



What drives early childhood education attendance? The role of structural factors and personal beliefs in Germany

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ABSTRACT

The paper investigates which and how characteristics of the family, the child, the context, and personal beliefs are related with attendance in early childhood education (ECE), examining their dynamics across the first three crucial years of children's life. By relying on the theoretical model developed by Pungello and Kurtz-Costes, we contribute to the literature on selection into ECE by providing (i) a comprehensive framework simultaneously integrating different sets of factors that can influence access to ECE and (ii) an empirical test of their relevance across crucial children's developmental stages by using recent data from the German National Educational Panel study. Binomial logistic regression models, applied to multiply imputed data, show that the German ECE system remains unequal even after a period of intense reforms. Inequalities begin already at one-year-old, being largest when children are two years old and decreasing at age three. Findings confirm the importance of structural divides linked to children's social origins and residential area as main drivers of ECE inequalities, especially at two years old. Yet, also mothers' beliefs play an important role: perceiving formal care as a tool to both support children's cognitive enrichment and favour their own occupational career increases children's ECE participation.

1. Introduction

In many Western countries, the expansion of childcare provision relates to two linked arguments: ECE relevance in (a) caring for and (b) investing in children. Prompted by increased female participation in the workforce, the first perspective focuses on childcare services as a tool for reconciling work and family duties (Del Boca & Wetzels, 2008) and tackling child poverty and social exclusion (Gambaro et al., 2014). Based on the so-called social investment perspective (Esping-Andersen 2002), the second stance conceives childcare as a channel for enhancing children's human capital (Heckman, 2011). Since inequalities in life chances are present before compulsory school entry (Blossfeld et al., 2017), providing all children, but particularly those from vulnerable backgrounds, with an externalised, highly-stimulating environment corresponds to supporting child development (Hemerijck, 2018; Van Lancker & Ghysels, 2016).

Because of this renewed interest in early life stages, European countries have witnessed an expansion in their ECE provision, but inequalities in ECE use remain the norm rather than the exception (Van Lancker & Ghysels, 2016). Although there is rich evidence regarding "which kind of children experience early child care and which kind of

parents select it" (Sylva et al., 2007, p. 118), less is known about the simultaneous influences of multiple factors on care selection. Filling this gap is the first contribution of this article. Second, by utilising prospective longitudinal data, this study extends previous research by documenting changes in the relevance of these factors according to children's age, shedding light on the dynamics of inequality. Third, the article explores recent data for Germany as an exemplary case study, analysing ECE inequalities after a decade of institutional reforms. Germany has experienced a rapid expansion of public care services since the early 2000s, recently providing its citizens with "a virtually universal, strongly state-subsidized system" of ECE (Stahl et al., 2018, p. 306). However, although the participation rate in formal care settings has continuously grown over the last years (Linberg et al., 2013), achieving equality in ECE use remains a challenge (Jessen et al., 2018).

The paper is organised as follows. Section 2 describes the German system and its recent changes, both in terms of institutional features and childcare policies. In the third section, we outline the theoretical framework and our expectations. The research design is described in the fourth section, and the fifth section is devoted to presenting the research results. Finally, in section 6, we discuss the main findings and conclude.

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2. Germany between institutional reforms and changing ideologies

Although children were legally entitled to a place in ECE beginning at the age of three since 1996 (Schober & Spieß, 2013), childcare expansion has further occurred in Germany since the mid-2000s. In 2005, children under three years old were entitled to a place in formal care settings if their parents were employed, in education or employment-integration programmes, or when welfare could not be otherwise guaranteed. In 2008, eligible recipients were further expanded and, from 2013, all children older than one year old have been entitled to a place in ECE (Stahl & Schober, 2018). As a result, formal care attendance has increased tremendously in Germany (Maaz et al., 2020), incentivising mothers to (re-)enter the labour market, especially during the first three years after giving birth (Müller & Wrohlich, 2016). From August 2014, parents whose 15- to 36-months-old children were not enrolled in any form of public or publicly-subsidized childcare could ask for the “Betreuungsgeld”, a direct cash transfer benefit amounting to 150 € per month. To promote inclusive access to public care, German states and municipalities have taken over the majority of ECE expenses, contributing to 47% of childcare costs on average in 2008. Families pay about 14% of the fees (Spiess et al., 2008), which is low compared to other OECD countries. More specifically, in 2012, parental childcare fees amounted to an average of 144 € per month (Stahl, Schober, & Spieß, 2018), and low-income or at-risk-of-poverty families were exempted from paying (Schmitz et al., 2017).

Changes in parental leave schemas accompanied reforms in the ECE system (Stahl & Schober, 2018). In 2007, the German government incentivised rapid maternal return to the labour market, as well as paternal involvement in child-rearing practices (Gangl & Ziefle, 2015). The new scheme promoted, in practice, a short leave for the primary caregiver (one year after childbirth) with a replacement quota amounting to 67% of the previous net earnings. Two additional months were reserved for fathers (or the secondary caregiver; Stahl & Schober, 2018; Geisler et al., 2010; Spiess et al., 2008; Spiess & Wrohlich, 2006). Thus, Germany moved from the typical male breadwinner/female carer model (Stahl & Schober, 2018) to a “one-and-a-half-dual-earner-model” (Spiess & Wrohlich, 2006, p. 4), where mothers usually work part-time and fathers full-time.

Finally, a cultural shift in gender ideologies at the individual level occurred as well (Zoch & Schober, 2018). After the post-war division, East and West Germany developed opposite visions regarding children's care and female employment (Scholz et al., 2019). More specifically, the former German Democratic Republic in the Eastern areas supported female employment with a well-developed system of full-day, publicly-funded ECE. In contrast, in West Germany, women were encouraged to care for their children at home, while their partners were the main providers of family income (Oberhuemer, 2012). After the fall of the Berlin Wall in 1989, Germany experienced “convergence in occupational and industrial structures as well as the adoption of the West German institutions in all policy areas” (Gangl & Ziefle, 2015, p. 521), suggesting a cultural alignment in gender ideologies among mothers from the two German areas (Zoch & Schober, 2018).

