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ABSTRACT

Children's School Placement in Germany: Does Kindergarten Attendance Matter?*

The positive effects of early childhood programs on children's school success have been demonstrated in the literature. However, most studies were completed in the U.S.A., where early childhood programs vary widely, based on differing auspice, regulation, cost, and other factors. In European countries, early childhood programs are generally far more homogenous. This is particularly true for Germany where most programs are community-based Kindertagesstätten operated under similar structural conditions. In this study we examine the relationship between Kindergarten attendance and the 7th grade school placement of children in West Germany, differentiating associations for the children of German citizens as compared to those of immigrants. Using information from a representative population sample, the German-Socio-Economic Panel (GSOEP), different models were estimated. The results indicate that there is no significant correlation between Kindergarten attendance of children of German citizens and children's later school placement. However, for children in immigrant households the reverse is true: later school placement is significantly associated with Kindergarten attendance prior to school enrollment. Additionally, the analysis shows that controlling for Kindergarten attendance changes the level of significance for other well-known "school attainment determinants," such as fathers' education and household income.

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Children's School Placement in Germany: Does *Kindergarten* Attendance Matter?

1. Introduction

Politicians in the U.S.A. and Europe are re-discovering education as a key factor in national economic and social well-being. This is particularly true in Germany where the relatively poor performance of German students in the most recent "Program of International Student Assessment-Study (PISA)" (e.g., Baumert et al., 2001) encouraged a new public debate on how to improve German school performance.

The economic value of more advanced schooling has been studied by economists since the early 1960s. The market and non-market effects of school education are well documented (Becker, 1965; Haveman & Wolfe, 1984; Mincer, 1974). Knowing the importance of education, the next step is to understand the determinants of children's school placement, in terms of being selected for the more academically demanding schools in the German educational system. The majority of American and European economic and sociological research on children's school success has shown that school outcome is explained by the child's personal characteristics, the parents' socio-economic characteristics and other factors related to the child's environment (Büchel & Duncan, 1998; Haveman & Wolfe, 1995; Mare, 1980; Shavit & Blossfeld, 1993). The role of early childhood programs (ECP), defined as organized programs for the care and education of young children prior to enrollment in the primary school system, in children's later school success has been less thoroughly examined and, studied primarily in the U.S.A. and a few European countries. For a comprehensive overview of studies that analyze the effects of ECP's on children's development, see, Currie, 2001; Dobbelsteen et al., 1999; ECCE, 1999; Lamb, 1998; Lerner & Gomby, 1995; Waldvogel, 1999).

In this study we examine the relationship between *Kindergarten* attendance and the later school placement of

children in West Germany, differentiating associations for the children of German citizens as compared to those of immigrants.

2. Previous Studies

Previous studies analyzing the potential benefits of ECP's use different approaches and focus on different areas of interest. As mentioned earlier most of the research has been completed within a U.S. context. These U.S. studies generally fall into three groups.

First a group of early studies focused on the effects of ECP's for children children who are at risk of school failure due to being from disadvantaged backgrounds. These found that participation in ECP affects children's school success positively (Berrueta-Clement et al., 1984; Schweinhart et al., 1993). However, these studies are limited, because of their restricted sample, examined in limited regions. Since the studies are experimental evaluations and due to the specific requirements on the "input side," these early childhood programs could not be compared with typical ECPs (Barnett, 1992; Donovan & Watts, 1990).

A second group of more recently initiated studies are based on much larger samples and focused on the evaluation of more typical ECP's. The NICHD Study of Early Child Care (NICHD Early Child Care Research Network, 1996), for example, is based on a sample of 1,374 children from 10 sites across the U.S. The study shows that the quality of child care for very young children does matter for their cognitive development and their use of language. While the quality of child care had a small but statistically significant relationship to children's cognitive and linguistic outcomes, the combination of family income, maternal vocabulary, home environment, and maternal cognitive stimulation, however, were stronger predictors of children's cognitive development. The Cost, Quality, and Outcomes Study, whose longitudinal outcome phase began in 1993, started with a sample of 826 children in four U.S.

states. The results of this study show that those who attended higher-quality ECPs had better outcomes in second grade than those who attended lower-quality ECP's, with particularly strong results for the children of less-educated mothers (Peisner-Feinberg et al., 1999).

