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Assimilation and Other Determinants of School Attainment in Germany: Do Immigrant Children Perform as Well as Germans?

By John P. Haisken-DeNew,
Felix Büchel, and Gert G. Wagner*

Summary

The German secondary school system has three levels: minimum (Hauptschule), general (Realschule), and university-entry (Gymnasium). Using the German Socio-Economic Panel (GSOEP), we examine determinants of school attainment of German and foreign pupils in West Germany from 1984 to 1993 using an ordinal probit model. In addition to standard control variables, we include controls for parental ability and income preference. Further, detailed regional level information is introduced to control for schooling supply conditions. Foreign children have a much higher probability of attaining only the minimum level of education. However, assimilation reduces this effect. Parental ability or income preference is shown very clearly to increase the probability of a child's Gymnasium attainment.

1. Introduction

Schooling is not only an important element of individual empowerment and equality in society, but also a major determinant of growth and international competitiveness of an economy. The intent of this paper is to give an empirical overview of the socio-economic and individual determinants of school attainment in West Germany from 1984 to 1993. Special focus is given to comparing the school attainment of children living in households with German heads-of-household to those with foreign household heads. The time period of analysis is defined by the availability of micro data from the German Socio-Economic Panel (GSOEP)¹. In addition to standard control variables, we include controls for parental ability and income preference. Furthermore, detailed regional level information is introduced to control for schooling supply conditions.

Theoretical Background: Human Capital Theory

In explaining schooling attainment, we concentrate largely on human capital theory as defined by Mincer (1974). The theory was developed from a microeconomic standpoint and is flexible to implement. This economic theory and most sociological theories typically concentrate on "structural" determinants, while differences in individual abilities and preferences (such as leisure preferences) are often given less emphasis. This is also seen in "probabilistic" theories, where only probability

predictions are made, since individual ability and preferences are not observed. Typically, the assumption is made that individual ability and preferences are somehow normally distributed. To fill this analytic gap in the literature, this paper examines the effect of children's ability and their parents' socio-economic status on school achievement level.

According to human capital theory, schooling is an investment. Those investing in an education that takes longer should expect to receive an appropriately higher wage in the future. Pohmer (1985) presents a model of how much an individual chooses to invest in education that depends on the individual's ability, the effort required to accumulate human capital, the preference for leisure, and the utility associated with income.

With perfect capital markets, i.e., no liquidity constraints, financing education is not a problem; the future expected gain in income can be used as collateral for the investment. However, in practice this is not the case (Holzmann 1988; Buechel and Helberger 1995). The assets and income of the student's parents play an important role in determining the level of education achieved by that student.

There may be other considerations. When parents themselves are better educated, one would expect their children to have higher educational levels as well, as a result of positive role models, informational advantage, other structure of social activities, i.e., "what one has to do to succeed" (Buechel and Duncan 1996). Parents with fewer children may be more inclined to make greater investments per child in education for their children. These parents would also be likely to have more time at home to read to their children when they are small, answer homework-related questions, and spark interest in school-related issues (Mayer 1991). However, in single-parent households this may be more difficult, as the single parent has less time to devote to such activities. On the other hand, education is not only an investment but also a consumption good. There is a non-monetary prestige value of having finished university-entry high school as opposed to only the required minimum high school education, or to be on the honor roll as opposed to having just passed. Educated parents might push their children to achieve high educational levels more than parents with less education.

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¹ The international public use version 1984-1993 of the GSOEP data was used here. For further information, see Wagner, Burkhauser, and Behringer (1993) as well as Burkhauser, Kreyenfeld, and Wagner (in this volume). Some additional regional-level indicators were merged into the micro data set.

Foreigner Investments in Education

Foreigners in Germany tend to find themselves in the lower end of the income distribution. The limited assets and income of such parents may well determine the amount of education their children will receive. If they want to borrow money to finance a child's education, they may face less access to capital and uncertain interest rates. They may also not be fully committed to staying in Germany as opposed to returning to their home countries. All of this leads to a greater degree of risk aversion for investing in education².

However, even if the foreigner's level of education is lower than that of Germans, a foreigner who returns to his home country may still be better educated than his fellow countrymen. Foreigners may view their income not only by absolute income levels in Germany, but also by relative income levels upon return to their home country. For children of temporary migrants, with otherwise similar preferences and uncertainties as long-term or permanent migrants, this can lead to disproportionately lower educational attainment levels.

It is intuitive that immigrant children do not have lower levels of ability but rather, confronted with the language and cultural barriers in Germany, have more difficulties in accumulating human capital in an efficient manner in the German school system. If the parents themselves have difficulty with the language, this problem is likely to be exacerbated. Even without barriers and credit liquidity constraints, there may also be systematic differences in the preference for leisure between Germans and foreigners, leading to different "optimal" levels of education for their respective children.

Institutional Initiatives

To further the notion of equal opportunity and increase the competitiveness of the German economy, an educational offensive was begun in the 1970s. School fees were all but abolished and university fees were kept very low to reduce the immediate personal cost of additional education. Training incentives were established to compensate students at least partially for foregone earnings (opportunity costs) during the additional education. Jeschek (1993) reports that this led to a dramatic increase in the proportion of gymnasium graduates in comparison to all other graduates, from 9 percent in 1960 to 27 percent in 1990.

