From Dawn till Dusk: Implications of Full-Day Care for Children's Development

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Abstract

A currently high-ranking question on the political agenda of many developed countries relates to the intensive margin of child care and thus to the effects of prolonging the opening hours of child care institutions. This study adds to the scarce literature on this question and investigates the consequences of expanding the supply of child care centers operating on a fullday basis on children's skill development just before entering primary school. Identification relies on a substantial expansion of the number of full-day slots triggered by reforms of the German child care system. Using unique administrative data covering almost 100'000 children, we find positive effects on immigrant children's school readiness. Yet, at the same time immigrant children suffer in terms of their socio-emotional development, a finding we also observe among native children from disadvantaged family backgrounds.

JEL-Codes: J130, I210, I380.

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1 Introduction

Nowadays, more children than ever attend some kind of child care institution. Across all OECD countries, more than 80 % of all three- to five-years-olds are enrolled in a child care program.[1] The intensity of child care, however, varies considerably across countries and rarely covers a full working day. Even in countries that exhibit full coverage – such as Germany, the Netherlands or the United Kingdom –, child care institutions mainly function on a half-day basis. The available child care institutions thus only partially facilitate the combination of market work and family life. To overcome this shortcoming, many countries are currently debating whether to expand the opening hours of the existing child care institutions.[2]

Yet, what are the consequences for children's development when attending a child care center on a full-day basis in contrast to attending it on a half-day basis? The answer to this question likely depends on the developmental dimensions under study as well as on how well the child care center cares for children compared to the counterfactual mode of care, home care or even more precisely motherly care in our setting. If a center substitutes home care, children lacking a stimulating family environment benefit most from center-based care. If a center complements home care, children with a stimulating family environment prosper most (Felfe and Lalive, 2014).

We address the question to which extent prolonged opening hours of child care centers affect several developmental dimensions of children coming from different family backgrounds. Specifically, we study the child development effects of a substantial expansion of the number of full-day slots triggered by several reforms of the German child care system. These reforms occurred after entitling families with a legal claim on a subsidized half-day slot in a child care center. Thus, our study analyzes the impact of moving from a system offering child care on a half-day basis to a system offering child care on a full-day basis.

In the early 2000s, Germany channeled substantial funding into municipalities to expand the supply of full-day care. The expansion did not occur at an equal pace, but the provision of funding and thus the timing of the expansion depended on municipalities' readiness to offer full-day supply. We exploit this variation in the speed of the expansion across municipalities to identify the child development effects of prolonged opening hours of child care centers. To abstract from the general time trend, underlying stable differences between the municipalities or any further confounding variables, we control for a set of cohort and municipality dummies as well as a set of socio-economic and demographic characteristics of the municipalities under study. In addition, we consider possible adjustments in child care centers' structural quality when expanding the opening hours.

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[1]All information on enrollment rates and opening hours are taken from the OECD Family Database (www.oecd.org/social/family/database, accessed on November 1, 2016).

[2]For instance, Germany mandated an expansion of the opening hours of child care centers in the context of their Child Care Expansion Law in 2005, the Netherlands did so in the context of their Child Care Act in 2005, the United Kingdom in 2006 and in British Columbia (Canada) in 2010.

While not random, the variation in the speed of expansion is plausibly exogenous. Demand is likely to vary across municipalities, but given nationwide excess demand it unlikely caused a differential speed of expansion. Consistent with this, supply in late expanding municipalities started taking off shortly after supply in early expanding municipalities took off (on average 5 years later). In addition, average supply in early and late expanding municipalities converged over time (10 years after the first reform average supply stagnated in the early expanding municipalities, while late expanding municipalities had basically caught up). The speed of expansion is, furthermore, unrelated to municipalities' socio-demographic structure or the quality of the available care centers prior to the reform. The exception is the initial share of child care centers offering full-day care and the share of child care staff employed on a full-time basis. These features, however, are some of the criteria determining the order according to which funding for expanding full-day care was distributed across municipalities. The intensity of the expansion is also unrelated to municipality specific trends in their socio-demographic and economic structure, the exception being the relative political power of the social democrats who are more inclined to a modern allocation of household work and thus possibly to lift barriers preventing full-day care to expand. The same is true for care center quality with the exception of the available full-time staff. Finally we are unaware of any other reform or policy change during the period we analyze that may have affected municipalities differentially.

Our analysis uses three unique data sources. First, we use administrative records from school entrance examinations in Schleswig-Holstein, the most northern state in Germany, from 2004 to 2012. These data provide us with physicians' assessments on the development, in particular the overall school readiness, the motor skills and the socio-emotional maturity, of almost 100'000 children at the onset of primary school. Second, we possess register data on structural features of child care centers. As such, we can construct the share of care centers operating on a full-day basis as well as a series of structural quality indicators, information which may be relevant to assess possible concessions in care center quality when expanding care centers' opening hours. Third, we draw on a comprehensive survey data set, the so-called *Families in Germany* survey, to dig deeper into the underlying mechanisms.

We take the issue of the relative care quality provided by the care center and the mother seriously and stratify by migration background, parental education and single parenthood. Our empirical analysis provides the following results. Children with migration background benefit from prolonged opening hours of child care centers in terms of their school readiness: if the supply of full-day slots increases by 11 percentage points (ppt), as it is the case in the reform under study, immigrant children are on average 3.9 ppt more likely to be assessed ready for primary school, an effect which corresponds to an increase of 0.10 standard deviations (sd) and closes the school readiness gap between immigrant and native children by more than two thirds (conditional on parental education). At the same time, it is exactly these children that

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suffer most from spending more hours in institutionalized care in terms of their socio-emotional development. The reform under study increased the prevalence of socio-emotional problems by 3.9 ppt (or 0.11 sd). The detrimental effect on children's socio-emotional development is also observed for native children if coming from a disadvantaged background, such as a relatively uneducated or a single parent household.

Our study relates to a growing literature which investigates the effects of providing universal access to child care centers (operating mostly on a half-day basis) on children's skill acquisition and thus the effects of the extensive margin (providing child care versus not providing child care). Findings from these studies are mixed and range from negative effects (Baker et al., 2008), to neutral effects (Cascio, 2009; Datta-Gupta and Simonsen, 2010) and even positive effects (Berlinski et al., 2009; Cornelissen et al., 2016; Felfe and Lalive, 2014; Felfe et al., 2012; Fitzpatrick, 2008; Gormley Jr. et al., 2008; Noboa Hidalgo and Urzúa, 2012; Havnes and Mogstad, 2011; Magnuson et al., 2007). The reasons underlying these heterogeneous effects likely range from methodological differences to contextual differences such as who are the compliers (which children react to the expansion), what are the counterfactual care modes (e.g. informal paid arrangements, extended family members or the mother) or how the child care system is designed (e.g., in terms of opening hours, staff-child ratio, group sizes or peer composition).

The question which currently ranks high on the political agenda of many developed countries, but is still under-studied, relates to the intensive margin and thus to the effects of prolonging the opening hours of child care institutions. Extrapolating from the findings of studies focusing on the extensive margin, and specifically on the effects of a shift from no care to care on a half-day basis, is leading to wrong conclusions if the returns to time spent with alternative caregivers are non-linear. Studies investigating the intensive margin, however, are scarce. There are some earlier studies that provide evidence for a positive correlation between full-day child care and child development (Cryan et al., 1992; Gullo, 2000; Walson and West, 2004).[3] A few recent studies aim at providing causal estimates for the impact of attending child care on a full-day basis. Most of them focus on the US, a setting with manifold, equally prevalent alternative care modes, such as maternal care, center-based care, informal paid care or home care (Blau and Currie, 2006). Using the Early Childhood Longitudinal Survey Rathburn and West (2004) and DeCicca (2007), for instance, compare children attending kindergarten (at age 5) on a half-day basis with children attending kindergarten on a full-day basis – while controlling for initial differences between both groups. They do not find any significant effects of attending child care on a full-time basis on children's academic achievement. Using the same data Cannon et al. (2006) exploit differences in US state policies regulating the opening hours of kindergarten (at age

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[3]In addition, there exist several studies analyzing the impact of full-time maternal employment on child development (Waldfogel et al., 2002; Brooks-Gunn et al., 2002; Hill et al., 2005). Similar to most existing studies on full-day kindergarten, these studies address endogeneity of maternal employment by controlling for a wide range of observable characteristics.

5) and find short-lived positive effects on children's academic achievement. Focusing on Canada, another setting with various alternative care modes such as the mother, care centers, informal paid care or home care (Sinha, 2014), Friesen *et al.* (2013) exploit the staggered introduction of full-day kindergarten in British Columbia to analyze the impact of attending kindergarten on a full-day basis (at age 5). Their results reveal some short-lived negative impact of full-day kindergarten on children's development, in particular on parental reports of children's behavior and emotional development.[4]

Our study contributes to the existing literature as follows. First, we add to the scarce literature investigating the intensive margin of center-based child care – the shift from a half-day to a full-day schedule. In contrast to the existing studies, we study the case of Germany where kindergarten lasts three years – from age 3 to 6 years – and not only one year – the last year prior to primary school entrance – and thus a treatment which covers a much longer period and entails possibly much stronger effects. Germany offers, moreover, a setting where home or more specifically motherly care is the most prevalent, if not the only counterfactual care mode (please refer to Section 6 for more details). This stands in contrast to the existing studies which focus on settings with multiple counterfactual care modes and thus settings where it is difficult to interpret the (underlying reasons for the) estimated effects (Kirkeboen *et al.*, 2014). Stratification according to children's family background, specifically migrant ancestry, parental education and single parenthood, thus allows us to infer about the effects of substituting home care, which may vary in quality depending on the family background, by institutionalized care. Stratification is not at last possible as we draw on large administrative data covering the universe of several cohorts of children at the onset of primary school. This data allows us moreover to circumvent problems of non-response and misreporting. Such issues likely arise in the case of survey data as parents may be difficult to reach if working and likely to justify their decision to enroll their child into child care on a full-day basis. Finally, we take advantage of administrative data on structural features of the universe of child care centers to deal with possible adjustments in child care centers' structural quality in times of large child care reforms.

The reminder of this study is structured as follows: the next section describes the German child care system as well as the reforms under study. Sections 3 and 4 introduce the data and the conceptual framework, respectively. Section 5 presents our main findings as well as results from the sensitivity analysis. Section 6 reflects on mechanisms potentially explaining the results. Section 7 concludes.

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[4]There is one further study which contrasts the development of primary school age children who attend after-school care with children who are taken care of by the mother in the afternoon hours (Felfe and Zierow, 2014). While this study does not find any effects on average, it finds beneficial effects for children from disadvantaged backgrounds.

