsidy payment goes to the childcare facility. The rest of the table shows the subsidy amount as a share of the mean net household income in East Germany for families with children under 3 as reported in the Microcensus (whole sample and different subsamples). The income measure sums over all household members and includes earnings, bonus payments, asset income, child benefit, unemployment and welfare benefits but does not include payroll taxes or income taxes, for example.

**Table 2: Effect of Home Care Subsidy on Childcare Choices**

| Base: Public daycare          | Childcare Mode       |                      |                      |                      |
|-------------------------------|----------------------|----------------------|----------------------|----------------------|
|                               | Treatment Dummy      |                      | Subsidy Amount       |                      |
|                               | (1)                  | (2)                  | (3)                  | (4)                  |
| Informal Childcare            | -0.275***<br>[0.069] | -0.250***<br>[0.072] | -0.140***<br>[0.036] | -0.104***<br>[0.033] |
| Childcare at Home             | 0.269***<br>[0.043]  | 0.122**<br>[0.061]   | 0.137***<br>[0.022]  | 0.044<br>[0.030]     |
| Observations                  | 891                  | 891                  | 891                  | 891                  |
| Log-likelihood                | -758.66              | -752.68              | -759.89              | -753.5               |
| Individual and State Controls | Yes                  | Yes                  | Yes                  | Yes                  |
| State Fixed Effects           | Yes                  | Yes                  | Yes                  | Yes                  |
| Year Fixed Effects            | Yes                  | Yes                  | Yes                  | Yes                  |
| State-specific Trends         | No                   | Yes                  | No                   | Yes                  |

  

| Base: No public daycare       | Time Spent in Public Daycare |                   |                      |                   |
|-------------------------------|------------------------------|-------------------|----------------------|-------------------|
|                               | Treatment Dummy              |                   | Subsidy Amount       |                   |
|                               | (1)                          | (2)               | (3)                  | (4)               |
| Public Daycare Parttime       | -0.019***<br>[0.006]         | -0.004<br>[0.012] | -0.011***<br>[0.003] | -0.001<br>[0.007] |
| Public Daycare Fulltime       | -0.053**<br>[0.026]          | -0.011<br>[0.036] | -0.028**<br>[0.014]  | -0.003<br>[0.019] |
| Observations                  | 1010                         | 1010              | 1010                 | 1010              |
| Log-likelihood                | -579.72                      | -576.89           | -579.76              | -577.57           |
| Individual and State Controls | Yes                          | Yes               | Yes                  | Yes               |
| State Fixed Effects           | Yes                          | Yes               | Yes                  | Yes               |
| Year Fixed Effects            | Yes                          | Yes               | Yes                  | Yes               |
| State-specific Trends         | No                           | Yes               | No                   | Yes               |

*Notes* : The dependent variables are childcare choices of households with children aged 1 and 2 living in East Germany between 2000 and 2009. In the top panel, marginal effects of a multinomial logit model are reported where public daycare is the base outcome. In the bottom panel, marginal effects of an ordered probit model are reported where the base outcome is no public daycare. The treatment dummy (columns (1) and (2)) is the interaction effect of children who live in Thuringia and an indicator for the post-policy period. The treatment (columns (3) and (4)) is the interaction effect between actual subsidy amount for children living in Thuringia (€150 if eligible is firstborn, €200 if secondborn, €250 if thirdborn and €300 if eligible child is 4th or higher-order child) and an indicator for the post-policy period (after July of 2006). All specifications include as controls: age and sex of the child; age, marital status, citizenship and education of the parent, number of children in the household, the unemployment and GDP growth rates as well state and year fixed effects. In even columns, we also include state-specific linear trends. Standard errors are calculated using the delta method. \* p<0.1, \*\* p<0.05 and \*\*\* p<0.01.

*Source* : German Socio-Economic Panel (2000-2009).

**Table 3: Effect of Home Care Subsidy on Female Labor Supply**

|                                 | Labor Force Participation<br>(German Microcensus ) |                     | Labor Force Participation<br>(German Socio-Economic Panel) |                      |
|---------------------------------|--|---------------------|--|----------------------|
|                                 | (1)  | (2)                 | (3)  | (4)                  |
| Treatment Dummy                 | -0.070<br>[0.045]                                  | -0.112**<br>[0.031] | -0.130**<br>[0.036]  | -0.157***<br>[0.020] |
| Observations                    | 2395   | 2395                | 1063   | 1063                 |
| R Squared                       | 0.123  | 0.125               | 0.111  | 0.12                 |
| Actual Subsidy                  | -0.009<br>[0.015]                                  | -0.028<br>[0.016]   | -0.050*<br>[0.020]   | -0.039**<br>[0.013]  |
| Observations                    | 2395   | 2395                | 1063   | 1063                 |
| R Squared                       | 0.127  | 0.128               | 0.11   | 0.119                |
| Individual and State Controls   | Yes  | Yes                 | Yes  | Yes                  |
| State Fixed Effects             | Yes  | Yes                 | Yes  | Yes                  |
| Year Fixed Effects              | Yes  | Yes                 | Yes  | Yes                  |
| State-specific Trends           | No   | Yes                 | No   | Yes                  |
| Implied Labor Supply Elasticity | -0.03  | -0.10               | -0.33  | -0.26                |

*Notes* : The table reports the effect on labor force participation in the Microcensus and GSOEP. The Microcensus sample is restricted to women aged 18-45 living in East Germany between 2005 and 2008 with at least one 2 years-old child in the household. The women do not attend school and have worked some time during their life. The SOEP sample is restricted to the responsible parent between 18 and 45 living in East Germany between 2000 and 2009. The treatment dummy in the upper panel is the interaction effect of a parent and child living in Thuringia and an indicator for the post-policy period. The treatment in the lower panel is defined as the interaction effect between the actual subsidy amount for children living in Thuringia (€150 if eligible is firstborn, €200 if secondborn, €250 if thirdborn and €300 if eligible child is 4th or higher-order child) and an indicator for the post-policy period (after July of 2006). All specifications include state and year fixed effects. Other controls include age, age squared, marital status, education, number of children aged 0 and 1, the linear and squared state unemployment rate and the linear and squared GDP growth rates (columns (1)-(2)) and age, marital status, citizenship and education of the parent, number of children in the household, the linear and squared unemployment and GDP growth rates as well state and year fixed effects. (columns (3)-(4)). In even columns, we also include state-specific linear trends. All standard errors are clustered at the state level. \* p<0.1, \*\* p<0.05 and \*\*\* p<0.01.