The *Transfer Scheme* ("BAFöG" *Bundesausbildungs-förderungsgesetz*) was introduced in 1971 to give students easier access to educational loans and grants. The scheme was modified in 1983 to exclude those students living at home with their families, and to increase the ratio of loans to grants (see Neumann and Schrapfer 1990 for further details). While repayment of loans after the students have found jobs is theoretically not a disadvantage to low-income households, there is evidence that children from

such households shy away from long educational programs, perhaps for fear of incurring large debts.

2. Previous Empirical Results

Despite the overall expansion of educational opportunities as reported by Leschinsky and Mayer (1990), Mayer and Blossfeld (1990), Blossfeld and Shavit (1993), and Koehler (1992), there are reports of persistent differences with respect to the social structure of school attainment. Using data from the General Population Survey (ALLBUS), Mueller and Haun (1993) report that for the birth cohorts 1960-1969, 90 percent of the children coming from highly qualified white collar workers and civil servants achieved at least the general-level high school diploma (*Realschulabschluss*) whereas only 40 percent of the children from unskilled blue collar workers attained the same level. This is a dramatic increase in social equality compared to cohorts of 1900-1910 of whom 80 percent of the highly skilled and only 5 percent of the children of unskilled blue collar workers attained at least the general-level high school diploma. Nonetheless, today's inequality of school attainment is of concern.

Studies examining school attainment of children from foreign household heads are far less numerous. Alba, Handl, and Mueller (1994) show large differences in finishing school between foreign and German children. Jeschek (1993, 1994) and Behringer, Jeschek, and Wagner (1994) report, however, that these differences are diminishing over time. Whereas nowadays approximately 30 percent of all German school completers graduated with a university-entry-level (*Gymnasium*) high school diploma (*Abitur*), with only 6 percent high school dropouts, the numbers for foreign pupils are completely opposite only 8 percent attain the *Abitur* with 22 percent dropping out³. See also Buechel and Wagner (1996).

Gang and Zimmermann (1996) using the GSOEP find strong differences in parental influence on school attainment of Germans and "guest worker" foreigners. Their sample consists of interviewed adults, looking retrospectively at their schooling attainment as children. This approach, although also based on the GSOEP, differs from our study in that we examine the children when they are children, and use the interviewed adults as the parents. In short, these are two very different samples and cohorts. For Italians, Greeks, Turks, Yugoslavs, and Spaniards, Gang and Zimmermann (1996) show that "the family's investment in the formation of education is not dependent on parent's education." They point rather to community and societal influences such as networking, i.e., the size of the respective ethnic group at the time of entry into Germany.

² Dustman (1993) demonstrates this point for guest workers in Germany who are offered on-the-job training.

³ Baker and Lenhardt (1988) show that as the cohorts of German pupils grow smaller, those of children from foreign-headed households are growing larger.

Gang (1996) shows positive although small parental influence on children's school attainment for Germans, with fathers having three times more influence than mothers. For the foreigners, the results are mixed.

Buechel and Helberger (1995), Buechel and Wagner (1996), Weissshuhn and Buechel (1994), and Alba, Handl, and Mueller (1994) also use the GSOEP data set to examine the probability of different levels of school attainment among German and foreign children. This serves as the basis for the empirical study in this paper, with methodological refinements and extensions. Specifically, the factors mentioned in the previous section are tested for their possible effects in determining school attainment in Germany. The extent to which ability and income preferences play a role is also examined. Finally, of special interest is an examination of whether the influence of possibility politically determined socio-economic factors is observable, controlling for individual and family-level ability and preferences.

3. Data and Implementation

The German Socio-Economic Panel

The German Socio-Economic Panel (GSOEP) is an annual sample of approximately 5,000 private households, which has been carried out since 1984. All persons aged 16 and over are sampled, with the household head giving information about children below the minimum interview age. In addition to general household information collected from the household head, information is obtained on daycare and schooling for every child in the household. Of interest here is the schooling attainment of the children. In contrast to most other population surveys in Germany, foreigners are explicitly included. The traditional five "guest worker" nationalities Italians, Greeks, Turks, Yugoslavs, and Spaniards are oversampled. Other foreigners, due to sample size restrictions, are not taken into account.

Finally, some 1,010 children age 13 (351 foreigners and 659 Germans) make up the sample⁴. Children in seventh grade are examined to determine whether the child is attending minimum-level (*Hauptschule*), general-level (*Realschule*), or university-entry-level high school (*Gymnasium*). Although streaming begins a few years earlier, this grade is chosen because by then it is definite which educational "stream" has been selected for a child by his parents. The child's actual grade is not observed but is approximated with the child's age. It is assumed that all children aged 13 years are in the seventh grade. As the child's age is used and not the grade, each child at that age appears only once throughout the entire panel.

In a similar vein, several children of the same family can appear in the data, leading to non-independence between observations. To handle this potential problem, children of the same family are grouped together, and one child at ran-

dom is chosen for the analysis⁵. Other decision rules, such as taking the first or last child only, were initially considered, but noticeable time effects were observed (i.e., different coefficients), and thus a random draw rule was chosen, resulting in approximately 25 percent of the sample being lost to multi-child households.

Implementation

In the appendix, descriptive statistics for the variables used are documented. The child's sex is used as a proxy to look for differences in career-path expectations. Females might have a lower probability of attaining general or university-entry-level high school levels if they are expected to drop out of the labor market due to future fertility decisions.