2 Background

The Child Care System in Germany: Germany offers child care at two levels.[5] Early child care is available for children between 0 and 3 years, while later child care – the so-called kindergarten – is available for children between 3 and 6 years. Since 1996 every child turning 3 years old is legally entitled to a slot in a child care center. As a result of this policy, since the early 2000s at least 90 % of children entering school have attended kindergarten for at least 3 years (90 % in 2002, 92 % in 2006 and 95 % in 2011). In contrast, early child care is a rather recent institution in West Germany.[6] A legal claim on a slot in early child care exists since 2013, but even then only 23 % of all West German 0-to-3-year-old children made use of it. In prior years, attendance rates were much lower: up to 2002 less than 3 % of all 0-to-3-year-old West German children attended a care center, in 2006 attendance rates rose to 7 % and in 2011 attendance rates amounted to 16 %. Thus, during the period under study child care centers were mainly an institution for 3-to-6-year-old children.

Child care is mostly organized in centers.[7] Care centers are run by subsidized non-profit organizations, such as the municipality, the church or welfare organizations.[8] Subsidies come from three public entities: the state usually pays a large amount of the total operating costs. Schleswig-Holstein, the state under study, pays an annual amount of 60-70 million Euros which corresponds to approximately 15 % of total operating costs. This money is distributed to the counties according to the number of children enrolled in care centers, the number of immigrant children enrolled in care centers and the opening hours of child care centers. Counties augment this amount by further 5% of the operating costs. The largest share of the operating costs is borne by the municipalities (around 40 % of operating costs). The remaining 40 % of the operating costs are paid by private organizations (10 %) and parents (30 %). Parental fees are differentiated according to family size, the number of siblings enrolled in child care and family income. The costs for a half-day slot range between 0 and 200 Euro/month and for a full-day slot between 0 and 420 Euro/month plus a separate fee for lunch (around 80 Euro/month).

States are in charge of regulating the quality of center-based care in Germany and every institution – independent of being run by the church, a welfare organization or the municipality – has to adhere to these regulations. Regulations concern aspects such as opening hours, group sizes, staff-child ratios, but also staff qualifications. On average, care centers have to remain

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[5]This section draws on our own calculations of the statistics provided by the German Child and Youth Services (*Kinder- und Jugendhilfe*) as well as on the official publications based on these statistics (Riedel *et al.* (2005), Lange *et al.* (2005), Huesken (2010) and Strunz (2011)).

[6]As a heritage from the former German Democratic Republic, in East Germany universal child care is available for all ages, also at a full-day basis.

[7]Since the child care expansion law in 2005, extra-familial childminders have gained increasing importance. However, in West Germany in 2006 only 1.2 % of all 0-2-year-old children have been taken care off by a child minder, in 2011 only 3.7 %. Among 3-6-year-old children this share is negligible (in 2011: 0.5 %).

[8]Only a negligible share is run by a private provider (in West Germany in 2006 the private share was at 1 %).

open for at least four hours on five days per week. Regulations regarding groupsize and child-staff ratio in the case of 3-6-year-old children are as follows: Playgroups can have at most 25 children and need to be supervised by at least one certified child care worker and one or two assistants. The degree of a child care worker requires two years of theoretical training and at least two years of practice in a child care center. Care centers comply with these regulations: in 2006 playgroups accommodated on average 20 children age 3-6 years old. 62.3 % of the employed staff had a child care worker degree. Overall, about ten children were supervised by one staff member. Moreover, in line with the minimum required opening hours, in West Germany in 2006 53% of children attending a care center were taken care off on a half-day basis, while 47% had a full-day slot.

Given the rather high quality of center-based care and the large subsidization of child care centers, privately arranged non-parental care is very uncommon in Germany. Indeed, statistics based on the *Families in Germany* data (see Section 6 for details) provide supportive evidence for the claim that the mother constituted the main care mode for children who were not enrolled in full-day kindergarten and that other care modes played at most a minor role. The survey data reveal that children who were enrolled in full-day kindergarten (35.1 hours per week) were on average taken care of 13.8 hours per week by their father, 3.3 hours per week by their grand-parents, 1.1 hours by other members of the extended family and 0.5 hours per week by informal paid care modes. These numbers are very comparable to the care modes for children enrolled in kindergarten only on a half-day basis (18.8 hours per week): they were on average looked after for 13.4 hours per week by their father, 3.0 hours by their grandparents, 1.0 hours by other members of the extended family and only 0.4 hours per week by informal paid care modes. In fact, none of the differences between the alternative counterfactual care modes between children enrolled in full-day and half-day care is significant. As such, the main counterfactual care mode in our setting covering the different amount of time spent in center-based care (16.4 hours) is the mother and we will interpret our results as replacing motherly care by care provided in a care center.

Reforms of the Child Care System: Over the last two decades, the German child care system has undergone a series of reforms. In 1996, the German government introduced a legal claim on a highly subsidized half-day slot in a child care center for every child turning 3 years old. While the law had been passed at the federal level, it was the states and, especially, the municipalities that were responsible for organizational and financial implementation of it. To relieve some of the burden, municipalities had time to fulfill the legal mandate until 1998 when full coverage was required. As a consequence of the mandate, many German states revised their child care laws. Schleswig-Holstein, the state under study, did so in 1999 (in its law on child care centers, the so-called Kindertagesstättengesetz, or short KiTaG). Revisions concerned

mainly existing child care centers to offer longer opening hours and later on also to accommodate younger children (between 0 and 3 years old). In 2005, the German government pushed the expansion of the child care system even further and enacted the day care expansion law (Tagesbetreuungsausbaugesetz, §24(1), SGB VIII). Besides kicking off the expansion of the supply of slots available to 0-to-3-year-old children – this expansion, however, only started in 2008 after the public announcement of a legal claim on a slot in early child care from 2013 onwards –, this mandate triggered a strong expansion of full-day slots.

Figure 1 illustrates the expansion of full-day slots available in child care centers for the region under study from the late 1990s til today. In 1998, only 30.1 % of all children enrolled in a care center were offered a full-day slot.[9] The revision of the KiTaG led to a slight increase in this share: in 2002 33.5 % of all slots were full-day slots. Following the 2005 mandate this share increased remarkably: in 2006 41.5 % of all children enrolled in Kindergarten were offered a full-day slot, in 2008 around 45 % and in 2011 53.9 %.

Figure 1: Expansion of the Share of Full-Day Child Care
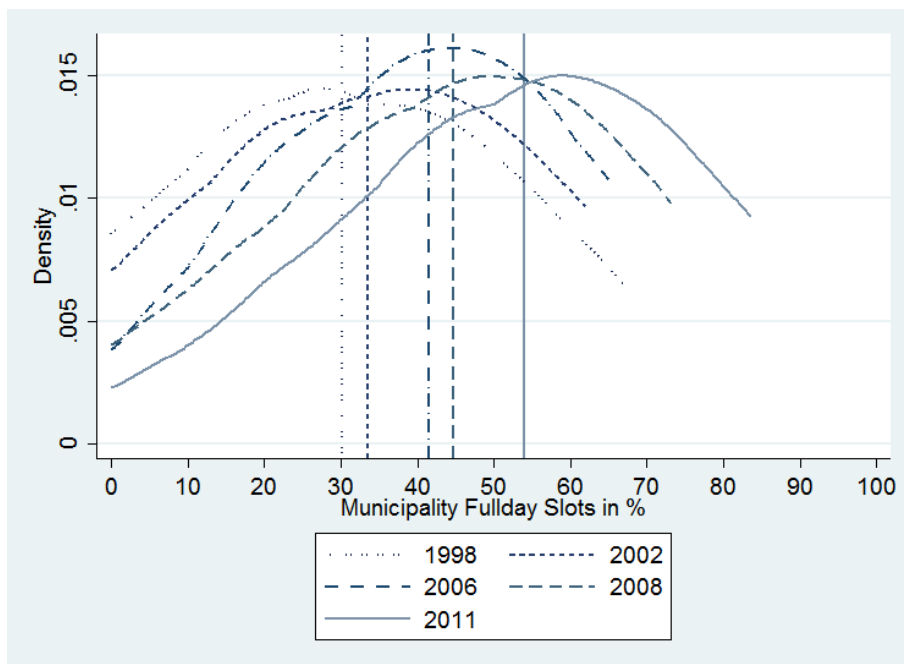
Notes: This graph plots the share of full-day slots over all slots in care centers available to 0-to-6-year-old-children for the years 1998, 2002, 2006, 2008 and 2011 in the examined area in Schleswig-Holstein.
Source: Statistics of the Child and Youth Services in Germany 1998-2011. Own calculations.

The expansion of full-day slots was heavily subsidized by the federal and state governments. Funds were allocated to municipalities in two steps. In the first step, the state government allocated subsidies to counties according to their predictions of required expansions. In Schleswig-

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[9]Register data on child care centers are only available from 1998 onwards. We therefore cannot provide any previous trends on the supply of slots in child care centers.

Holstein, the local organizations of the child and youth welfare services were obliged to annually assess the demand for child care slots and desired opening hours (§7, KiTaG). Key figures for the prediction of the demand for longer opening hours were the number of children in preschool age and the number of mothers working or desiring to work. In the second step, each county's child and youth welfare service allocated subsidies to municipalities. Child and youth welfare services allocated funding to municipalities with a low supply of full-day slots prior to the reform, a large number of children in preschool age, and a convincing expansion plan.[10] Municipalities faced two main barriers to submitting a convincing expansion plan: infrastructure and staff. Regulations regarding infrastructure required centers wanting to offer full-day care to possess of cooking and sleeping facilities complying with specific hygienic standards. This regulation restricted the set of properties, and prolonged time until a municipality could submit an expansion plan. Moreover, Germany lacked sufficient child care workers, in particular full-time workers (in 2002, for instance, only 35% of the staff working in child care centers worked on a full-time basis in Schleswig-Holstein, the region under study). Applications for subsidies exceeded the available funds, and the child and youth welfare services used lotteries and waiting lists to select municipalities complying with the eligibility criteria served within the same calendar year. All remaining municipalities were served the following calendar year.

The reform generated substantial geographic variation in the speed of expansion. Some municipalities only needed the financing to initiate a rapid expansion by presenting a convincing expansion plan. Other municipalities took considerably longer to cope with the requirements to be eligible for subsidies. Our empirical analysis exploits variation in when municipalities expand full-day care to assess its effects on child development. The key question is thus whether the timing of the expansion was exogenous, i.e., unrelated to child development. Two concerns caution against taking expansion timing as exogenous. First, some municipalities, particularly those with a less conservative constituency may be more prepared to expand or lobby more strongly for expansion. While concerns with differences across municipalities should be mitigated since we exploit the variation over time within municipalities, we discuss whether the speed of expansion was related to trends in a series of socio-economic aspects characterizing municipalities. Second, the timing of the expansion might be correlated with child development, for instance, because child care quality changed. The youth welfare services implemented strong guards against deteriorating quality. They all had to apply the same quality regulations and only applications that satisfied the required regulations were awarded funding. Nevertheless, we will document below that trends in care center quality were largely uncorrelated with the speed in expansion of full-day care.

