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Assimilation and the Earnings of Guestworkers in Germany

Jörn-Steffen Pischke

ZEW

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Abstract

Unlike prototype immigration countries, Germany has attracted a large number of southern Europeans as temporary guestworkers in the 60s and 70s. Nevertheless, many of them have stayed on and intend to remain in Germany. I investigate whether these workers have become successfully integrated into the German labor market as reflected by their earnings. Analyzing data from the Socioeconomic Panel for the 80s I find that guestworkers earn 20 to 25 percent less than Germans but their earnings do not seem to catch up to the overall mean. This is due to the fact that the guestworkers are almost entirely confined to blue collar positions. Among blue collar workers there is little noticable difference between the earnings of Germans and foreigners.

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1 Introduction

Foreigners who migrate to traditional immigrant countries, the U.S., Canada, or Australia, tend to start their labor market careers with relatively low earnings. But soon the immigrants share in the prosperity of their surrounding. This process of assimilation, as economists call it, has been associated with the immigrants learning the local language, acquiring skills relevant to the host country labor market, discovering the niches most suited to their traits, etc. That immigrants soon catch up to natives is less than surprising given that they often move in search of better opportunities.

Judging from the magnitudes of the migration flows, many countries in Europe today have become immigrant countries. About 5 million foreigners live in Germany. They make up almost 10 percent of the labor force in the western part of the country, making it the most important immigrant country in western Europe. Many of the foreigners have come originally as guestworkers, temporary migrants who were supposed to fill the gap during times of tight labor markets. A large fraction have stayed throughout the following recessions, and they are unlikely to return home in the future. Have they taken a similarly prosperous path as migrants who moved to one of the traditional immigration countries?

Following the seminal work of Chiswick (1978) there is a large literature on the assimilation of foreigners for the U.S., and to a lesser degree for Canada and Australia. Part of the extensive debate in the U.S. is due to the limitations of the available data: most studies use one or more of the decennial census. Since migrants are unlikely to be a random group, much of the discussion has focused on the identification of assimilation rates in the presence of self-selection and other confounding effects. Little wonder that no consensus has arisen on the magnitude and pattern of the assimilation rates of different immigrant groups.

Researchers in Germany are relatively fortunate; the Socio Economic Panel (SOEP) contains a large subsample of foreigners. While the SOEP has been conducted since 1984, the economic situation of foreigners in Germany has not found extensive attention in the literature yet. Dustmann (1990) has first exploited the SOEP to estimate assimilation rates but he only uses the first wave of the data. Licht and Steiner (1992b) have subsequently addressed the assimilation issue with the first six waves, presenting fixed effects estimates. Both studies find economically and statistically significant positive assimilation rates although they may be somewhat lower than the estimates for the U.S.

In this paper, I present a variety of estimates of the assimilation rates for male guestworkers in the SOEP thus exploring the robustness of different estimation strategies. My approach also differs from the two earlier studies as it tries to build a bridge to the large American literature. The second section is devoted to a detailed discussion of the various assumptions inherent in the cross-section and repeated

cross-section estimates for the U.S. A reader familiar with the literature may want to skip this section. In the empirical part I start by presenting pooled cross section results that would be roughly comparable to what has been done in the U.S. I demonstrate that for the SOEP there is not much difference between cross section and panel results controlling for cohort or individual fixed effects.
I find very little evidence for assimilation during the sample period this. A basic problem is that the guestworker population in Germany is rather "old," potentially already beyond the phase where important assimilation effects take place. I will try to uncover some of the patterns of earnings growth of subgroups among the foreigners but a lot remains unclear. The results provide little evidence that the earnings of foreign guestworkers catch up to the earnings of Germans because guestworkers are mostly confined to unskilled and semi-skilled blue collar jobs offering few possibilities of advancement.

2 Identifying the Assimilation of Immigrants: A Stylized Survey

Much of the debate in the American literature on the economic status of immigrants has evolved around the issue of what estimated assimilation rates actually mean. Early on the debate has focused on the issue of disentangling assimilation from a possible secular decline in the unobserved ability of subsequent immigrant cohorts. With two or more of the decennial censuses age (assimilation) and cohort effects can be separated but at the cost of stringent assumptions on the influence of time effects. Lately, these assumptions have come under attack since they seem untenable in an environment characterized by a widening of the wage distribution.[1] Other problems, like biases from selective remigration, while acknowledged, have found less attention since few suitable panel datasets are available for the U.S.
None of these questions of identification are particularly exotic, they appear in a variety of contexts in labor economics and elsewhere. For example, the statistical model applied for studying assimilation is similar to the models used to study tenure effects. Since cross section data require relatively strong identifying assumptions and careful model specification, the debate has evolved around relaxing one or another of these assumptions. To set the stage for the empirical part of the paper I will reiterate the debate focussing on the various identifying assumptions.

1) These issues are also well summarized by Lalonde and Topel (1990) and by Baker and Benjamin (1992).

We wish to estimate a standard earnings equation on a dataset containing observations on immigrants and natives. The goal is to distinguish differential slopes in the age-earnings profile for immigrants and natives, the difference being associated with assimilation of the immigrants into the host country labor market. Equation (1) is a rather general example of such an earnings equation.

$$y_{it} = \alpha_{0j} + \alpha_{1j} S_i + \alpha_2 X_{it} + \beta_{2i} YSM_{it} + \alpha_3 AGEI_i + \psi_c + \mu_i + \tau_{it} + \varepsilon_{it} \qquad (1)$$

The first two terms in equation (1) are the typical schooling (S_i) and experience (X_{it}) variables. For exposition, I have entered experience only linearly rather than as a quadratic or higher order polynomial. No additional insights are gained from more complicated functional forms. On the contrary, they may trick us into using the functional form of the time varying variables for identification purposes, a rather tenuous assumption. I will also assume that experience is constructed as age minus schooling minus age at first enrollment.

Notice that schooling is not indexed by t, signifying a time invariant factor that can only be estimated from cross-section information. This assumption should be reasonable for the bulk of the population who obtain all their formal schooling at the beginning of their life-time. S_i could be a vector of variables satisfying this assumption.

I have indexed the first two coefficients, α_{0j}, α_{1j}, by j standing for natives (n) and migrants (m). Thus baseline earnings (α_{0j}) may differ for natives and immigrants, so may returns to schooling. On the other hand, it makes no sense to distinguish differential returns to experience when we talk about assimilation as I will argue below.

In this stylized earnings equation, schooling and experience are the only two variables relevant for natives; for immigrants a number of further variables are observed. The first is years since migration, YSM_{it}, the variable of interest that will allow us to measure assimilation. Notice that it has a coefficient β_{2i} that is indexed by individual. I did this to highlight that assimilation rates may differ among immigrant groups. Of course, we will have to impose some restrictions on the assimilation coefficient in the estimation. The next two variables are age at entry, $AGEI_i$ and an entry cohort effect, ψ_c, both variables that do not vary over time.

Finally, equation (1) allows for a three-component error consisting of an individual effect, a time effect, and a time-individual effect. I will explain below why the time effect τ_{it} is indexed by individual. Depending on the model we will have to assume that some or all of these error components are uncorrelated with the regressors.

Estimating Assimilation with Cross Section Data

Let us turn to concrete applications of model (1). The seminal paper trying to estimate assimilation rates in the U.S. is the one by Chiswick (1978), who used the 1970 Census, i.e. a single cross-section. It is immediately obvious that the effects due to *YSM*, and entry cohorts ψ_c cannot be disentangeled. Given that Chiswick wanted to study assimilation it is no surprise that he chose to enter *YSM* implying $\psi_c = 0$. Furthermore, we will combine the three error components into u_{it} and assume they are all uncorrelated with the regressors. This yields the restricted model

$$y_{it} = \alpha_{0j} + \alpha_{1j} S_i + \alpha_2 X_{it} + \beta_2 YSM_{it} + u_{it} \qquad (2)$$

which is roughly what Chiswick estimated. Figure 1 plots two representative age-earnings profiles for a similar native and immigrant. They both have the same schooling level but this level of schooling yields differential returns in their respective home countries. Similarly, returns to experience are lower for the potential immigrant. At $AGEI_i$ the migrant moves, a step potentially associated with a further earnings loss. Equation (2) does not allow for such a loss but this is inconsequential. Since we only have data on immigrants already in the host country, we can lump this loss into the constant α_{0m}. At the time of immigration, the immigrant receives earnings A while the native has by now reached earnings level B. Hence, the immigrant is at an initial earnings disadvantage (B - A). Now the earnings profile of the immigrant steepens and he eventually overtakes the native at point C.

How much of the slope of the age-earnings profile of the immigrant shall we attribute to general experience and how much to assimilation? There are two obvious candidates for a reference levels we can use as general experience. The first is to assume that the experience profile of immigrants in the absence of assimilation is the same as that of natives (broken line in figure 1). The second is to assert that assimilation should be measured over and above the experience profile an immigrant had in his home country (dotted line in figure 1). Earnings of natives has been the choice adopted throughtout most of the literature.

The basic reason for this choice is that home country earnings are not observed. Home country experience profiles can therefore at best be infered from the initial wages of immigrants in the host economy. In a panel context this possibility vanishes completely; the slope of the home-country experience profile for an immigrant will not be identified for a within-estimator. To facilitate comparisons with cross-section results, the earnings of natives are the only possible choice. Even on a more conceptual level, it seems more sensible to measure assimilation with respect to the experience of natives rather than the experience of foreigners who never migrated. To fix ideas, suppose there are three

countries, the United Kingdom, the U.S., and Mexico. Assume that the U.K. and the U.S. have the same, positive experience profile while earnings do not rise with experience in Mexico. Suppose that everybody coming to the U.S. immediately has the same earnings as a native. Using home country experience as a reference, we would now say that there is tremendous assimilation of Mexicans. Englishmen in the U.S. would not assimilate at all. This interpretation seems rather strange. Nevertheless, it is adopted by some authors, e.g. Dustmann (1990).