Household net income proxies the opportunity costs of following a longer educational path. As the data span a ten-year period, income is deflated (1985=100) by the overall cost-of-living index. Controls for family size are incorporated; here, the household income is weighted by family size to achieve a household equivalence income. The first person is weighted with 1.0, the second with 0.7, and all remaining with 0.5. A low equivalence income would imply higher opportunity costs in financing a longer education. On the other hand, more income should have a positive influence on higher levels of education⁶. While parents in large households have less time for each individual child, there may be compensating networking effects among the children themselves. Overall, we expect household size should have a negative sign in the analysis, even more so for single-parent households.

Parents having an *Abitur*, a university-entry-level high school education, should positively influence human capital accumulation for the reasons previously mentioned: the consumption nature of education, positive role models, etc. For foreigners this variable is defined as having an advanced secondary school degree in the home country as opposed to the minimum required.

We employ the age difference between parents and their children as a proxy for preference and time-budget heterogeneity. Older parents may have specifically chosen to have children and be more willing to invest. Also older parents tend to be better educated, but we control for this explicitly. Adopted children may be treated differently by

⁴ Table 5 shows that the unweighted minimum-level high school level (*Hauptschule*) is overrepresented in the combined sample. This is not surprising, as foreigners are oversampled.

⁵ Originally, an ordinal probit model for multi-child households with family fixed effects was attempted. Unfortunately, as the overwhelming majority of households had only a single child in the sample, this estimation was infeasible.

⁶ Alba, Handl, and Mueller (1994) do not control for equivalent income. Here, in the other hand, on the basis of human capital theory, we do not control for "shift work" and "job status", as they do.

their parents. Mayer (1991) suggests there is a positive relationship between school attainment and "natural" child status, and thus the coefficient should have a positive sign.

City or municipality size is a useful proxy in examining urban/rural differences. The larger the city, the greater the diversity of an access to advanced schooling is expected, thus giving a positive sign. Time effects are controlled for by the year of observation, not by using a set of dummies, but rather as a single "continuous" variable. Weissshuhn and Buechel (1994) report that this method is acceptable, as the relative importance of the various forms of schooling have remained pretty much constant in Germany over the last ten years.

For children of foreign household heads, additional controls are introduced. The intention of staying in Germany permanently should have a positive effect on school attainment whereas the intention to remigrate in the next five years should have a negative impact. The extent to which foreign parents can help with homework and scholastically be a positive role model for the children should depend positively on duration of residence, due to reduced language and cultural barriers over time. Specifically, cultural assimilation can be more directly tested with a self-reported variable, whether traditional meals of the home country are primarily eaten as opposed to German meals (see Esser 1990). "Little assimilation" should have a negative impact on school attainment of children of foreign household heads. We do not have the language skills of the children themselves in the data. However, this is not a significant problem, as these skills might be endogenous and should be dropped anyway.

Capturing "Ability" and "Income Effects"

As there are no measures of "ability" (i.e., an IQ test score) in the GSOEP, some proxy must be found to control for possible correlations of ability between parents and their children, and therefore potential overestimation of the importance of societal factors⁷. Therefore, as a proxy for the parents' ability, which the children would inherit, that portion of income not explained by human capital theory is used⁸. This amounts to the residuals ϵ_i from the following Mincerian labor-income regression. For parent i ,

$$\ln(Y) = \alpha_0 + \alpha_1 E_i + \alpha_2 X_i + \alpha_3 X_i^2 + \epsilon_i \quad (1)$$

where E is the number of years of schooling of the parent and X is the number of years of work experience. E is coded according to Helberger (1983), such that a mapping is made from type of diploma to minimum years of education⁹. X is approximated by the standard potential experience formula, $Age-E-6$. As the overwhelming majority of household heads are males who are very likely to be working constantly full-time in the labor market, this assumption seems to be plausible. We augment the previous equation to include foreigner-specific indicators:

$$\ln(Y_i) = \alpha_0 + \alpha_1^G E_i^G + \alpha_2^G X_i^G + \alpha_3^G X_i^{G2} + \alpha_1^F E_i^F + \alpha_2^F X_i^F + \alpha_3^F X_i^{F2} + \sum_t^T \alpha_t \text{Time}_t + \epsilon_i \quad (2)$$

is used, where E_i^G and E_i^F refer to years of education of German and foreign household heads, respectively; X_i^G X_i^F and refer to years of labor market experience of Germans and foreigners respectively; and Time_t is a time-specific (1985-1993) fixed effect (see Schmidt 1992).

The residual is obviously not a direct control for ability, although not a bad proxy. In addition to standard human capital factors, luck, assumed to be randomly distributed, also plays a role. Ambition, and therefore income preference, would also lead to higher levels of educational accumulation.

It is debatable to what extent parents' ability spills over into their children's ability, but for the purposes of this paper, this correlation will be assumed. In our strategy, the parents' ability measure should be independent of the children's school attainment because it has netted out the influence of parent's education. Using IQ as a measuring instrument, as in Mare (1980), can create a problem, because IQ scores are likely to be higher, the higher the education of the person being examined. But there are some potential econometric problems with our method, which will be discussed shortly.