However, neither of these studies focused on specific quality characteristics of early childhood programs, has, to date, provided results from following children beyond second grade.

A third group of studies is based on secondary analysis of data that are generally representative of the overall population of a country. Among these studies are those which focus on the effects of Head Start attendance, a special early intervention program in the United States. Lee and Loeb (1995), investigate the relationship between Head Start experience and the quality of schools subsequently attended based on the National Education Longitudinal Study (NELS). They found that the low quality of middle-grade schools attended by former Head Start participants explains, in part, why the positive effect of Head Start fades over time. Currie and Thomas (1995), who investigate the effects of Head Start attendance based on the National Longitudinal Survey of Youth (NLSY), find that for white children the potential gains are much larger than the costs, since even a small decline in the high-school dropout rate has the potential to pay for itself in terms of future wage gains. In a more recent paper, Garces et al. (2000) investigate the long-term effects of participation in Head Start based on the Panel Study of Income Dynamics (PSID). Their results show that among whites, participation in Head Start is associated with a significantly increased probability of completing high school and attending college.

In a European context, studies which focus on the effects of certain types of ECPs are rare, since there are few of such programs in Europe. In contrast to the U.S. system, European ECP systems can be characterized as being more homogenous.

Therefore, the few European studies existing focus mainly on the effects of community based ECP's, which are open for every child and not designed to serve any particular group of the population.

In the German context, there are only a few quantitative studies on the longitudinal effects of community-based ECP's. Among these is a study by Tietze (1998) in which the quality effects of more than 400 German *Kindergartens* are analyzed. The results demonstrate a positive relationship between quality of care and a child's cognitive and social performance. Another study designed by the ECCE (1997) is a cross-sectional analysis of the child care and educational programs for 4-year old children in Austria, Germany, Portugal, and Spain (Tietze et al., 1996 & 1998). The study focused on the two settings in which children in these countries spend the majority of their time, the family and the ECP. Nevertheless, both studies examine only the short-term effects of quality care. The results show that although the family effect on children's development is greater, it should be remembered that the effect of ECP quality on children's development can make up to a year's difference in development for some children.

One of the few exceptions to European studies that focus on the longitudinal effects of ECP's is an early study by Tietze (1987). This study examined the effects of the regional provision of German *Kindergarten* slots on school achievement. It is a secondary analysis that is based on official community school statistics. Tietze's findings show a positive association between ECP's and school progress, as indicated by grade retention and special education placement. His study differs from many U.S. studies in that it evaluates the effects of *typical* ECP. However, the results are for only one (of 16) German federal states (*Bundesland*), North Rhine-Westphalia.

Another exception is a more recent study by the ECCE Group (1999), which is a follow-up study of the earlier one

mentioned above (ECCE 1997). In the context of a European comparison, Tietze et al. analyzed the longitudinal effects of *Kindergarten* quality on child outcomes in Germany. The results of this study indicate that the quality of ECP's, after controlling for effects of child characteristics and characteristics of educational quality in families during the pre-school phase, accounts for 1 to 15 percent of inter-individual differences in the different measures of cognitive/school achievement and socio-emotional development of 8-year-olds. However, because the main focus of this study is on quality, it does not look at the school achievement of children who did not attend *Kindergarten*. In addition, the effort to measure longitudinal effects, to date, end at the age of 8.

In our present study we examine the relationship between the typical community based ECP in Germany, namely the *Kindergarten*, and children's 7th grade school placement into more or less academically demanding schools, based on a micro-data set representative of West Germany. This approach makes our study comparable to the U.S. studies of the third group mentioned above in the sense that it is a secondary analysis. However, it is not comparable in the sense that we study the effects of a common ECP open to every child.

Our analysis focuses on the longitudinal effects of ECP attendance immediately prior to school enrollment. We focus on differences in this relationship at age 14 for children with German parents and parents belonging to one of the five major immigrant nationalities. In doing so, we take into account that American research findings tell us that a high-quality ECP is known to be an important factor in explaining the school success of children from disadvantaged families. Considering non-German children to be children from disadvantaged families seems plausible, because we know from other German studies that children of German guest workers do not perform as well in school as their German counterparts (Alba et al., 1994).