3. Theoretical framework and hypotheses

Considering early education as the first step in the educational career of individuals implies that attention should be devoted to the educational decisions that parents take shortly after childbirth, such as the selection among various care arrangements and the decision to enter formal care settings (and for how long). The choice of enrolling in ECE is notable since it could help parents, especially mothers, maximise family earnings and minimise career penalties, risk of poverty, and social exclusion by (re-)entering the workforce. Moreover, ECE attendance could foster child development in various domains and enhance school readiness, promoting equal educational opportunities from the start

(Gambaro et al., 2014).

Although from a lifelong learning perspective, early educational choices are a pivotal step, research on the mechanisms driving educational choices in early years is scarce compared to that devoted to later educational transitions (Steinberg & Hoenig, 2018). Within the field of educational sociology, models based on the rational choice theory (RCT) have emerged as the most notable explanation for inequalities in educational opportunities. More specifically, RCT assumes that social classes have different perceptions about the costs, benefits, and success probabilities of diverse educational options and that, consequently, class differences in taking rational decisions generate and reproduce social inequalities in education (Stocké et al., 2011). Yet, focusing solely on benefit-maximising and cost-minimising motives limits the RCT, which fails to consider the context in which individuals choose, the characteristics of the persons involved in the decision, and the role of attitudes and beliefs in the decision-making process.

In practice, social structures provide a heterogeneous set of opportunities and constraints, while systems of beliefs and normative values delimit the space of desirable options and the importance attributed to different choice criteria. Parents' decisions are, therefore, “neither entirely individual (...) nor fully informed and reflective” (Meyers & Jordan, 2006, p. 60). They are, rather, accommodations influenced by rational reasoning, as well as socially constructed norms, values, beliefs, and social networks. Indeed, feasible care options may be limited, and parents may conduct the childcare search under significant time pressure and with limited information. Previous parental experiences or families' and friends' perspectives on childcare arrangements may influence the process. Finally, parental perceptions of their children and the availability of other care alternatives, such as paternal and grand-parental care, may also play a role (Chaudry et al., 2010).

Hence, to understand the aetiology of ECE participation, parental decisions should be considered as the result of rational reasoning that occurs within a social structure. As such, the Pungello and Kurtz-Costes (PKC) model (1999) seems preferable for framing this complexity, as it addresses the interwoven network of individual and contextual factors behind childcare selection. According to this framework, depicted in an adjusted form in Figure 1¹, maternal search and selection of care are affected by four main groups of factors, including parents' socio-economic resources, family structure, place of living, and child characteristics. Additionally, parents' work-care beliefs and considerations regarding the costs and benefits associated with childcare arrangements contribute to explaining the heterogeneous patterns of ECE participation.

Parents' structural conditions (e.g. household income, social class) and family structure (e.g. employment status, number of children, grandparents' availability) define the set of socio-economic resources and time available for caring for children. Children's characteristics, such as temperament and early cognitive skills, frame parents' decisions related to childcare arrangements. Moreover, the social context characterised by specific childcare availability, affordability, and quality influences childcare selection: few childcare places, higher costs, and lower (perceived) care quality decrease the likelihood of using formal care settings (Geier & Riedel, 2008; Meyers & Jordan, 2006). The availability of ECE services is determined by the public (and private) offer in the municipality and the surrounding area but also by the specific criteria of access. Different areas could provide more or fewer services and offer different qualities of service in terms of structure, teachers' qualifications, and prevalent caring approach. It is important to bear in mind that the perception of costs is relative to the available financial resources in the household: the same absolute costs would imply different economic stress for richer and poorer families. Along with the role of the perceived costs and benefits, cultural factors and

¹ The PKC model was originally developed to explain U.S. working mothers' selection of care for their infants.

societal norms are relevant for the care selection process, such as opinions about the consequences of formal care on child development, socially accepted child-rearing practices, and work attitudes. In the PKC model, the mentioned factors are not studied in isolation, as in previous work, but in their mutual and dynamic connection (Fig. 1).

Following the insights from the PKC model and prior evidence for Germany, the following expectations can be drawn for the German context. Concerning structural constraints, previous studies found disparities in child development due to social origins before Kindergarten entry (Kulic et al., 2019; Weinert et al., 2010), which tend to increase later (Halle et al., 2009; Skopek & Passaretta, 2018). Hence, we hypothesise that parents with high social positions disproportionately opt for ECE. Furthermore, we claim that children's place of residence affects the care selection process, with parents who reside in East Germany disproportionately opting for ECE. Previous findings confirm that the availability of (full-time) ECE facilities varies significantly between and within Länder², and ECE use remains, in general, more common in East than West Germany (BMFSFJ, 2019; Linberg et al., 2013; Schober & Spieß, 2013). Moreover, as indicated by previous research (Skopek, 2017) and due to the features of the German leave system, we expect social and geographical inequalities in ECE use to be more prominent during the Kinderkrippe phase, and more specifically at two years old, than at Kindergarten entry.

Given the central position of parental beliefs in the PKC model, we further claim that, as suggested by previous studies (Steinberg & Klei- nert, 2022), rational reasoning and parental views around childrearing and childcare are highly predictive for ECE participation, particularly when children are under three years old. More specifically, due to the intense national and international debate around early childhood, we expect that motives linked to both the care and investment foci have been absorbed in parental discourses around care alternatives and that, as such, they affect ECE attendance. Regarding the calculation of ECE costs, we expect that childcare affordability is no longer perceived as an issue due to the recent reforms enacted in Germany.

