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Working Paper — Digitized Version

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DIW Discussion Papers, No. 141

Provided in Cooperation with:

German Institute for Economic Research (DIW Berlin)

Suggested Citation: Haisken-DeNew, John P.; Büchel, Felix; Wagner, Gert G. (1996) : Assimilation and other determinants of school attainment in Germany: Do immigrant children perform as well as Germans?, DIW Discussion Papers, No. 141, Deutsches Institut für Wirtschaftsforschung (DIW), Berlin

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Diskussionspapiere
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Deutsches Institut für Wirtschaftsforschung

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Assimilation and other determinants of school attainment in Germany: Do immigrant children perform as well as Germans?

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Berlin, September 1996

Assimilation and other determinants of school attainment in Germany: Do immigrant children perform as well as Germans ?

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Abstract – The German secondary school stream-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 1984-1993 using an ordinal probit model. Unlike standard specifications, we augment with 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 only attaining the lowest level of education. However, assimilation reduces this effect. Ability or income preference, is shown very clearly to increase the probability of a child's *Gymnasium* attainment¹.

Keywords: Educational Attainment, Foreigner Assimilation, Ability, Income Preference, Ordinal Probit, Marginal Effects, Pseudo R²

JEL classification: J15, J24, I21, C25

I. Background

Schooling is not only an important element of individual empowerment and equality in society, but also a major determinant of economic 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 will be given to comparing the school attainment of children living in households with German heads-of-household, to those of foreign household-heads. The time period of analysis is defined by the availability of micro-data from the German Socio-Economic Panel (GSOEP)². Unlike standard specifications, we augment with controls for parental ability and income preference. Further, detailed regional level information is introduced to control for schooling supply conditions.

A. 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 micro-economic standpoint, and is flexible to implement. This economic as well as most sociological theories typically concentrate on “structural” determinants, whereas differences in individual abilities and preferences (such as leisure preferences) are given inadequate attention. This is seen in “probabilistic” theories, where probability predictions are only made, as individual ability and preferences are not observed. Typically, the assumption is made that individual ability and preferences are somehow normally distributed. As this problem is

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¹The authors would like to thank the participants of the 1996 GSOEP Potsdam/Berlin Meetings, and especially Ira Gang and Thomas Dunn for their very helpful and constructive comments.

²The international public-use version 1984-1993 of the GSOEP data was used here. For further information, see Wagner et al. (1993). Some additional regional level indicators were merged into the micro dataset.

neglected in the literature, this paper will begin to examine the correlation between childrens' ability and the socio-economic status of their parents, and control for this in the analysis.

According to human capital theory, schooling is an investment. Those investing in an education which takes longer, should expect to receive an appropriately higher wage in the future. Pohmer (1985) defines a model such that according to an individual's ability, the effort required to accumulate human capital, the preference for leisure, and utility associated with income, the more or less will be invested in education.

With perfect capital markets, i.e. no liquidity constraints, financing education is unproblematic, as the future expect gain in income can be used as collateral for the investment. However in a formal sense, in practice this is not the case, as shown in Holzmann (1988). Here, theoretically and also in Buechel and Helberger (1995) empirically, the assets and income of the parents play an important role in the determination of education levels.

Further considerations include: when parents themselves are better educated, one would think that their children would have higher educational levels as well, through positive role-models, informational advantage, other structure of social activities (Buechel and Duncan 1996) i.e. "what one has to do to succeed". Parents with fewer children may be more inclined to make greater investments in education for their children. These parents would likely 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) elaborates on this. However, in single-parent households, this may be more difficult, as the single-parent's time constraint becomes more binding than that of two-parent households. On the other hand, education is not only an investment but also education takes on a "consumption" nature. There is a non-monetary prestige value of having finished university-entry-high school as opposed to just the required minimum high school education, or to be on the honor-role as opposed to having just passed. Educated parents might push their children to achieve high educational levels more than parents with less education.