Thus our research questions can be summarized as follows.

- Are there any longitudinal effects of ECP attendance while controlling for other characteristics of the child or his or her parents.
- Are there differences in the relationship between ECP attendance and later school placement, when examining the children of Germans and those with a non-German background?

3. Early Childhood Programs and Schooling in Germany

3.1 Early Childhood Programs

ECP's in Germany differ considerably for children under three versus aged three and over (Colberg-Schrader & Oberhuemer, 1993; Pettinger, 1993; Spiess, 1997; Tietze et al., 1989). Infants and toddlers can be send to what is known as "Krippe". However, slots in *Krippen* are scarce, and children of single-parent families have first priority.

The typical, and often only, ECP option for children from age three until they enter school is *Kindergarten*. Although *Kindergarten* provides both care and education it is not linked to schools in any respect. By law ("Kinder- und Jugendhilfegesetz"), the German *Kindergarten* is supposed to help parents meet their work and family life responsibilities while also providing the first stage of the general education system. However, in West Germany the majority of *Kindergarten* slots are only half-day and usually no lunch is offered. In 1998, for example, only about 20 percent of all *Kindergarten* slots offer full day care (Statistisches Bundesamt, 2001). Therefore, in reality, working parents have to make additional care arrangements outside of *Kindergarten* hours. These additional care arrangements consist mostly of private arrangements with grandparents, neighbors or friends. Büchel and Spiess (2002) have shown for 2000 that almost 30 percent of all children of *Kindergarten* age are cared for by private persons living outside the household. This demonstrates that

German *Kindergarten* hardly helps parents combine work and family life, a fact that is currently subject to heated debate (Büchel & Spiess 2002).

Kindergarten is usually provided by the community or non-profit organizations. The quality is generally regulated at the state level with a focus on structural features such as staff-to-child ratios, group size, or building standards (Kreyenfeld et al., 2001). Although the German *Kindergarten* is not mandatory, it is intended to prepare children for school. This is reflected in high public subsidies to the providers of *Kindergarten* care. *Kindergarten* is supposed to be available for every child and can not refuse any child due to reasons other than an obvious shortage of slots. Fifty-seven percent of preschool children were enrolled in West German *Kindergartens* in 1994 (Statistisches Bundesamt, 1996). Given the surplus demand for *Kindergarten* slots in the first half of the 1990s, the rate of provision was lower than the actual rate of children using *Kindergartens*. This was caused by the fact that some slots were actually shared by two children. Büchel and Spiess (2002) show that in 2000 the actual percentage of children attending *Kindergarten* by age group was 29.8 at age 3, 76.9 at age 4, 94.8 at age 5 and 85.9 at age 6 (for an earlier study which provides transition rates into *Kindergarten* by age group, see Ondrich & Spiess 1998). Family day care plays a minor role in Germany and is mostly seen as a care option for toddlers (Kreyenfeld et al., 2001).

Recognizing that *Kindergarten* in Germany is seen as educational, it is surprising that there has been little research examining the impact of participation in these programs. Moreover, the hypothesis of positive ECP effects becomes more plausible. If the primary function of German preschool programs is to prepare children for school, we would expect to find observable effects of preschool attendance on children's later school success.

3.2 *The School System*

In all German states, except Berlin, during 4th grade, pupils and their parents must choose between three types of secondary schools, which begin with 5th grade. Based on a child's primary school performance and in some German states based on the results of special tests, teachers recommend one of these three school types. In reality this recommendation is binding and in principle parents and pupils must accept this recommendation for placement. The most demanding school is the university-entry-level high school, the so-called "*Gymnasium*", the intermediate is the "*Realschule*," and the "*Hauptschule*" is the type of secondary school with the lowest requirements in Germany. It is important to note that children who leave school from the less demanding *Hauptschule* track have only limited chances in the labor market and are at high risk of unemployment throughout their lifetime (Reinberg & Hummel, 2002).