Concerning family factors, we claim that maternal employment status is possibly the most important determinant of ECE participation, as confirmed by previous studies, especially when children are young. Because of the well-known interdependence of childcare and employment, working mothers are more likely to early enrol their preschool-aged children in ECE services (Kreyenfeld & Krapf, 2016). Research has also found that a high number of children at home corresponds to a

high probability of choosing home-based or informal care settings, while children from single-headed families are more likely to be enrolled in formal care, thus enabling their parent to work (Kreyenfeld & Krapf, 2016; Pungello & Kurtz-Costes, 1999). Finally, paternal working schedules and the availability of other forms of informal care (e.g. grandparents) may influence the choice to enrol in institutional care (Pungello & Kurtz-Costes, 1999).

Finally, regarding children's characteristics, we base our claims on previous results for other countries that, although scarce, show no effects on ECE participation based on children's characteristics, such as gender and early temperament (Burghardt, 2018; Sylva et al., 2007). Based on previous studies, the most consistent result indicates that children with a migration background have a lower probability of attending ECE compared to natives, particularly in the first two years of life (Miller et al., 2013; Schober & Spieß, 2013).

4. Data, variables, and methods

4.1. Data and sample

We use data from the National Educational Panel Study (NEPS), which reconstructs the educational trajectories of individuals who live in Germany (Blossfeld & Roßbach, 2019). More specifically, our empirical analysis uses the first cohort of the study (hereafter, SC1), whom the study used to measure the development of competencies and the early educational paths of all infants born in Germany between February and July 2012. The NEPS data are particularly suitable for our purposes since, in addition to providing information on a nationally representative sample of the German population, they contain information on all the theoretical concepts we are interested in, with variables that, in most cases, are consistent across waves, but that are also specific according to children's ages. Moreover, children of this cohort could take advantage of both recent family reforms described above. In the first wave of the study, the sample size amounted to 3,481 infants six to eight months old and their families (FDZ-LiFi, 2019). In the second wave, infants were 12 to 17 months old, and all parents who gave consent to be contacted again were interviewed ($n = 2,849$). From the third wave onwards, children and their parents ($n = 2,609$) were followed up on yearly.

The analytical sample includes only children whose respondent parent is the mother³. In our view, mothers are the focal decision agent since, although many Western countries have witnessed a closing gender gap in the time spent with children over the past decades, mothers still often devote more time to childcare (Gauthier et al., 2004). Moreover, because of (a) an increasing number of women involved in the workforce and (b) an agreement around an ideology that reinforces beliefs on the importance of maternal time and nurturing behaviours for child development (Hays, 1996), the choice for institutional care can be more controversial and delicate for mothers than fathers. Furthermore, since household characteristics and related considerations may affect family decisions concerning care before ECE effective uptake, we further exclude from the analytical sample those children who, at about seven months of age, were already attending formal care settings⁴. Missing values on the variables of interest were imputed through a multiple imputation strategy, which we describe below. With these amendments and corrections, the final size of the analytical sample amounts to 3,184 mothers and their children. Our observation period ranges from 2012 to 2015, embracing children from when they are about seven months to three years old (i.e. from wave 1 to wave 4).

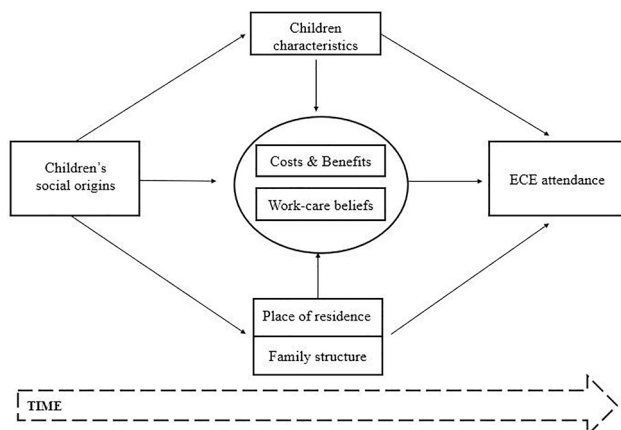


Fig. 1. Conceptual model of childcare selection adapted from the PKC model.

² Federal German states are responsible for education and social services, but municipalities are accorded great autonomy in providing childcare. This, in turn, made the German ECE system highly decentralised.

³ The label mother refers to the biological, adoptive, foster, and stepmothers of the target children. Out of the six waves ($n = 15,087$), we exclude 321 cases from the analysis, corresponding to 2.13% of the sample.

⁴ We further remove from the analysis 61 children who were already enrolled in childcare in the first wave of the study.

4.2. Variables

Our dependent variable measures ECE attendance, taking a value of 1 if children are enrolled in formal care and 0 otherwise. Two variables are the items that measure children's socioeconomic backgrounds. First is the parental highest education level, a three-category ordinal variable obtained by grouping the mother and her partner's highest educational level, measured through ISCED in wave 1. The three categories are (1) low: when one member of the couple is low-educated, thus holding an ISCED 2 level; (2) medium: when one member in the couple holds a maturity certificate and the other either has the same level of education or higher; (3) high: when both hold a tertiary degree. Second, family net income was standardised to have a mean of 0 and a standard deviation of 1.

The availability of centre-based care services is captured by a variable identifying where children reside. The latter takes the value of 1 if children reside in East Germany (including Berlin) and 0 if children live in West Germany. Although the children's residential area is a rough measure of the service supply, it is the only proxy available in the data we were able to obtain.

Personal beliefs include maternal perceived costs and benefits linked to ECE attendance, as well as work-care beliefs. The cost dimension measures the likelihood of encountering financial difficulties in attending formal care. The benefit dimension considers formal childcare as a tool for both enabling mothers' labour market return and enhancing children's school readiness. Finally, work-care attitudes are measured by three items: attachment to the job sphere, social costs linked to Kinderkrippe use, and importance given to social competencies. Originally, each dimension linked to personal beliefs was captured by a one-item question measured via a quasi-metric scale ranging from 1 to 5. Yet, both the left-skewed distribution (Steinberg & Hoenig, 2018) and the non-linear bivariate association with children's social background prompted a recodification of the items into a three-category variable, with low values corresponding to negative responses to the question.