Furthermore, notice that allowing for differential slopes on X_{it} is equivalent to allowing for $AGEI_i$ in the equation since home country experience is identified via the age at immigration. If we choose a separate X_{it} for immigrants, assimilation with respect to natives will be given by $\beta_2 + \alpha_{2m} - \alpha_{2n}$. Using $AGEI_i$ as a regressor instead lets us read the assimilation rate directly off the coefficient β_2.

Chiswick's specification is somewhat more restrictive in this respect. Since he does not allow for age at entry effects he forces everyone's earnings differential at entry to be the same. He found rather high assimilation rates. Immigrants, while entering with an earnings disadvantage of 16 percent (due to lower returns to their schooling), overtake natives after only 13 years in the U.S. Assimilation is highest at entry at a rate of 1.5 percent per year, falling slowly to 1.3 percent after 10 years in the U.S. After 10 years assimilation has added 13 percent to the earnings of immigrants relative to natives, thus almost closing the initial gap. Chiswick attributed the high assimilation rates and the overtaking of natives to positive selection of migrants.

Cohort Effects

The rather promising finding of fast assimilation has been challenged by Borjas in a series of papers (1985, 1987). Borjas' main criticism is that the high assimilation rates estimated by Chiswick may rather be due to the declining quality of subsequent cohorts of immigrants. Figure 2 illustrates how this will yield spuriously high assimilation rates.

In terms of the econometric model (1) the problem can be solved by allowing for cohort effects captured by the variable ψ_c. The model used by Borjas essentially extends the Chiswick model by allowing for these effects.

$$y_{it} = \alpha_{0j} + \alpha_{1j} S_i + \alpha_2 X_{it} + \beta_2 YSM_{it} + \psi_c + u_{it} \qquad (3)$$

If we have at least two cross sections available we can estimate (3) by entering cohort dummy variables and thus identify assimilation as well as cohort effects. Borjas (1987) essentially followed this strategy but restricted the cohort effects to lie along a quadratic

profile. He found annual assimilation rates after 10 years in the U.S. ranging from 3.2 percent for Koreans to -1.0 percent for Portugese. His estimates also revealed declining cohort quality for many immigrant groups.

It is possible to estimate the model in (3) and allow assimilation rates to vary across cohorts. In his 1985 paper, Borjas has allowed for such flexibility of the cohort specific age-earnings profiles of immigrants. He found indeed that the profiles varied considerably by cohort. However, he presents in that paper a decomposition of the earnings growth for immigrants found on a cross section (C-A in figure 2) into an assimilation effect (B-A) and an effect due to the change in cohort quality (C-B). This decomposition, however, makes only sense if true assimilation rates are the same across cohorts as Duleep and Regets (1992) point out. If some cohorts enter with a larger initial earnings gap but make up for this entirely by faster assimilation then Borjas' decomposition would (incorrectly) assign this faster assimilation to the (spurious) cohort effect.

It is easy to see how cohort specific assimilation rates can be identified from two cross sections by forming average cohort data. Think of taking means for every level of schooling for natives and for interactions of years of schooling and entry cohort for migrants in (3). Denote the resulting variables by $\bar{z}_{ct}$. This would reduce the schooling variable as well as the cohorts effects to constants within every group over time. Using these means, estimates of separate assimilation rates for every entry cohort are given as

$$\hat{\beta}_{2c} = \Delta\bar{y}_{mct} - \Delta\bar{y}_{nt} \tag{4}$$

Such cohort specific assimilation rates are presented in Lalonde and Topel (1991). They find that assimilation tends to be slower for earlier entry cohorts and for European immigrants who enter the U.S. with less of a wage differential. Duleep and Regets (1992) relate changes in wage growth of immigrants to changes in the level of entry wages for schooling-age-nation cells and find a strong negative relationship. These findings make some of Borjas' interpretations rather questionable.

Before closing this subsection it should be mentioned that spurious assimilation may not only be due to declining quality of subsequent immigrant cohorts but could as well be caused by increasing quality of native cohorts which are used as a comparison group. This is much less likely to be important but can be handled along similar lines. However, allowing for differential earnings growth across native cohorts will make it harder to define a base level which to compare immigrant earnings growth to when calculating assimilation rates.

Time Effects

While it seems from the discussion of cohort effects that panel or pseudo-panel data are the way out of the identification dilemma in a single cross section this is far from the truth. While panel data allow us to partial out cohort effects the additional time dimension confounds the estimates by introducing possible time effects. While it is impossible to distinguish age and cohort effects in a cross section it is impossible to distinguish (the linear portion of) age, cohort and time effects in a panel.
The simplest identifying assumption is that time effects have the same impact on natives and immigrants. In this case we can write the time effect as τ_t. The model is now

$$y_{it} = \alpha_{0j} + \alpha_{1j} S_i + \alpha_2 X_{it} + \beta_2 YSM_{it} + \psi_c + \tau_t + u_{it} \tag{5}$$

For a single cross section, construct predicted wages for natives and immigrants with similar characteristics and take differences between the two groups yielding

$$\hat{y}_{mct} - \hat{y}_{nct} = \hat{\alpha}_{0m} - \hat{\alpha}_{0n} + (\hat{\alpha}_{1m} - \hat{\alpha}_{1n}) S_c + \hat{\beta}_{2c} YSM_{ct} + \psi_c \tag{6}$$

The time effects have been swept out by this comparison because they affect migrants and natives similarly. Now form differences with the corresponding variables for the same cohort from another cross section.

$$\beta_{2c} = (\hat{y}_{mct+1} - \hat{y}_{nct+1}) - (\hat{y}_{mct} - \hat{y}_{nct}) \tag{7}$$

This difference-in-difference estimator identifies the assimilation coefficient.[2] It has been applied by Borjas (1985) and various researchers after him.
Lalonde and Topel (1990) point out that the assumption of equal time effects is dangerous, however. The earnings distribution in the U.S. has widened in the 1970 to 1980 period commonly studied with higher wage growth accruing at the top and less at the bottom of the distribution. Figure 3 exhibits the problem that will arise in this context. It assumes that an immigrant enters at the 25th percentile of the native earnings distribution in 1970. While a native in this position exhibits little or no earnings growth the immigrants earnings grow substantially putting her in the 40th percentile of the native distribution in 1980, say. Because the distribution has widened no catching up

2) This is the same estimator as in equation (4).

to the median native has occured. Still, we would conclude that assimilation has occured if we compare the immigrants position in 1980 and the position we would have predicted from the earnings dynamics of a comparable native.
In our model this effect of a widening earnings distribution can be captured by a time effect that has an individual specific loading factor, i.e. $\tau_{it} = \lambda_i v_t$. Of course, the λ_i have to be restricted in an appropriate way to identify the model. Lalonde and Topel assume that these loading factors are a function of the position in the native earnings distribution for both immigrants and natives. This is akin to saying that time effects influence the earnings of immigrants in a similar way as they affect a native in a similar position in the earnings distribution. Lalonde and Topel find this effect, if not accounted for, to bias the assimilation rate of recent Mexican immigrants downward by 8 percentage points over the 1970-1980 period. This type of bias is unlikely to be a problem for German data since the wage distribution has been very similar over time (see Abraham and Houseman, 1992).

Age at Entry

Friedberg (1991) has addressed the obvious possibility that the earnings disadvantage of foreigners may depend on the age when they enter the host country. If such age effects exist and are not controlled for, then estimates of assimilation rates will in general be biased. As Friedberg points out, this is due to the fact that in any sample of labor force participants age at arrival and years since migration will be negatively correlated because of finite working lifes. A migrant who has been in the host country for a long time must have entered very young, otherwise she would be retired.
The effect of age at entry can be identified together with cohort effects on two independent cross sections if we restrict time effects to be the same again for natives and foreigners. Consider the model

$$y_{it} = \alpha_{0j} + \alpha_{1j} S_i + \alpha_2 X_{it} + \beta_2 YSM_{it} + \alpha_3 AGEI_i + \psi_c + u_{it} \qquad (8)$$

The coefficients for assimilation, age at entry, as well as cohort effects can be identified separately. Notice, however, that the estimation of the assimilation rate is again based on a difference-in-difference estimator as in equation (7). Hence, Borjas' estimates, by sweeping out all time invariant effects, identify the assimilation rate correctly, even if age-at-entry effects are present. However, his estimates of cohort effects will be biased.
Friedberg finds that earnings drop on average by 0.5 percent for every year the immigrant is older at entry. This estimate varies by source country; age matters least

for Europeans and becomes most important for Asians. She also finds sizeable assimilation rates but little evidence of an overall drop in cohort quality, although the earnings of European and Hispanic immigrants have decreased for later cohorts.

Remigration

We will now have to take a closer look at the error structure in our initial model. Disregard age and cohort effects again but assume that individual effects are an important factor in the determination of earnings. This raises a new potential source of bias that may lead us to overestimate assimilation rates: the possibility that different types of workers have different propensities to remigrate. Borjas (1989) investigated the possibility that more successful migrants stay while the ones who perform badly return to their home countries or migrate elsewhere. Migrants who leave will not turn up in the Census anymore so that the sample of migrants will tend to consist of workers of increasingly better quality. Thus a high YSM_{it} will imply a high value of μ_i on average. This simultaneity due to the sorting mechanism will bias the coefficient β_2 upwards. In fact, it is possible to find apparent assimilation if there is actually none for every individual worker.

As long as the sorting takes place only on the earnings level, the problem can be solved straightforwardly using a within-estimator on panel data. Borjas (1989) analyzes data from a two period panel on scientists and engineers. While there is some evidence that the remigrants have lower earnings than the stayers, this does not seem to lead to a marked upward bias in the estimate of the assimilation rate. Notice that repeated cross-sections do not solve this problem since the sorting will generally happen at the individual level and thus affect cohort averages.