B. Foreigner Investments in Education

As foreigners in Germany tend to find themselves in the lower end of the income distribution, the assets and income of the parents, i.e. very binding liquidity constraints, play a crucial role in determining just how much education their children will receive. Financing of a long educational program for their children may prove very difficult for foreigners. This may be due not only to less access to capital, and uncertainty of interest rates, but also to the possible decision of returning to their home countries. All of this leads to more risk aversion in investing in education.

Dustmann (1993) demonstrates this point for guest-workers in Germany receiving on-the-job training. However, even if the foreigner level of education is lower than that of Germans, in the event of return-migration, this foreigner level may still be higher than that of the home-country. Foreigners may be motivated not only by absolute income levels in Germany, but by relative income levels upon remigration to that of their home country. Then, for children of temporary migrants, for otherwise similar preferences and uncertainty, 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 liquidity constraints, there may also be systematic differences in the preference for leisure between Germans and foreigners, leading to different, but "optimal" levels of education for their respective children.

C. Institutional Initiatives

With the intent of furthering the notion of “equal-opportunity” and increasing competitiveness of the German economy, in the 1970’s an “educational offensive” was started. School fees were all but abolished, and university fees were kept very low, to reduce the immediate personal cost of additional education. Further, there were training incentives which were set up to compensate financially at least partially for forgone earnings (opportunity costs) during the additional education. Jeschek (1993) reports that this led to a dramatic increase in the share of high school graduates compared to all other graduates from 9% in 1960 to 27% in 1990.

Since 1971, the “BAFoeG” Transfer Scheme (*Bundesausbildungsfoerderungsgesetz*) has been in place, allowing easier access to pupil and university student loans and grants. This was later removed in 1983 for those pupils/students living together with their families, and in addition, the share of loans-to-grants increased; see Neumann and Schaper (1990) for further details. While repayment of loans after the students have found jobs is theoretically not a disadvantage to financially strapped households, there is evidence that children from such households shy away from longer educational programs.

II. Previous Empirical Results

Despite the educational expansion as reported by Leschinsky and Mayer (1990), Mayer and Blossfeld (1990), Blossfeld and Shavit (1993) and Koehler (1992), there are reports of persisting considerable 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% of the children coming from highly qualified white collar workers and civil servants achieve at least the general-level high school diploma (*Realschulabschluss*) whereas only 40% of the children from unskilled blue collar workers achieve the same level. Compared to earlier cohorts of 1900-1910, this is a dramatic decrease in social inequality, where 80% of the children of the “highly skilled” and only 5% of the children of the unskilled blue collar workers attained at least the general level high school diploma. Nonetheless, today’s inequality of school attainment is of concern. Unfortunately, this data does not allow differentiating between German and foreign children.

Studies examining school attainment of children from foreign household heads are far less numerous. Alba et al. (1994) show large differences in finishing school between foreign and German children. Jeschek (1993-1994), and Behringer et al. (1994) report however that these differences are diminishing over time. Whereas nowadays approximately 30% of all German school completers graduated with a university-entry-level (*Gymnasium*) high school diploma (*Abitur*), with only 6% high school drop-outs, the numbers for foreign pupils are completely opposite: only 8% attain their *Abitur* with 22% 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/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/societal influences such as networking, i.e. the size of the respective ethnic group at the time of entry into Germany. Gang (1996) shows positive although small parental influence on

³Baker and Lenhardt (1988) show that diminishing cohort sizes by German pupils are compensated by children of foreign household heads.

children's school attainment for Germans, with the father having three times more influence than the mother. For the foreigners, the results are mixed.

Buechel and Helberger (1995), Buechel and Wagner (1996), Weissshuhn and Buechel (1994), and Alba et al. (1994) also use the GSOEP data set in examining the probability of German and foreign children school attainment. This will serve as the basis for the empirical study in the paper, with methodological refinements and extensions. Specifically, the factors mentioned in the previous section will be tested for their possible effects in determining school attainment in Germany. Further, the extent to which ability and income preferences play a role, will be examined. Finally, of special interest is to examine whether the influence of potentially politically determined socio-economic factors are observable, controlling for ability and preferences.