Family structure refers to a group of variables that account for family characteristics (i.e. marital status and number of siblings) and economic (i.e. maternal employment 12 months before childbirth) and networking resources (i.e. partner's working hours, availability of care offered by either grandparents or other relatives).

Children's attributes include standard socio-demographic information, such as sex and migration background, as well as health, early temperament, and cognitive skills. More details on the measurement level and the question wording of each item under analysis are shown in Table A1. in the Appendix.

4.3. Analytical strategy

Because of the sampling design implemented for the SC1, the data present a high amount of missingness (see Table A5. in the Appendix). A complete case analysis based on list-wise deletion would lead to a rather small sample size of 1,196 (37.6% of the sample). This large reduction could lead to both low statistical power and potential biases in the estimates of the quantities of interest. Therefore, we decided to replace missing values through multiple imputations (Rubin, 1987) by chained equations. This technique allows us to tackle statistical uncertainty in the process of imputing missing values and handling variables of various types at the same time (Azur et al., 2011). We performed 50 imputations, including all the variables used in the analysis in the list of covariates (Tables A3 and A4 in the Appendix show descriptive statistics with imputed data and missing values, respectively).

After having obtained the imputed dataset, we applied binomial logistic regression to model the probability of children being enrolled in formal care at different ages as a function of the set of covariates described in the previous section. Design and longitudinal weights provided by the NEPS are used in the regression models, accounting for the survey sampling strategy (Würbach et al., 2016). Furthermore, our

research design accounts for the longitudinal nature of the dataset by identifying the temporal dimension of each group of factors (see Table A1. in the Appendix for more information).

We estimated a number of model specifications that allowed for retrieving the total effect of each item on ECE attendance by adjusting our estimates for all the potential confounders and excluding variables that could act as mediators in the relationship of interest (Elwert, 2013; Vander Weele & Shpitser, 2013). In other words, the effect of each factor on ECE attendance is cleaned of the possible influence of all those variables that affect the distribution of the independent variable of interest and access to ECE, but not the possible mediators. Thus, we avoid the common pitfalls of interpreting all coefficients from the same model specification, mixing up different types of effect for the independent variables of interest (Westreich & Greenland, 2013).

5. Empirical findings

In this section, we aim to determine the most relevant factors associated with childcare enrolment at different critical age points. To make the results from the logistic regression more easily interpretable, we express the conditional association of specific items with the expected probability of ECE attendance using average partial effects (APE), expressed in percentage points (p.p. hereafter). Sampling uncertainty is communicated reporting 95% confidence intervals around the point estimates.

5.1. Descriptive results

We begin with a descriptive overview of the transition to formal care across children's ages. In Germany, the older children are, the highest their ECE attendance. Indeed, while at one year old, 17% of children attend Kinderkrippe, at four years old, participation becomes almost universal (98%). However, at three years old, 16% still do not attend Kindergarten (see Appendix Fig. A1.). Furthermore, systematic differences in childcare enrolment are evident along both social and geographical lines. The left panel of Fig. 2 reveals that the children of university-graduated parents have the highest participation rate in institutional care at one year old. The right panel of Fig. 2 shows that the regional divide supplements social stratification patterns, with East German children more likely to attend ECE than West German children. (See Fig. 3.).

The sudden jump at two years old is likely due to the end of paid parental leave, while the educational gradient may reflect the joint introduction of the legal claim to childcare place and the introduction of the Betreuungsgeld. More generally, by providing empirical support for the importance of structural factors, these descriptive findings highlight the first three years of children's lives, when discrepancies in ECE attendance appear to be remarkably pronounced. Therefore, we proceed by analysing the underlying drivers of such discrepancies in ECE participation from a dynamic perspective.

5.2. Children's socio-economic backgrounds

Results from the logistic regressions are in line with the descriptive patterns, confirming that despite years of reforms, structural inequalities in Germany strongly determine ECE attendance from early years. More specifically, tertiary-educated parents are 14p.p. more likely to enrol their children in ECE when they are one year old. This advantage doubles one year later (29p.p.), while it reduces to 14p.p. at the time of Kindergarten entry. This result is in line with previous studies in Germany, which have reported a divergence in care use over time along educational lines, with children of medium and especially highly educated mothers increasingly enrolled in Kinderkrippe between 1997 and 2013 (Stahl & Schober, 2018) and in Kindergarten between 1995 and 2008 (Konietzka & Kreyenfeld, 2010).

Conversely, family income is only partially relevant: one standard

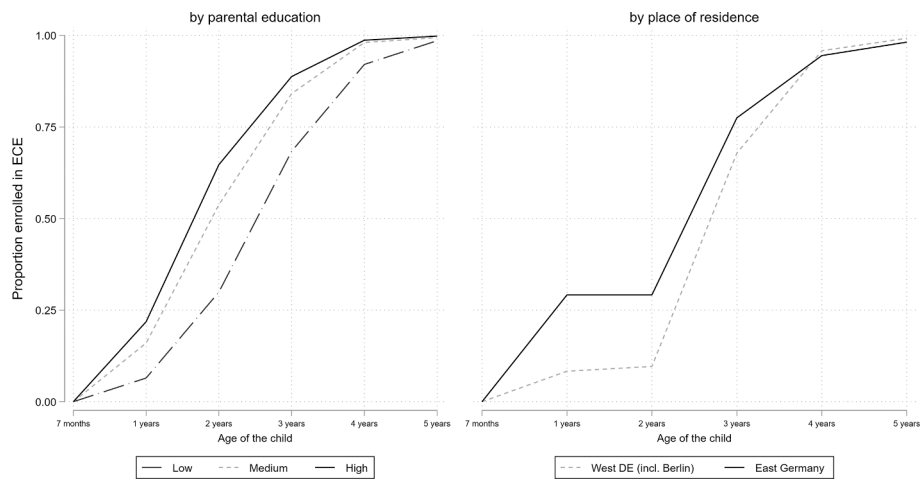


Fig. 2. ECE participation across children's ages, by parental education and place of residence (Kaplan–Meier estimates). Source: Authors' calculations based on the NEPS, SC1.