Immigrant sorting due to remigration may be positive as well as negative. In particular in the German context, it may be more reasonable that guestworkers who have done well and accumulated enough financial assets or human capital will return first to start a new career in their home country. The less successful migrants may stay on waiting for their big hit, or because they do not want to return home looking like a failure, or to benefit from the more generous social insurance system in Germany. However, if the target level of success that induces remigration depends not only on innate ability but also on changes in income then even within-estimates of assimilation may be biased. Say all guestworkers want to save a target level before returning home. The longer the tenure of a guestworker in the host country the more likely is that she has had bad luck in the most recent years when close to the target. Thus, years since migration will be negatively correlated with ε_{it} yielding an underestimate of the assimilation rate. Since there is very little observed remigration in the SOEP this is unlikely to be a big problem (see Licht and Steiner, 1992b).

Estimating Assimilation with Panel Data

Most of the issues that have preoccupied the literature on assimilation in the U.S. would not have arisen in the same way if true panel data on a representative sample of foreigners was available. Cohort effects and effects due to age at entry can be eliminated by using a within-estimator. This would also reduce the potential bias from selective remigration if it is related to the level of earnings. If migrants leave because their assimilation rate is lower than for the stayers then sweeping out fixed effects will still not yield unbiased estimates of the assimilation rate. However, if migrants are observed to leave the panel, estimates can be obtained separately for different subgroups of migrants according to their length of stay.[3]

The use of a within-estimator has its cost. All cross-sectional information is lost. The effects of experience and duration of stay for foreigners cannot separately be distinguished within the sample for immigrants. Hence, the experience profile of natives will have to serve as the base over which we measure any difference in the increase in the wages of foreigners as assimilation. Furthermore, once we allow for experience, independent time effects cannot be identified anymore. As long as time effects affect foreigners and natives alike they will only confound the estimate of α_2, the coefficient on experience but not the estimate of the assimilation rate. Obviously the problem is just analogous to the cohort data context and similar identifying assumptions are possible.

It might be of interest to have estimates of the parameters other than the assimilation rate as well. For example, the initial earnings gap between foreigners and natives may be of interest to put the estimated assimilation rates into perspective. In general, it will not be possible to obtain consistent estimates of these parameters if years since migration is correlated with the error term. To apply the strategy of Hausman and Taylor (1981) time varying regressors uncorrelated with the fixed effect are necessary. It is hard to think of such variables. Consistent estimates of the assimilation rate can be obtained (under the assumptions of a correlated individual effect) from pooled cross section data by instrumenting years since migration by deviations from person means as Altonji and Shakotko (1987) have observed. However, here there is no presumption that cohort effects are not present. Notice that in a balanced panel cohort effects and mean years since migration are linearly dependent. Altonji and Shakotko's estimator works by ignoring the between information of the assimilation process, which is the part which is problematic. However, cohort effects can only be estimated from between variation, thus all regressors correlated with cohorts may be biased. I find little evidence of assimilation below and little difference between cross section and fixed effect results.

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3) This is the strategy Borjas (1989) follows.

I will therefore report a variety of pooled cross section results in the hope that these will not be affected by strong inconsistencies. Before turning to the regression results I will give a description of the sample used.

3 Foreign Workers in the Socio Economic Panel

The data used in this study are the first six waves of the Socio Economic Panel of West Germany (SOEP). This household panel is patterned after the American Panel Study of Income Dynamics and has been conducted annually since 1984. Contrary to most longitudinal household data sets in the U.S. the SOEP oversamples foreign households. Of the 6,000 households in the dataset are 1,600 foreign households.

The subsample of immigrants is not representative of the foreign population in Germany. Rather, the five most important countries of origin were chosen for inclusion in the sample. For each country a random sample of roughly equal size was drawn. The five countries are Turkey, Greece, Yugoslavia, Italy, and Spain. These countries of origin accounted for 75 percent of the foreigners in Germany in 1984; the proportion has only declined mildly since: They make up the traditional guestworker population in Germany.

The analysis that follows will be limited to males. For this group, figure 4 plots the distribution of the foreign subsample in the extract I used from SOEP and the comparable distribution among all workers in jobs covered by the social security system.[4] The figure shows that the survey distribution differs somewhat from the population distribution. Turks, the largest population group, are underrepresented while Greeks and Spaniards are overrepresented in the sample.

I drew a sample of workers aged 18 to 65 who reported to work full time and worked actually more than 25 hours in the current week. Earnings refer to the previous month; I added one twelvth of annual bonus payments for the previous year and deflated them to 1985 Marks. Observations with an implied hourly wage rate below 4 Marks and over 150 Marks an hour were deleted. Finally, I kept observations with complete records on the covariates and required that everybody worked for at least two periods between 1982 and 1989. This allows me to use a consistent sample for cross-section as well as for panel analyses. The sample consists of 2,976 individuals, 858 of whom are foreigners. On average, individuals appear in the sample in 5.0 periods yielding a total sample size of 13,540 (3,749 foreigners).

4) This excludes mainly low paying part-time employment.

In the remainder of this section I will describe some features of the foreign population in this sample. One of the key variables to study assimilation is the year of arrival. Figure 5 plots this variable for the entire sample as well as by country of origin. The sample reflects important institutional features of the German policy with respect to foreign workers.[5] Guestworkers started to enter Germany in the late fifties and were actively recruited throughout the sixties and early seventies when labor markets where tight. Recruitment was halted in December of 1973 as a response to the changing labor market conditions. Inflows from the five sampling countries have dropped signigicantly and leveled off to date.

This implies that most of the sample members will have been in Germany for fifteen years or so at the beginning of the sampling period. For the study of assimilation this is rather problematic since for such an "old" group of immigrants much of the initial process of catching up may be over. The figure also reveals that there are distinct differences between nations of origin. Turks are among the more recent arrivals, having been in Germany for 15.0 years on average. Greeks are the oldest group with 19.6 years since arrival.

Figure 6 plots the ages of guestworkers when they arrived in Germany. It reveals that most workers enter in their twenties. This is true for all of the sending countries; in fact, differences may be mostly due to sampling variation. Yugoslavs and Greeks tend to be slightly older, Italians and Spaniards younger.

The complexity of the German educational system poses the usual problems in creating suitable measures for the level of schooling. Educational attainment by Germans and foreigners in the SOEP is coded through a variety of variables. For Germans there are two questions about the highest degree taken in secondary school as well as for vocational and other post-secondary training completed. For foreigners there is additional information on schooling and training obtained in their home country, even if no degrees where received.

From the survey information I constructed two measures of education, years of primary and secondary schooling and years of post-secondary training. The former is rather simple to define since the various secondary degrees are usually reached in a fixed number of years. The training variable poses more problems since the same type of training can be of variable length. For example, apprenticeships last from two to over three years, depending on the trade and the previous degree of the apprentice. See the appendix for details on the assignments.

Despite rather complex educational systems in many southern European countries the information on the schooling of foreigners is limited. The questionnaire allows for three answers: less than compulsory, completed compulsary, and higher schooling. Training is coded in more detail: none, some instruction on the job, formal

5) See for example Franz (1991) and McRae (1981) for details and additional statistics.

apprenticeship, vocational school, university, and other. Converting these into years poses the problem that many of the countries require rather long apprenticeship periods. These should not be considered primarily an instruction, but the apprentice serves as cheap unskilled labor. This is true, for example, for the traditional Turkish system, where an apprenticeship lasts five years, see Kühn (1987). The idea is to apportion only the number of years that corespond to actual training. I made -- admittedly -- somewhat arbitrary assignments, see again the appendix for details.

Using these assignments, figures 7 and 8 display the levels of schooling for the various countries and show the marked differences between Germans and foreigners. Germans have 9.9 years of schooling on average and an additonal 2.0 years of training, that is almost 12 years of education. Foreigners have 6.1 years of foreign schooling plus 1.3 years in Germany. They also received 0.6 years of training in their home countries plus 0.2 years in Germany. There are considerable differences between the countries, Turks tend to have more German schooling and training. This is presumably mostly accounted for by the children of the immigrants who entered Germany young enough to receive some of their education in the host country.

Given that foreign guestworkers in Germany have comparatively little training they will not be able to enter the same types of professions as the average German. The following table shows the types of jobs Germans and foreigners occupy in the sample.

Types of Jobs Held by Germans and Guestworkers (in percent)

Type of Job	Germans	Foreigners
unskilled worker[a)]	4.3	21.5
semiskilled worker	12.5	46.7
skilled worker	20.8	21.0
master craftsman	7.9	4.3
self employed	7.0	3.4
white collar	32.0	2.8
simple public servant[b)]	1.2	0.0
higher public servant[c)]	14.3	0.3

Notes: a) including low level white collar positions
b) einfacher Dienst
c) mittlerer to höherer Dienst

There are extremely striking differences in the types of jobs occupied by Germans and foreigners. Almost all guestworkers (more than 90 percent) hold blue collar positions, the types of jobs they were originally recruited for. Within this group two thirds occupy unskilled and semi-skilled positions while German blue collar workers tend to concentrate in the skilled jobs. However, 21 percent of the foreigners do skilled jobs and four percent have advanced to master craftsmen or foremen. Hardly any foreigners hold any white collar and public service positions while about half of the Germans are in such jobs. Self-employment rates are also lower among the foreigners. [6]
Since foreigners fill the jobs on the bottom of the occupational hierarchy it comes as no surprise that they have lower earnings than Germans on average. The following table displays monthly earnings in the sample for the various nationalities.

Gross Monthly Earnings of Germans and Guestworkers (Marks)			
Nation of origin	Mean	in percent of Germans	Log standard deviation
Germany	4189	100	0.389
Turkey	3064	73	0.249
Yugoslavia	3386	81	0.266
Greece	3190	76	0.263
Italy	3077	73	0.249
Spain	3127	75	0.271

Germans make 4200 Marks a month. All guestworker groups are below this level, mostly by a substantial amount. Yugoslavs make "only" 19 percent less than Germans. Recall that they are also the group with the highest level of training. Turks and Italians are at the bottom of the ranking with a 27 percent differential, they make less than 3100 Marks.
The last column of the table reveals that there is also a susbstantial difference in the dispersion of earnings within the nationalities. The income of Germans is much more dispersed than that of guestworkers. Figure 9 reveals that this is due to the fact that the earnings distribution of foreigners is missing the right tail present for Germans.