Depending on the state, the *Hauptschule* offers 5 to 6 years of schooling, while the *Gymnasium* offers 9 years *Realschule* offers 6 to 7 years of schooling. The 5th and 6th grades are a trial period. During this time it is possible for talented students to change into one of the more demanding types of secondary school. All three types of high schools are typically public (OECD 1997).

4. **Method**

4.1 *Sample*

Data used for this study come from the German Socio-Economic Panel (GSOEP). The international public use version 1984-1994 of the GSOEP was used (Wagner et al., 1993). The GSOEP is based on an annual representative sample of approximately 5,000 private households, carried out since 1984. All persons aged 16 and older are sampled. The head of the household provides information about children under 16 years of age. In addition to general household information collected from the household head, information is obtained on

child care and schooling for every child in the household. In contrast to most other population surveys in Germany, foreigners are explicitly included. Moreover, the traditional five immigrant nationalities, Italian, Greek, Turkish, Spanish, and formerly Yugoslavian, are over-sampled. The political intention was that these were temporary migrants who were expected to leave after a few years (guest-workers). However, the German reality is that guest-worker immigrants are not in Germany temporarily. They bring their families and raise second generation immigrants, that is, children who are born in Germany but still carry a foreign passport. In contrast to regulations in the U.S., children of non-German parents who are born in Germany do not automatically enjoy German citizenship. The response rates in the GSOEP in the first wave varied by stratum (for instance, Germans or guest-workers). They ranged from 61 to 70 percent. In the follow-up a response rate of more than 90 percent was reached.

Immigrants who returned to their native countries before their children were 14 years of age and East Germans are not taken into consideration. This allows us to compare two groups in West German society that have at least one thing in common, namely a relatively stable pattern of residence.

Status of 7th grade children was examined to determine school placement into *Hauptschule*, the intermediate *Realschule*, or a university-entry-level high school *Gymnasium*. Although school placement begins a few years earlier, by 7th grade it is almost certain which educational placement has been selected for a child.

4.2 Estimation Methods

Due to the relatively small number of cases (in particular for our separate estimations based on the two subsamples, see below), we use robust methods for our analysis. We do not apply an ordered probit model for three levels of school attainment, but rather a binary probit model with a dichotomous dependent variable. To avoid effects caused by an

empty cell of foreign children who attend *Gymnasium* without attending preschool, we look at the choice between the low level of *Hauptschule* versus the higher levels of *Realschule* and *Gymnasium*. This split is also the most reasonable one with respect to a research question.

To examine the relationship between *Kindergarten* attendance and the probability of a child's low school level placement, we use the binary probit technique. Different models were estimated for the entire sample, German children only, and immigrant children only, to estimate the probability of attending *Hauptschule* vs. other types of school in West Germany.

In the interpretation of our results we are not able to distinguish entirely between a selection and a treatment effect. The selection effect means that parents who care more about education may be more likely to enroll their children in *Kindergarten*, so that superior performance of the *Kindergarten* group is due not to *Kindergarten* itself (which would be the treatment effect) but to greater parent support. This means that children who attend *Kindergarten* are not randomly assigned, which might result in biased estimates (for such an argumentation in an ECP context, see Garces et al., 2000).

One approach to addressing this concern is to include measures of relevant intervening characteristics as covariates. Thus we control for education of the mother and the father, household income and household size (see below). These variables can be characterized as background factors that rule out parental selection factors that flow from those background factors.

But despite these characteristics there might still be some other unmeasured characteristics for which we can not control due to data restrictions. Garces et al. (2000: 12) argue that in some cases it still could be that parents whose children attend *Kindergarten* place a higher value on building human capital at an early age than other parents do. If this accumulation of human capital is associated with better school

outcomes, then this unobserved difference will result in an upward bias of our *Kindergarten* effects. One solution for this problem might be to incorporate a family-specific fixed effect in the model (see Garces et al., 2000). However, as Garces et al. (2000: 12) pointed out, "the fixed effects method is not without its own limitations". In our approach we therefore decided to use the above mentioned covariates, bearing in mind that our estimates might be biased.

It must also be mentioned that the child's actual grade is not observed, but is approximated by the child's age. It is assumed that all children aged 14 are in the 7th grade.