III. Data and Implementation

A. The German Socio-Economic Panel

The German Socio-Economic Panel (GSOEP) is a yearly repeated sample of approximately 5000 private households, which has been carried out since 1984. All persons 16 years old and over are sampled, with one person, namely the household head, giving information on children not having reached the minimum interview age. Specifically, in addition to general household information collected from the household head, information is obtained on the child's day-care 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 interviewed. 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 1010 children make up the sample. Quick perusal of Table 5 shows that the unweighted minimum-level high school level (*Hauptschule*) is over-represented. This is not surprising, as foreigners are oversampled.

As the GSOEP can match children to their parents, the effects of household characteristics can be examined. For those children reaching the seventh grade, the level school attainment is examined: whether the child has reached minimum-level (*Hauptschule*), general-level (*Realschule*) or university-entry-level high school (*Gymnasium*). This grade is chosen as being the most important indicator for which educational "stream" the child is sorted into by his parents.

As the child's actual grade is not observed, it is approximated with the child's age. It is assumed that all children aged 13 years are in the seventh grade. As the GSOEP is a yearly repeated panel, there is the possibility of the same children appearing several times. As the child's age is used and not the grade, there is the added benefit of ensuring that indeed the child can only appear once and only once. On 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 random is chosen for the analysis⁴. Preliminary investigation examined other decision rules, such as taking the first or last child only, but noticeable time effects were observed (i.e. different coefficients), and thus a random-draw rule was chosen, resulting in approximately 25% of the sample being lost to multi-children households.

B. Implementation

In Table 5, descriptive statistics for the variables used are documented. The child's sex is used as a proxy for differences in career-path expectations. One would expect that females would have a lower

⁴Originally, 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 impossible.

probability of attaining general or university-entry-level high school levels, as long as women would be expected to drop-out of the labor market due to future fertility.

Household net income proxies the opportunity costs of following a longer educational path. As the data span a 10 year period, income is deflated (1985=100) by the overall cost-of-living index. As the same income, but with varying numbers of family members greatly influences disposable income, controls for family size are incorporated. Here, the household income is weighted by family size to achieve an household equivalence income, such that 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 education⁵. While parents in large households have less time for each individual child, there may be compensating networking effects among the children themselves. Thus, household size should have a negative sign in the analysis, even more so for single parent households.

Parents having an *Abitur*, i.e. a university-entry-level high school education, should positively influence human capital accumulation, for reasons mentioned: consumptive nature of education, positive role models, etc., and thus this variable should have a positive sign. For foreign parents, 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 kids, 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 their parents. Mayer (1991) suggests preference effects on the parents, such that one would expect, that if the child is the natural child of the parent, this should have positive school attainment effects, 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 larger the diversity and 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 appropriate as the relative importance of the various forms of schooling have remained pretty much constant over the last 10 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 5 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, 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.

C. Capturing "Ability" and "Income Effects"

As true "ability" cannot be measured in the GSOEP, i.e. there are no IQ test results available, some proxy must be found to control for possible correlations of ability between parents and their children,

⁵Alba et al. (1994) do not control for equivalence income. Here, on the other hand, on the basis of human capital theory, we do not control for "shift work" and "job status".

and therefore potential overestimation of the importance of societal factors⁶. Therefore, as a proxy for the parents' ability⁷, which the children would inherit, that portion of income not explained by human capital theory is used. This amounts to the residuals ϵ_i from the following Mincerian labor-income regression. For parent i ,

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

where E is the number of years of schooling of the parent, and X is the number of years of employment. E is coded according to Helberger (1992), such that a mapping is made from type of diploma to minimum years of education⁸. X is approximated by the standard $Age - E - 6$ formula. 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. To augment (1) for foreigner specific indicators,

$$\begin{aligned} \ln(Y_i) = & \alpha_0 + \\ & \alpha_1^G E_i^G + \alpha_2^G X_i^G + \alpha_3^G X_i^{G2} + \\ & \alpha_1^F E_i^F + \alpha_2^F X_i^F + \alpha_3^F X_i^{F2} + \\ & \sum_i^T \alpha_t Time_t + \epsilon_i \end{aligned} \quad (2)$$

is used, where E_i^G , E_i^F refer to years of education of German and foreign household heads respectively, X_i^G , X_i^F 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 ϵ 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 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. On the other hand there are some methodological advantages to this strategy, as this information is by definition independent of the children's school attainment. Using IQ as a measuring instrument, as in Mare (1980), is shown to be a nonignorable problem, as it is thought to be higher, the higher the education of the person being examined. There are some potential econometric problems with this method, which will be discussed shortly.