6) However, self employed foreigners seem to be rather successful in Germany, see Seifert (1991), although this result rests on very small cell sizes. Both facts, lower self-employment rates and relative success would be in contrast to the U.S. where foreigners are more often self-employed than natives but earn less. See Borjas (1990a), chapter 10.

Practically no foreigners earn monthly wages above 5000 Marks while a fair number of Germans do. The upper tail is, of course, associated with qualified white collar jobs and higher level public sector positions. These are the positions foreigners hardly ever fill. Figure 10 makes this clear by limiting the sample to workers in unskilled and semi-skilled jobs. For this subsample the earnings distributions do not differ much between Germans and foreigners.
This theme, that foreigners differ from the average German mainly because they fill the unskilled blue collar jobs, will occupy us again below in the estimation of assimilation rates of guestworkers in Germany. It is these estimates that we turn to now.

4 The Assimilation of Guestworkers in Germany

The available evidence seems to show that there is at least some degree of assimilation of foreign immigrants in the U.S., even though the assimilation rate may be lower than the initial estimates by Chiswick (1978). The few econometric analyses of assimilation for Germany have produced lower but still positive assimiation rates, see Dustmann (1990) and Licht and Steiner (1992b).

Pooled Cross-Section Results

Table 1 presents a series of GLS random effects estimates on the pooled sample from 1984 to 1989.[7] Column 1 is a standard earnings regression with schooling and experience as controls. Additionally, as in the studies by Chiswick and Dustmann, years since migration are included as a quadratic in the regression. For simplicity, I will call the estimates on these variables "assimilation" despite the fact that they will capture numerous effects, recall the discussion in section 2. The estimate for the assimilation rate at entry is 0.1 percent. This rate increases over time, so that the cumulative effect amounts to 3.5 percent after 10 years in Germany. This is only 25 percent of Chiswick's estimates and slightly less than Dustmann's.[8] The quadratic in years since migration is significant; a Wald-test for joint significance is reported on the bottom of the table.

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7) The computations follow Hsiao (1986, pp. 194-196) with the only difference that the estimated variance components are adjusted for degrees of freedom. This yielded much more satisfactory results in a small monte carlo study.

8) Dustmann (1990) only used the 1984 wave in his analysis. Estimated assimilation rates are higher for the 1984 cross-section than for most later years.

Since the specification allows for differential returns to schooling in Germany and immigrants home countries computing the initial earnings gap of foreigners is not quite straightforward. The last row shows estimates of this earnings gap for an immigrant who had the same number of years of schooling in his home country as an average German. Additional assumptions in later regressions are that the immigrant is from Yugoslavia, entered in 1970 (the median entry year in the sample), at an age of 24.1 years (the average in the sample). Most immigrants have considerably less schooling than Germans and lower earnings than Yugoslavs. Hence, most actual immigrants would have experienced an even greater earnings gap. In the basic specification the assumed immigrant would have received 35 percent less than a comparable German. However, the following columns show that the initial result is not too robust. Column 2 adds period dummies, capturing general wage growth over time. This makes the initial assimilation rate negative. The initial earnings gap is now smaller because immigrants position deteriorates over time. Experience profiles become flatter as well. Adding age at immigration has little effect on the estimated assimilation rates. Furthermore, higher age at immigration *increases* earnings, the opposite of what would be expected from flatter experience profiles in immigrants home countries. But the effect is small and insignificant. Adding nation of birth effects has again little little impact on the results.

The first column in table 2 adds cohort dummies to the regression. Cohort quality may be deteriorating slightly leading to even more negative assimilation rates. However, the assimilation rates as well as the cohort effects are not as well determined any more. This comes as no surprise when we recall that we try to estimate these effects jointly for a sample of foreigners who entered over a 40 year period with a six year panel. Thus, cleanly disentangling these effects in the pooled cross-sections is rather unrealistic.

The next column adds type of job dummies. Jobs are classified in eight categories as in the previous section. This regression checks whether there is assimilation within these job categories, i.e. absent any changes into higher level jobs. Such changes are actually relatively rare for foreigners as well as for Germans.[9] Again the difference to the previous results is slight. Experience profiles as well as assimilation rates are very similar within job categories. The initial earnings gap for an unskilled worker is slightly lower.

9) See the paper by Seifert (1991) on this issue.

Panel Estimates

As the discussion above indicated there are good reasons to be suspicious of the pooled cross section results despite various controls like cohort and age at entry effects. The last two columns of table 2 show comparable fixed effects estimates, overall and within job types. Again the results are only marginally different from the previous estimates thus indicating that factors like selective remigration may not be very important in influencing these estimates.

Estimated assimilation rates, though insignificant, still show a U-shaped profile with the position of foreigners deteriorating in the initial years. If such an effect is indeed present this does not mean actually declining earnings for the foreigners in the sample but rather lower earnings growth than for Germans. Various conjectures about this phenomenon come to mind. Differential time effects for Germans and foreigners may be an explanation. While the German economy was booming during the years the panel refers to this was the recovery from the severe recession in the early eighties. The recovery may not have affected all groups in society at the same rates. Unemployment throughout the eighties remained at historically high levels. Disadvantaged groups, among them many foreigners, may have still suffered from the aftermath of the recession even if they had jobs. Thus the pattern may be dominated by effects that have nothing to do with assimilation. Another explanation is that, on average, foreigners tend to hold jobs with lower rates of earnings growth as natives. I will return to this issue shortly.

The results differ from the ones obtained by Licht and Steiner (1992b) who also calculate fixed effects estimates for a comparable sample. They found positive assimilation rates of initially about 1 percent, or 8 percent during the first 10 years in Germany. However, they use actual work experience by Germans and foreigners as regressors and instrument these variables by potential experience. They also control for selective participation in the labor market. Since unemployment spells are connected with losses in subsequent earnings (see Licht and Steiner, 1992a) the differences may emerge from the higher incidence of unemployment among foreigners.

Before turning to some different subgroups of the sample, let us take a brief look at some of the other coefficients in these regressions. They are presented in table 3 together with variable means. Column 3 repeats the baseline regression with all controls except job types (i.e. it repeats column 1 in table 2). Cohort effects are decreasing slightly over time but they are not large in magnitude. There are some clear differences between the nationalities. Yugoslavs perform best, Spaniards worst. The other countries lie inbetween and do not differ much. We will see below that the relatively good performance of the Yugoslavs has to do with their better education.

Results for Immigrant Subgroups

Table 4 tackles the problem of trying to sort out some of the issues alluded to above. The first problem is that the sample of foreigners is dominated by the group with a relatively long residence in Germany (the mean is 17 years). Assimilation effects may be low for this group while other effects confound the estimates. The early years after entry may instead be the most crucial in the assimilation process. Column 2 in table 4 excludes all immigrants who entered before 1977. Foreigners in this sample have thus at most a tenure of 12 years in Germany. The cost of this exercise is of course the loss of most observations on immigrants. In fact, their share in the sample drops from 28 percent to 3 percent or 317 observations. Because of the small cell sizes I had to exclude nation dummies from the specification. Still, standard errors on the years since migration effect surge. But the assimilation profile is now positive and assimilation effects are (potentially) huge. Immigrants' earnings growth exceeds that of Germans by 5.5 percent at entry or 22 percent after 10 years. Almost all this catching up occurs within the first 5 years in Germany. However, the initial gap in earnings which results from extrapolating this profile to the time at entry is now a huge 50 percent. After a few years in Germany the earnings gap is back to the level of around 25 percent I have been finding throughout this study.

Column 3 takes a different approach by changing the comparison group of Germans: only unskilled and semi-skilled workers are included in the sample. These are the most important job types foreigners occupy; they make up 61 percent of this subsample. There is again no evidence that foreigners' earnings profiles differ at all from those of Germans in this group. Furthermore, there is almost no initial earnings gap between immigrants and Germans in this group. This implies that the observed differences between immigrants and Germans stem largely from the different composition of the respective samples. Germans are far more likely to hold well paid white collar positions, requiring higher education. These jobs imply steeper earnings profiles which is visible from the differences for the coefficients on experience in columns 1 and 3. This explains the slightly negative assimilation rates in the full sample.

This regression yields some other notable results (which are not shown in the table). The returns to education are much lower for this group and differences between German and foreign education are attenuated. These results are not very surprising for unskilled jobs. They show that some of the difference between German and foreign education are not accounted for by the quality of instruction but rather by the fact that foreigners tend to hold jobs in which formal training is not rewarded. The effect of age at immigration is now negative.

Most interestingly, the absence of an assimilation profile is now accompanied by a stronger pattern of lower earnings for subsequent cohorts. The earnings of post-1980 arrivals are 15 percent below the earnings of guestworkers entering before 1960. Note that the estimated cohort effects are unbiased under the null hypothesis of no

assimilation. What explains the strong negative trend in cohort quality? One conjecture is related to the migration behavior of families. Much of the post 1973 immigration from the guestworker countries is presumably family reunification. If a family decides not to migrate together in one step they will send their most productive member first (see Borjas and Bronars, 1990b). After some experience in the host country the migrant may decide to return home to his family or, in the case of success in the new labor market, have the family join. Thus, later immigrants will on average be less productive than the earlier ones. This is especially true if an additional sorting process has taken place with only successful initial migrants appearing in the sample.
The last column repeats the same exercise for skilled and unskilled blue collar workers (excluding foremen). This yields results very similar to the previous column but with a slightly higher estimate of the assimilation rate and again a widening of the initial earnings gap. In conclusion, foreigners do not tend to do worse or have different earnings profiles than *comparable* natives, meaning Germans in similar jobs. The earnings differential and the absence of assimilation effects is explained by the fact that foreigners are confined to jobs that require few skills and thus offer few possibilities for advancement.