*Source* : For columns (1), (2), German Microcensus (2005-2008); for columns (3), (4), German Socio-Economic Panel (2000-2009).

**Table 4: Heterogeneous Effects on Childcare Choices and Labor Force Participation**

|  | Single Parent       |                     | Parent Low-Skilled  |                     | Low-Income Household |                      | Foreign (non-EU) Household |                    |
|--|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------------|--------------------|
|  | Dummy<br>(1)        | Amount<br>(2)       | Dummy<br>(3)        | Amount<br>(4)       | Dummy<br>(5)         | Amount<br>(6)        | Dummy<br>(7)               | Amount<br>(8)      |
| Informal Childcare                         | 1.267***<br>[0.105] | 0.746***<br>[0.071] | 1.029***<br>[0.132] | 0.641***<br>[0.080] | 0.339***<br>[0.046]  | 0.184***<br>[0.022]  |                            |                    |
| Childcare at Home                          | 0.854***<br>[0.158] | 0.599***<br>[0.104] | 1.109***<br>[0.129] | 0.746***<br>[0.081] | -0.017<br>[0.042]    | -0.003<br>[0.023]    |                            |                    |
| Observations                               | 891                 | 891                 | 891                 | 891                 | 873                  | 873                  |                            |                    |
| Log-likelihood                             | -747.55             | -749.51             | -761.24             | -761.84             | -734.44              | -735.53              |                            |                    |
| Labor Force Participation<br>(Microcensus) | -0.128**<br>[0.044] | -0.069**<br>[0.022] | -0.260**<br>[0.079] | -0.097*<br>[0.042]  | -0.180***<br>[0.039] | -0.109***<br>[0.022] | -0.052<br>[0.077]          | -0.083*<br>[0.038] |
| Observations                               | 2395                | 2395                | 2395                | 2395                | 2294                 | 2294                 | 2353                       | 2353               |
| R Squared                                  | 0.134               | 0.138               | 0.126               | 0.129               | 0.152                | 0.154                | 0.140                      | 0.144              |
| Individual Controls                        | Yes                 | Yes                 | Yes                 | Yes                 | Yes                  | Yes                  | Yes                        | Yes                |
| State Fixed Effects                        | Yes                 | Yes                 | Yes                 | Yes                 | Yes                  | Yes                  | Yes                        | Yes                |
| Year Fixed Effects                         | Yes                 | Yes                 | Yes                 | Yes                 | Yes                  | Yes                  | Yes                        | Yes                |
| State-specific Trends                      | Yes                 | Yes                 | Yes                 | Yes                 | Yes                  | Yes                  | Yes                        | Yes                |

*Notes* : The dependent variables in the top panel are childcare choices of households with children aged 1 and 2 living in East Germany between 2000 and 2009; in the bottom panel, the dependent variable is labor force participation of women between 18 and 45 with at least one 2 years-old child living in East Germany between 2005 and 2008. Estimates in the top panel are marginal effects from a multinomial logit model where public daycare is the base outcome; and linear difference-in-difference estimates in the bottom panel. The treatment in odd columns is the three-way interaction of children who live in Thuringia, an indicator for the post-policy period and an indicator for the population subgroup specified in the top row (single parents, low-educated mothers, low-income households and households with at least one adult with non-EU citizenship). Single parents live in households with no other adult. Low educated parents have not completed a high school degree or vocational training. Low income parents are households in the bottom 20% of the income distribution in East Germany. Foreign households have at least one adult with citizenship outside the European Union. The treatment in even columns is the three-way interaction between the actual subsidy amount for children living in Thuringia (€150 if eligible is firstborn, €200 if secondborn, €250 if thirdborn and €300 if eligible child is 4th or higher-order child), an indicator for the post-policy period (after July of 2006) and an indicator for the population subgroup specified in the top row. All specifications include year and state fixed effects as well as state trends. Specifications in the top panel also include: age and sex of the child; age, marital status, citizenship and education of the parent, number of children in the household and the linear and quadratic terms of the state unemployment and GDP growth rates. The bottom panel includes as controls: age, age squared, marital status, education, number of children aged 0 and 1, the linear and squared state unemployment and GDP growth rates. Standard errors are clustered at the state level. \* p<0.1, \*\* p<0.05 and \*\*\* p<0.01.

*Source* : In top panel, German Socio-Economic Panel (2000-2009); in bottom panel, Microcensus (2005-2008)



**Table 5: Additional Adjustment Margins**

|                       | Male Labor<br>Force Participation<br>(1) | Male Hours<br>Worked<br>(2) | Labor Force<br>Participation t+1<br>(3) | Labor Force<br>Participation t+2<br>(4) | Probability of<br>Newborn (Age 2)<br>(5) | Probability of<br>Newborn (Age 3)<br>(6) | Public Daycare<br>Older Siblings<br>(7) |
|-----------------------|--|-----------------------------|---|---|--|--|---|
| Treatment Dummy       | -0.029**<br>[0.009]                      | 0.750<br>[0.738]            | -0.164*<br>[0.069]                      | 0.017<br>[0.040]                        | 0.014<br>[0.028]                         | 0.006<br>[0.044]                         | -0.299***<br>[0.039]                    |
| Observations          | 2037                                     | 1779                        | 1044                                    | 814                                     | 2395                                     | 2238                                     | 261                                     |
| R Squared             | 0.095                                    | 0.027                       | 0.179                                   | 0.192                                   | 0.016                                    | 0.020                                    | 0.372                                   |
| Actual Subsidy        | -0.019**<br>[0.006]                      | 1.148**<br>[0.353]          | -0.019<br>[0.034]                       | 0.026<br>[0.019]                        | -0.028<br>[0.024]                        | 0.004<br>[0.019]                         | -0.155***<br>[0.021]                    |
| Observations          | 2037                                     | 1779                        | 1044                                    | 814                                     | 2358                                     | 2238                                     | 261                                     |
| R Squared             | 0.098                                    | 0.031                       | 0.178                                   | 0.193                                   | 0.018                                    | 0.020                                    | 0.377                                   |
| Individual Controls   | Yes                                      | Yes                         | Yes                                     | Yes                                     | Yes                                      | Yes                                      | Yes                                     |
| State Fixed Effects   | Yes                                      | Yes                         | Yes                                     | Yes                                     | Yes                                      | Yes                                      | Yes                                     |
| Year Fixed Effects    | Yes                                      | Yes                         | Yes                                     | Yes                                     | Yes                                      | Yes                                      | Yes                                     |
| State-Specific Trends | Yes                                      | Yes                         | Yes                                     | Yes                                     | Yes                                      | Yes                                      | Yes                                     |