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[10]This discussion is based on several interviews with the officials that were in charge of implementing the expansion. Administrators provided us with rich personal information on how the allocation process was implemented.

3   Data and Descriptive Statistics

This section describes the data and provides first descriptive statistics of the children included in our sample.

School Entrance Examinations: Our main data source are administrative records from *Schleswig-Holstein*'s school entrance examinations (SEE). In Germany, children undergo several mandatory medical screenings between birth and primary school.   These medical screenings promote children's health by diagnosing medical anomalies and providing necessary treatment as early as possible. An important medical screening is the school entrance examination (SEE). Pediatricians employed by the local health service document a child's health and determine whether a child is "ready" to follow the primary school curriculum or not. Examinations take place in the year prior to entering primary school and thus when children are around 6 years old. Specifically, a school entrance cohort comprises all children who turn 6 years old between July of the previous year and June of the same year as school entrance.[11] This study draws on data for the school entrance cohorts 2004 to 2012 and thus on birth cohorts 1997-2006.

The SEE contains a medical diagnosis for several dimensions of children's state of development, among others, children's motor skills and socio-emotional maturity. The motor skills diagnosis concerns coordination and motor capacities of the child. Children have to stand on one leg, jump on one leg, jump left and right for a longer time span. The socio-emotional maturity assessment is based on the pediatrician's observations as well as on a questionnaire – the well-established *Strengths and Difficulties Questionnaire*, short SDQ (Goodman, 1997) – designed to identify emotional problems, behavioral problems, hyperactivity, peer relationships, and social behavior given to the accompanying caregiver.[12] The school readiness assessment is based on the diagnoses concerning the different developmental domains, but may include further aspects, i.e. proficiency in German or cultural assimilation for immigrant children. The overall school readiness diagnosis thus needs not to be the sum of the different skill dimensions.

There is a growing amount of research relating such early performance indicators to later success on the labor market. Gregg and Machin (1999, 2001), for instance, discuss the relevance of children's early cognitive abilities for their later success in the labor market. Duncan *et al.* (2007)

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[11]Children who were not ready for school in one year undertake a special examination one year later and thus are not included in the baseline SEE. Parents whose children turn 6 years between July and December of the same year can ask their child to be examined a year before the official SEE would have taken place. We exclude these children from our analyses.

[12]One might worry that the assessment of socio-emotional maturity might be affected by subjective perceptions of the caregiver, or by non-response problems. Considering that the pediatricians re-assess children's socio-emotional maturity and that in 93 % of all cases a medical diagnoses regarding socio-emotional maturity is available, reporting bias and non-response bias are not a major concern in our context. One further concern may be that pediatricians are subjective in their assessment (and possibly consider children's family and institutional environment in their assessment). This, however, is unlikely to occur and can be accounted for by the municipality fixed-effects, which given the rather low turnover of pediatricians implicitly corresponds to a pediatrician fixed-effect (on average every pediatrician is assigned to 5-8 municipalities).

show that dimensions assessed in the school entrance examination – such as intellectual skills and socio-emotional maturity – are key in predicting later educational achievements. Finally, motor skills are surprisingly very strong predictors for children's later achievements (Grissmer *et al.*, 2010). The school readiness diagnosis finally, even if not binding, is an important piece of information for parents' decision whether to enroll their child in school on time or not.

The SEE also contains parental reports on child and family background. Among other questions, parents indicate whether their child attended child care, not however, on the specific amount of hours. In other words, we do not possess direct information on the intensive margin on an individual basis – i.e. whether the child attended care on a full-day basis. Instead we rely on the average rate of full-day slots among all slots available in care centers on the municipality level – provided by our second data source described in turn. Thus, similar to previous studies investigating the impact of universal child care on children's development (Baker *et al.*, 2008; Cascio, 2009; Felfe *et al.*, 2012; Fitzpatrick, 2008; Havnes and Mogstad, 2011), we can only provide estimates for the intention-to-treat effect (ITT), but not for the treatment effect itself.

Statistics on Child and Youth Services: Administrative records of all child care centers are our second data source (the so-called *Kinder- und Jugendhilfestatistik* or *Statistics on Child and Youth Services*). These records contain detailed information on the provider, the number of children enrolled and the staff employed and thus allow us to construct the following series of indicators describing the care centers: coverage rates among 0-to-3-year-old children and 3-to-6-year-old children, the share of full-day and half-day slots, the provider (public provider vs. the church vs. other providers, which are mostly welfare organizations), as well as structural quality features such as group size and the staff composition in terms of age, gender, pedagogical degree and workload. All information is available at the care center level. Since a substantial share of care centers host children of different age groups,[13] we cannot distinguish between slots offered to 0-to-3-year-old children and slots offered to 3-to-6-year-old children. As such our treatment – the share of full-day slots – as well as any other information on care centers refer to children at the age of 0 to 6 years. Nevertheless, as pointed out before, until 2006 only up to 6% of all slots in care centers are offered to 0-to-3-year-old children, while more than 94% of all slots in care centers are offered to 3-to-6-year-old children. The focus of our analysis thus lies on the effect of expanding full-day care available to 3-6-year-old children.

The smallest regional level available in both data sources is the municipality.[14] Data protection issues, however, restrict the number of municipalities available for scientific research.[15]

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[13]In 1998 25% care centers hosted children of different age groups, in 2011 55 %.

[14]We observe the municipality of residence of a child at the SEE date. As post-birth mobility is low in West Germany, the municipality of residence at the SEE date is likely to be the same as the municipality of residence when children attend center-based care for most children in our sample.

[15]First, administrative data on care centers are only released if municipalities contain at least three care centers, otherwise only averages of care centers in neighboring municipalities are available. Second, not all municipalities

We possess identifiers for 75 municipalities (belonging to 8 out of 15 counties) which allow us to merge the available administrative data on child care centers to the SEE data. We additionally merge information on the demographic and socio-economic composition of the municipalities via the municipality identifiers. These additional data are mainly part of the "INKAR-Raumordnungsdaten", a data set on municipality characteristics published by the *Federal Institute for Research on Building, Urban Affairs and Spatial Development*; data on female full-time employment are provided by "Statistikamt Nord", the statistical office of the North German states Hamburg and Schleswig-Holstein. Restricting our sample to children for whom we possess information on all assessed dimensions – school readiness, motor skills and socio-emotional maturity – leads to a sample of 93,570 children belonging to nine school entrance cohorts and residing in 75 municipalities.

The fact that information on our treatment – the share of full-day slots – is only available at the municipality level rises the question of when to measure the share of full-day slots. We have the choice of measuring the supply of full-day slots in any of the first six years after child birth. To circumvent endogeneity of care center features to the parental decision of enrolling their child in child care and in particular, in child care on a full-day basis, we choose children's birth year as the year of measurement and thus the year which is definitely prior to children's own enrollment in child care. Yet, we test the robustness of our results when choosing alternative points in time to merge the share of full-day slots with child outcomes (see section 5.2).

Descriptive Statistics   Table 1 provides descriptive statistics for the cohorts entering school between 2004 and 2012 (and thus born between July 1997 and June 2006). We separately look at four groups of children: children of high-educated native parents (17.5 % of the full sample), children of low-educated native parents (55.5 % of the full sample), children of native single parents (12.8 % of the full sample) and children of low-educated immigrant parents (8.6 % of the full sample).[16]

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can be identified in the SEE data. In fact, counties – the second smallest regional level in Germany – are in charge of gathering the results of the SEE and delivering them to the respective state office (which is the *Ministry of Social Affairs, Health, Family and Equality* in Schleswig-Holstein). When delivering the data to the ministry, counties have the right to make municipalities anonymous and some of them do so.

[16]We abstain from studying the subgroups of children of high-educated immigrant parents (1.5 % of the full sample) and immigrant single parents (1.2 % of the full sample) separately given their small number of observations.

Table 1: Descriptive Statistics on Individual Skills and Characteristics

	High-Educated Native Parents	Low-Educated Native Parents	Single Parents	Immigrant Parents
Panel A: Skills				
School Readiness (D)	.948	.864	.828	.808
	(.223)	(.343)	(.377)	(.394)
Motor Skills (D)	.851	.797	.771	.824
	(.356)	(.402)	(.42)	(.381)
Socio-Emotional Maturity (D)	.867	.806	.761	.845
	(.34)	(.395)	(.427)	(.362)
Panel B: Individual Characteristics				
Male (D)	.532	.523	.52	.519
	(.499)	(.499)	(.5)	(.5)
Age (in month)	73.5	73.838	73.896	73.607
	(3.777)	(3.895)	(3.927)	(3.941)
Birth weight (in gram)	3383.31	3298.082	3250.432	3248.142
	(722.567)	(752.362)	(771.277)	(850.050)
Nr of siblings (excl. kid)	1.037	.968	.838	1.304
	(.876)	(1.031)	(1.057)	(1.135)
N	16410	51937	12006	8054

Notes: These individual descriptives are based on the cohorts 2004-2012 of the School entrance examination data. We construct a binary indicator which equals one if the child is assessed to be ready for school. Based on the medical diagnosis in the SEE, we construct a binary indicator for each of the two dimensions motor skills and socio-emotional maturity, which is equal to one if the child does not exhibit any problem in the assessed tasks. Binary variables are marked with a (D). Standard deviations in parentheses.

Source: Statistics of the School entrance examination 2004-2012. Own calculations.

Panel A of Table 1 displays the respective subgroup means for all child development dimensions in a discretized fashion.[17] As we can see, 94.8 % of all children of high-educated native parents are assessed to be ready for starting school. Yet, only 86.4 % of all children of low-educated native parents and an even lower percentage of children of single parents (82.8 %) and immigrant parents (80.8 %) are assessed to be able to follow the curriculum taught in primary school. In other words, we observe large (raw) gaps between the different subgroups: 8.4 ppt when stratifying by parental education and 5.6 ppt when stratifying by migrant background (conditional on parental education). As regards motor skills, children of high-educated native parents fare again best, 85.1 % of them do not have any problems in this skill dimension. Among immigrant children, 82.4 % are assessed to have age appropriate motor skills, while 79.7 % of

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[17]The medical diagnosis can take five forms: "normal development", "some problems, but no treatment is necessary", "some problems, already in treatment", "problems, treatment necessary", and "problems which will reduce the child's performance in school". Based on this diagnosis, we construct a binary indicator for each of the two dimensions assessed in the SEE (motor skills and socio-emotional maturity), which is equal to one if the child does not exhibit any problem in the assessed tasks. The school readiness recommendation can take the following three forms: "ready for school", "school enrollment only with support provided by the teacher", and "special needs education required". We also construct a binary indicator which equals one if the child is ready for school.

children of low-educated native parents and 77.1 % of single parents do so. Thus, we again find a substantial gaps in terms of parental education (5.4 ppts), not however in terms of migrant background (conditional on parental education). Finally, children of high-educated parents also feature the highest probability of having no problems in terms of their socio-emotional maturity (86.7 %). On average, children of immigrant parents do not fare much worse in this dimension (84.5 %). Yet, only 80.6 % of children of low-educated native parents and 76.1 % of children living in a single parent-household are assessed to be socio-emotionally mature. Hence, there is a large gap in children's socio-emotional maturity related to parental education background (6.1 ppt).