Supply Side Indicators

Using detailed regional macro data from the *Bundesforschungsanstalt fuer Landeskunde und Raumordnung* (1992) at the *Kreiskennziffer* level (328 county-level observations)¹⁰ measures are constructed for the share of foreign residents; the share of welfare recipients; the share of mandatory social insurance covered employees in service industries; and the share of the seventh grade school-going population in schooling above the minimum level (*Hauptschule*), including *Realschule*, *Gesamtschule*, and *Gymnasium*¹¹. As scaling sometimes presents convergence problems for nonlinear iterative procedures, all shares are expressed as fractions of 1.

⁷ Altonji and Dunn (1991), Solon (1992), and Zimmermann (1992), show, for the United States, a large earnings correlation between parents and their children.

⁸ For an analysis controlling for genetic correlations of siblings, see Behrman and Taubman (1989).

⁹ For foreigners, the mapping is: mandatory school without diploma is six years, mandatory school with diploma is seven years, and advanced schooling is nine years.

¹⁰ Due to data security rules, this kind of analysis can be performed only at Deutsches Institut für Wirtschaftsforschung.

¹¹ Gang and Zimmermann (1996) control for the "quality of Germans" in a very similar way. Using the micro data, they calculate the percentage of persons who completed more than minimum education levels in the same age cohort.

4. Empirical Application

Econometrics

In order to econometrically examine school attainment among three different choices of achievement levels, we employ the ordered probit model¹². See Greene (1993, 1995) for a detailed description. This is appropriate, as there is a natural hierarchical order to the three high school diplomas (minimum-, general-, and university-entry-level).

The model is defined with the continuous latent variable, y_i^* , being the endogenous variable, x_i being the exogenous variable, and v_i being the standard normally distributed error:

$$y_i^* = B'x_i + v_i \quad (3)$$

If J is the possible number of endogenous variable outcomes, these are $J-1$ thresholds to be estimated, along with the model parameters, B . We used the software package LIMDEP, which restricts the first threshold, μ_0 , to zero, and estimates it with a constant. In the three outcome case,

$$y_i = \begin{cases} 0, & \text{if } y_i^* \leq 0, \\ 1, & \text{if } 0 < y_i^* \leq \mu_1, \\ 2, & \text{if } y_i^* > \mu_1 \end{cases} \quad (4)$$

where for $P(O_j)$, the probability of landing in outcome j , the marginals are defined as:

$$\frac{\delta P(O_0)}{\delta x_i} = \phi(\beta'x_i) \beta \quad (5a)$$

$$\frac{\delta P(O_1)}{\delta x_i} = [\phi(-\beta'x_i) - \phi(\mu_1 - \beta'x_i)] \beta \quad (5b)$$

$$\frac{\delta P(O_2)}{\delta x_i} = [\phi(\mu_1 - \beta'x_i)] \beta.$$

Due to the adding-up property of probabilities, if the probability of landing in outcome "0" increases by x percent, then the sum of all other (1 and 2) outcome probability changes must be $-x$ percent, since a person can only have a single outcome.

To measure the goodness-of-fit of the ordered probit model, the McKelvey and Zavoina (1975) pseudo R^2 measure is reported for all regressions. These are shown by Veall and Zimmermann (1994) to be far superior to all other measures, especially those measures relying on the likelihood ratio, in coming as close as possible to the OLS measure of R^2 . With \hat{y} being the fitted values of the latent variable, the McKelvey-Zavoina measure is:

$$R_{MZ}^2 = \frac{\text{var}(\hat{y})}{1 + \text{var}(\hat{y})} \quad (6)$$

Including the residual from the household heads' wage equation as a proxy for genetic ability and income preference in the child's schooling attainment ordered probit equation is potentially problematic. One problem is separating "ability" from wage discrimination and other factors other than ability that determine the parent's wage. A parent may earn less due to wage discrimination, unrelated to any "ability." This is likely to play a larger role for foreign household heads than their German counterparts¹³. In addition to wage discrimination, the variable "ability" may consist of other components. However, as long as the components are not correlated with the child's schooling they present no problems for the analysis¹⁴. Although the simultaneity issue is not very important, i.e., parent's ability affects child's schooling attainment but not vice versa, the danger is that the residual ϵ_i in the wage equation (2) may be correlated with the error v_i in the ordered probit equation (3). This is equivalent to saying that the schooling outcome is measured with error, and that its error component is correlated with ϵ_i , an included regressor. In an OLS setting this would deliver inconsistent estimates and bias all coefficients toward zero. In order to correct for measurement error, instrumenting and eliminating the error component or using some additional or external known information is required, which in this case is unfortunately not available. In a nonlinear ordered probit model, these problems may be made worse. However, for our case this does not seem to be an empirical problem, as the sample correlation coefficient, although not a definitive test, is $P(\epsilon_i, v_i) = 0.04$, indicating virtually no correlation.

Because regional information is merged into our individual-level data, further complications arise. In an OLS setting, Moulton (1986, 1990) reports that as the levels of aggregation in the independent variables re different, the aggregation error component of the macro data is misspecified, thereby understating the standard errors of the macro variables. In some cases, correct t -values are half that of those that are estimated¹⁵. Similar arguments must apply for the ordinal probit model. Unfortunately, an ordered probit model augmented with group random effects is not available.

¹² We implement this with Greene's (1995) econometrics software LIMDEP [7.0]. The routine used here has the advantage that not only are the probit coefficients reported, but so are their respective marginal impacts on the probabilities.