*Notes* : The table reports coefficients on the treatment effect defined as an interaction between the post-policy period and an indicator for Thuringia in the top panel or the actual subsidy amount (€150 if eligible is firstborn, €200 if secondborn, €250 if thirdborn and €300 if eligible child is 4th or higher-order child) in the bottom panel. The sample is restricted to families with 2 years-old children in East Germany (columns (1)-(2) and (5)), to families with 3 years-old children in East Germany (in column (6)) and to families with 1 and 2 years-old children in East Germany (columns (3), (4) and (7)). The dependent variables are male labor supply in columns (1) and (2), female labor force participation in future years in columns (3) and (4), whether a household with a 2 years-old (or 3 years-old) also has a newborn child in column (5) (column (6)); and the effect on daycare attendance of 3-5 years-old children (column (7)). All specifications include state and year fixed effects as well as state-specific trends. Other control variables: age, age squared, marital status, education, number of children aged 0 and 1, linear and quadratic terms of the state unemployment and GDP growth rates (columns (1)-(2)), age, education, citizenship and marital status of the mother, number of children, household size as well as linear and quadratic terms of the state unemployment and GDP growth rates (columns (5)-(6)); age and sex of the child; age, marital status, citizenship and education of the parent, number of children in the household and the linear and quadratic terms of the state unemployment and GDP growth rates (columns (3)-(4) and (7)). Standard errors are clustered at the state level. \* p<0.1, \*\* p<0.05 and \*\*\* p<0.01

*Source* : For male labor supply in columns (1) and (2) and presence of newborn in (5) and (6), German Microcensus (2005-2008); for effects on future labor force participation in columns (3) and (4) and childcare of older siblings in (7), German Socio-Economic Panel (2000-2009)

**Table 6: Effect of Home Care Subsidy on Child Outcomes**

|  | Mean              | Boys and Girls    |                     |          | Differential Effect for Girls |                      |             |
|--|-------------------|-------------------|---------------------|----------|-------------------------------|----------------------|-------------|
|  | (Std. Dev.)       | No Trend          | State Trend         | % Change | No Trend                      | State Trend          | % Change    |
|  | (1)               | (2)               | (3)                 | (4)      | (5)                           | (6)                  | (7)         |
| <u>Vineland Maturity Scale (20 items)</u>  | 32.609<br>(4.759) | 0.239<br>[0.921]  | -0.524<br>[1.495]   | 1%       | -4.155***<br>[0.659]          | -3.770**<br>[1.062]  | <b>-13%</b> |
| <u>Social Skills (5 items)</u>             | 8.863<br>(1.420)  | 0.529<br>[0.295]  | 0.606<br>[0.675]    | 6%       | -1.613***<br>[0.274]          | -1.607***<br>[0.266] | <b>-18%</b> |
| <u>Motor skills (5 items)</u>              | 7.858<br>(1.832)  | -0.355<br>[0.195] | -0.796**<br>[0.199] | -5%      | -1.080***<br>[0.265]          | -0.950***<br>[0.207] | <b>-14%</b> |
| <u>Skill in daily activities (5 items)</u> | 7.051<br>(2.052)  | 0.208<br>[0.205]  | -0.269<br>[0.818]   | 3%       | -1.942**<br>[0.676]           | -1.806*<br>[0.740]   | <b>-28%</b> |
| <u>Language Skills (5 items)</u>           | 8.838<br>(1.379)  | -0.143<br>[0.361] | -0.064<br>[0.504]   | -2%      | 0.481*<br>[0.234]             | 0.593<br>[0.295]     | <b>5%</b>   |

*Notes* : The dependent variables are child outcomes of households with children aged 1 and 2 living in East Germany in the years 2003 and 2009. The data come from the supplementary "mother-child" and the "your child between age 2 and 3" questionnaires, which ask additional questions of mothers with children born in 2003 or later (N=197). Mothers report for different skills whether a child is not able (=0), partly able (=1) or fully able (=2) to perform a skill. The overall Vineland Maturity Scale contains 20 items and its score ranges from 0 to 40. The individual categories each contain 5 items and the score ranges from 0 to 10. Larger scores means that a child is better able to perform the specified skill. The table reports the coefficients on the treatment which is the interaction effect of 1-2 years-old children who live in Thuringia and an indicator for the post-policy period. Columns (2) and (3) show estimates for the whole sample, while columns (5) and (6) show differential effects for girls (by interacting the treatment variable with the child's gender). All specifications include as controls: age and sex of the child; age, marital status, citizenship and education of the parent, number of children in the household, the unemployment and GDP growth rates as well state and year fixed effects. In the third and sixth column, we also include state-specific linear trends. Columns (4) and (7) calculate the percentage change based on the estimates in columns (2) and (5). Statistically significant effects are

*Source* : German Socio-Economic Panel (2003-2009).