D. Supply-Side Indicators

Using detailed regional macro data from the *Bundesforschungsanstalt fuer Landeskunde und Raumordnung* (1992) at the *Kreiskennziffer* level (328 county level observations), controls⁹ are made for: the share of foreign residents, the share of welfare recipients $\times 10$, 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*¹⁰. As scaling sometimes presents convergence problems for non-linear iterative procedures, all shares are expressed as fractions of 1.

⁶Altonji and Dunn (1991), Solon (1992), and Zimmerman (1992) show, for the United States, a large degree of intergenerational income stability between parents and their children.

⁷For an analysis controlling for genetic correlations of siblings, see Behrman and Taubman (1989).

⁸For foreigners, this is: Mandatory school without diploma 6 years, Mandatory school with diploma 7 years, and Advanced schooling 9 years.

⁹Due to data security rules, this kind of analysis can be performed only at the DIW.

¹⁰Gang 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.

IV. Empirical Application

A. Econometrics

In order to econometrically examine school attainment, with the pupil having the choice of three different levels, we employ the ordered probit model. See Greene (1993) and Greene (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).

We implement this with the Greene (1995) econometrics package LIMDEP [7.0], having the advantage that not only the coefficients of the model are reported, but also their respective marginals ($\partial Y|X/\partial X$), so important for meaningful interpretation for multi-outcome nonlinear models.

Thus only with the marginals can one examine the change in a probability of having a particular outcome, with the change in an exogenous variable. Using only the beta coefficients, one can talk about the signs of the changes, and then one can only be certain of the first and last categories. Changes of the middle categories, due to the non-linearity of the model, can only be determined using the marginals.

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

$$y_i^* = \beta'x_i + \varepsilon_i \quad (3)$$

Thus, along with the model parameters, if J is the number possible of endogenous variable outcomes, there are $J-1$ thresholds to be estimated. LIMDEP restricts the first threshold μ_0 to zero, and estimates with a constant. In the 3 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:

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

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

$$\frac{\partial P(O_2)}{\partial x_i} = [\phi(\mu_1 - \beta'x_i)]\beta. \quad (5c)$$

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

To measure the goodness-of-fit of the ordinal 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 an analogous OLS 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" and wage discrimination. A parent may earn less simply

due to wage discrimination, unrelated to any “ability”. This is likely to play a larger role for foreign household heads than their German counterparts¹¹. 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 analysis¹². Although the simultaneity issue is not very important, i.e. parent’s ability will affect their children’s schooling attainment, but not vice-versa, the danger is that the residual ϵ_i in (2) in the wage equation may be correlated with the ϵ_i in the ordered probit equation (3). This is equivalent to saying that ϵ_i is measured with error, and that its error component is correlated with ϵ_i . 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 must be made worse. However, this does not seem to be a problem, as the sample correlation coefficient, although not a definitive test, is $\rho(\epsilon_i, \epsilon_i) = 0.04$, indicating virtually no correlation whatsoever.

As regional information is merged into a micro dataset, further complications arise. In an OLS setting, Moulton (1986,1990) reports that as the levels of data aggregation are different, the aggregation error component of the macro data is misspecified thereby understating the standard errors of macro variables. In some cases, correct *t*-values are *half* that of those estimated¹³. Similar arguments must apply for the ordinal probit model. Unfortunately, an ordinal probit model augmented with group random effects is not available.

B. Overall Results

Four models using the ordinal probit estimator will be presented here. Table 1 contains all pupils ($N = 1010$). 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 parents (household heads) having earnings information ($N = 724$), as Table 4 augments the previous with the additional variable “Ability/Income Preference” ($N = 724$).