¹³ The authors thank Thomas Dunn for this comment.

¹⁴ The authors thank Ira Gang for this comment.

¹⁵ Moulton (1990) demonstrates that even completely spurious variables at an aggregate level can be merged into a micro data set and found to be significant. For example, the spurious geographical variable "Elevation of Highest Point" at the state level was found to be significant in a wage equation, whereas the corrected t -value was indeed insignificant.

Overall

Results Four models using the ordered probit estimator are presented here. Table 1 contains all pupils (N = 1,010). As *Gymnasium* attainment for children of household heads with *Abitur* is almost deterministic, Table 2 contains only pupils whose household heads do not have an *Abitur* (N = 936). Table 3 contains those pupils in Table 2 with employed household heads reporting valid earnings information (N = 724), while Table 4 augments the previous sample with the additional variable "Ability/Income Preference" (N = 724).

Although the coefficients in all tables show negative effects for boys, they are insignificant throughout all tables. It is clear that boys and girls have equal probabilities of attaining higher levels of secondary education. Table 1 shows very clearly the generational correlations of schooling attainment. Having a household head with an *Abitur* (who himself/herself successfully completed *Gymnasium*) increases the child's probability of attaining *Gymnasium* by 35 percent. Marginal additions to the household size decrease *Gymnasium* attainment by 3.2 percent; the parents may be diverted from helping with homework to

Table 1

Determinants of Secondary School Attainment by Ordered Probit Estimation
Model I

Variable	Coefficient	t-Value	Change in Probability of <i>Hauptschule</i>	Change in Probability of <i>Realschule</i>	Change in Probability of <i>Gymnasium</i>
Constant	-3.1107	(-2.470)	1.2274	-0.2749	-0.9525
μ_1	0.87560	(18.833)			
Male	-0.07142	(-0.921)	0.0282	-0.0063	-0.0219
HH—Head with <i>Abitur</i>	1.1469	(6.962)	-0.4525	0.1014	0.3512
Age Difference	0.00800	(1.328)	-0.0032	0.0007	0.0025
Child Not Related	-0.26359	(-1.217)	0.1040	-0.0233	-0.0807
Single Parent	-0.25011	(-1.587)	0.0987	-0.0221	-0.0766
HH Size	-0.10509	(-2.598)	0.0415	-0.0093	-0.0322
HH Equivalent Income	0.02926	(6.446)	-0.0115	0.0026	0.0090
City Size: > 500,000	0.19634	(1.648)	-0.0775	0.0174	0.0601
City Size: 20,000-100,000	0.00609	(0.042)	-0.0024	0.0005	0.0019
City Size: < 20,000	-0.06734	(-0.541)	0.0266	-0.0060	-0.0206
Foreign HH-Head					
HH—Head Advanced School	0.51861	(2.447)	-0.2046	0.0458	0.1588
Return Migration < 5 years	-0.37936	(-1.763)	0.1497	-0.0335	-0.1162
Return Migration > 5 years	-0.31290	(-2.168)	0.1235	-0.0277	-0.0958
Little Assimilation	-0.34890	(-2.424)	0.1377	-0.0308	-0.1068
Years since Migration	0.05324	(2.651)	-0.0210	0.0047	0.0163
HH-Head Turk	-1.3886	(-3.262)	0.5479	-0.1227	-0.4252
HH-Head Yugoslav	-1.0094	(-2.552)	0.3983	-0.0892	-0.3091
HH-Head Greek	-0.74002	(-1.601)	0.2920	-0.0654	-0.2266
HH-Head Italian	-1.4414	(-3.230)	0.5688	-0.1274	-0.4414
HH-Head Spanish	-1.4132	(-3.049)	0.5576	-0.1249	-0.4327
Year	0.02966	(2.100)	-0.0117	0.0026	0.0091
Macro: Foreigner Share	-2.0581	(-1.969)	0.8121	-0.1819	-0.6302
Macro: Share Welfare	0.51737	(1.784)	-0.2041	0.0457	0.1584
Macro: Share Service	0.32942	(0.737)	-0.1300	0.0291	0.1009
Macro: Cohort Size	0.66554	(1.697)	-0.2626	0.0588	0.2038
N			1,010		
McKelvey-Zavoina R ²			0.32767		
LogL			-938.5467		
LogL-R			-1078.283		
LRT χ^2			279.4720		
Note: Full sample as defined in Section 3 of the text.					
Source: Authors' calculations and GSOEP, 1984-1993.					

provide basic care for other children. This result holds in all results.

For the approximately 2 percent of children unrelated to the household head, Tables 3 and 4 show a striking tendency toward minimum education. These children are about 25 percent more likely to achieve *Hauptschule* and about 19 percent less likely to achieve *Gymnasium*.

Household equivalent income has a positive influence, with a 1 percent increase in income translating to a 1 percent increase in the probability of attaining *Gymnasium*. This result is rather stable in Tables 1 to 3. Children living in very large cities of 500,000 or greater, perhaps having better selection or access to schooling, have a 6 percent higher chance of attaining *Gymnasium*, as seen in Table 1.

The regional (macro) level measures show mixed results. The regional foreigner share of residents in Tables 1 and 2 show strong and significant negative impacts on *Gymnasium* attainment for all pupils. Thus, there seems to be some "crowding" effect of foreigners. It may be that with large local populations of foreigners, who are geared toward the *Realschule*, German pupils may find themselves attaining similar levels of schooling.