**Table 7: Analysis of Prior Trends**

|  | Public Daycare<br>(1) | Informal Childcare<br>(2) | Childcare at Home<br>(3) | LFP (Microcensus)<br>(4) | LFP (GSOEP)<br>(5)  |
|--|-----------------------|---------------------------|--------------------------|--------------------------|---------------------|
| Treatment Dummy                            | -0.114**<br>[0.034]   | -0.275***<br>[0.039]      | 0.276***<br>[0.056]      | -0.016<br>[0.058]        | -0.202<br>[0.110]   |
| Pre-Policy Differences (01/2005-06/2006)   | -0.07<br>[0.039]      | 0.005<br>[0.057]          | 0.053<br>[0.060]         | 0.044<br>[0.029]         | -0.048<br>[0.039]   |
| Observations                               | 1060                  | 899                       | 895                      | 4957                     | 1063                |
| R Squared                                  | 0.238                 | 0.095                     | 0.232                    | 0.123                    | 0.112               |
| Treatment Dummy                            | -0.127**<br>[0.039]   | -0.331***<br>[0.010]      | 0.347***<br>[0.057]      | -0.083*<br>[0.037]       | -0.188<br>[0.102]   |
| Pre-Policy Differences (01/2003-06/2006)   | -0.06<br>[0.040]      | -0.065*<br>[0.024]        | 0.17<br>[0.101]          | -0.077<br>[0.040]        | 0.018<br>[0.055]    |
| Observations                               | 1060                  | 899                       | 895                      | 4957                     | 1063                |
| R Squared                                  | 0.238                 | 0.097                     | 0.235                    | 0.125                    | 0.112               |
| Treatment Dummy                            | -0.127**<br>[0.039]   | -0.275***<br>[0.039]      | 0.276***<br>[0.056]      | -0.083*<br>[0.037]       | -0.312**<br>[0.079] |
| Differential Prior Trend (01/2003-06/2006) | 0<br>[0.000]          | 0<br>[0.000]              | 0<br>[0.000]             | -0.000<br>[0.000]        | 0.102<br>[0.060]    |
| Observations                               | 1060                  | 899                       | 895                      | 4957                     | 1063                |
| R Squared                                  | 0.238                 | 0.095                     | 0.232                    | 0.125                    | 0.112               |
| Individual controls                        | Yes                   | Yes                       | Yes                      | Yes                      | Yes                 |
| State Fixed Effects                        | Yes                   | Yes                       | Yes                      | Yes                      | Yes                 |
| Year Fixed Effects                         | Yes                   | Yes                       | Yes                      | Yes                      | Yes                 |

*Notes* : The table reports coefficients on the treatment effect defined as an interaction between the post-policy period and an indicator for Thuringia. The sample is restricted to families with 1 and 2 years-old children in East Germany (columns (1) to (3)) and to families with 2 years-old children in East Germany (columns (4)). The dependent variables are childcare choices in columns (1) to (3) and female labor force participation in columns (4) and (5). The first specification tests for prior changes in the treatment state by including a dummy for the pre-policy period (2002-2005) for Thuringia. The second and third specifications test for prior trend differences by including a pre-policy trend for 2002-2005 and for 2000-2005 in Thuringia respectively. All specifications include state and year fixed effects. Other controls: age and sex of the child; age, marital status, citizenship and education of the parent, number of children in the household as well as linear and squared state unemployment GDP growth rates (columns (1)-(3) and (5)) and age, age squared, education, citizenship and marital status of the mother, number of children aged 0 and 1 as well as the linear and squared state unemployment and GDP growth rates (column (4)). Standard errors are clustered at the state level. \* p<0.1, \*\* p<0.05 and \*\*\* p<0.01.

*Sources* : For columns (1)-(3) and (5), German Socio-Economic Panel (2000-2009); for column (4), German Microcensus (2005-2008)

**Table 8: Comparison over Time, States and Age Groups (Triple Differences)**

|                       | Public Daycare      |                   | Informal Childcare  |                     | Childcare at Home   |                     | LFP (Microcensus)    |                      | LFP (GSOEP)          |                      |
|-----------------------|---------------------|-------------------|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|----------------------|
|                       | (1)                 | (2)               | (3)                 | (4)                 | (5)                 | (6)                 | (7)                  | (8)                  | (9)                  | (10)                 |
| Treatment Dummy       | -0.067<br>[0.056]   | -0.067<br>[0.056] | -0.127**<br>[0.045] | -0.124**<br>[0.043] | 0.254***<br>[0.023] | 0.241***<br>[0.027] | -0.089***<br>[0.019] | -0.089***<br>[0.018] | -0.209***<br>[0.040] | -0.205***<br>[0.044] |
| Observations          | 2080                | 2080              | 1788                | 1788                | 1873                | 1873                | 4633                 | 4633                 | 1183                 | 1183                 |
| R Squared             | 0.459               | 0.462             | 0.071               | 0.08                | 0.314               | 0.32                | 0.154                | 0.155                | 0.198                | 0.211                |
| Actual Subsidy        | -0.033**<br>[0.010] | -0.016<br>[0.012] | -0.061*<br>[0.023]  | -0.044<br>[0.024]   | 0.116***<br>[0.010] | 0.097***<br>[0.011] | -0.032**<br>[0.010]  | -0.035**<br>[0.009]  | -0.085**<br>[0.020]  | -0.084**<br>[0.022]  |
| Observations          | 2080                | 2080              | 1788                | 1788                | 1873                | 1873                | 4633                 | 4633                 | 1183                 | 1183                 |
| R Squared             | 0.459               | 0.463             | 0.070               | 0.080               | 0.318               | 0.32                | 0.155                | 0.156                | 0.196                | 0.21                 |
| Individual Controls   | Yes                 | Yes               | Yes                 | Yes                 | Yes                 | Yes                 | Yes                  | Yes                  | Yes                  | Yes                  |
| State Fixed Effects   | Yes                 | Yes               | Yes                 | Yes                 | Yes                 | Yes                 | Yes                  | Yes                  | Yes                  | Yes                  |
| Year Fixed Effects    | Yes                 | Yes               | Yes                 | Yes                 | Yes                 | Yes                 | Yes                  | Yes                  | Yes                  | Yes                  |
| State-specific Trends | No                  | Yes               | No                  | Yes                 | No                  | Yes                 | No                   | Yes                  | No                   | Yes                  |