Education and Earnings

If foreigners do not assimilate then it becomes a more crucial question why they occupy a lower position in the earnings distribution initially. The prime candidate is, of course, the educational attainment of foreigners. The last table allows a closer look at this determinant of the wages of immigrants. Column 3 in table 5 presents again the baseline specification with results shown for the education variables. Education is broken up into years of schooling and years of training in Germany and abroad. The first striking result is the very different return to schooling and post-secondary training. An additional year of the former adds 4 percent to wages while a year of the latter has an effect of 11 percent. Returns to schooling abroad show the same general pattern but are much lower. The return to foreign schooling is basically zero, while a year of training yields 3 percent more in earnings.
Column 4 includes an interaction of German schooling with foreigner. Now, returns to schooling and training for Germans are very similar: about 8 percent each. For foreigners the picture is very different. An additional year of schooling in Germany yields just 1.5 percent higher earnings. Returns to training, on the other hand, are the same as for Germans. The results above already gave a hint that this does not mean that education is valued less because immigrants are foreigners but rather because they tend to enter jobs where education is not very important.

The final column breaks down the returns to education further by nation of origin. Years of schooling are equally unimportant for all sending countries. The picture is very different for training. Here, Yugoslavs receive a return of 6.5 percent for an additional year of qualification. The Yugoslav vocational training system is of relatively high quality. In fact, among all guestworker groups, Yugoslavs were most likely to have their training certificates accepted as equivalent to the completion of a German apprenticeship (see McRae, 1981). Recall that Yugoslavs also have the highest level of training, about twice as much as all the other nationalities. Greek and Italian workers also receive relatively high returns to their training, about 5 percent. The training of Turkish and Spanish workers is not valued at all in Germany. Obviously, the differential effects of training for different guestworker groups account for the differences in immigrant performance in Germany. The raw earnings of Yugoslavs are about 10 percent above the earnings of Turks. Home country training alone explains this effect.

5. Concluding Comments

This paper discusses the identification of assimilation rates for immigrant workers and presents a series of results for guestworkers in Germany. The analysis draws on the Socioeconomic Panel that oversamples the important groups in the foreign population in Germany. Panel data have a distinct advantage in estimating dynamic effects due to assimilation: potential biases due to correlated individual effects may be controlled for. Sources for such biases have been discussed at length in the U.S. literature on assimilation: cohort effects, the role of age at entry, selective remigration, etc. Most of these effects are easily eliminated by allowing for individual specific effects. My estimates show that fixed effects results do not differ much from cross section findings using the standard controls that have been suggested in the American literature. In most specifications, assimilation effects are basically zero or even slightly negative. While panel data on individuals are desirable to provide better controls for individual effects they also pose their own problems. In the present case one of the fundamental problems is that the population of foreigners sampled mostly entered Germany before 1974 while the sample only starts in 1984. Thus, the foreigners in the sample have already been in Germany for a long time and assimilation effects may not be particular strong any more. Using a quadratic in years since migration may not identify the slope of the assimilation profile in the first few years but might be dominated by the slope and curvature of the earnings profile of older immigrants. I present some evidence that estimated negative assimilation rates rather reflect lower earnings growth in blue collar positions as they are typically occupied by guestworkers.

The second problem is the maintained assumption that time effects influence foreigners and natives alike. While there is no secular widening of the wage distribution in Germany as in many other western economies, differential business cycle effects may be present. This is a problem that needs additional attention.

Given these caveats, it turns out that there is no earnings gap or differential earnings growth between foreigners and Germans in comparable types of jobs. If any differential earnings growth takes place it is concentrated in the first five or at most ten years in the host country. However, since this result is based on more recent arrivals and might not hold for the older groups of guestworkers who entered during a period of tight labor markets in the 60s.

In the U.S. literature earnings gaps have often been computed between recent migrants and immigrants of the same origin who have been in the U.S. for 30 years or so, see Borjas (1985) and Lalonde and Topel (1990). If subsequent immigrant cohorts occupy similar jobs this will also tend to eliminate between job effects. However, these estimates show that recent immigrants enter with a substantial earnings disadvantage. In this sense, foreign workers are better protected against low wages in Germany than in the U.S. This may be a factor why Germany tends to attract only immigrants with relatively low skills.

Such a selection would be consistent with the argument proposed by Borjas (1987). His story goes in terms of the type of immigrants a receiving country like the U.S. can expect to draw from different sending nations. Based on the idea of Roy (1954), immigrants from countries with more dispersed opportunities than the receiving nation will be negatively self-selected on average. The opposite is true for countries with less dispersed opportunities. The self-selection argument can equally be employed to the situation of a sending country. A highly skilled Italian will benefit most by migrating to a nation with high returns to skill, like the U.S. An unskilled Italian will be better off to migrate to a country where minimum wages are relatively high, like Germany. Thus, Germany will be most attractive to the bottom of the skill distribution among international migrants while better qualified migrants will choose countries like the U.S. or Canada.

Absent any assimilation, the question arises what determines the initial position of immigrants. There seem to be substantial differences in earnings among the different nationalities in Germany. These are related to the quality and quantity of vocational training the immigrants received. Since most foreigners are likely to stay in Germany permanently, this also points to the importance of additional education for their upward mobility. This will be especially important for the second (and thrird) generation of foreigners which is still almost fully excluded from higher education and white collar positions.

However, the economic position of guestworkers should not be undervalued either. The foreigners who have decided to stay in Germany are most likely better off economically than they were in their home countries. During the depression of the early eighties, the German government offered to pay returning foreigners the cash

value of their social security claims. This offer has not been attractive enough for most guestworkers to induce them to return home. With gross monthly earnings of 3200 Marks the average foreigner is still much better off than the average East German. However, much is to be done to accomplish a better social and political integration of the foreigners.

Appendix: Coding of the Schooling and Training Variables

Years of schooling and years of training are coded in the following way. For schooling in Germany 9 years were assumed for basic secondary school (Hauptschule), for special schools, and if no degree was received, 10 years for middle school (Realschule), 12 years for the entry exam to technical colleges (Fachhochschulreife), and 13 years for the university entry exam (Abitur). Training was coded in the following way. Apprenticeships were assumed to last 3 years half of which is work experience, half of which is training, so 1.5 years were coded. Since apprenticeships can be shortened for those who finished additional years of secondary school, only 1 year was assumed for everybody past grade 10 in school. 2 years were assumed for vocational school (Berufsfachschule) and 1.5 years for the training of nurses. Technical schools (Fachschulen) last for one or two years beyond a completed apprenticeship so that 1.5 years were added to the apprenticeship training. Training of public servants was coded as 1.5 years. Technical college (Fachhochschule) is assumed to last 4 years, university 5 years. Other training was coded as 2 years.

Years of Education Assigned for the Guestworker Countries

Type of Education	Turkey	Yugoslavia	Greece	Italy	Spain
Less than cumpulsory	4	7	8	7	7
Compulsory school	5	8	9	8	8
More than compulsory	8	11	12	12	11
On-the-job instruction	0.5	0.5	0.5	0.5	0.5
Apprenticeship	1	1	1	1	1
Vocational school	2	2	2	2	2
University	7	4	4	5	4
Other training	2	2	2	2	2

Education in foreign countries was coded according to the following table. In the codes for years of schooling I followed the survey of school systems by Schultze (1969). He gives information on the years of compulsory schooling, I subtracted one year for everybody who reported not to complete compulsory school. For more than compulsory schooling, I used the typical level beyond compulsory school to leave the secondary school system. In all countries except Turkey and Italy, this is also the level that allows access to university.

Since I have insufficient information on the vocational training systems in the separate countries, I have coded years of training consistently for all of them according to the table. Notice that I had to add further years of secondary school for university graduates in Turkey and Italy.

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Table 1
Earnings Regressions for Immigrants and Natives
(standard errors in parentheses)

independent variable	GLS (1)	GLS (2)	GLS (3)	GLS (4)
experience	0.044 (0.002)	0.037 (0.002)	0.037 (0.002)	0.037 (0.002)
experience^2/100	-0.066 (0.003)	-0.061 (0.003)	-0.061 (0.003)	-0.061 (0.003)
YSM	0.0013 (0.0049)	-0.0031 (0.0048)	-0.0032 (0.0048)	-0.0036 (0.0048)
YSM^2/100	0.0227 (0.0137)	0.0145 (0.0135)	0.0151 (0.0135)	0.0039 (0.0136)
age at immigration	--	--	0.0014 (0.0014)	0.0013 (0.0014)
5 period dummies	--	yes	yes	yes
4 nation of birth dummies	--	--	--	yes
7 cohort dummies	--	--	--	--
7 dummies for job types	--	--	--	--
R^2	0.322	0.354	0.355	0.356
std. dev. of individual effect	0.268	0.268	0.268	0.268
std. dev. of noise	0.156	0.151	0.151	0.151
Wald-Test for significance of YSM and YSM^2 [p-value]	24.01 [0.000]	1.50 [0.472]	1.60 [0.449]	1.63 [0.442]
assimilation: first 5 years	0.012 (0.021)	-0.012 (0.021)	-0.012 (0.021)	-0.014 (0.021)
first 10 years	0.035 (0.036)	-0.016 (0.035)	-0.017 (0.035)	-0.020 (0.036)
initial earnings gap	-0.327 (0.045)	-0.225 (0.045)	-0.229 (0.045)	-0.190 (0.049)

Notes: Data are from the first six waves of the German Socio-Economic Panel. Sample consists of males aged 18-65 who were full-time employed at the time of the survey. Sample size is 13,540. Dependent variable is log monthly earnings plus one twelves of annual bonuses. Regressors also include a constant, a dummy for foreigners, and four variables for years of schooling and training in Germany and abroad.