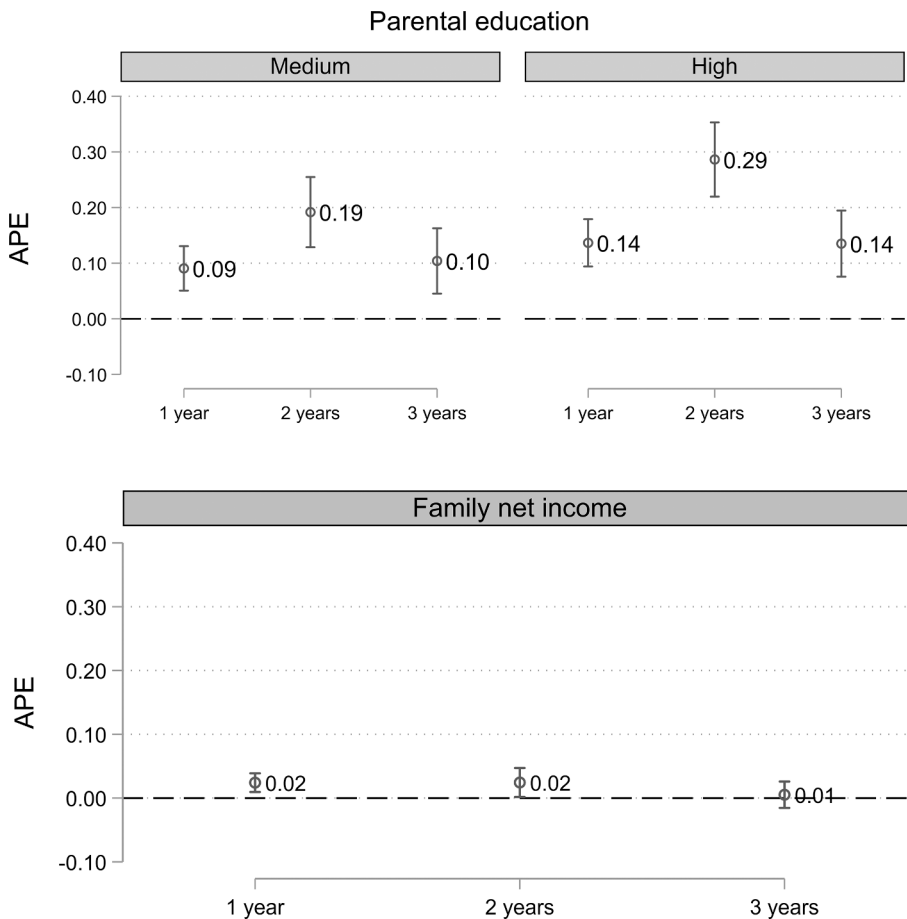


Fig. 3. The relationship between ECE attendance and children's socio-economic background: APE and 95% confidence intervals (N = 3,184). Notes: The estimate of APE for parental education is adjusted for children's sex, migratory background, and place of residence. The estimate of APE for family income is adjusted for children's characteristics, maternal marital status, number of siblings, maternal employment, partner's working hours, parental education, and place of residence. Source: Authors' calculations based on the NEPS, SC1.

deviation difference in the income variable is associated with a 2p.p. difference in the probability of attending Kinderkrippe at one year old. If we compare families at the extreme of the income distribution, the difference amounts to around 5.6p.p. Although modest in comparison with the role of education, this result is interesting since, at that age stage, children should have been guaranteed a place in Kinderkrippe, regardless of their family's economic standing. This difference can be explained by the fact that the parental fees calculation and concrete implementation is the responsibility of the federal state and the

municipalities and, in some cases, even the providers of the centre (Schmitz et al., 2017; Scholz et al., 2019). As such, although differences in care expenses for households at different poverty levels have gradually decreased since the introduction of the legal claim, the financial burdens for families in the lowest income quartile are not considerably lower than those of families in the highest quartile (Schmitz et al., 2017).

5.3. Place of residence

As depicted in Fig. 4, Germany suffers from a West–East gap, with children residing in the former German Democratic Republic being 23p. p. more likely to experience care in institutional settings at all ages, yet most evidently at two years old. Resembling previous findings reported for Germany, this finding could reflect the fact that differences across German areas in the supply of childcare services and diversities in women's participation in the labour market and attitudes towards care are still in place, despite legal changes. Indeed, although the number of children in childcare has increased significantly since 2005, children are still disproportionately enrolled in ECE in East Germany, where, historically, women worked part-time or full-time and full-day care for young children is widely accepted.

5.4. Family structure and children's characteristics

In general, items linked to the family structure are modestly associated with ECE participation, with some exceptions. Being a working or a single mother is considerably associated with ECE attendance (Fig. 5). Compared to non-working mothers, being a working mother increases the probability of enrolling children in childcare at one year old by 6p.p. This (conditional) difference doubles when children are two years old (12p.p.) and, although reduced, it is still present at Kindergarten entry (6p.p.). Being a single mother is associated with a 5p.p. higher probability of ECE participation at age one. The gap increases to 8p.p. at age two and vanishes afterwards. Other items are only moderately associated with ECE participation: the higher the number of siblings in the household, the lower the chances (3p.p.) that a child will be enrolled in Kinderkrippe, but only at two years old. Concerning the informal care networks at the family's disposal, those mothers who lack grandparental support are slightly more likely than their counterparts to enrol their one-year-old children in Kinderkrippe (5p.p.). Yet, this advantage is brief, disappearing only one year later. Interestingly, the availability of neither mothers' partners nor close relatives impacts childcare uptake (see Fig. A2, Appendix).