*Notes* : The table reports coefficients on the treatment effect (triple differences) comparing eligible children to older children (3 and 4 years-old), between Thuringia and the rest of Germany before and after the policy change (in July 2006). In the top panel the treatment is a binary indicator for Thuringia, the bottom panel uses the actual subsidy amount (€150 if eligible is firstborn, €200 if secondborn, €250 if thirdborn and €300 if eligible child is 4th or higher-order child). The sample is restricted to families with 1-4 years-old children in East Germany (columns (1) to (6) and (9) to (10)) and to mothers between 18 and 45 with at least one 2 or 3 years-old child in East Germany (columns (7) and (8)). The dependent variables are childcare choices (columns (1)-(6)) and female labor force participation (columns (7)-(10)). All specifications in columns (1) to (6), (9) and (10) control for age and sex of the child; age, marital status, citizenship and education of the parent, number of children in the household as well as linear and quadratic state unemployment and GDP growth rates. The specification in columns (7) and (8) control for age, age squared, marital status and education, number of children age 0 or 1 in the household as well as linear and quadratic state unemployment and GDP growth rates. All specifications include state and year fixed effects. In even columns, we also include state-specific linear trends. All standard errors are clustered at the state level. \* p<0.1, \*\* p<0.05 and \*\*\* p<0.01.

*Sources* : For columns (1) to (6) and (9) to (10), German Socio-Economic Panel (2000-2009); for columns (7) and (8), German Microcensus (2005-2008).

**Table A1: Summary Statistics for the German Socio-Economic Panel (2000-2009)**

|                                      | Treatment State:     |                      | Control States:      |                      |
|--------------------------------------|----------------------|----------------------|----------------------|----------------------|
|                                      | Thuringia            |                      | Rest of East Germany |                      |
|                                      | Before Policy        | After Policy         | Before Policy        | After Policy         |
| Child in Publicly Subsidized Daycare | 0.292<br>(0.40)      | 0.182<br>(0.39)      | 0.283<br>(0.45)      | 0.400<br>(0.49)      |
| Child in Public Childcare Fulltime   | 0.452<br>(0.51)      | 0.625<br>(0.52)      | 0.599<br>(0.49)      | 0.652<br>(0.48)      |
| Child in Informal Care               | 0.384<br>(0.50)      | 0.264<br>(0.45)      | 0.367<br>(0.48)      | 0.411<br>(0.49)      |
| Child exclusively cared for at Home  | 0.454<br>(0.50)      | 0.608<br>(0.49)      | 0.480<br>(0.50)      | 0.355<br>(0.48)      |
| Labor Force Participation            | 0.264<br>(0.44)      | 0.136<br>(0.35)      | 0.300<br>(0.46)      | 0.348<br>(0.48)      |
| Age of Child                         | 1.47<br>(0.50)       | 1.53<br>(0.50)       | 1.48<br>(0.50)       | 1.53<br>(0.50)       |
| Child is a Girl                      | 0.46<br>(0.50)       | 0.47<br>(0.50)       | 0.50<br>(0.50)       | 0.51<br>(0.50)       |
| Number of Children                   | 1.81<br>(1.10)       | 2.00<br>(1.53)       | 1.71<br>(1.03)       | 1.73<br>(0.96)       |
| Household Size                       | 3.91<br>(1.19)       | 3.87<br>(1.63)       | 3.70<br>(1.20)       | 3.72<br>(1.42)       |
| # Children aged 0-1                  | 0.58<br>(0.54)       | 0.52<br>(0.57)       | 0.56<br>(0.52)       | 0.52<br>(0.54)       |
| # Children under 6                   | 1.43<br>(0.74)       | 1.55<br>(0.86)       | 1.37<br>(0.70)       | 1.47<br>(0.79)       |
| Age of Parent                        | 30.43<br>(5.92)      | 30.06<br>(5.72)      | 30.17<br>(5.63)      | 30.22<br>(5.53)      |
| Single Parent                        | 0.09<br>(0.19)       | 0.23<br>(0.42)       | 0.11<br>(0.31)       | 0.15<br>(0.36)       |
| Parent Low Skilled                   | 0.06<br>(0.23)       | 0.09<br>(0.28)       | 0.09<br>(0.29)       | 0.15<br>(0.36)       |
| Parent Medium Skilled                | 0.69<br>(0.41)       | 0.57<br>(0.50)       | 0.62<br>(0.49)       | 0.47<br>(0.50)       |
| Parent High Skilled                  | 0.22<br>(0.35)       | 0.29<br>(0.46)       | 0.23<br>(0.42)       | 0.28<br>(0.45)       |
| Parent Still in School               | 0.04<br>(0.14)       | 0.05<br>(0.22)       | 0.06<br>(0.24)       | 0.10<br>(0.30)       |
| Household Income                     | 2576.58<br>(1720.64) | 2599.22<br>(2581.43) | 2340.96<br>(1482.73) | 2446.39<br>(1494.29) |

*Notes* : The summary statistics are for the sample of 1 and 2 years-old children and their responsible parent (in 99% the mother) in East Germany. Low-skilled parents are those without a high-school or vocational degree, while medium-skilled parents have either a highschool or vocational degree. High-skilled parents have a university degree.