Table 2
Earnings Regressions for Immigrants and Natives
(standard errors in parentheses)

independent variable	GLS (1)	GLS (2)	Fixed Effects (3)	Fixed Effects (4)
experience	0.037 (0.002)	0.035 (0.002)	0.049 (0.005)	0.048 (0.005)
experience^2/100	-0.061 (0.003)	-0.058 (0.003)	-0.055 (0.004)	-0.054 (0.004)
YSM	-0.0050 (0.0055)	-0.0038 (0.0055)	-0.0067 (0.0058)	-0.0069 (0.0058)
YSM^2/100	0.0172 (0.0152)	0.0120 (0.0151)	0.0193 (0.0160)	0.0201 (0.0159)
age at immigration	0.0013 (0.0014)	0.0013 (0.0013)	--	--
period dummies	5	5	4	4
4 nation of birth dummies	yes	yes	--	--
7 cohort dummies	yes	yes	--	--
7 dummies for job types	--	yes	--	yes
R^2	0.356	0.419	0.133[a]	0.141[a]
std. dev. of individual effect	0.268	0.249	--	--
std. dev. of noise	0.151	0.152	0.151	0.152
Wald-Test for significance of YSM and YSM^2 [p-value]	0.74 [0.690]	0.33 [0.850]	0.73 [0.695]	0.80 [0.671]
assimilation: first 5 years	-0.021 (0.024)	-0.016 (0.024)	-0.029 (0.025)	-0.030 (0.025)
first 10 years	-0.033 (0.041)	-0.026 (0.041)	-0.047 (0.043)	-0.049 (0.043)
initial earnings gap	-0.215 (0.065)	-0.174 (0.062)	--	--

Notes: see table 1
a) within R^2

Table 3
Earnings Regressions for Immigrants and Natives: Details
(standard errors in parentheses)

independent variable	means (1)	means (foreigners) (2)	GLS (3)
experience	24.8	26.7	0.037 (0.002)
experience^2/100	--	--	-0.061 (0.003)
YSM	4.79	17.3	-0.0050 (0.0055)
YSM^2/100	--	--	0.0172 (0.0152)
age at immigration	6.7	24.1	0.0013 (0.0014)
1985	0.19	0.19	-0.106 (0.006)
1986	0.19	0.19	-0.104 (0.006)
1987	0.17	0.17	-0.071 (0.005)
1988	0.16	0.16	-0.043 (0.005)
1989	0.15	0.15	-0.015 (0.005)

continued

Table 3 continued

independent variable	means (1)	means (foreigners) (2)	(3)
entered before 60	0.016	0.06	0.002 (0.051)
entered 61-64	0.047	0.17	0.014 (0.035)
entered 65-67	0.023	0.08	-0.040 (0.040)
entered 68-69	0.020	0.07	0.003 (0.041)
entered 72-73	0.071	0.26	-0.027 (0.028)
entered 74-79	0.028	0.10	-0.018 (0.041)
entered after 80	0.009	0.03	-0.056 (0.066)
Turkey	0.079	0.28	-0.058 (0.029)
Greece	0.041	0.15	-0.049 (0.035)
Italy	0.064	0.23	-0.038 (0.032)
Spain	0.039	0.14	-0.078 (0.035)
R^2			0.356

Notes: see table 1

Table 4
Earnings Regressions for Immigrants and Natives:
Various Immigrant and Comparison Groups
(standard errors in parentheses)

independent variable	Base model (1)	Immigrants since 1977 (2)	Unskilled workers (3)	Blue collar workers (4)
experience	0.037 (0.002)	0.040 (0.002)	0.023 (0.002)	0.020 (0.002)
experience^2/100	-0.061 (0.003)	-0.066 (0.004)	-0.038 (0.004)	-0.035 (0.003)
YSM	-0.0050 (0.0055)	0.0555 (0.0250)	0.0013 (0.0065)	0.0084 (0.0055)
YSM^2/100	0.0172 (0.0152)	-0.3328 (0.1625)	-0.0098 (0.0176)	-0.0204 (0.00151)
age at immigration	0.0013 (0.0014)	0.0054 (0.0041)	-0.0028 (0.0014)	-0.0012 (0.0012)
5 period dummies	yes	yes	yes	yes
4 nation of birth dummies	yes	--	yes	yes
cohort dummies	7	1	7	7
R^2	0.356	0.358	0.150	0.135
std. dev. of individual effect	0.268	0.287	0.183	0.184
std. dev. of noise	0.151	0.152	0.139	0.141
Wald-Test for significance of YSM and YSM^2 [p-value]	0.74 [0.690]	2.53 [0.279]	0.40 [0.817]	1.16 [0.559]
assimilation: first 5 years	-0.021 (0.024)	0.194 (0.086)	0.004 (0.029)	0.037 (0.024)
first 10 years	-0.033 (0.041)	0.222 (0.100)	-0.004 (0.050)	0.063 (0.042)
inital earnings gap	-0.215 (0.077)	-0.493 (0.108)	-0.068 (0.062)	-0.120 (0.054)
number of observations	13540	10108	4203	7033
Notes: see table 1				

Table 5
Earnings Regressions for Immigrants and Natives:
The Role of Education
(standard errors in parentheses)

independent variable	means (1)	means (foreigners) (2)	Base model (3)	(4)	(5)
experience	24.8	26.8	0.037 (0.002)	0.036 (0.002)	0.036 (0.002)
experience^2/100	--	--	-0.061 (0.003)	-0.057 (0.003)	-0.057 (0.002)
YSM	4.79	17.3	-0.0050 (0.0055)	-0.0039 (0.0055)	-0.0061 (0.0056)
YSM^2/100	--	--	0.0172 (0.0152)	0.0124 (0.0151)	0.0183 (0.0155)
German Schooling	7.50	--	0.033 (0.003)	0.083 (0.006)	0.083 (0.006)
German Training	1.49	--	0.106 (0.005)	0.076 (0.006)	0.077 (0.006)
German Schooling * Foreigner	0.36	1.28	--	-0.070 (0.007)	-0.071 (0.007)
German Training * Foreigner	0.054	0.20	--	0.011 (0.018)	0.011 (0.019)
Foreign schooling	1.69	6.11	0.001 (0.001)	0.000 (0.001)	--
Foreign Training	0.156	0.56	0.038 (0.011)	0.036 (0.011)	--

continued

Table 5 continued

independent variable	means (1)	means (foreigners) (2)	(3)	(4)	(5)
Schooling Turkey	0.35	4.47	--	--	-0.004 (0.003)
Schooling Yugoslavia	0.37	6.87	--	--	-0.001 (0.003)
Schooling Greece	0.31	7.41	--	--	0.003 (0.003)
Schooling Italy	0.41	6.47	--	--	-0.002 (0.003)
Schooling Spain	0.25	6.38	--	--	0.005 (0.003)
Training Turkey	0.039	0.50	--	--	0.005 (0.018)
Training Yugoslavia	0.054	1.01	--	--	0.078 (0.021)
Training Greece	0.014	0.34	--	--	0.027 (0.030)
Training Italy	0.029	0.46	--	--	0.049 (0.023)
Training Spain	0.019	0.49	--	--	0.025 (0.035)
R^2			0.356	0.379	0.380

Notes: see table 1
Regressors also include a constant, a dummy for foreigners, age at immigration, 5 period dummies, 4 nation of birth dummies, and 7 cohort dummies.