In order to examine the effects of "ability," the sample size was significantly reduced (from 936 in Table 2 to 724 in Tables 3 and 4), due primarily to the loss of households with unemployed heads. The strong and significant foreigner share effect, however, disappears in Tables 3 and 4. Tables 1 and 2 also show that an increase in cohort size of pupils

Table 2

Determinants of Secondary School Attainment by Ordered Probit Estimation
Model II

Variable	Coefficient	t-Value	Change in Probability of <i>Hauptschule</i>	Change in Probability of <i>Realschule</i>	Change in Probability of <i>Gymnasium</i>
Constant	-3.2064	(-2.442)	1.2786	-0.3888	-0.8898
μ_1	0.88319	(18.572)			
Male	-0.04266	(-0.535)	0.0170	-0.0052	-0.0118
Age Difference	0.00667	(1.075)	-0.0027	0.0008	0.0019
Child Not Related	-0.24795	(-1.101)	0.0989	-0.0301	-0.0688
Single Parent	-0.31323	(-1.956)	0.1249	-0.0380	-0.0869
HH Size	-0.10041	(-2.394)	0.0400	-0.0122	-0.0279
HH Equivalent Income	0.03046	(6.819)	-0.0121	0.0037	0.0085
City Size: > 500,000	0.19807	(1.634)	-0.0790	0.0240	0.0550
City Size: 20,000-100,000	-0.00882	(-0.060)	0.0035	-0.0011	-0.0024
City Size: < 20,000	-0.07645	(-0.603)	0.0305	-0.0093	-0.0212
Foreign HH-Head					
HH-Head Advanced School	0.52021	(2.459)	-0.2074	0.0631	0.1444
Return Migration < 5 years	-0.37432	(-1.744)	0.1493	-0.0454	-0.1039
Return Migration > 5 years	-0.31899	(-2.213)	0.1272	-0.0387	-0.0885
Little Assimilation	-0.34588	(-2.399)	0.1379	-0.0419	-0.0960
Years since Migration	0.05448	(2.703)	-0.0217	0.0066	0.0151
HH-Head Turk	-1.4225	(-3.330)	0.5672	-0.1725	-0.3947
HH-Head Yugoslav	-1.0410	(-2.623)	0.4151	-0.1262	-0.2889
HH-Head Greek	-0.77233	(-1.668)	0.3080	-0.0937	-0.2143
HH-Head Italian	-1.4681	(-3.285)	0.5854	-0.1780	-0.4074
HH-Head Spaniard	-1.4602	(-3.140)	0.5822	-0.1771	-0.4052
Year	0.02984	(2.019)	-0.0119	0.0036	0.0083
Macro: Foreigner Share	-2.0730	(-1.891)	0.8266	-0.2514	-0.5752
Macro: Share Welfare	0.43855	(1.480)	-0.1749	0.0532	0.1217
Macro: Share Service	0.38532	(0.848)	-0.1536	0.0467	0.1069
Macro: Cohort Size	0.81144	(2.029)	-0.3236	(0.0984)	0.2252
N			936		
McKelvey-Zavoina R ²			0.24698		
LogL			-889.7709		
LogL-R			-980.1813		
LRT χ^2			180.8207		

Note: Full sample minus children whose parents have Abitur degrees.

Source: Authors' calculations and GSOEP, 1984-1993.

going to higher level schooling (not just *Hauptschule*) tends to increase the probability of going to *Gymnasium*. This effect disappears in Tables 3 and 4 when unemployed households are dropped. The foreigner share and the cohort variable seem to be telling similar stories. The share of welfare recipients variable has confusing effects. Here, if the share of welfare recipients increases (counter intuitively) the probability of *Gymnasium* attainment increases in all four tables. Overall it appears to be the case that local conditions play a much larger role for children of the unemployed than for those children with employed household heads.

Children of Immigrants

For those household heads who are foreign, having a more than minimum schooling degree in their home country increases significantly the probability of their children's *Gymnasium* attainment, by 14 to 18 percent depending on model specification. We find that the possibility of return migration, however, decreases investments in advanced schooling. The sooner the intent to return, the higher the probability of investing in only the minimum level of *Hauptschule* education. Those interested in staying longer than five years have a 1 to 2 percent higher chance of attaining

Table 3

Determinants of Secondary School Attainment by Ordered Probit Estimation
Model III