**Table A2: Summary Statistics for the Microcensus (2005 -2008)**

|                                | Treatment State:<br>Thuringia |                      | Control States:<br>East Germany |                      |
|--------------------------------|-------------------------------|----------------------|---------------------------------|----------------------|
|                                | Before Policy                 | After Policy         | Before Policy                   | After Policy         |
| Labor Force Participation      | 0.494<br>(0.500)              | 0.545<br>(0.500)     | 0.569<br>(0.495)                | 0.528<br>(0.499)     |
| Actual Hours Worked            | 31.446<br>(11.555)            | 31.900<br>(10.744)   | 32.535<br>(10.335)              | 27.019<br>12.014     |
| Age                            | 30.757<br>(5.807)             | 32.295<br>(5.644)    | 30.685<br>(5.425)               | 32.499<br>6.288      |
| Low-skilled                    | 0.083<br>(0.276)              | 0.082<br>(0.274)     | 0.091<br>(0.287)                | 0.097<br>0.296       |
| Medium-skilled                 | 0.782<br>(0.413)              | 0.755<br>(0.431)     | 0.766<br>(0.424)                | 0.728<br>0.445       |
| High-skilled                   | 0.135<br>(0.342)              | 0.164<br>(0.371)     | 0.144<br>(0.351)                | 0.175<br>0.380       |
| Single (Never Married)         | 0.329<br>(0.470)              | 0.359<br>(0.481)     | 0.367<br>(0.482)                | 0.282<br>0.450       |
| Married                        | 0.601<br>(0.490)              | 0.586<br>(0.494)     | 0.576<br>(0.494)                | 0.670<br>0.470       |
| Divorced or Widowed            | 0.070<br>(0.255)              | 0.055<br>(0.228)     | 0.057<br>(0.233)                | 0.049<br>0.215       |
| # Children Age 0               | 0.072<br>(0.258)              | 0.082<br>(0.275)     | 0.099<br>(0.308)                | 0.110<br>0.322       |
| # Children Age 1               | 0.022<br>(0.147)              | 0.023<br>(0.177)     | 0.031<br>(0.180)                | 0.023<br>0.151       |
| Unemployment Rate              | 16.087<br>(0.687)             | 12.969<br>(1.709)    | 18.444<br>(1.118)               | 14.848<br>1.381      |
| GDP per capita growth rate     | 2.294<br>(0.890)              | 3.087<br>(0.899)     | 1.898<br>(1.147)                | 2.622<br>1.075       |
| Single Mother                  | 0.195<br>(0.396)              | 0.186<br>(0.390)     | 0.174<br>(0.379)                | 0.142<br>0.349       |
| Parent with Non-EU Citizenship | 0.031<br>(0.174)              | 0.028<br>(0.164)     | 0.019<br>(0.137)                | 0.056<br>0.229       |
| Monthly Household Income       | 1964.72<br>(1120.045)         | 2173.34<br>(966.263) | 2191.89<br>(1412.768)           | 2485.436<br>1681.175 |

*Notes* : Summary statistics are reported for women aged between 18 and 45 with at least one 2 years-old child living in East Germany between 2005 and 2008. The sample is restricted to mothers who are not currently in school and have worked before. Low-skilled denotes mothers without a high-school or vocational degree, while medium-skilled mothers have either a highschool or vocational degree. High-skilled mothers have a university degree.

**Table A3: Linear Probability Models of Childcare Choices**

|                               | Public Daycare      |                   | Informal Childcare   |                      | Informal (Friends, Relatives) |                     | Informal (Childminder) |                   | Childcare at Home   |                    |
|-------------------------------|---------------------|-------------------|----------------------|----------------------|-------------------------------|---------------------|------------------------|-------------------|---------------------|--------------------|
|                               | (1)                 | (2)               | (3)                  | (4)                  | (5)                           | (6)                 | (7)                    | (8)               | (9)                 | (10)               |
| Treatment Dummy               | -0.168**<br>[0.039] | -0.109<br>[0.086] | -0.275***<br>[0.025] | -0.162***<br>[0.020] | -0.275***<br>[0.033]          | -0.161*<br>[0.067]  | -0.018<br>[0.014]      | -0.005<br>[0.030] | 0.254***<br>[0.033] | 0.091**<br>[0.040] |
| Observations                  | 1060                | 1060              | 899                  | 899                  | 899                           | 899                 | 899                    | 899               | 895                 | 895                |
| R Squared                     | 0.244               | 0.247             | 0.097                | 0.1                  | 0.089                         | 0.093               | 0.129                  | 0.131             | 0.232               | 0.237              |
| Actual Subsidy                | -0.074**<br>[0.024] | -0.039<br>[0.040] | -0.137***<br>[0.014] | -0.061***<br>[0.013] | -0.152***<br>[0.017]          | -0.095**<br>[0.031] | 0.005<br>[0.008]       | 0.029<br>[0.016]  | 0.129***<br>[0.018] | 0.026<br>[0.023]   |
| Observations                  | 1060                | 1060              | 899                  | 899                  | 899                           | 899                 | 899                    | 899               | 895                 | 895                |
| R Squared                     | 0.244               | 0.247             | 0.096                | 0.101                | 0.092                         | 0.096               | 0.13                   | 0.133             | 0.233               | 0.239              |
| Individual and State Controls | Yes                 | Yes               | Yes                  | Yes                  | Yes                           | Yes                 | Yes                    | Yes               | Yes                 | Yes                |
| State Fixed Effects           | Yes                 | Yes               | Yes                  | Yes                  | Yes                           | Yes                 | Yes                    | Yes               | Yes                 | Yes                |
| Year Fixed Effects            | Yes                 | Yes               | Yes                  | Yes                  | Yes                           | Yes                 | Yes                    | Yes               | Yes                 | Yes                |
| State-specific Trends         | No                  | Yes               | No                   | Yes                  | No                            | Yes                 | No                     | Yes               | No                  | Yes                |
| Implied elasticity            | -0.54               | -0.29             | -0.69                | -0.31                | -0.84                         | -0.52               | 0.12                   | 0.72              | 0.57                | 0.12               |

*Notes* : The dependent variables are childcare choices (as specified in the top row) of households with children aged 1 and 2 living in East Germany in the years 2000 and 2009. The dependent variables are binary indicators whether the specific childcare mode was used or not. The table reports the coefficients on the treatment effect. The treatment dummy in the top panel is the interaction effect of children who live in Thuringia and an indicator for the post-policy period. The treatment in the bottom panel is the interaction effect between actual subsidy amount for children living in Thuringia (€150 if eligible is firstborn, €200 if secondborn, €250 if thirdborn and €300 if eligible child is 4th or higher-order child) and an indicator for the post-policy period (after July of 2006). All specifications include as controls: age and sex of the child; age, marital status, citizenship and education of the parent, number of children in the household, linear and squared state unemployment and GDP growth rates as well state and year fixed effects. In even columns, we also include state-specific linear trends. All standard errors are clustered at the state level. \* p<0.1, \*\* p<0.05 and \*\*\* p<0.01.

*Source* : German Socio-Economic Panel (2000-2009).