To document *Kindergarten* attendance prior to a child's school enrollment we have to further restrict data. Our study considers only children who are observed two times: once as preschoolers and once at age 14. Thus, we can use only children who were 14 years old between 1992 to 1994, since the preschool period of any older children was not observed in the GSOEP, which started in 1984. The final longitudinal sample is comprised of 316 children aged 14 (110 foreigners and 206 Germans). Due to missing values we had to delete 3.2 percent when running our models. We also exclude pupils attending non-standard schools such as *Gesamtschulen* (integrated schools) and *Waldorfschulen* (anthroposophical schools). The resulting subsample of 14-year-olds is a random sample that covers pupils from all parts of West Germany. It is noteworthy that our approach avoids any kind of "recall error" in that we use information reported at the time the child was attending or not attending *Kindergarten*.

4.3 Variables

The dependent variable in our analysis is a dummy variable (0/1) indicating whether a child of age 14 attended *Hauptschule*. To group the two higher school levels makes sense, as this split determines, to a great extent, the possibilities of later success in the German work force. This grouping also makes sense for methodological reasons and is a

logical reduction because of the relatively small sample size. Therefore, the definition of school placement we use for our analysis is the following: If a child attends any level of school higher than *Hauptschule* (i.e., *Realschule* or *Gymnasium*), we define him or her as having a higher school placement than the reference group.

The independent variable of primary interest is a child's *Kindergarten* attendance. The GSOEP asks heads of households whether a child attends *Kindergarten*. However, the GSOEP does not cover any information on the particular *Kindergarten* the child attends. Therefore we have no information on the particular quality of a *Kindergarten*. Attending *Kindergarten* in our sample covers all cases of any *Kindergarten* arrangement (half-day and full-day). Focusing on the year prior to school enrollment allows us to concentrate on the effects of only one ECP, namely the German *Kindergarten*, as *Krippe* and family day care are not important care alternatives for older preschoolers.

Besides our covariate of main interest, *Kindergarten* attendance, we can use only a limited number of other independent variables due to the small number of cases. Table 1 gives an overview of the definitions of all independent variables. The means of the independent variables are shown together with the estimation results in Table 3.

Table 1 about here.

In addition to school placement and age, we use gender of the child as the variable that represents child characteristics.

Household net income, household size, whether the child lives in a single-parent household, and mother's and the father's years of education are included because of their documented importance to school outcomes, while at the same time they provide some control for parental selection.

City or municipality size was included as a means for examining urban/rural differences. Apart from this "infrastructure effect," the GSOEP does not allow controlling for any other community characteristics.

The dummy variable "change of residence" shows whether there has been a residence change during the last three years. This controls for potential difficulties caused by a change of school or the social environment of a child.

A dummy variable indicating whether the household head is of one of the five traditional immigrant nationalities is included to analyze whether this relates to school placement. For children of immigrant households additional variables are included. Parents' years of residency in Germany is included because it may relate to the extent to which parents can help scholastically or be a positive role for their children, due to reduced language and cultural barriers over time, and the variable may also help with the selection issues.

Calendar effects are controlled for by the year of observation, not by using a set of dummies. Weissshuhn and Büchel (1998) report that this method is efficient, given that the relative importance of the various forms of schooling have remained very much constant in Germany over the last ten years.

5. Results

Table 2 gives an overview of the effects of preschool enrollment on later school placement for the entire sample and differentiated by parents with German and foreign nationality.

Table 2 about here

When we use the entire sample, the results show the following:

As compared to only 41 percent of children without *Kindergarten* experience, 64 percent of children who attend *Kindergarten* attend *Realschule* or *Gymnasium* at age 14. This is

a significant difference as it is shown by the results of the Chi2-Test in Table 2.

A further distinction between the two subsamples shows that this significant difference seems to be due to immigrant children. 51 percent of the immigrant children who had some kind of *Kindergarten* experience attend *Realschule* or *Gymnasium*, compared to only 21 percent of the immigrants' children who had no *Kindergarten* experience. For the German subsample, the difference is smaller: 73 percent of who attended *Kindergarten* attend *Realschule* or *Gymnasium* as well as about 60 percent of those without *Kindergarten* experience. However, it should be mentioned again that these correlations do not tell us whether a higher school level results from a particular treatment in *Kindergarten* or from the selection of the parents. Given that it is only a bivariate analysis it also does not tell us whether these effects are due to other variables which are not controlled for. Thus we continue with the results based on a multivariate analysis.