Figure 1

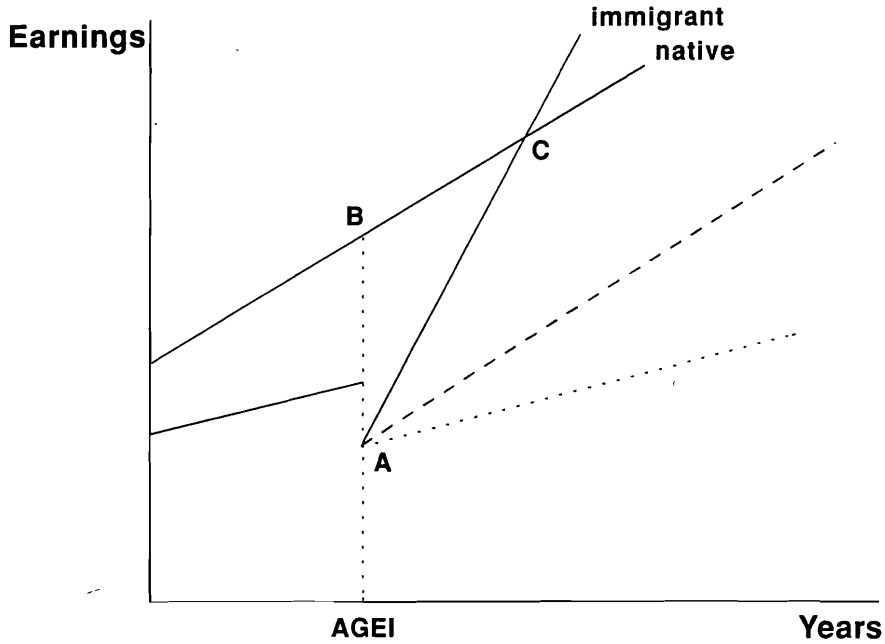


Figure 2

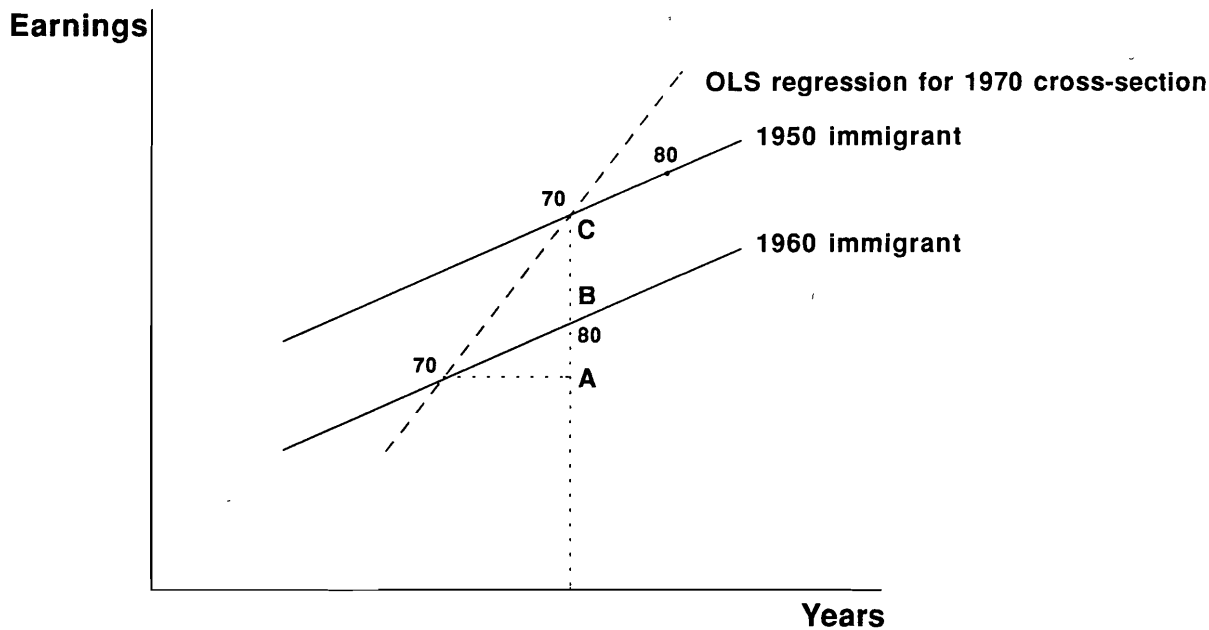
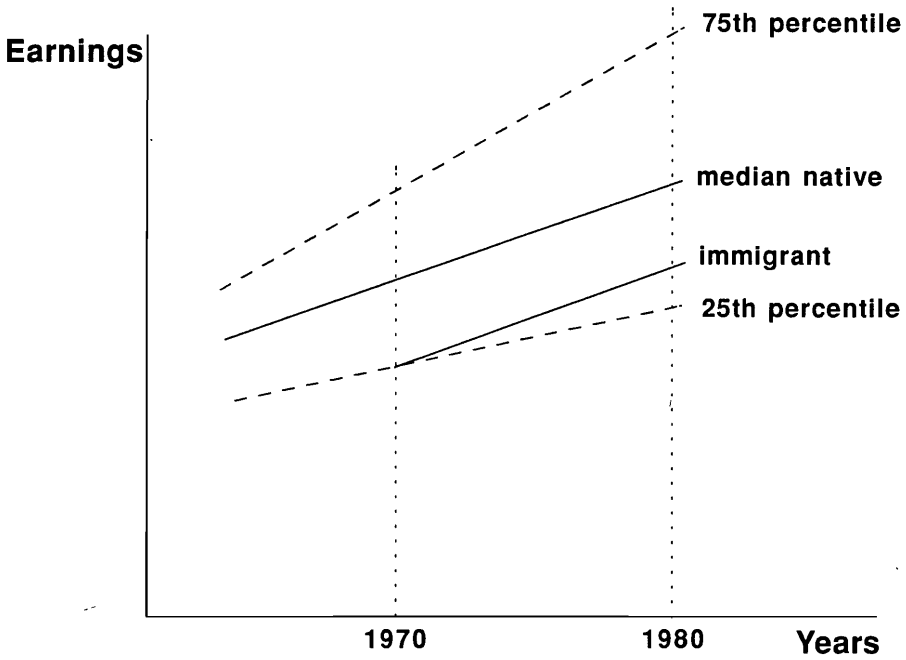
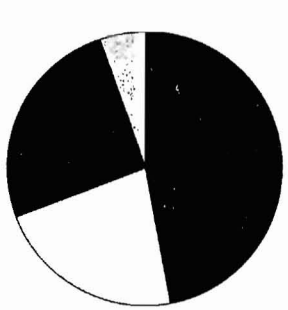

Earnings
OLS regression for 1970 cross-section
1950 immigrant
80
70
C
1960 immigrant
B
80
70
A
Years

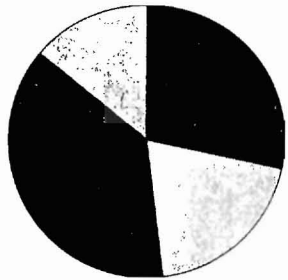
Figure 3


Earnings
75th percentile
median native
immigrant
25th percentile
1970
1980
Years



47% turkey
22% yugoslavia
8% greece
18% italy
5% spain

population



28% turkey
20% yugoslavia
15% greece
23% italy
14% spain

sample

Figure 4

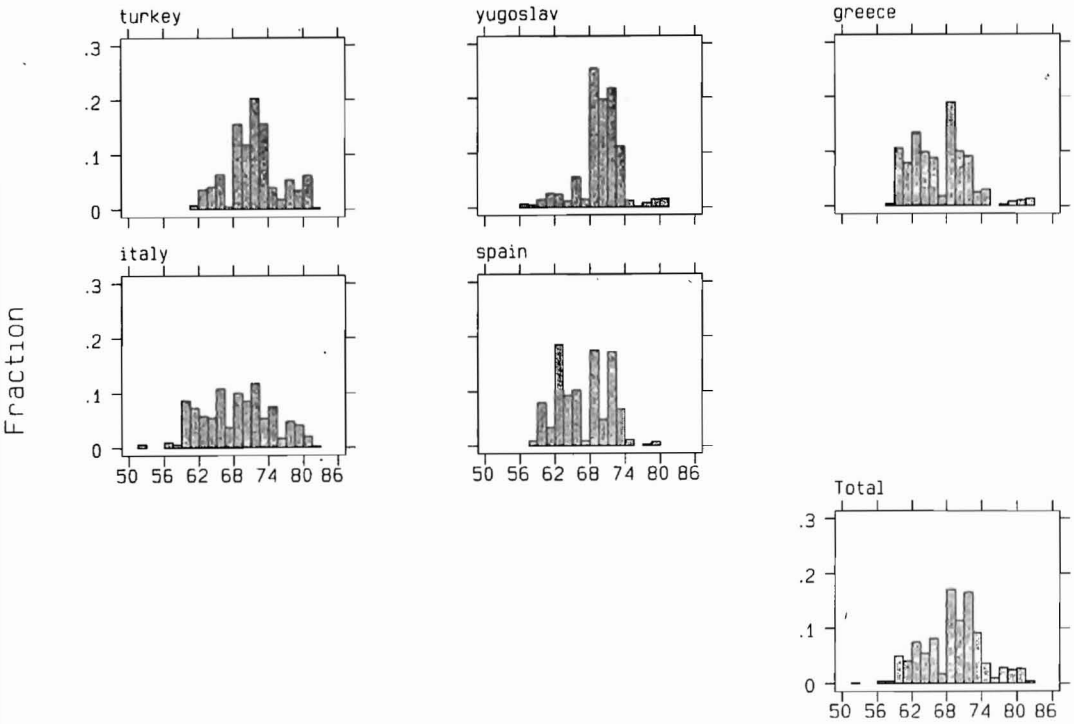

turkey
yugoslav
greece
italy
spain
Total
Fraction
.3
.2
.1
0
50 56 62 68 74 80 86
year of migration