Although the coefficients in all tables show negative effects for boys, as 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* (having himself/herself successfully completed *Gymnasium*) increases the child’s probability of attaining *Gymnasium* by 35%. Marginal additions to the household size decreases *Gymnasium* attainment by 3.2%, as the parents’ time is potentially diverted away from helping with homework to the basic care of other children. This result holds in all tables.

For the approximately 2% of children living in households unrelated to them, Tables 3 and 4 show a striking tendency toward only the minimum *Hauptschule*, being 25-27% more likely, with *Gymnasium* being 17-19% less likely.

Household equivalence income is a positive influence, with a 1% increase in income translating to a 1% increase in the probability of attaining *Gymnasium*. This result is rather stable for 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% higher chance of attaining *Gymnasium*, as seen in Table 1.

Supply controls at the regional (macro) level show mixed results. The regional foreigner share of

¹¹The authors thank Thomas Dunn for this comment.

¹²The authors thank Ira Gang for this comment.

¹³Moulton (1990) demonstrates that even completely spurious variables at an aggregated level can be merged into a micro data set and found significant. For example, the spurious geographical variable “Elevation of Highest Point” at the state level was found significant in a wage equation, whereas the adjusted *t*-value was indeed insignificant.

residents for Tables 1 to 2, shows strong and significant negative impacts on *Gymnasium* attainment for *all* pupils. Thus, there seems to be some “crowding” effect of foreigners. It can 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 unemployed household heads. The strong and significant foreigner share effect however disappears in Tables 3 and 4. If the cohort size of those pupils going to higher level schooling (not just *Hauptschule*) increases, then this tends to increase probabilities of going to *Gymnasium*. This also disappears in Tables 3 and 4. The foreigner share and the cohort variable seem to be telling similar stories. Confusing is the share of welfare recipients variable. Here, if the share of welfare recipients increases, (counterintuitively) the probability of *Gymnasium* attainment increases.

It appears to be the case that local supply conditions play a much larger role for children of the unemployed than for those children with employed household heads.

C. 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 14-18%, depending on model specification. The possibility of return migration however decreases investments in advanced schooling. The sooner the intention of return, the higher the probability of investing in only the minimum level of education *Hauptschule*. Those interested in staying longer than 5 years have a 1-2% higher chance of attaining *Gymnasium*, than those intending to return before 5 years. On the flipside, the longer the residency, the more assimilation takes place. Tables 1-4 show 1.4-1.7% greater probability of *Gymnasium* attainment per 1% longer residency.

The cultural assimilation variable “Little Assimilation”, shows a very strong tendency toward only the minimum *Hauptschule*, with a 21% higher probability, while not being culturally assimilated reduces *Gymnasium* attainment by 15%.

Differentiating by nationality, almost all foreigner groups show much higher probabilities of attaining only the minimum secondary schooling. Tables 1 to 4 show 50-66% higher probabilities for Turks, Italians, and Spanish compared to Germans of attaining only *Hauptschule*. Greeks and Yugoslavs amongst the foreigners have higher probabilities of attaining *Gymnasium*. In Tables 1,3 and 4, Greek children are not statistically different from their German counterparts¹⁴. See Buechel and Wagner (1996).

D. Ability and Income Preference

Table 4 augments Table 3 to examine the effects of “ability” and income preference. “Ability” 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% increase in parental ability makes *Gymnasium* 14% more likely, *Realschule* 5.7% more likely and thereby *Hauptschule* 19.7% less likely. The McKelvey/Zavoina pseudo R^2 increases from 0.238 in Table 3 to 0.259 in Table 4 with the inclusion of the ability variable. However the size of the income coefficient is half as large as in Table 3, losing also in significance. Almost all other variables remain stable in Table 4, especially the nationality effects. There seems to be at least *prima facie* evidence for ability effects.

¹⁴Helberger, Rendtel and Schwarze (1994), also with the German SOEP data, use a double threshold model for schooling to apprenticeship to employment transitions. From schooling into apprenticeship they find negative attainment effects for foreigners, however these disappear in the following step from apprenticeship to employment.