Table 3 shows whether these differences remain after controlling for other socio-economic variables.

Table 3 about here.

The model based on the entire sample (Table 3, columns 1 to 3) shows that when controlling for important SES measures, no significant relationship between *Kindergarten* attendance and a child's later school level is found.

For the whole sample, background variables that are significantly (.01) associated with placement in higher school levels at age 14 are household size and father's education. The negative coefficient of the father's education supports the hypothesis that the more educated the father, the higher the probability that a child is placed in a higher school level.

When the model is used separately for the German and immigrant samples, the results show the following:

The model that is based on the German subsample (Table 3, columns 4 to 6) demonstrates that there is no significant relationship between attendance of *Kindergarten* in the year prior to school and attending a higher school-level at grade 7. Restricting the sample to only Germans also changes some results. The effect of household size is most striking in this model (.01 significance). The proportion of time the child lived in a city is related to the probability of attending a minimum-level school at the .05 level.

The third model for non-German children shows very different results (Table 3, columns 7 to 9). The probability that a child of immigrant parents attends *Hauptschule* is influenced heavily by his or her *Kindergarten* attendance. The effect is significant at the .05 significance level. If a child with average characteristics in this subsample attended *Kindergarten*, his or her probability of attending an intermediate or university-entry-level high school is substantially higher than for a child who did not attend *Kindergarten*. It should be noted that there is no significant effect for any other explanatory variable.

From these estimations for our multivariate model it is possible to calculate the probability of *Hauptschule* attendance, controlling for all factors in our models. To do this we define a "reference child" - with all else equal, one attends *Kindergarten* and one does not.

Based on the estimations for the entire sample the probability of the reference child, who is set to be German in this model, to attend *Hauptschule* is almost 50 percent (49.7 percent) if he did not attend *Kindergarten* prior to school, and decreases to as little as 36.3 percent if the child did attend *Kindergarten*. However, this effect is not significant. In the model based on the sample of immigrants this influence is significant. The probability of the reference child attending *Hauptschule* decreases from 71.6 percent to 45.8

percent if the child attended *Kindergarten* before school versus a child who did not attend *Kindergarten*.

6. Discussion

In summary, having attended *Kindergarten* care in West Germany significantly raises the probability of immigrant children being placed into a higher educational level of school. For German (pre-)schoolers living in West Germany the findings of this study indicate that there is no significant relationship between attending *Kindergarten* and later school placement.

Although this study represents only a first attempt to examine the long-term effects of *Kindergarten* attendance on school placement at age 14, we recognize limitations:

First the study is representative only of children living in West Germany and excludes East Germany. Second, our estimates may be biased as we cannot control for selection effect entirely. Third, there could be other additional variables that might also account for the findings.

There are multiple possible explanations of our primary finding that there are different *Kindergarten* effects for children of German and non-German backgrounds. A first explanation relates to the role of *Kindergarten* with respect to language acquisition. As we know from other studies, immigrant households speak their native language at home. If immigrant children attend *Kindergarten* they have one big advantage in comparison to their counterparts who do not attend *Kindergarten*: they learn the German language and thus are better prepared to deal with the demands of German school. In addition, immigrant children in *Kindergarten* learn about German culture, which supports their assimilation. In general, the integrating role of German *Kindergarten* may well be of most importance when immigrant children are considered (Bundesministerium für Familie, Senioren, Frauen und Jugend, 2002). For German children the *Kindergarten* does not play this role as strongly, and thus might not have such an effect.

Second it could be that, on average, immigrants are less advantaged than Germans (Alba et al., 1994) and *Kindergarten* may provide the necessary early childhood educational experiences that more advantaged children tend to have.

Third, the acceptance of *Kindergarten* differs between Germans and immigrants. Among German parents *Kindergarten* is accepted independent of their socio-economic status. This is not the case with immigrant parents (Büchel & Spiess 2002). Thus the insignificant effect for children of Germans might be due to the small share of German children not attending *Kindergarten* at all. This share represents only 8 percent of the German sub-sample.