Turning to the role played by the characteristics of the children themselves, our results confirm previous findings that across crucial developmental ages, children's characteristics do not affect the care selection process. Most coefficients linked to this group of factors are either not statistically significant (see Figure A2, Appendix) or very modest in size (see the second and third graph in the lower panel of Fig. 5). Being native represents a small advantage in terms of ECE participation, but only at Kindergarten entry (4p.p.). Having a difficult temperament modestly increases the chances of entering Kindergarten (2p.p.). Yet, if we compare families at the extremes of the temperament distribution, this difference increases to around 6.7p.p.

5.5. Personal beliefs: Perception of costs and benefits

Overall, the results concerning the role of personal beliefs suggest that maternal perceived benefits and work-care beliefs bear intensively on the care selection process, although with different intensities. Perceived financial costs are irrelevant for ECE participation, but ECE attendance is strongly predicted by the prospects of boosting both children's and mothers' human capital development: the former in terms of improvement in cognitive skills, and the latter in terms of occupational careers. Moreover, not only considerations about the expected benefits but also more values-related attitudes, such as maternal job attachment, drive the choice towards formal care settings.

More specifically, the first graph in the lower panel of Fig. 6 shows the role of the perception of financial costs and job importance in enrolling children in formal care. We see that cost perception does not affect the probability of enrolling children in Kinderkrippe. The fact that families do not perceive ECE participation as a financial burden is in line with the relatively modest childcare expenses in Germany. When it comes to Kindergarten, the perception of financial costs is quite surprisingly negatively related to participation among comparable families. It is possible that, at Kindergarten, families in need could benefit from additional support, and thus are more prone to enrol their children in these environments. Perceptions of benefits associated with ECE attendance are instead strongly related to the choice of formal care beginning

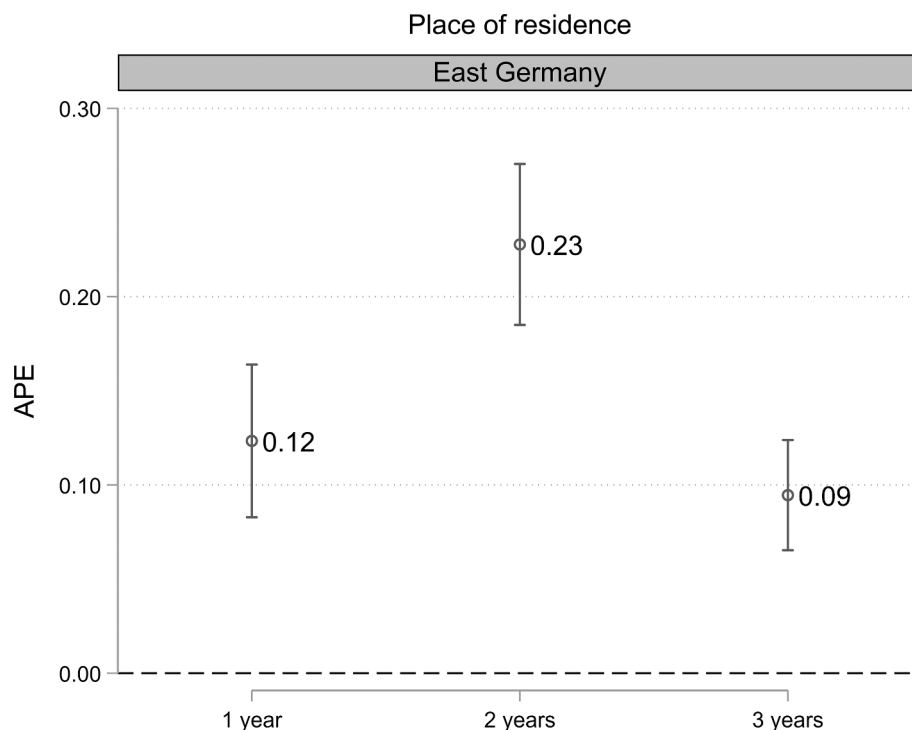
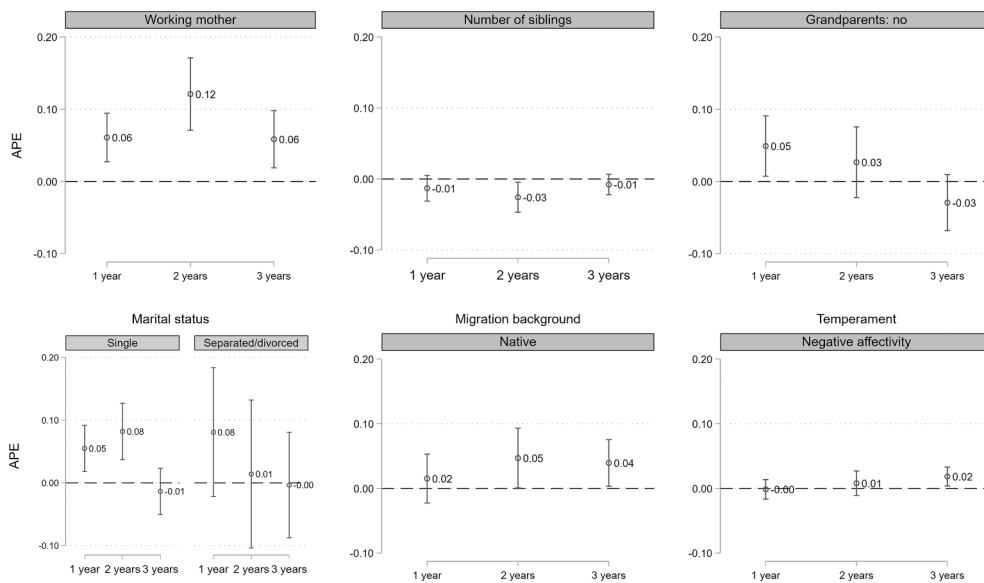
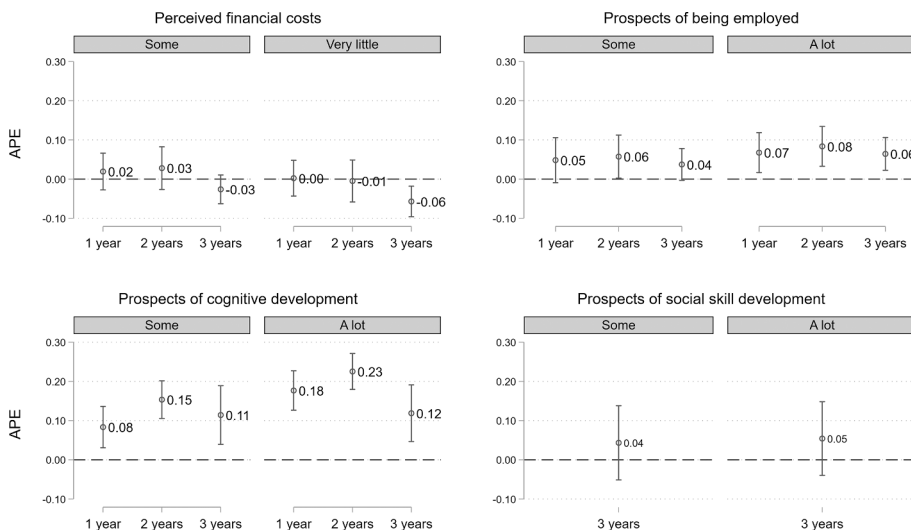