Panel B in Table 1 reports differences in terms of children's demographics. On average children are between 73.5 and 73.9 months (6.1 years) old and around half of them are boys (52 - 53 %). There are no major differences between the subgroups in terms of birth weight (ranging from 3'248-3'383 gram). Children of immigrant parents have on average more siblings (1.3) than children of the other subgroups. Children of single parents have the lowest number of siblings (0.84).

Table 2 displays the features of the child care centers located in the municipalities contained in our estimation sample (Panel A) and further regional characteristics (Panel B). The variables are measured as the respective average at the municipality level of the year the child is born (and thus across the years 1998 until 2006). As described in Section 2, while the supply of slots in kindergarten is basically fulfilling the legal mandate of full coverage (82 % of all children age 3-6 years old can attend kindergarten), early child care is basically not existing in the period under study (4.5 % of all children can attend early care). Regarding the share of available full-day slots, we observe the following: on average, one third of all children is offered a full-day slot (34 %). This share is steadily rising over the last two decades (see Figure 1) – a fact we base our identification strategy on (see Section 4 for details). Most child care centers are either run by the church (41.7 %) or by a welfare organization, making up the biggest share of the category *other providers*, (37.4 %), but still a fifth of all care centers are run by the municipality (20.9 %). On average there are 20 children in one group, the staff working in the child care centers is on average 37.4 years old, most are female (95.4 %), the majority holds a pedagogical degree (62.1 %), and around a third works full-time (35.8 %).

Table 2: Descriptive Statistics on Child Care and Regional Characteristics

	Mean (SD)
Panel A: Child Care	
Coverage 0-3 years old (in %)	4.538
	(2.543)
Coverage 3-6 years old (in %)	82.139
	(6.683)
Fullday Share	.336
	(.198)
Public provider (in %)	20.944
	(16.158)
Other provider (in %)	37.387
	(17.974)
Church provider (in %)	41.669
	(18.664)
Children per group	19.969
	(3.284)
Age of staff (years)	38.179
	(2.328)
Staff male (in %)	4.355
	(3.281)
Staff: pedagogical degree (in %)	62.113
	(9.51)
Staff: fulltime (in %)	35.813
	(14.678)
Panel B: Regional Characteristics	
Citizens per km2	1021.08
	(700.396)
Employed female (in %)	44.251
	(2.66)
Fulltime-Employed female (in % of total working)	63.978
	(5.343)
Share 0-6-y-old children (in %)	5.796
	(.804)
Vote share for social democrats county in %	44.436
	(3.73)
Vote share for CDU and FDP in %	42.035
	(4.28)
Vote share for other parties in %	13.529
	(3.034)
Log of GDPpc (in 1000Euro/Citizen)	3.211
	(.226)
Local business tax rate	3.535
	(.529)
Local tax rate on agrarian real property	2.978
	(.489)
Local tax rate on other real property	3.391
	(.810)
N	93570

These descriptives are based on the regional characteristics in the year of birth of the school entrance cohorts 2004-2012 and thus measuring the average across the years 1998-2006. Standard deviations in parentheses.
Source: Statistics of the *Child and Youth Services in Germany*/INKAR/Statistik-Nord. Own calculations.

Panel B in Table 2 finally provides some information on the municipalities the children live

in (again merged to the SEE data for the year when children are born and thus measuring the average across the years 1998-2006). Female employment, the share of women working full-time, GDP per capita, the local tax rates[18] and the percentage of children between 0 and 6 years are comparable to the West German average. The region under study is a bit more densely populated – notice that four of the counties under study are city counties – and less conservative – the vote share for the conservative parties is substantially lower than the West German average.

Table A.1 in the Appendix displays the means of child care features and regional characteristics by the subgroups of interest. It shows that children of immigrant parents and children of single parents live more often in more densely populated regions with a higher child care coverage and a higher supply of full-day slots.

4   Conceptual Framework

Effect of Interest: We are interested in the causal effect of offering child care on a full-day basis on children's development at the onset of primary school. We estimate this effect using the following estimation equation:

$$Y_{imc}^s = \beta F_{mc} + \gamma C_{mc} + \delta Z_{mc} + \eta X_i + \mu_c + \psi_m + \epsilon_{imc} \tag{1}$$

where Y_{imc}^s denotes skill dimension s of child i residing in municipality m and belonging to cohort c, F_{mc} stands for the share of full-day slots available to children belonging to cohort c and residing in municipality m, C_{mc} represents a set of care center features, Z_{mc} a set of municipality features, and X_i a set of individual background characteristics. Controlling for a set of cohort dummies μ_c allows us to abstract from the overall expansion of full-day slots. The set of municipality dummies ψ_m allows us to control for any time-constant features of municipalities that may correlate with the timing of the expansion in full-day slots and with changes in children's development. Finally, ϵ_{imc} represents an idiosyncratic shock.

Identification: The key identifying assumption is that F_{mc} is conditionally independent of the unobserved determinants of children's development ϵ_{imc}. We exploit an expansion of full-day slots triggered by revisions of the German child care law and specifically, the variation in the timing of the expansions across municipality. In other words, our identification strategy relies on within-municipality variation of the supply of full-day slots. Two questions may arise when relying on this identification strategy: first, is the within-municipality variation in the supply of full-day slots sufficiently strong? Second, is the municipality-specific timing of expansions in the supply of full-day slots indeed exogenous?

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[18]In Germany, municipalities have the legal right to annually decide on the tax rate of three different kinds of local taxes: business taxes, taxes on agrarian real property and taxes on other real property.

Figure 1 in Section 2 provides first evidence for the variation in the strength of the expansion across municipalities: there is variation of the share of full-day slots over the years under study (the mean is growing from 30.1 % in 1998 to 41.5 % in 2006) and at the same time there is high variation in every year across municipalities. Further evidence for the expansion of full-day slots varying by starting time and intensity across the 75 municipalities provides Figure 2. We divide the municipalities in two groups: municipalities expanding their full-day slots by more than the median expansion between 1998 and 2006 (the initial years) and municipalities expanding their full-day slot supply by less than the median expansion between 1998 and 2006. As Figure 2 shows, during the period under study (1998-2006) we observe differential time trends – there are quick and slow expanders. In the long-run, however, they all expand and there is even convergence – the quick expanders slow down and the slow expanders catch up. Figure 3 finally addresses the question of within-municipality variation. The figure reports the overall variation (net of the cohort trend), the within-municipality variation (net of the cohort trend), and the within-municipality variation conditional on all control variables (child, family, care center and regional characteristics as well as a set of cohort fixed effects). Obviously, variation shrinks substantially when conditioning on municipality dummies, but the support of the supply of full-day slots is still remarkably large. Conditioning on the set of control variables does not affect the variation by much.

Figure 2: Expansion of the Share of Full-Day Slots of Below- and Above-Median Expanders
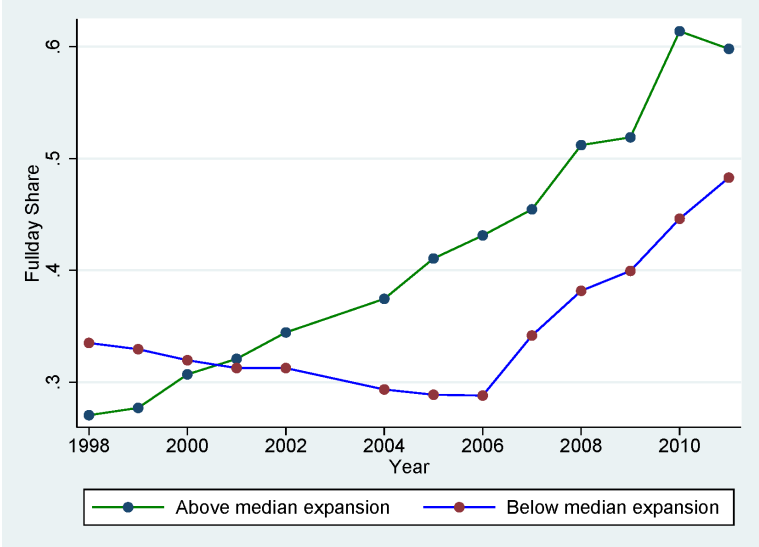
Notes: This graphs is produced using Epanechnikov kernel regressions. The share of full-day slots is expressed as municipality mean weighted by the number of children. The group of above-median expanders includes those municipalities that experienced an above median growth between 1998-2006. The group of below-median expanders includes the other municipalities.

Source: Statistics of the *Child and Youth Services in Germany*, Own calculations.

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Figure 3: Variation in the Share of Full-Day Slots
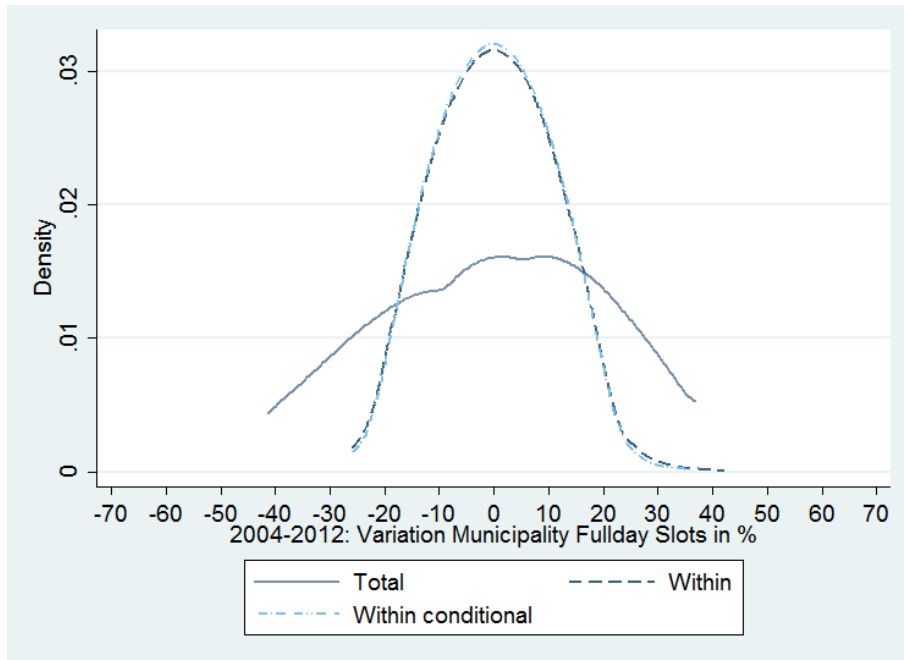
Notes: This graph plots the variation in the share of full-day slots over all child care slots for the school entrance cohorts 2004-2012; the solid line plots the overall varia- tion (net of the cohort trend), the dashed line plots the within municipality variation, and the dashed-dotted line plots the within municipality variation conditional on all control variables (child, family, care center and regional characteristics as well as a set of cohort fixed effects). The graph is produced using Epanechnikov kernel regression. Source: Statistics of the *Child and Youth Services in Germany*/School entrance ex- amination 2004-2012/INKAR/Statistik-Nord. Own calculations.