V. Conclusions

This paper has examined determinants of secondary schooling attainment of German and foreign pupils in Germany. Foreign children have a much higher probability of only attaining the lowest level *Hauptschule*, however, the longer they have been in the country, and the more they are culturally assimilated, the lower this initial discrepancy will be. Gender differences, regardless of nationality are shown *not* to be significant. Amongst the foreigners, Turks, Italians, and the Spanish 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.

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Table 1: Determinants of Secondary School Attainment by Ordinal Probit Estimation (Model I)

Variable	Coefficient	t-Value	Δ Prob. <i>Hauptschule</i>	Δ Prob. <i>Realschule</i>	Δ Prob. <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 Abitur	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 Equiv 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
<i>Foreign HH-Head:</i>					
HH-Head Advanced School	0.51861	(2.447)	-0.2046	0.0458	0.1588
Return Migration <5 yrs	-0.37936	(-1.763)	0.1497	-0.0335	-0.1162
Return Migration >5 yrs	-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	1010				
McKelvey/Zavoina R ²	0.32767				
LogL	-938.5467				
LogL-R	-1078.283				
LRT χ^2	279.4720				

Sample: Full
Data: GSOEP 1984-1993

Table 2: Determinants of Secondary School Attainment by Ordinal Probit Estimation (Model II)

Variable	Coefficient	t-Value	Δ Prob. <i>Hauptschule</i>	Δ Prob. <i>Realschule</i>	Δ Prob. <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 Equiv 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
<i>Foreign HH-Head:</i>					
HH-Head Advanced School	0.52021	(2.459)	-0.2074	0.0631	0.1444
Return Migration <5 yrs	-0.37432	(-1.744)	0.1493	-0.0454	-0.1039
Return Migration >5 yrs	-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 Spanish	-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				

Sample: Full minus children having parents with *Abitur*
 Data: GSOEP 1984-1993

Table 3: Determinants of Secondary School Attainment by Ordinal Probit Estimation (Model III)

Variable	Coefficient	<i>t</i> -Value	Δ Prob. <i>Hauptschule</i>	Δ Prob. <i>Realschule</i>	Δ Prob. <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 Equiv 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
<i>Foreign HH-Head:</i>					
HH-Head Advanced School	0.67855	(2.698)	-0.2689	0.0764	0.1925
Return Migration <5 yrs	-0.25248	(-1.050)	0.1000	-0.0284	-0.0716
Return Migration >5 yrs	-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 Spanish	-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				

Sample: Full minus children having parents with *Abitur* minus unemployed parents
 Data: GSOEP 1984-1993

Table 4: Determinants of Secondary School Attainment by Ordinal Probit Estimation (Model IV)

Variable	Coefficient	t-Value	Δ Prob. <i>Hauptschule</i>	Δ Prob. <i>Realschule</i>	Δ Prob. <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 Equiv 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
<i>Foreign HH-Head:</i>					
HH-Head Advanced School	0.65043	(2.545)	-0.2576	0.0741	0.1835
Return Migration <5 yrs	-0.22636	(-0.935)	0.0897	-0.0258	-0.0639
Return Migration >5 yrs	-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	-0.0825	-0.2044
HH-Head Italian	-1.6229	(-2.935)	0.6428	-0.1848	-0.4579
HH-Head Spanish	-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				

Sample: Full minus children having parents with *Abitur* minus unemployed parents
 Data: GSOEP 1984-1993

Table 5: Unweighted Descriptive Statistics for all Ordered Probit Models

Variable	Table 1		Table 2		Table 3 & 4	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
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 Equiv 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
<i>Foreign HH-Head:</i>						
HH-Head Advanced School	0.0386	0.1928	0.0417	0.1999	0.0401	0.1962
Return Migration <5 yrs	0.0554	0.2290	0.0598	0.2373	0.0594	0.2365
Return Migration >5 yrs	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 Spanish	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	1010		936		724	
Educational Attainment	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Hauptschule (0)	458	45.3%	453	48.3%	328	45.3%
Realschule (1)	279	27.6%	268	28.6%	225	31.0%
Gymnasium (2)	273	27.0%	215	22.9%	171	23.6%

Data: GSOEP 1984-1993