Fig. 4. The relationship between ECE attendance and place of residence: APE and 95% confidence intervals (N = 3,184). Notes: The estimate of APE for place of residence is adjusted for children's sex, migratory background, and parental education. Source: Authors' calculations based on the NEPS, SC1.



Source: Authors' calculations based on the NEPS, SC1.



in the child's early years (Fig. 6). Mothers who believe their return to the labour force is highly probable are, at all ages, more likely to enrol their children into childcare settings, compared to mothers with lower perceived chances of being employed. The greatest divide is again observed when children are two years old. Moreover, mothers who believe that ECE is helpful for children's cognitive development are more likely to enrol their children in formal childcare at all ages. Although the most significant difference is found at two years old (23p.p.), the gap is already considerable at one year old, amounting to 18p.p. Interestingly, perceiving Kindergarten as meaningful for the enhancement of children's social skills does not significantly translate into greater participation in ECE.

5.6. Work-care beliefs

Finally, Fig. 7 shows the relevance of work-care beliefs in the process of care selection. Results reveal that mothers tend to disproportionately

Fig. 5. The relationship between ECE attendance and family structure and children's characteristics: APE and 95% confidence intervals (N = 3,184). Notes: The estimate of APE for maternal employment is adjusted for marital status, number of siblings, income, partner's working hours, parental education, and place of residence. The estimate of APE for marital status is adjusted for children's characteristics, number of siblings, family income, maternal employment, partner's working hours, parental education, and place of residence. The estimate of APE for number of siblings is adjusted for children's characteristics, marital status, family income, maternal employment, partner's working hours, parental education, and place of residence. The estimate of APE for grandparental availability to care is adjusted for children's characteristics, family structure, parental education, and place of residence. The estimate of APE for migration background is adjusted for children's sex, parental education, and place of residence. The estimate of APE for temperament is adjusted for children's other attributes, family structure, parental education, and place of residence.

Fig. 6. The relationship between ECE attendance and costs and benefits perceptions: APE and 95% confidence intervals (N = 3,184). Notes: The estimate of APE for perceived costs, employment prospects, and cognitive enrichment is adjusted for children's characteristics, family structure, other costs and benefits perceptions, work-care beliefs, parental education, and place of residence. The estimate of APE for social skills enrichment is adjusted for children's characteristics, family structure, other costs and benefits perceptions, work-care beliefs parental education, and place of residence. Source: Researchers' calculations based on the NEPS, SC1.

enrol their children in Kinderkrippe if their attachment to work is strong. This relationship tends to strengthen when children become two years old, reaching 15p.p. On the contrary, neither the level of social pressure from near relatives or friends (i.e. what we called social costs) nor the importance attached to social competencies in terms of getting along with others influence the choice towards formal care settings.

6. Discussion and conclusions

This paper contributes to the literature on childcare participation since it is the first that applied a comprehensive conceptual model to explain the mechanisms of childcare selection at different children's ages in Germany, a country that has experienced significant reforms in its ECE organisation. This study expands previous results for Germany, which primarily looked at childcare choices from a rational, benefit-maximising perspective (Steinberg & Kleinert, 2022) and analysed childcare selection as a process in which parental preferences are