We now turn to the second major threat to our identification strategy, the exogeneity of the municipality-specific speed of the full-day expansion. As described in Section 2, municipalities received substantial funding to expand their supply of full-day slots. Besides municipalities' need for expanding the number of full-day slots – proxied by the number of children in preschool age and the number of working mothers (both part- and full-time) –, the most restrictive eligibility criteria for receiving funds was municipalities' readiness. As such, one may be concerned that municipalities lobbying strongly enough were first in receiving funds. Given the fact that in the long-run a large part of the operating costs of child care centers is borne by the municipalities, one may further worry that it is mainly municipalities with a strong economic standing that expand their supply of full-day slots. At the same time one may be concerned that municipalities cut down on other social expenditures or levy more taxes to finance the expansion of full-day slots. While individual taxes and social benefits are set on the federal level, municipalities may levy corporate taxes as well as taxes on real property to finance the expansion and thus pass on the financial burden to the local economy. Yet, it is unlikely that municipalities are willing to damage its attractiveness as a business location in order to satisfy the demand for more full-

day care. Finally, despite strict quality regulations provided and enforced by the local Youth and Welfare Services, one may worry that a rapid expansion of full-day slots comes along with concessions in care centers' quality, e.g., due to difficulties to recruit adequately trained staff.

To shed some light on the driving forces behind the expansions in full-day care, we regress each municipality's full-day share expansion between 1998 and 2006 – a proxy for early expanders and the respective intensity of the expansion – on the set of municipality and care center features prior to the reform (measured in 1998). Results in Table 3 show that the early and particularly strong expanders were municipalities that had a low share of full-day slots prior to the reform (i.e., those that had to catch up) and those that had a higher share of child care staff already working on a full-time basis (i.e. those who had fewer constraints on the supply side). Importantly, these features are exactly the features entering the priority lists made by Child and Youth Welfare Services providing subsidies to the municipalities. There is no further municipality-specific socio-economic feature correlating with the intensity of the expansion.

Table 4 provides another perspective and shows which regional characteristics change simultaneously with the share of full-day slots over time.[19] In line with the revisions of the child care law we observe a strong trend in the share of full-day slots over time. Importantly, there is no sign that municipalities simultaneously plan the expansion of full-day sots and the expansion of slots in early care. There is also no indication that expansions in full-day care are correlated with changes in care provided to 3-6-year-olds. The p-value resulting from an F-test for overall significance of coverage in early care and kindergarten is 0.765. The expansion in the share of full-day slots is also uncorrelated with the observable municipality features. The exception is the relative power of the political parties represented in a municipality. To be precise: in regions, where the social democrats enjoy a relatively stronger representation than the more conservative Christian democrats (by 1 ppt), the share of full-day slots is on average 2 ppt higher. This is also true for regions where smaller parties enjoy a relatively stronger representation (1 ppt more representation is related to a 1.2 ppt stronger expansion). Finally, there is no evidence for concessions in care centers' quality when expanding the opening hours.

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[19]In an alternative regression, shown in Table A.2 we control for all municipality features in the previous year. This accounts for possible planning of the expansion of full-day slots. Results are basically unchanged.

Table 3: Pre-reform Determinants of the Expansion of Full-Day Slots

	Expansion of Fullday Share 1998-2006
Fullday Share in 1998	-0.979***
	(0.103)
Coverage 0-3 years old (in %) in 1998	-0.018
	(0.020)
Coverage 3-6 years old (in %) in 1998	0.006
	(0.006)
Public provider(in %) in 1998	0.001*
	(0.001)
Other provider (in %) in 1998	0.001*
	(0.001)
Staff: fulltime (in %) in 1998	0.005***
	(0.001)
Children per group in 1998	-0.004
	(0.003)
Age of staff (years) in 1998	-0.007
	(0.006)
Staff: male (in %) in 1998	0.002
	(0.002)
Staff: pedagogical degree (in %) in 1998	-0.000
	(0.001)
Citizens per km2 in 1998	-0.000
	(0.000)
Fulltime-Employed female (in % of total working) in 1998	0.001
	(0.001)
Employed female (in %) in 1998	0.002
	(0.004)
Share 0-6-y-old children (in %) in 1998	-0.011
	(0.016)
Votes for Social Democrats (in %) in 1998	-0.022
	(0.018)
Votes for other parties (in %) in 1998	0.022
	(0.028)
Log of GDPpc (in 1000Euro/Citizen) in 1998	-0.002
	(0.010)
Local business tax rate in 1998	0.205
	(0.130)
Local tax rate on agrarian real property in 1998	-0.092
	(0.112)
Local tax rate on other real property in 1998	0.003
	(0.087)
Municipality FE	No
Joint significance - Slots (p-Value)	0.106
Joint significance - Institution (p-Value)	0.061
Joint significance - Center (p-Value)	0.000
Joint significance - Regional (p-Value)	.022
Adj. R2	.779
Children	93570

Notes: This table shows the coefficients of the OLS estimates of the expansion of full-day slots between 1998-2006 on regional characteristics in 1998. Standard errors are clustered at the municipality level and are shown in parenthesis: *p < 0.10, ** p<0.05, ***p<0.010.
Source: Statistics of the *Child and Youth Services in Germany*/School entrance examination 2004-2012/INKAR/Statistik-Nord. Own calculations.

Table 4: Correlates of the Expansion of Full-Day Slots

	Full-Day Share at Birth
Cohort 2005 (D)	0.015**
	(0.007)
Cohort 2006 (D)	0.031**
	(0.015)
Cohort 2007 (D)	0.049**
	(0.021)
Cohort 2008 (D)	0.098***
	(0.029)
Cohort 2009 (D)	0.119***
	(0.030)
Cohort 2010 (D)	0.139***
	(0.031)
Cohort 2011 (D)	0.215***
	(0.054)
Cohort 2012 (D)	0.229***
	(0.057)
Coverage 0-3 years old (in %)	0.001
	(0.008)
Coverage 3-6 years old (in %)	-0.002
	(0.003)
Public provider(in %)	-0.000
	(0.001)
Other provider (in %)	-0.001
	(0.001)
Children per group	-0.003
	(0.004)
Age of staff (years)	-0.008
	(0.007)
Staff: male (in %)	-0.000
	(0.003)
Staff: pedagogical degree (in %)	-0.001*
	(0.001)
Staff: fulltime (in %)	0.006***
	(0.002)
Citizens per km2	-0.001
	(0.001)
Employed female (in %)	0.003
	(0.005)
Fulltime-Employed female (in % of total working)	-0.000
	(0.001)
Share 0-6-y-old children (in %)	0.034
	(0.025)
Votes for Social Democrats (in %)	0.020**
	(0.009)
Votes for other parties (in %)	0.012*
	(0.007)
Log of GDPpc (in 1000Euro/Citizen)	0.079
	(0.130)
Local business tax rate	-0.120
	(0.157)
Local tax rate on agrarian real property	0.006
	(0.073)
Local tax rate on other real property	-0.045
	(0.060)
Municipality FE	Yes
Reference year/cohort	2004
Joint significance - Slots (p-Value)	0.765
Joint significance - Institution (p-Value)	0.887
Joint significance - Center (p-Value)	0.001
Joint significance - Regional (p-Value)	.043
Adj. R2	0.939
Children	93570

Notes: This table shows the coefficients of the OLS estimates of the share of full-day slots. Regressions control further for a full set of municipality dummies and a constant term. Standard errors are clustered at the municipality level and are shown in parenthesis: *p < 0.10, ** p<0.05, ***p<0.010.
Source: Statistics of the *Child and Youth Services in Germany*/School entrance examination 2004-2012/INKAR/Statistik-Nord. Own calculations.

Taken together, the only remaining threat to identification are municipality-specific changes over time that are orthogonal to the municipality and care center characteristics we already control for, but correlate with the municipality-specific variation in the share of full-day slots and children's development – a threat to identification which is hard to imagine. We are also unaware of any further reform of the education system that might differentially affect children belonging to different cohorts. In any case, if there were one, the educational system is regulated at the state level and thus any change should be controlled for by the set of cohort fixed effects. Thus, we are confident that the observed variation in timing of the expansion of the share of full-day slots is – conditional on the controls presented above – due to unplanned, non-systematic delays, e.g. delays in the construction of full-day care facilities, in the search for employees, in administrative decision-taking.

5 Results

5.1 Baseline results

We now present our estimates of the impact of extending the opening hours of child care centers from a half-day schedule to a full-day schedule on children's development. As previously discussed, we stratify our analysis according to the following child and family characteristics: migration background, parental education and parental cohabitation status. To ease interpretation, we look at mutually exclusive groups, but given the rather low number of observations we abstain from analyzing immigrant children from a high-educated family background and immigrant children living in a single parent household. Table 5 shows the estimates for the different subgroups resulting from estimating equation 1 using OLS and clustering the standard errors at the municipality level.

Comparing the estimates resulting for native children with high-educated parents versus native children with low-educated parents provides interesting insights: while children from a more educated family background are not affected by the observed expansion in full-day slots, children from a less educated family background experience substantial losses in terms of their socio-emotional development: the expansion under study (11 full-day slots per 100 children on average) implies a deterioration of these children's socio-emotional maturity by 2.6 ppt which corresponds to 0.07 sd. Strong detrimental effects in terms of socio-emotional maturity also arise among children living with one parent only: in their case the expansion under study implies a deterioration of 3.6 ppt or 0.08 sd. We, however, do not observe any effects of the expansion of full-day care on the overall school readiness or motor skill development, neither for children from a low-educated nor from a single parent household.