Variable	Coefficient	t-Value	Change in Probability of <i>Hauptschule</i>	Change in Probability of <i>Realschule</i>	Change in Probability of <i>Gymnasium</i>
Constant	-2.3535	(-1.538)	0.9326	-0.2650	-0.6676
μ_1	0.94236	(17.099)			
Male	-0.05903	(-0.650)	0.0234	-0.0066	-0.0167
Age Difference	0.00930	(1.180)	-0.0037	0.0010	0.0026
Child Not Related	-0.68256	(-1.947)	0.2705	-0.0769	-0.1936
Single Parent	-0.44519	(-1.975)	0.1764	-0.0501	-0.1263
HH Size	-0.12446	(-2.437)	0.0493	-0.0140	-0.0353
HH Equivalent Income	0.02308	(4.044)	-0.0091	0.0026	0.0065
City Size: > 500,000	0.18043	(1.334)	-0.0715	0.0203	0.0512
City Size: 20,000-100,000	0.01528	(0.093)	-0.0061	0.0017	0.0043
City Size: < 20,000	-0.04497	(-0.315)	0.0178	-0.0051	-0.0128
Foreign HH-Head					
HH-Head Advanced School	0.67855	(2.698)	-0.2689	0.0764	0.1925
Return Migration < 5 years	-0.25248	(-1.050)	0.1000	-0.0284	-0.0716
Return Migration > 5 years	-0.22025	(-1.301)	0.0873	-0.0248	-0.0625
Little Assimilation	-0.48151	(-2.707)	0.1908	-0.0542	-0.1366
Years since Migration	0.04936	(1.976)	-0.0196	0.0056	0.0140
HH-Head Turk	-1.3017	(-2.584)	0.5158	-0.1466	-0.3692
HH-Head Yugoslav	-1.1015	(-2.235)	0.4364	-0.1240	-0.3124
HH-Head Greek	-0.72119	(-1.315)	0.2858	-0.0812	-0.2046
HH-Head Italian	-1.5602	(-2.854)	0.6182	-0.1757	-0.4425
HH-Head Spaniard	-1.5749	(-2.785)	0.6241	-0.1773	-0.4467
Year	0.02434	(1.428)	-0.0096	0.0027	0.0069
Macro: Foreigner Share	-1.2783	(-1.035)	0.5065	-0.1440	-0.3626
Macro: Share Welfare	0.58743	(1.765)	-0.2328	0.0661	0.1666
Macro: Share Service	0.35222	(0.715)	-0.1396	0.0397	0.0999
Macro: Cohort Size	0.40211	(0.895)	-0.1593	0.0453	0.1141
N			724		
McKelvey-Zavoina R ²			0.23831		
LogL			-700.5132		
LogL-R			-769.4334		
LRT χ^2			137.8404		

Note: Full sample minus children whose parents have Abitur degrees or are unemployed.
Source: Authors' calculations and GSOEP, 1984-1993.

Gymnasium than those intending to return in less than five years. On the flip side, the longer the residency, the more assimilation takes place. Tables 1 through 4 show 1.4 to 1.7 percent greater probability of *lymnasium* attainment per 1 percent longer residency. The cultural assimilation variable "Little Assimilation" shows a very strong tendency toward only the minimum *Hauptschule*, with a 21 percent higher probability, while not being culturally assimilated reduces *Gymnasium* attainment by 15 percent.

Differentiating by nationality almost all foreigner groups show much higher probabilities of attaining only the minimum secondary school. Tables 1 to 4 show 50 to 66 percent higher probabilities for Turks, Italians, and Spaniards compared to Germans of attaining only *Haupt-*

schule. Greeks and Yugoslavs among the foreigners have higher probabilities of attaining *Gymnasium*. In Tables 1, 3, and 4, Greek children are not statistically different from their German counterparts.

Ability and Income Preference

Table 4 augments Table 3 to examine the effects of "ability" and income preference. The "ability" coefficient is positive and significant, as expected. The higher the parental ability, and hence the higher that of the son/daughter, the more likely attaining *Gymnasium* is. Another interpretation is that ambitious and successful parents tend to push their children to achieve. A 1 percent increase in parental ability

Table 4

Determinants of Secondary School Attainment by Ordered Probit Estimation
Model IV

Variable	Coefficient	t-Value	Change in Probability of <i>Hauptschule</i>	Change in Probability of <i>Realschule</i>	Change in Probability of <i>Gymnasium</i>
Constant	-3.1433	(-1.979)	1.2450	-0.3580	-0.8870
μ_1	0.95255	(17.151)			
Male	-0.07395	(-0.811)	0.0293	-0.0084	-0.0209
Age Difference	0.00927	(1.157)	-0.0037	0.0011	0.0026
"Ability"	0.49711	(3.616)	-0.1969	0.0566	0.1403
Child Not Related	-0.64599	(-1.777)	0.2559	-0.0736	-0.1823
Single Parent	-0.45349	(-1.984)	0.1796	-0.0516	-0.1280
HH Size	-0.13566	(-2.613)	0.0537	-0.0155	-0.0383
HH Equivalent Income	0.01162	(1.128)	-0.0046	0.0013	0.0033
City Size: > 500,000	0.18089	(1.325)	-0.0716	0.0206	0.0510
City Size: 20,000-100,000	0.02749	(0.168)	-0.0109	0.0031	0.0078
City Size: < 20,000	-0.06071	(-0.421)	0.0240	-0.0069	-0.0171
Foreign HH-Head					
HH-Head Advanced School	0.65043	(2.545)	-0.2576	0.0741	0.1835
Return Migration < 5 years	-0.22636	(-0.935)	0.0897	-0.0258	-0.0639
Return Migration > 5 years	-0.19420	(-1.136)	0.0769	-0.0221	-0.0548
Little Assimilation	-0.53887	(-2.999)	0.2134	-0.0614	-0.1521
Years since Migration	0.05079	(2.033)	-0.0201	0.0058	0.0143
HH-Head Turk	-1.2776	(-2.521)	0.5060	-0.1455	-0.3605
HH-Head Yugoslav	-1.1173	(-2.264)	0.4425	-0.1273	-0.3153
HH-Head Greek	-0.72455	(-1.320)	0.2870	-0.1825	-0.2044
HH-Head Italian	-1.6229	(-2.935)	0.6428	-0.1848	-0.4579
HH-Head Spaniard	-1.6785	(-2.956)	0.6648	-0.1912	-0.4736
Year	0.03002	(1.711)	-0.0119	0.0034	0.0085
Macro: Foreigner Share	-1.3384	(-1.070)	0.5301	-0.1524	-0.3777
Macro: Share Welfare	0.60554	(1.797)	-0.2398	0.0690	0.1709
Macro: Share Service	0.38550	(0.766)	-0.1527	0.0439	0.1088
Macro: Cohort Size	0.34908	(0.748)	-0.1383	0.0398	0.0985
N			724		
McKelvey-Zavoina R ²			0.25917		
LogL			-694.1857		
LogL-R			-769.4334		
LRT χ^2			150.4955		