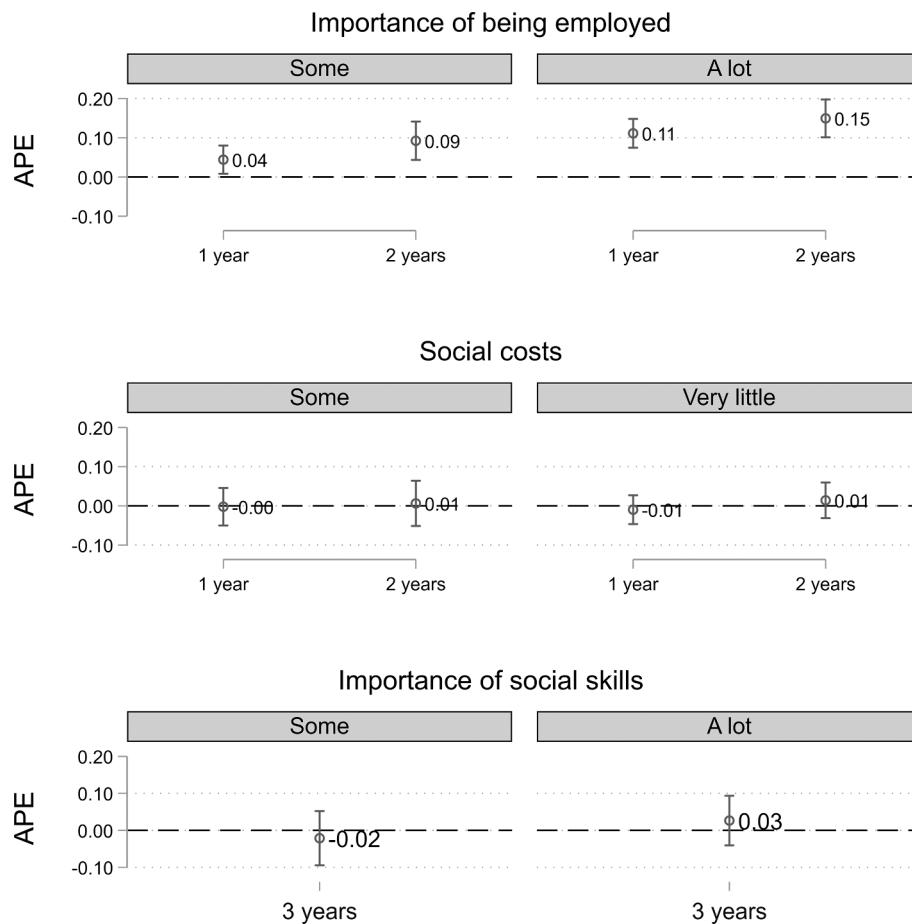


Fig. 7. The relationship between ECE attendance and work-care beliefs: APE and 95% confidence intervals ($N = 3,184$). Notes: The estimate of APE for importance of being employed, social costs, and the importance of getting along with others is adjusted for children's characteristics, family structure, costs and benefits perceptions, other work-care beliefs, parental education, and place of residence. Source: Researchers' calculations based on the NEPS, SC1.

accommodated to multiple determinants, such as family demands and job constraints, child and parents' characteristics, parental beliefs and attitudes, and ECE supply (Chaudry et al., 2010). However, the PKC model does not clarify which factors are the leading drivers of ECE attendance and how their roles change with children's ages, which is the aim of our empirical analysis. Indeed, by relying on prospective panel data derived from the NEPS, we incorporated a longitudinal dimension in the analysis that allowed us to inspect the relative importance of various factors at different children's ages.

The results allow us to draw the following conclusions. First, despite years of reforms aimed at improving the availability and inclusivity of formal care services, structural inequalities in ECE participation are still the norm in Germany. This finding corroborates previous results (Schober & Stahl, 2014), highlighting, therefore, that both an educational gradient and a geographical divide are still in place, especially for the ECE participation of children under three years old. Additionally, we found that the social gap is slightly broader than the regional one at all the analysed ages.

Second, together with structural factors, parental beliefs stand out as pivotal for ECE enrolment. Our analysis provides empirical support for the relevance of benefit-maximising perspectives on the intertwined double-function of ECE. In other words, the use of formal care is fostered by the maternal claim, according to which ECE services provide cognitive enrichment for children (investment focus) and favour parental return in the labour market and occupational career (care perspective). Moreover, mothers' prospects of (re-)entering the labour market and their personal attachment to the job sphere are pivotal for enrolment in ECE for children under three. Regarding costs, the study suggests that,

with virtually universal access to Kinderkrippe, costs are no longer a critical factor in explaining the differences in ECE use across families in Germany.

Third, although the primary recipients of ECE, children themselves are passive, rather than active, actors in the process of childcare selection. Indeed, not only socio-demographic characteristics but also children's early abilities and temperament seem to play a negligible or very modest role in shaping families' decisions in relation to care options.

Fourth, this study suggests that inequalities are dynamic, as parental preferences and other constraints are not fixed but change according to both the developmental phase of children and the policies enacted. For almost all factors under analysis, inequalities begin early, when children are one year old, increase the next year, and, although reduced, are still present at Kindergarten entry. This pattern suggests that the Kinderkrippe phase remains the most delicate period, despite the expansion of childcare services, and confirms the critical role of the second year of life, not only for structural inequalities, as noted by Skopek (2017), but also for other factors, such as parental beliefs and attitudes. For example, the fact that parental leave expires with the child's second birthday may urge parents to return to work, especially if they are from high social classes. At the same time, the introduction of the Betreuungsgeld, which is argued to prevent children from low social backgrounds from attending ECE (Boll & Reich, 2012), may be relevant in explaining social gaps in ECE attendance, as well.

This study is not without limitations. Unfortunately, we were unable to find adequate supply indicators, such as regional or municipal childcare coverage, criteria for accessing ECE, and quality of childcare. All these factors are relevant structural constraints to childcare uptake,

which are relevant everywhere in Europe, especially for disadvantaged children (Pavolini & Van Lancker, 2018). Our results offer just a hint of the relevance of supply-side indicators for ECE access, indicating that their influences change dynamically across children's developmental age. Further research should therefore better grasp the relevance of supply-side factors, disentangling their role in the care selection process. Moreover, these results concern the German context, with its specificity in terms of care availability and affordability. This raises questions about the generalisability of the results, and more efforts are needed to determine whether these findings hold in other countries.

As early childhood becomes the first step in the educational career of many children in Europe, we note that the care selection process in Germany appears to be a function of rational decisions and subjective perceptions embedded in a context of opportunities and constraints. Indeed, ECE participation occurs in the broad social context that surrounds families, including maternal beliefs on the role of formal care and family structural resources. Interestingly, after a period of reforms, it is possible to see that formal care services are increasingly perceived as potential skill-enhancers for child development, on the one hand, but also as an instrument that allows parents, especially mothers, to reach financial independence, professional realisation, and family-work reconciliation, on the other.

CRedit authorship contribution statement

Iliaria Pietropoli: Conceptualization, Methodology, Software, Formal analysis, Data curation, Writing – original draft, Writing – review & editing, Visualization. **Moris Triventi:** Validation, Writing – review & editing, Supervision.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.childyouth.2023.107035>.

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