Table 5: Baseline Results: Effects of the Share of Full-Day Slots on Child Development

	School Readiness	Motor skills	Socioemotional maturity
Native high-educated parents			
Share of full-day slots	0.013	0.061	-0.103
	(0.034)	(0.086)	(0.083)
Adj. R2	0.038	0.088	0.073
Observations	16410	16410	16410
Native low-educated parents			
Share of full-day slots	0.027	0.013	-0.239***
	(0.050)	(0.069)	(0.085)
Adj. R2	0.091	0.088	0.096
Observations	51937	51937	51937
Single parents			
Share of full-day slots	0.011	0.126	-0.330***
	(0.091)	(0.115)	(0.107)
Adj. R2	0.095	0.089	0.099
Observations	12006	12006	12006
Immigrant parents			
Share of full-day slots	0.299***	0.071	-0.351***
	(0.112)	(0.116)	(0.118)
Adj. R2	0.128	0.068	0.084
Observations	8054	8054	8054
Municipality Fixed Effects	Yes	Yes	Yes
Cohort Fixed Effects	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes
Regional Controls	Yes	Yes	Yes
Quality Controls	Yes	Yes	Yes

Notes: This table displays the estimates resulting from an OLS regression of the three respective children's development indicators (dummies equal to one if there is no development problem) at school entrance on the share of full-day slots measured in children's year of birth and on the full set of individual, regional and care center characteristics as well as a set of municipality and cohort dummies. The table shows the regression results for four mutually exclusive subgroups – native children with high educated parents, native children with low educated parents, single parents (which contain only native children given the rather low number of observations of single parents with a migration background) and immigrant children (which contain only children with low educated parents given the rather low number of immigrant families where both parents are qualified to attend university). Standard errors are clustered at the municipality level.

Source: Statistics of the *Child and Youth Services in Germany*/School entrance examination 2004-2012/INKAR/Statistik-Nord. Own Calculations.

Turning to immigrant children reveals further crucial insights. Analogue to the native children with a low-educated parental background, also immigrant children suffer from the expansion of full-day care in terms of their socio-emotional development: the expansion under study implies a slight, but not significantly stronger deterioration of the socio-emotional maturity for immigrant children than for native children (3.9 ppt vs. 2.6 ppt or 0.11 sd vs. 0.07 sd). Yet, there is another notable, highly policy relevant difference in the effect of full-day care between native and immigrant children. In contrast to native children immigrant children benefit substantially from the expansion of full-day care in terms of how prepared they are for primary school: the observed expansion leads to an increase in immigrant children's overall school readiness by 2.6

ppt or 0.07 sd. This improvement is substantial in light of the raw gap between immigrant and native children which conditional on the parental education background amounts to 5.6 ppt (86.4 % of all native children from a rather low-educated family background are assessed to be ready for school, while only 80.8 % of the respective group among immigrant children are): the expansion under study closes this gap by almost half.

The differences in the results observed for the various subgroups rise questions regarding the role of motherly care versus care provided by trained child care workers for children's development. It likely hints towards center-based care and the employed staff playing an important role for fostering the development of children in dimensions where parents lack relative competence (e.g., knowledge of the local language in the case of parents with migration background). Yet, besides variation in the quality of motherly care, there may also be variation in quality of the care centers attended by children from different family backgrounds, e.g., due to residential segregation. Moreover, there is the question regarding the take-up of the newly generated full-day slots, which may not be homogeneous among children belonging to the different subgroups. Unfortunately, the administrative data at hand do not allow us to dig deeper into these issues – we lack information on the individual care providers and thus cannot make any statement regarding take-up or counterfactual care. In Section 6 we therefore rely on an alternative dataset, the so-called *Families in Germany* survey, and shed more light on these questions. Yet, before doing so, we assess the robustness of the baseline results.

5.2 Robustness

Results coming from our baseline specification rest upon several assumptions which we address and test in turn. Table 6 shows the results of the respective alternative specifications.

First, our baseline specification controls for the share of full-day slots and a series of municipality and care center features simultaneously, specifically in the year of child birth. To account for the potential lag when full-day slots actually open up once demand is predicted (using specific features of the municipality and the existing care centers, see Section 2 for details), we test the robustness of our results when measuring both municipality and care center features in the year prior to child birth and thus one year prior to measuring the share of full-day slots (see Table 6, Panel A). In an alternative specification we use the average share of available full-day slots in the years when a child is between 0-6 years old and thus across the years when a child is potentially enrolled in day care (see Table 6, Panel B). While this specification likely reflects the probability whether a child is indeed enrolled in full-day care better, it may be endogenous to parental demand, a threat we aim to address in our baseline specification.[20] Finally, our baseline specification rests upon the assumption that there are no municipality-specific changes

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[20]Recall, data on full-day slots and care center features refer to all children enrolled in care centers. As such, these features cannot be disaggregated by age groups.

over time that are orthogonal to the characteristics we already control for but correlate with children's development. While it is hard to come up with any systematic difference within a municipality over time that is likely to drive the expansion of full-day slots and affects children's development beyond the conditions we already account for, we additionally provide estimates where we allow for region-specific time trends (see Table 6, Panel C).

Table 6 shows the results of the three alternative specifications for all subgroups. Opting to control for the key predictors of required demand for full-day slots in the year prior to measuring actual full-day slots barely changes the results (see Panel A, Table 6). Results are also fairly robust when opting to control for the average share of full-day slots available over a child's total preschool period (Panel B, Table 6) – the exception is the negative effect on the socio-emotional maturity of native children with low-educated parents which not only loses precision but also decreases by more than half. Finally, allowing for region-specific linear time trends, decreases magnitude and precision of the estimates for all subgroups with the exception of immigrant children: the negative effect on their socio-emotional maturity stays equally strong, while the positive effect on their school readiness loses precision (the standard error almost doubles), but its magnitude does not change.

Table 6: Robustness Checks: Effects of the Share of Full-Day Slots on Child Development

	School Readiness	Motor skills	Socioemotional maturity
Panel A: Lagged Determinants of Full-day slots			
Native high-educated parents			
Share of full-day slots	0.020	0.008	-0.063
	(0.033)	(0.082)	(0.095)
Native low-educated parents			
Share of full-day slots	0.057	0.035	-0.215**
	(0.046)	(0.071)	(0.089)
Single parents			
Share of full-day slots	0.074	0.147	-0.320***
	(0.080)	(0.114)	(0.106)
Immigrant parents			
Share of full-day slots	0.294***	0.019	-0.334**
	(0.098)	(0.117)	(0.144)
Panel B: Full-day slots at age 0-6 years			
Native high-educated parents			
Share of full-day slots	0.004	-0.137	-0.044
	(0.083)	(0.152)	(0.130)
Native low-educated parents			
Share of full-day slots	0.065	-0.086	-0.102
	(0.070)	(0.149)	(0.128)
Single parents			
Share of full-day slots	0.164	0.040	-0.384**
	(0.108)	(0.242)	(0.163)
Immigrant parents			
Share of full-day slots	0.398**	0.176	-0.496**
	(0.164)	(0.292)	(0.248)
Panel C: County-specific time trends			
Native high-educated parents			
Share of full-day slots	0.029	0.051	-0.016
	(0.038)	(0.088)	(0.086)
Native low-educated parents			
Share of full-day slots	-0.019	-0.086	-0.082
	(0.048)	(0.068)	(0.079)
Single parents			
Share of full-day slots	0.045	0.007	-0.095
	(0.104)	(0.143)	(0.110)
Immigrant parents			
Share of full-day slots	0.262	-0.165	-0.334*
	(0.172)	(0.121)	(0.176)
Municipality Fixed Effects	Yes	Yes	Yes
Cohort Fixed Effects	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes
Regional Controls	Yes	Yes	Yes
Quality Controls	Yes	Yes	Yes

Notes: This table displays, separately for the four subgroups, the estimates resulting from an OLS regression of the three respective children's development indicators at school entrance on the share of full-day slots using three alternative specifications. In panel A, all regional and care center characteristics are measured one year prior the year that the share of full-day slots is measured. In panel B, the average share of available full-day slots across the years when a child is born and the year when the child turns 6 years old is built, and in the same vein the average of the center and regional characteristics is built. In panel C, a county-specific time trend is added to the baseline specification. Standard errors are clustered at the municipality level.
Source: Statistics of the *Child and Youth Services in Germany*/School entrance examination 2004-2012/INKAR/Statistik-Nord. Own Calculations.

6 Discussion – Take-up, Counterfactual Care Modes and Mechanisms

The estimation results – based on the SEE data – show that prolonging the opening hours of child care centers benefits immigrant children's cognitive skills, but harms the socio-emotional development of all children with the exception of children from a high-educated parental background. The differential effects raise interesting questions regarding the role that parents and care centers play when it comes to children's development across different skill domains. Yet, as stated earlier, the effects presented so far are intention-to-treat effects and given the lack of information on take-up and counterfactual care modes we can only speculate about the underlying mechanisms. In order to dig deeper into these issues and gain at least some intuition on the mechanisms driving the results, we draw on additional survey data, *Familie in Deutschland* (FiD) available for a group of children comparable to the children in our baseline sample.

FiD is provided by the *Deutsches Institut für Wirtschaftsforschung* (DIW) and forms part of the well-established German Socio-Economic Panel (SOEP). The FiD data are based on family surveys and include birth cohorts from 2004-2007, i.e. we have an overlap between 2004 and 2006 between the cohorts contained in our baseline data and the FiD data. Families are interviewed when their children are 4-5 years old, i.e. they are on average one year younger than children in the SEE. Like the SEE, the FiD provides us with information on children's socio-emotional maturity using the SDQ questionnaire. Unlike the SEE data, the FiD data cover the total German territory. We restrict the analysis to West Germany, given the initially rather low coverage with full-day slots and end up with 1,103 children living in 251 counties. Table A.3 in the Appendix shows descriptive statistics of the child characteristics in the FiD data and compares them with those in the SEE data.

Take-up The main advantage of the FiD data is the included information on children's actual care mode, including the actual hours. As such, we can address the question of take-up and calculate back-of-the-envelope estimates for the subgroup specific treatment effects. Table 7, Panel A presents the results when regressing individual child care attendance on a full-day basis on the supply of full-day slots available in the municipality and year of birth while controlling for a set of cohort dummies and individual, regional and care center characteristics. Given the rather small samples available for the subgroups (the biggest subgroup comprises native children with low-educated parents, 640 children, the second biggest native children with high-educated parents, 262 children, followed by immigrant children, 164 children, and finally children from a single parent household, 99 children) we abstain from controlling for municipality fixed effects.

Take-up rates vary substantially, even if not significantly across subgroups – in fact, none of the estimates is significant which is likely due to a power problem. The highest take-up rate

is observed for immigrant children: in case of an available full-day slot, immigrant children are 87.9 % likely to take it. This effect may be (at least partially) explained by the priority given to high-immigrant density regions when it comes to distributing subsidies and the priority given to children with migration background when it comes to allocating available full-day slots. Thus, the strong ITT effects observed for immigrant children may be in part explained by the fact that immigrant children are actually the (or at least one) target of the expansion of full-day slots. Children from a high-educated family background rank second when it comes to their probability to take advantage of a newly opened full-day slot: their take-up rate amounts to 31.5 % and likely reflects their parents' work orientation and thus interest in having their children taken care off on a full-day basis. Take-up rates are much lower among native children from a disadvantaged family background, such as low parental education or single parents (16.1 % and 13.1 %, respectively) reflecting their lower degree of information about newly available slots and their probably lower effort when signing up for a slot.