However, it would be incorrect to argue that *Kindergarten* has no effect at all on school outcome for German children living in West Germany. In our study we can not control for the quality of care, measured, for instance, by the staff-to-child ratio in day care centers, maximum group sizes, training requirements and other structural factors. Had we been able to distinguish high-quality *Kindertagesstätten* from lower-quality institutions, we might have found different results.

That the approach to control for quality might be very promising is demonstrated by the findings of the German studies that focus on "ECP quality" (ECCE, 1997, 1999; Tietze, 1998). In general these studies confirm a positive relationship between the quality of a *Kindergarten* and a child's cognitive and social performance. The only study based on German data and which takes longitudinal effects of *Kindergarten* into account (see ECCE, 1999) additionally proves that these effects can still be measured at the age of 8.

Consequently, from a research policy perspective it is important to develop data sets allowing a detailed analysis of ECP attendance and ECP quality in a long-term perspective.

Moreover, the results of further studies could be improved considerably if more child-related information were available. To control for cognitive abilities, for example, would enable us to distinguish between the effects due to the children

themselves, and other effects. Other information that could distinguish between the described treatment and selection effects would be of great merit as well.

With respect to future studies on school outcomes it is important to control for Kindergarten experience--not only to capture this effect, but also to measure the right effects of the other control variables. The fact that we do not find a significant effect of household income indicates that previous findings of a significant income effect on children's schooling without controlling for *Kindergarten* experience may at least partly capture a *Kindergarten* attendance effect.

With regard to future research, the longitudinal design of the GSOEP promises interesting features. More waves will make it possible to investigate whether *Kindergarten* attendance matters not only for school attainment, but also for employment outcomes, reliance on public assistance, as well as other relevant performance indicators. Subsequent waves will make it possible to extend the analysis to German and immigrants living in East Germany as well.

From a political point of view, these results provide evidence that the German debate on how to improve school outcomes of immigrant children should start with a discussion about how to increase German *Kindergarten* participation among immigrant children. Policies should be considered that ensure better information distribution for immigrants, highlighting the importance of *Kindergarten* attendance, especially for immigration groups coming from countries where ECP's play a minor role.

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Table 1: Variable definition

Variable	Definition
Kindergarten	Indicator variable equal to unity if <i>Kindergarten</i> attended in the year prior to school enrollment
Male	Indicator variable equal to unity if male pupil
Guest worker	Indicator variable equal to unity if head of household has one of the five traditional guest worker nationalities
HH-income	Continuous variable: household net income per month (in 1,000 DM, deflated (1985=100) by the overall cost-of-living index, average income of the observed period)*
HH-size	Continuous variable: number of persons living in the household (average household size of the observed period)*
Single parent	Indicator variable equal unity if single parent household
Urban	Continuous variable: fraction of years a child lived in an urban area (urban area = city with population of 500,000 or more)
Rural	Continuous variable: fraction of years a child lived in a rural area (rural area = city with population less than 5,000)
Change of residence	Indicator variable equal to unity if change of residence within the last 3 years
Education father	Continuous variable: years of father's schooling calculated as number of years required for highest degree obtained (foreign degrees integrated)
Father economically active	Continuous variable: fraction of years father has participated in the labor force
Education mother	Continuous variable: years of mother's schooling calculated as number of years required for highest degree obtained (foreign degrees integrated)
Mother economically active	Continuous variable: fraction of years mother has participated in the labor force
Years of residence	Continuous variable: number of years the head of household has been living in Germany (immigrants only)
Monitoring years	Continuous variable: calendar year of observation (two digits)

Note: * To avoid random fluctuations the averages of the observed period are used for the estimations.

Source: Authors.