Note: Full sample minus children whose parents have Abitur degrees or are unemployed.

Source: Authors' calculations and GSOEP, 1984-1993.

makes *Gymnasium* 14 percent more likely, *Realschule* 5.7 percent more likely and, thereby, *Hauptschule* 19.7 percent less likely. However, the size of the income coefficient is half as large as in Table 3 and it loses significance. Almost all other variables remain stable from Table 3 to Table 4, especially the nationality effects. The McKelvey-Zavoina pseudo R² increases from 0.238 in Table 3 to 0.259 in Table 4 with the inclusion of the ability variable. There seems to be at least *prima facie* evidence for ability effects.

5. Conclusions

This paper has examined determinants of secondary schooling attainment of German and foreign pupils in Ger-

many. Foreign children have a much higher probability of only attaining the lowest level *Hauptschule*. However, the longer their parents have lived in Germany and the more their household is culturally assimilated, the lower this initial discrepancy becomes. Gender differences, regardless of nationality, are shown not to be significant. Among foreigners, Turks, Italians, and Spaniards have much higher probabilities of attaining only the *Hauptschule* level. Greeks are shown in some cases to be indistinguishable from Germans in their schooling attainment. More household income and parental "ability" increases the probability of *Gymnasium* attainment, whereas household size decreases it.

Appendix Table

Unweighted Descriptive Statistics for all Ordered Probit Models

Variable	Table 1		Table 2		Tables 3 and 4	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Educational Attainment	0.8168	0.8312	0.7457	0.8060	0.7831	0.8019
Male	0.4772	0.4997	0.4744	0.4996	0.4751	0.4997
HH-Head with Abitur	0.0733	0.2607	—	—	—	—
ln(Ability)	—	—	—	—	1.0405	0.3534
Age Difference	30.3327	6.7284	30.2137	6.7049	29.8163	5.9454
Child Not Related	0.0317	0.1752	0.0310	0.1734	0.0166	0.1278
Single Parent	0.0832	0.2763	0.0823	0.2749	0.0497	0.2175
HH Size	4.3327	1.2796	4.3429	1.3011	4.3343	1.1907
HH Equivalent Income	12.5140	6.7368	12.0199	6.5308	12.5581	6.3615
City Size: > 500,000	0.4436	0.4971	0.4391	0.4965	0.4420	0.4970
City Size: 20,000-100,000	0.1158	0.3202	0.1175	0.3222	0.1257	0.3317
City Size: < 20,000	0.2861	0.4522	0.2874	0.4528	0.2831	0.4508
Foreign HH-Head:						
HH-Head Advanced School	0.0386	0.1928	0.0417	0.1999	0.0401	0.1962
Return Migration < 5 years	0.0554	0.2290	0.0598	0.2373	0.0594	0.2365
Return Migration > 5 years	0.1228	0.3283	0.1325	0.3392	0.1312	0.3379
Little Assimilation	0.1822	0.3862	0.1966	0.3976	0.1768	0.3818
Years since Migration	6.6059	9.3975	7.1282	9.5695	6.6727	9.3672
HH-Head Turk	0.1257	0.3317	0.1357	0.3426	0.1174	0.3221
HH-Head Yugoslav	0.0871	0.2822	0.0940	0.2920	0.0815	0.2738
HH-Head Greek	0.0386	0.1928	0.0417	0.1999	0.0428	0.2026
HH-Head Italian	0.0614	0.2402	0.0662	0.2488	0.0691	0.2537
HH-Head Spaniard	0.0347	0.1830	0.0374	0.1898	0.0414	0.1994
Year	87.8871	2.9911	87.8280	2.9588	87.7666	2.9476
Macro: Foreigner Share	0.0836	0.0494	0.0834	0.0492	0.0830	0.0499
Macro: Share Welfare	0.3667	0.1925	0.3635	0.1917	0.3512	0.1870
Macro: Share Service	0.4855	0.1169	0.4838	0.1170	0.4816	0.1180
Macro: Cohort Size	0.6172	0.1193	0.6153	0.1195	0.6153	0.1186
N	1,010		936		724	
Educational Attainment	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
<i>Hauptschule</i> (0)	458	45.3%	453	48.3%	328	45.3%
<i>Realschule</i> (1)	279	27.6%	268	28.6%	225	31.0%
<i>Gymnasium</i> (2)	273	27.0%	215	22.9%	171	23.6%

Source: Authors' calculations and GSOEP, 1984-1993.

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