	High-Educated Native Parents	Low-Educated Native Parents	Single Parents	Immigrant Parents
Panel A: Take-up				
Fullday Share	0.315	0.161	0.131	0.879
	(0.461)	(0.255)	(0.743)	(0.597)
Panel B: Counterfactual				
Care modes				
Hours: Creche	13.87***	16.74***	19.22***	16.29***
	(0.735)	(0.683)	(1.779)	(1.196)
Hours: Father	4.180	3.491*	0.0355	-0.713
	(3.818)	(1.792)	(0.0949)	(3.181)
Hours: Extended family	-0.563	0.719	-1.287	1.923*
	(0.674)	(0.653)	(2.174)	(1.145)
Hours: Childminder & others	0.0684	0.146	0.554	-0.135
	(0.228)	(0.107)	(0.430)	(0.140)
Panel C: Channels				
Maternal employment				
Mother works	0.172**	0.179***	0.008	0.165**
	(0.0752)	(0.0441)	(0.118)	(0.0822)
Fulltime-employed mother	0.136**	0.0970**	-0.0945	0.0591
	(0.0636)	(0.0376)	(0.116)	(0.0696)
Actual working hours of mother	7.928***	7.715***	1.872	4.974*
	(2.579)	(1.462)	(3.720)	(2.779)
Net income of mother	450.5*	222.8***	-0.531	345.9**
	(241.4)	(65.88)	(186.8)	(147.6)
Activities				
Outdoor Activities	-0.0438	-0.0262	-0.0884	-0.0810
	(0.0451)	(0.0265)	(0.103)	(0.0649)
Indoor Activities	0.0151	-0.0172	-0.0220	-0.0848
	(0.0351)	(0.0210)	(0.0531)	(0.0597)
Passive Activities	0.110*	0.0191	0.202*	-0.115
	(0.0560)	(0.0399)	(0.109)	(0.0873)
N	262	640	99	164

Notes: This table shows evidence from an alternative dataset, the *Familie in Deutschland*-survey conducted by the *DIW Berlin*. The data stem from parents' interviews, conducted between the years 2010-2013, on 1103 children living in 251 counties in West Germany who were born between 2004-2007. Panel A shows the coefficients of regressions of the actual full-day care attendance on the county's fullday share (i.e. the take-up rate). Panel B shows the weekly hours a child is taken care of by someone other than the mother. Panel C shows the labor market participation of the mother. Labour net income is measured in Euro/month and working hours in hours/week. Furthermore, Panel C displays activities the mother is undertaking with her child (dummy equals one if an activity is undertaken at least several times a week). The variables of interest are regressed on full-day attendance controlling for individual characteristics, regional characteristics, quality characteristics of child care settings as well as for state and year effects. Standard errors are clustered at the county level and shown in parentheses: * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

Source: *Familie in Deutschland*. Statistics of the *Child and Youth Services in Germany*. INKAR. Statistik-Nord. Own calculations.

Counterfactual Care Modes: The information on children's actual hours spent with alternative caregivers allows us furthermore to address the question regarding the counterfactual care mode. The FiD survey provides us with information on the hours spent in center-based care, with the father, with members of the extended family or with a paid child minder. The omitted

category – which is in line with the rather conservative society assuming that motherly care is the default option – is the mother. Panel B of Table 7 shows the conditional differences in the hours spent with alternative care providers between children enrolled in a care center on a full-day basis versus children enrolled in a care center on a half-day basis. Specifically, it shows the results when regressing the actual number of hours children are taken care of by alternative care providers on a dummy indicating child care attendance on a full-day basis (the omitted category being child care attendance on a half-day basis given an average enrollment rate above 90 %) while controlling for a set of cohort dummies and individual, regional and care center characteristics. We again abstain from controlling for municipality fixed effects.

By definition, children attending a care center on a full-day basis spend more time in a care center than children attending a care center on a half-day basis. This difference varies across subgroups and ranges between 13.87 hours per week (which amounts to almost 3 hours per day) for children from a high-educated family background to 19.22 hours per week (or almost 4 hours per day) for children from a single parent household. Strikingly, there are no further notable differences in the hours children spent with other caregivers – the exception being native fathers which take over some, but not significantly more child care duties. We can thus infer that the main substitution takes place between hours provided by the mother and the care center. As noted previously, this is an important contrast to previous studies focusing on the US or Canada which are settings with more private market oriented child care systems. This difference may be explained by highly subsidized child care centers as well as a quite generous tax scheme and labor market legislation making it (financially) more attractive for mothers with young children to stay at home. In sum, given the child care infrastructure in Germany it is very unlikely that the counterfactual care would be non-maternal care in absence of full-day care slots.

In light of this counterfactual care scenario we may speculate about the relative role of mothers and trained staff employed in care centers in fostering children's development across different skill domains. Trained staff may substitute parents in specific skill domains where parents lack competence. The beneficial effect of attending child care on a full-day basis on immigrant children's school readiness is one example for such a substitution effect: parents with a migration background likely lack knowledge in the local language, an indispensable skill when it comes to being assessed ready for primary school. The negative effect on the socio-emotional development of children from disadvantaged backgrounds may be another example for such a substitution effect. The attachment theory postulates that the separation from the primary caregiver – who in most cases is the mother – causes anxiety and stress of children (Bowlby, 1969; Mercer, 2006). In other words, time spent with the mother is crucial for the development of children's emotional skills. As a consequence, this theory could explain why we find negative effects of full-day care – leading to a reduction of valuable time spent with the mother – on children's socio-emotional maturity. The absence of a negative effect on the socio-

emotional development of native children from a high-educated background may be explained by various facts, among others by educational disparities in parenting styles documented by a well-established literature in psychology and sociology (see Hsin and Felfe (2014), for an overview). Another explanation may be the relative better quality of care centers frequented by children from advantaged backgrounds, an issue we discuss further at the end of this section.

Mechanisms: We finally assess several indirect channels through which center-based care may exert its effects on children's skill development: maternal employment and thus income effects, spillover effects on parenting styles as well as heterogeneity in care center quality. Panel C, Table 7 displays the respective estimates of regressing a set of maternal employment outcomes as well as maternal activities undertaken with the child on a binary variable indicating whether the child attends child care on a full-day basis while controlling for a set of child, family, regional and care center characteristics. Due to sample size issues we again abstain from controlling for municipality fixed effects.

As previously discussed center-based care frees maternal time and thus enrolling children in care centers on a full-day basis likely helps mothers to engage in employment. And indeed, we observe a positive conditional difference in employment at both the extensive as well as the intensive margin between mothers whose children are enrolled in child care on a full-day basis and mothers whose children are enrolled on a half-day basis only, an effect which is true for all subgroups with the exception of single mothers. The effect on employment at the extensive margin ranges between between 16.5 and 17.9 ppt and the effect at the intensive margin goes up to 13.6 ppt. Specifically, high-educated mothers are 17.2 ppt more likley to work at all and 13.6 ppt more likely to work on a full-time basis when their child attends center-based care on a full-time basis which translates into an increase of 7.9 working hours per week. In terms of available net income, this imploes an increase of 450.5 Euro/month. Among native low-educated mothers are 17.9 ppt more likely to work, but only 9.7 % more likely to work full-time which translates into an increase of 7.7 working hours per week on average. The estimated effect on the net income of native low-educated mothers amounts to 222.8 Euro/month. Finally, immigrant mothers work about 5 hours per week more which stems from an increase at the extensive margin (by 16.5 ppt), not however from an increase at the intensive margin. This increase in employment is paralleled by an increase in mothers' net income by 345.9 Euro/month.

One would expect the observed increase in families' net income (due to positive maternal labour market participation effects of full-day care supply) to lead to positive effects on children's skills (Dahl and Lochner, 2012; Gonzalez, 2013). The increase in financial resources could be used, for example, to provide material compensation for the reduction of maternal time spent with the child. Another example of how children would be affected by the income gain could be a reduction of maternal stress: mothers could use the additional income to outsource household

chores enabling them to spend more quality time with their child. Nevertheless, this positive effect is only revealed for the cognitive skill development of immigrant children.

The bottom part of Panel C in Table 7 provides evidence on the activities mothers undertake with their children on a daily basis when their children are enrolled in child care on a full-day basis instead of half-day basis. Care centers have the clear educational mission to develop children's motor, language, and pattern-recognition skills. Staff members support the development of these skills by engaging children in playful activities. In addition, center staff are in close contact to parents and may not only provide valuable feedback on the child's development, but also stimulate development-enhancing parenting practices; in other words, there may be positive spill-over effects on parents' child caring practice. Analysing the data at hand, which provide us on the frequency (on a daily basis) of a range of child-mother interactions, however, does not provide any evidence on spill-over effects on parents' child caring practices (see Panel C in Table 7). If anything we see that children (of high-educated native parents and single parents) who are enrolled in child care on a full-day basis are more likely to pursue more passive activities such as watching TV, playing computer games and going shopping.

Finally, we assess the possibility that care center quality varies across the subgroups, e.g. in terms of structural quality or the socioeconomic composition of the children attending a center. As previously mentioned we only possess such information on the municipality level and as such we can only assess variation in these characteristics arising due to residential segregation. Using information on the structural quality measures provided by the statistics of the *Child and Youth Services in Germany* we provide some intuition whether structural quality correlates with the socio-economic composition of a municipality. For this purpose, Table A.4 in the appendix displays the average quality across a series of indicators in the lowest and highest quartile of the respective subgroups (high-educated parents, single parents, immigrant parents). indeed, two groups are likely to attend care centers of a higher structural quality: children of high-educated parents as well as children of immigrant ancestry are more likely to be in smaller playgroups (19 children vs. 23 children per group resp. 20 vs. 22 children per group) and have more educated staff (67% vs. 60% with pedagogical degree resp. 63% vs. 60% with pedagogical degree). While there is some evidence for different quality of care across subgroups, it is unlikely to fully explain the differences in the effects found for the various subgroups.

7   Conclusion

This study investigates the consequences for children's skill development when shifting from a child care regime offering care on a half-day basis to a regime offering care on a full-day basis. We rely on two particularly rich administrative data sources for one West German state – data from school entrance examinations and records on the supply and quality of child care centers.

Our identification strategy relies on several reforms triggering the expansion of full-day slots in public child care. Specifically, we exploit the municipality-specific deviations from the overall trend in the timing of the expansion. We focus on four subgroups of children who potentially accrue very different gains or losses from center-based care: native children with high-educated parents, native children with low-educated parents, immigrant children and children living in a single parent household.