**Table A4: Heterogeneous Effects on Childcare Choices (Linear Probability Models)**

|                       | Public Daycare       |                     | Informal Childcare |                   | Childcare at Home |                  |
|-----------------------|----------------------|---------------------|--------------------|-------------------|-------------------|------------------|
|                       | Dummy<br>(1)         | Amount<br>(2)       | Dummy<br>(3)       | Amount<br>(4)     | Dummy<br>(5)      | Amount<br>(6)    |
| Single Parent         | -0.129<br>[0.098]    | -0.124*<br>[0.054]  | 0.233*<br>[0.105]  | 0.158*<br>[0.059] | 0.046<br>[0.153]  | 0.012<br>[0.091] |
| Observations          | 1060                 | 1060                | 886                | 886               | 895               | 895              |
| R Squared             | 0.246                | 0.244               | 0.099              | 0.096             | 0.24              | 0.241            |
| Parent Low-Skilled    | -0.300***<br>[0.062] | -0.136**<br>[0.031] | 0.396**<br>[0.108] | 0.169*<br>[0.064] | 0.12<br>[0.151]   | 0.064<br>[0.083] |
| Observations          | 1060                 | 1060                | 886                | 886               | 895               | 895              |
| R Squared             | 0.247                | 0.247               | 0.093              | 0.092             | 0.238             | 0.239            |
| Low Income Household  | -0.07<br>[0.141]     | -0.034<br>[0.077]   | 0.079<br>[0.054]   | 0.029<br>[0.035]  | 0.068<br>[0.148]  | 0.049<br>[0.086] |
| Observations          | 1039                 | 1039                | 866                | 866               | 863               | 863              |
| R Squared             | 0.251                | 0.251               | 0.1                | 0.098             | 0.237             | 0.238            |
| Individual Controls   | Yes                  | Yes                 | Yes                | Yes               | Yes               | Yes              |
| State Fixed Effects   | Yes                  | Yes                 | Yes                | Yes               | Yes               | Yes              |
| Year Fixed Effects    | Yes                  | Yes                 | Yes                | Yes               | Yes               | Yes              |
| State-specific Trends | Yes                  | Yes                 | Yes                | Yes               | Yes               | Yes              |

*Notes* : The dependent variables are childcare choices (as specified in the top row) of households with children aged 1 and 2 in East Germany. The table reports the coefficient of the treatment effect interacted with an indicator for the subgroup of interest (as specified in the first column). Single parents live in households with no other adult. Low educated parents have not completed a high school degree or vocational training. Low income parents are households in the bottom 20% of the income distribution in East Germany. Odd columns use the treatment dummy (living in Thuringia interacted with an indicator for the post-policy period). Even columns use the actual subsidy for children living in Thuringia (€150 if eligible is firstborn, €200 if secondborn, €250 if thirdborn and €300 if eligible child is 4th or higher-order child) interacted with an indicator for the post-policy period (after July of 2006). All specifications include the age and sex of the child, the age, education, citizenship and marital status of the parent as well as linear and quadratic terms of the state unemployment and GDP growth rates, state and year dummies as well as state-specific linear trends. Standard errors are clustered at the state level. \* p<0.1, \*\* p<0.05 and \*\*\* p<0.01.

*Source* : German Socio-Economic Panel (2000-2009).



**Table A5: Additional Specification Checks**

|  | <u>Public Daycare</u> |                   | <u>Childcare at Home</u> |                     | <u>Labor Force Participation</u> |                      |
|--|-----------------------|-------------------|--------------------------|---------------------|----------------------------------|----------------------|
|  | Dummy<br>(1)          | Amount<br>(2)     | Dummy<br>(3)             | Amount<br>(4)       | Dummy<br>(5)                     | Amount<br>(6)        |
| <u>(1) Parental benefit (Elterngeld) since 01/2007</u> | -0.071<br>[0.033]     | -0.03<br>[0.043]  | 0.264***<br>[0.033]      | 0.094*<br>[0.043]   | -0.080*<br>[0.032]               | -0.029<br>[0.017]    |
| Observations   | 1017                  | 1017              | 881                      | 881                 | 2395                             | 2395                 |
| R Squared  | 0.256                 | 0.258             | 0.221                    | 0.227               | 0.156                            | 0.128                |
| <u>(2) State Election in June 2004</u>                 | -0.027<br>[0.021]     | -0.031<br>[0.054] | 0.225***<br>[0.044]      | 0.058<br>[0.038]    | -0.112**<br>[0.031]              | -0.028<br>[0.016]    |
| Observations   | 1017                  | 1017              | 881                      | 881                 | 2395                             | 2395                 |
| R Squared  | 0.256                 | 0.258             | 0.221                    | 0.228               | 0.125                            | 0.128                |
| <u>(3) Other Shifts in Political Preferences</u>       | -0.334<br>[0.166]     | -0.083<br>[0.125] | 0.939***<br>[0.212]      | 0.477<br>[0.351]    |                                  |                      |
| Observations   | 177                   | 177               | 154                      | 154                 |                                  |                      |
| R Squared  | 0.41                  | 0.404             | 0.436                    | 0.431               |                                  |                      |
| <u>(4) Exclude Saxony from Control Group</u>           | -0.034<br>[0.057]     | -0.03<br>[0.030]  | 0.159**<br>[0.036]       | 0.061*<br>[0.019]   | -0.165**<br>[0.035]              | -0.048<br>[0.026]    |
| Observations   | 714                   | 714               | 619                      | 619                 | 1750                             | 1750                 |
| R Squared  | 0.29                  | 0.29              | 0.26                     | 0.26                | 0.135                            | 0.139                |
| <u>(5) Subsidy as Share of Household Income</u>        |                       | -0.002<br>[0.003] |                          | 0.011**<br>[0.003]  |                                  | -0.919***<br>[0.170] |
| Observations   |                       | 998               |                          | 863                 |                                  | 2294                 |
| R Squared  |                       | 0.259             |                          | 0.225               |                                  | 0.133                |
| <u>(6) Probit Model</u>                                | -0.093**<br>[0.031]   | -0.048<br>[0.065] | 0.313***<br>[0.039]      | 0.141**<br>[0.054]  | -0.118***<br>[0.040]             | -0.027<br>[0.021]    |
| Observations   | 1017                  | 1017              | 881                      | 881                 | 2395                             | 2395                 |
| log-likelihood   | -463.54               | -461.07           | -499.96                  | -496.25             | -1483.08                         | -1478.78             |
| <u>(7) Sample of Eligible 2 Years-old only</u>         | -0.093<br>[0.053]     | -0.05<br>[0.032]  | 0.221***<br>[0.028]      | 0.106***<br>[0.016] |                                  |                      |
| Observations   | 503                   | 503               | 450                      | 450                 |                                  |                      |
| R Squared  | 0.127                 | 0.128             | 0.135                    | 0.136               |                                  |                      |