Figure 5

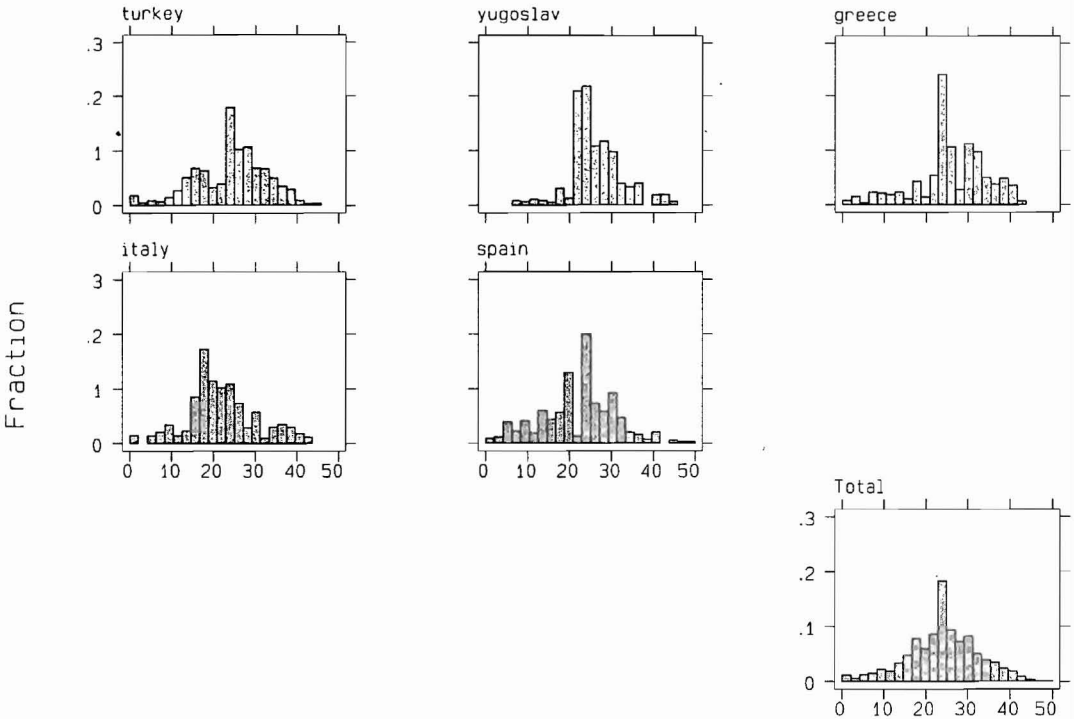

turkey
yugoslav
greece
italy
spain
Total
Fraction
age at immigration

Figure 6

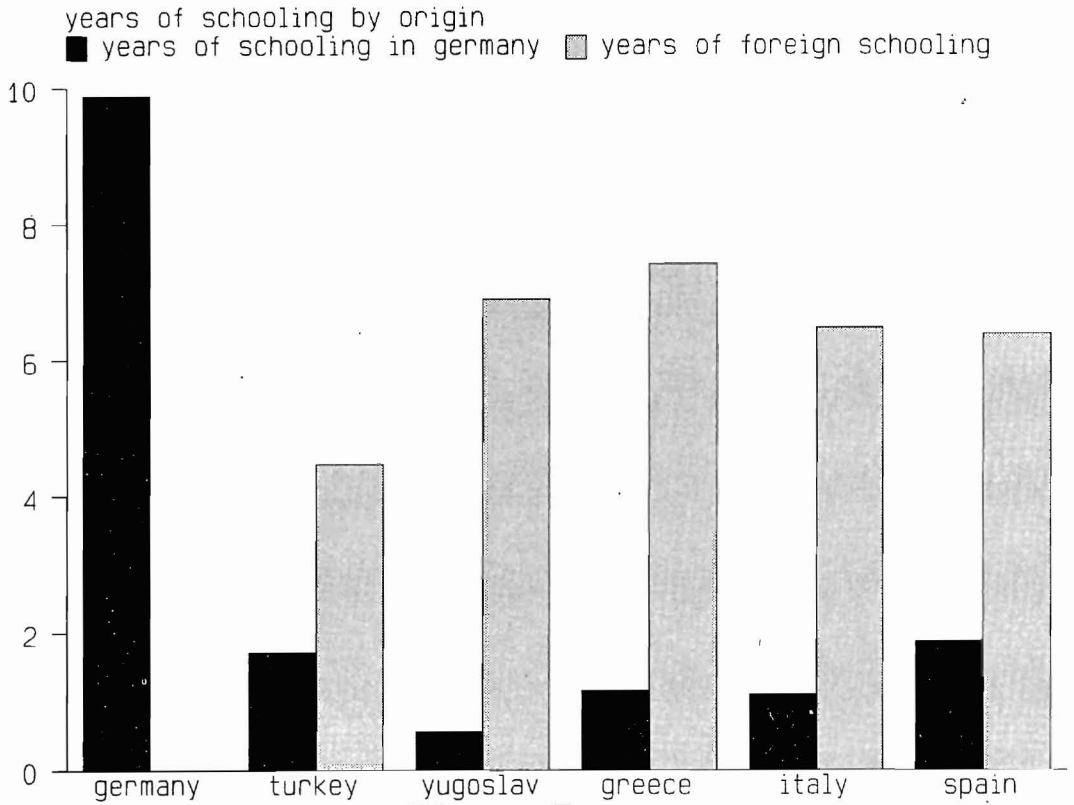
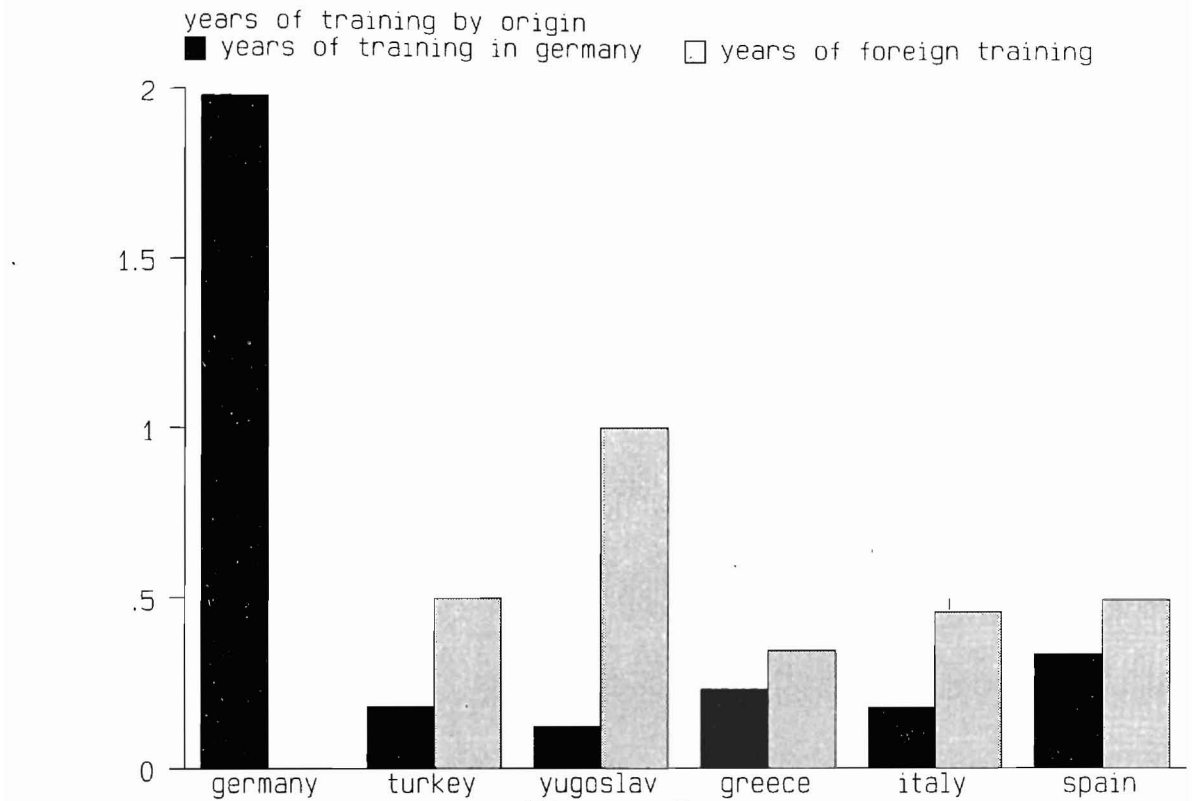

years of schooling by origin
years of schooling in germany
years of foreign schooling
10
8
6
4
2
0
germany
turkey
yugoslav
greece
italy
spain

Figure 7


years of training by origin
years of training in germany
years of foreign training
2
1.5
1
.5
0
germany
turkey
yugoslav
greece
italy
spain
Figure 8

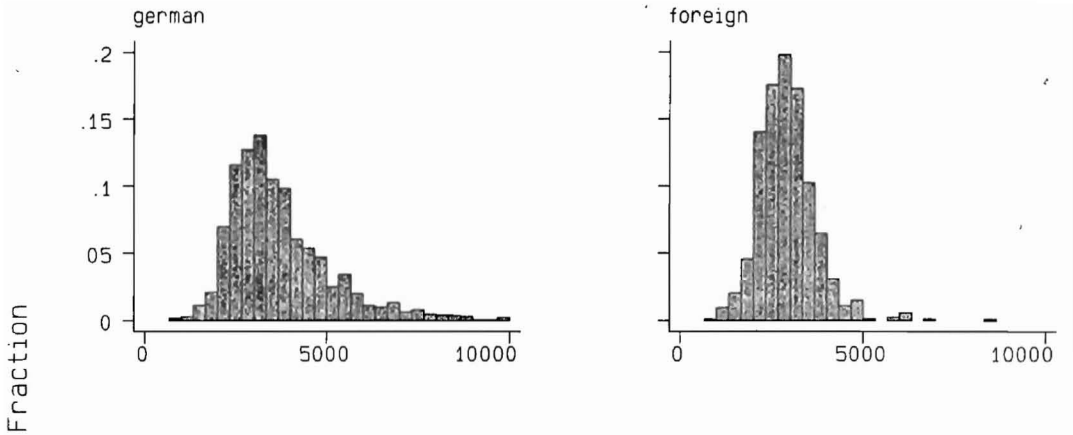

german
foreign
Fraction
.2
.15
.1
05
0
0
5000
10000
0
5000
10000
monthly earnings

Figure 9

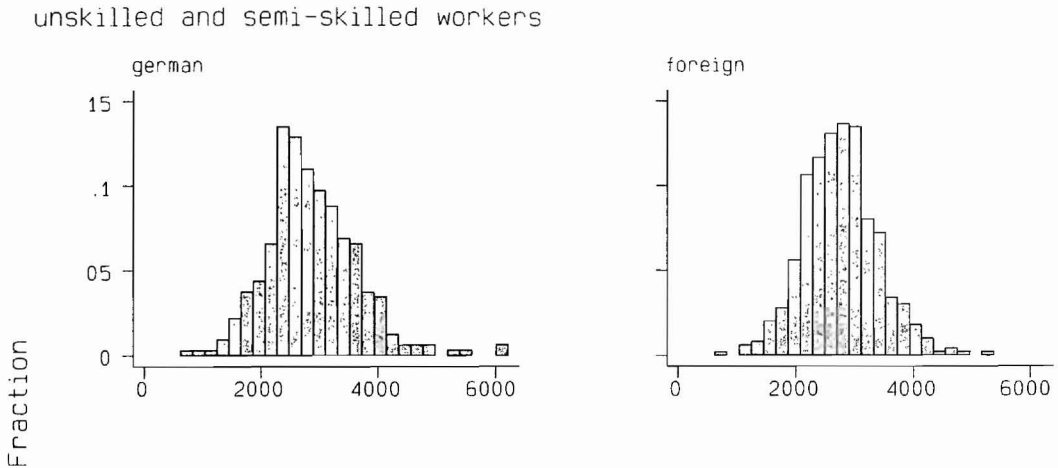

unskilled and semi-skilled workers
german
foreign
Fraction
15
.1
05
0
0
2000
4000
6000
monthly earnings

Figure 10