Our analysis reveals that children of immigrant ancestry are better prepared for primary school when attending center-based care on a full-day basis instead of attending it on a half-day basis – a finding which is most likely explained by center staff having a relative advantage to train children's language skills in comparison to immigrant parents. Yet, we also find that this subgroup of children suffers in terms of their socio-emotional development when spending more hours in child care. This negative impact on children's socio-emotional development is also prevalent among children from other disadvantaged backgrounds, such as native children with low-educated parents and children living in a single parent household.

Our findings are interesting from two points of view: first, they highlight that the consequences of center-based care on child development depend on the quality of the alternative care modes. Second, they make clear that the returns to time investments for children's skills are likely to be non-linear and thus, one cannot just rely on findings from studies analyzing, for instance, the effects of center-based care functioning on a half-day basis to extrapolate the effects of full-day care on children's skill development.

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A Appendix

Table A.1: Descriptive Statistics on Care Centers and Regional Characteristics

	High-Educated Native Parents	Low-Educated Native Parents	Single Parents	Immigrant Parents
Panel A: Child Care				
Coverage 0-3 years old at Birth	4.79	4.239	4.738	4.988
	(2.534)	(2.449)	(2.649)	(2.681)
Coverage 3-6 years old at Birth	82.455	81.999	82.883	83.744
	(6.495)	(6.545)	(7.052)	(6.594)
Fullday Share	.344	.313	.379	.401
	(.192)	(.203)	(.194)	(.171)
Public provider (in %)	20.071	20.6	21.774	20.965
	(16.204)	(16.761)	(14.728)	(14.039)
Other provider (in %)	39.196	36.434	39.061	40.006
	(17.539)	(18.729)	(16.89)	(16.23)
Church provider (in %)	40.732	42.966	39.165	39.029
	(19.122)	(19.29)	(17.169)	(16.046)
Children per group	19.523	20.241	19.714	19.438
	(3.046)	(3.506)	(3.027)	(2.606)
Age of staff (years)	38.138	38.233	37.999	37.967
	(2.396)	(2.369)	(2.27)	(2.227)
Staff male (in %)	4.588	4.142	4.918	5.11
	(3.382)	(3.322)	(3.184)	(3.02)
Staff: pedagogical degree (in %)	62.868	61.768	61.369	62.043
	(9.645)	(9.878)	(8.928)	(8.131)
Staff: fulltime (in %)	35.828	34.183	38.493	40.514
	(14.151)	(15.3)	(13.008)	(10.093)
Panel B: Regional Characteristics				
Citizens per km2	1021.566	950.358	1178.087	1365.376
	(712.879)	(708.535)	(679.224)	(608.244)
Employed female (in %)	44.574	44.208	44.258	44.531
	(2.609)	(2.722)	(2.587)	(2.631)
Fulltime-Employed female (in % of total working)	64.053	63.972	64.035	63.843
	(5.438)	(5.686)	(4.591)	(3.687)
Share 0-6-y-old children (in %)	5.768	5.865	5.68	5.665
	(.813)	(.829)	(.738)	(.707)
vote share for social democrats county in %	43.986	44.365	45.045	44.763
	(3.657)	(3.705)	(3.714)	(3.897)
vote share for CDU and FDP in %	42.262	42.379	41.078	40.994
	(4.281)	(4.207)	(4.469)	(4.425)
vote share for other parties in %	13.752	13.256	13.877	14.242
	(3.035)	(2.958)	(3.246)	(3.229)
Log of GDPpc (in 1000Euro/Citizen)	3.207	3.193	3.252	3.268
	(.229)	(.225)	(.235)	(.229)
Local business tax rate	3.506	3.477	3.638	3.661
	(.535)	(.512)	(.525)	(.497)
Local tax rate on agrarian real property	2.926	2.936	3.068	3.113
	(.487)	(.488)	(.482)	(.464)
Local tax rate on other real property	3.335	3.304	3.559	3.606
	(.822)	(.788)	(.799)	(.753)
N	16410	51937	12006	8054

Notes: These individual descriptives are based on the regional characteristics in the year of birth of the school entrance cohorts 2004-2012. Standard deviations in parentheses.

Source: Statistics of the *Child and Youth Services in Germany*/INKAR/Statistik-Nord. Own calculations.

Table A.2: Determinants of the Share of Fullday Slots using lagged municipality features

	Full-Day-Share at Age 1
Cohort 2005 (D)	0.014*
	(0.008)
Cohort 2006 (D)	0.027*
	(0.015)
Cohort 2007 (D)	0.046**
	(0.021)
Cohort 2008 (D)	0.094***
	(0.025)
Cohort 2009 (D)	0.113***
	(0.026)
Cohort 2010 (D)	0.130***
	(0.027)
Cohort 2011 (D)	0.205***
	(0.048)
Cohort 2012 (D)	0.255***
	(0.053)
Coverage 0-3 years old (in %)	0.003
	(0.006)
Coverage 3-6 years old (in %)	-0.002
	(0.003)
Public provider (in %)	-0.000
	(0.001)
Other provider (in %)	-0.000
	(0.001)
Children per group	-0.002
	(0.003)
Age of staff (years)	-0.003
	(0.005)
Staff: male (in %)	-0.002
	(0.004)
Staff: pedagogical degree (in %)	-0.001*
	(0.001)
Staff: fulltime (in %)	0.005***
	(0.001)
Citizens per km2	-0.001
	(0.001)
Employed female (in %)	0.006
	(0.004)
Fulltime-Employed female (in % of total working)	0.001
	(0.001)
Share 0-6-y-old children (in %)	0.024
	(0.021)
Votes for Social Democrats (in %)	0.017**
	(0.008)
Votes for other parties (in %)	-0.008
	(0.007)
Log of GDPpc (in 1000Euro/Citizen)	0.007
	(0.103)
Local business tax rate	-0.096
	(0.146)
Local tax rate on agrarian real property	-0.036
	(0.065)
Local tax rate on other real property	0.035
	(0.045)
Municipality FE	Yes
Reference year/cohort	2004
Joint significance - Slots (p-Value)	0.774
Joint significance - Institution (p-Value)	0.866
Joint significance - Center (p-Value)	0.001
Joint significance - Regional (p-Value)	.213
Adj. R2	0.944
Children	93570

Notes: This table shows the coefficients of the OLS estimates of the share of fullday slots. Regressions control further for a full set of municipality dummies and a constant term (not shown in the table). Standard errors are clustered at the municipality level and are shown in parenthesis: *p < 0.10, ** p<0.05, ***p<0.010.

Source: Statistics of the *Child and Youth Services in Germany*/School entrance examination 2004-2012/INKAR/Statistik-Nord, Own calculations

Table A.3: Comparison of SEE and FiD Data

	SEE data		FiD data		
	Pooled (N=93,570)	SD	Full-day (N=489)	Half-day (N=614)	Full- vs. Half-day
Socio-Emotional Maturity(D)	.825	.380	.863	.889	-.026
Age (in month)	73.761	3.888	52.877	59.349	-6.471***
Male (D)	.524	.499	.54	.502	.038
Immigrants (D)	.125	.331	.176	.187	-.011
Single parent (D)	.151	.358	.139	.073	.066***
Mom's education: high (D)	.274	.446	.333	.221	.112***

Notes: Individual characteristics in column 1 and 2 are based on the full sample (2004-2012) of the SEE data. Column 3 and 4 display the individual characteristics for children in the *Familie in Deutschland*-survey; the means for children in full-day care and half-day care are shown respectively. In column 5, the raw difference between column 3 and column 4 is calculated.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Source: School entrance examination 2004-2012 and *Familie in Deutschland*-Survey. Own calculations.

Table A.4: Care Quality and Demographic Characteristics - Descriptive Evidence

	(1) Low education (<p25)	(2) High education (>p75)	(3) Difference (2)-(1)	(4) Few single parents (<p25)	(5) Many single parents (>p75)	(6) Difference (5)-(4)	(7) Few immigrants (<p25)	(8) Many immigrants (>p75)	(9) Difference (8)-(7)
Demographics									
Share of high-educated parents	0.099	0.397	0.298*** (0.009)	0.329	0.259	-0.070*** (0.014)	0.281	0.275	-0.005 (0.015)
Share of single parents	0.125	0.104	-0.021*** (0.007)	0.048	0.199	0.151*** (0.004)	0.092	0.151	0.060*** (0.009)
Share of foreign parents	0.06	0.055	-0.005 (0.007)	0.034	0.129	0.095*** (0.007)	0.006	0.181	0.175*** (0.004)
Care Quantity at Birth									
Coverage 0-3 years old (in %)	2.673	4.416	1.743*** (0.198)	3.378	3.685	0.307 (0.231)	3.153	4.204	1.051*** (0.213)
Coverage 3-6 years old (in %)	79.471	82.834	3.364*** (0.502)	81.098	80.63	-0.468 (0.653)	80.995	82.642	1.647*** (0.558)
Full-Day Share	0.129	0.238	0.109*** (0.017)	0.121	0.288	0.167*** (0.019)	0.093	0.325	0.232*** (0.016)
Care Quality at Birth									
Public provider(in %)	22.513	17.463	-5.049* (2.634)	18.705	18.915	0.210 (2.451)	22.233	17.06	-5.173** (2.338)
Other provider (in %)	24.444	41.093	16.649*** (2.525)	29.21	36.591	7.381*** (2.735)	22.443	37.959	15.516*** (2.542)
Church provider(in %)	53.043	41.443	-11.600*** (2.644)	52.085	44.494	-7.590*** (2.685)	55.324	44.981	-10.344*** (2.575)
Children per group	23.312	18.983	-4.329*** (0.470)	21.19	20.692	-0.497 (0.483)	22.201	20.19	-2.012*** (0.457)
Age of staff (years)	38.827	39.133	0.306 (0.326)	39.323	38.526	-0.797** (0.311)	39.621	38.553	-1.068*** (0.314)
Staff: male (in %)	1.846	3.475	1.629*** (0.408)	2.128	3.95	1.821*** (0.311)	1.986	4.256	2.269*** (0.413)
Staff: pedagogical degree (in %)	60.284	66.813	6.529*** (1.270)	61.608	61.55	-0.058 (1.418)	60.797	63.161	2.365** (1.149)
Staff: fulltime (in %)	19.01	27.908	8.898*** (1.854)	16.98	34.649	17.669*** (1.752)	14.707	37.815	23.109*** (1.407)

Notes: This table displays the averages of care quantity and care quality in the lowest and highest quartile of the respective subgroup (high-educated parents, single parents, immigrant parents). Columns 3, 6 and 9 display the difference between the quartile's averages.

Standard errors are shown in parenthesis. * p<0.1, ** p<0.05, *** p<0.01.

Source: Statistics of the *Child and Youth Services in Germany*/School entrance examination 2004-2012/INKAR. Own Calculations.