Notes: The table reports coefficients on the treatment effect defined as an interaction between the post-policy period and an indicator for Thuringia. The sample is restricted to families with 1 and 2 years-old children in East Germany (columns (1) to (4)) and to families with 2 years-old children in East Germany (columns (5) to (6)). The dependent variables are childcare choices in columns (1) to (4) and female labor force participation (5) to (6). The first specification tests for differential impacts of the federal parental subsidy (Elterngeld) in Thuringia. Specification 2 and 3 control for preference shifts by controlling for the state election in Thuringia preceding the policy as well as party preferences (available in GSOEP only). The fourth specification excludes Saxony which introduced a parental subsidy in 2007 (with features similar to the policy in Thuringia). The fifth specification defines the treatment variable as the actual subsidy in percent of current household income interacted with an indicator for Thuringia. The sixth specification reports marginal effects of a probit model and the final specification restricts the sample to two years-old children in the GSOEP. All specifications include state and year fixed effects as well as state trends. Other controls include age and sex of the child; age, education, citizenship and marital status of the parent, number of children, household size, linear and quadratic terms of the state unemployment and GDP growth rates (columns (1)-(4)) and age, age squared, marital status, education, number of children aged 0 and 1 as well as linear and quadratic terms of the state unemployment rate and GDP growth rates (columns (5)-(6)). Standard errors are clustered at the state level. \* p<0.1, \*\* p<0.05 and \*\*\* p<0.01.

Source: German Socio-Economic Panel for childcare choices (columns (1)-(4)); German Microcensus for female labor supply choices (columns (5)-(6))

**Table A6: Alternative Estimators of Standard Errors**

|                                      | <u>Public Daycare</u> |                   | <u>Informal Childcare</u> |                      | <u>Childcare at Home</u> |                    | <u>Labor Force Participation</u> |                      |
|--------------------------------------|-----------------------|-------------------|---------------------------|----------------------|--------------------------|--------------------|----------------------------------|----------------------|
|                                      | (1)                   | (2)               | (3)                       | (4)                  | (5)                      | (6)                | (7)                              | (8)                  |
| <u>Treatment Dummy:</u>              |                       |                   |                           |                      |                          |                    |                                  |                      |
| State and Year Cluster               | -0.168***<br>[0.053]  | -0.109<br>[0.086] | -0.275***<br>[0.072]      | -0.162<br>[0.172]    | 0.254***<br>[0.055]      | 0.091<br>[0.094]   | -0.070**<br>[0.032]              | -0.112***<br>[0.023] |
| State and Pre-/Post Policy Cluster   | -0.168***<br>[0.038]  | -0.109<br>[0.096] | -0.275***<br>[0.018]      | -0.162***<br>[0.040] | 0.254***<br>[0.024]      | 0.091**<br>[0.035] | -0.070<br>[0.049]                | -0.112***<br>[0.030] |
| FGLS with AR(1) Error                | -0.195**<br>[0.079]   | -0.044<br>[0.102] | -0.128<br>[0.141]         | 0.021<br>[0.190]     | 0.154*<br>[0.082]        | 0.062<br>[0.121]   |                                  |                      |
| <u>Actual Subsidy:</u>               |                       |                   |                           |                      |                          |                    |                                  |                      |
| State and Year Cluster               | -0.074***<br>[0.027]  | -0.039<br>[0.035] | -0.137***<br>[0.048]      | -0.061<br>[0.069]    | 0.129***<br>[0.037]      | 0.026<br>[0.055]   | -0.009<br>[0.028]                | -0.028<br>[0.024]    |
| State and Pre-/Post Policy Cluster   | -0.074***<br>[0.021]  | -0.039<br>[0.035] | -0.137***<br>[0.013]      | -0.061<br>[0.040]    | 0.129***<br>[0.015]      | 0.026<br>[0.034]   | -0.009<br>[0.033]                | -0.028<br>[0.026]    |
| FGLS with AR(1) Error (Hansen, 2007) | -0.058*<br>[0.035]    | -0.051<br>[0.036] | -0.071<br>[0.045]         | -0.011<br>[0.049]    | 0.080**<br>[0.035]       | 0.08<br>[0.051]    |                                  |                      |

*Notes* : The table reports three alternative estimators to account for dependent standard errors: clustering by state and year, cluster by state and the period before and after the policy change; and using a GLS model with AR(1) error term. The dependent variables are childcare choices of families with 1 and 2 years-old children in East Germany (columns (1)-(6)) and the labor force participation of mothers with 2 years-old children in East German (columns (7)-(8)). The table shows the coefficients on the interaction between the post-policy period and a binary indicator for living in Thuringia in the top panel or the actual subsidy amount (€150 if eligible is firstborn, €200 if secondborn, €250 if thirdborn and €300 if eligible child is 4th or higher-order child) in the bottom panel. Columns (1)-(6) include the following controls: age and sex of the child; age, marital status, citizenship and education of the parent, number of children in the household, linear and squared terms of the state unemployment and GDP growth rates as well state and year fixed effects. Columns (7)-(8) include age, age squared, marital status and education of the mother, number of children aged 0 and 1 in the household, linear and squared state unemployment and GDP growth rates as well state and year fixed effects. Odd columns also include state-specific linear trends. Standard errors are clustered at the state level. \* p<0.1, \*\* p<0.05 and \*\*\* p<0.01.

*Source* : For childcare choices, German Socio-Economic Panel (2000-2009) (columns (1) to (6)); for female LFP, German Microcensus (2005-2008) (columns (7) to (8))