Table 2: School attainment at age 14 by *Kindergarten* attendance and nationality (West Germany, monitoring years 1992 to 1994), in percent

<i>Kindergarten</i> attendance prior to school enrollment	Entire Sample			Germans			Immigrants		
	HS	RS/Gym	Total	HS	RS/Gym	Total	HS	RS/Gym	Total
Kindergarten	35.6 (N=90)	64.4 (N=176)	100	26.8 (N=50)	73.2 (N=137)	100	48.6 (N=40)	51.4 (N=39)	100
No Kindergarten	58.6 (N=32)	41.4 (N=18)	100	40.4 (N=8)	59.6 (N=11)	100	78.7 (N=24)	21.3 (N=7)	100
N	122	194	(316)	58	148	(206)	64	46	(110)

Shares as line percentages, weighted. Number of cases: unweighted.

HS: Hauptschule, RS: Realschule, Gym: Gymnasium.

Chi2-Test: Germans: $p=0.34$, Immigrants: $p=0.01$, Entire Sample: $p=0.00$.

Without pupils attending non-standard schools like *Gesamtschulen* (integrated schools) and *Waldorfschulen* (anthroposophical), as well as pupils who could not be monitored by the GSOEP in the year prior to their school enrollment.

Source: GSOEP, pooled over 1984-1994 and authors' calculations.

Table 3: Determinants of the probability to attend *Hauptschule* (as opposed to *Realschule* or *Gymnasium*), as a function of *Kindergarten* attendance and other socio-economic covariables (aged 14, West Germany, monitoring years from 1992 to 1994, Probit Model)

Covariables:	Entire Sample			Germans			Immigrants		
	Coeff.	t-Value	Mean	Coeff.	t-Value	Mean	Coeff.	t-Value	Mean
<i>Kindergarten</i>	-0.340	(1.344)	0.853	0.159	(0.344)	0.925	-0.675*	(1.985)	0.692
Male	0.272+	(1.648)	0.492	0.346	(1.545)	0.474	-0.030	(1.111)	0.521
Guest worker	0.256	(1.280)	0.352	-	(-)	-	-	(-)	-
HH-income	-0.165+	(1.774)	3.686	-0.165	(1.331)	3.910	-0.034	(0.196)	3.074
HH-size	0.275**	(3.354)	4.523	0.362**	(2.992)	4.312	0.186	(0.142)	4.570
Single parent	-0.646	(0.947)	0.075	-1.667	(1.565)	0.080	-0.172	(0.163)	0.073
Urban	-0.320+	(1.720)	0.450	-0.516*	(1.933)	0.410	0.018	(0.059)	0.554
Rural	-0.059	(0.228)	0.132	-0.203	(0.670)	0.152	0.140	(0.232)	0.067
Change of residence within last 3 years	0.095	(0.417)	0.169	0.017	(0.450)	0.147	0.246	(0.697)	0.225
Education father	-0.126**	(2.681)	10.50	-0.172*	(2.389)	11.29	-0.117	(1.581)	9.109
Father economically active	0.431	(1.149)	0.855	-0.121	(0.209)	0.886	0.678	(0.270)	0.777
Education mother	-0.081	(1.558)	10.44	-0.084	(1.077)	11.15	-0.044	(0.587)	9.053
Mother economically active	0.279	(1.286)	0.469	0.327	(1.202)	0.438	0.117	(0.268)	0.532
Years of residence in W. Germany	-	(-)	-	-	(-)	-	-0.035	(1.000)	22.50
Monitoring years	0.154	(1.481)	93.03	0.102	(0.745)	92.98	0.277	(1.547)	93.17
(Constant)	-13.512	(1.401)	-	-8.393	(0.658)	-	-24.276	(1.479)	-
Mean of dependent variable: (1= <i>Hauptschule</i> , 0= <i>Realschule</i> or <i>Gymnasium</i> ; unweighted)		0.381			0.276			0.570	
Log likelihood:		-160.1			-91.1			-63.4	
Likelihood-ratio Statistic:		101.4			62.6			22.8	
N (unweighted):		306			199			107	

Without pupils attending non-standard schools like *Gesamtschulen* (integrated schools) and *Waldorfschulen* (anthroposophical scholars), as well as pupils who could not be monitored by the GSOEP in the year prior to their school enrollment.

+ $p \leq 0.10$; * $p \leq 0.05$; ** $p \leq 0.01$.

Source: GSOEP, pooled over 1984-1994 and authors' calculations.

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