EMPLOYMENT EFFECTS OF IMMIGRATION TO GERMANY: AN ANALYSIS BASED ON LOCAL LABOR MARKETS

Jörn-Steffen Pischke and Johannes Velling*

Abstract—We analyze the impact of increased immigration on employment outcomes of natives in Germany using a data set of county-level variables for the late 1980s. In order to construct more unified labor market regions, we aggregate the 328 counties to 167 larger regions. We study two measures of immigration, the change in the share of foreigners between 1985 and 1989 as well as one-year gross and net flows of immigrants to an area. In order to address the potential problem of immigrant selection into local labor markets, we condition on previous labor market outcomes, which may serve as the basis of immigrant selection. This specification allows for mean reversion in the unemployment rate, which is strong in our data set and period of study. We show that this rules out some other approaches of identifying the impact of immigration. Our results indicate no detrimental effect of immigration. We find no support for the hypothesis that the absence of displacement effects is due to a response of native migration patterns.

I. Introduction

MIGRATION into Germany has increased greatly during the late 1980s. Probably the most contentious economic issue surrounding increased immigration is the impact of the inflow of foreign workers on the labor market outcomes of natives in the host country. This has been the focus of much research in the United States in recent years. Typically, only minor negative wage effects and no employment effects of increased immigration have been found in these studies. The German labor market differs in many important aspects from the labor market in the United States so that we might expect immigration to have very different effects. In particular, since the wage structure tends to be much more rigid and unions tend to play a large role in the wage-setting process, we expect to find that immigration has larger employment effects on natives than in the U.S. context. So far, there have been only few empirical studies on this issue for Germany with somewhat mixed results. We focus on the late 1980s and exploit a new data set to address these issues.

Figure 1 shows net immigration rates, distinguishing foreigners from the traditional guest-worker countries Italy, Greece, Spain, Yugoslavia, and Turkey and immigrants from other countries. Net immigration to Germany was initially low or negative after the guest-worker recruitment stop in

1973. A substantial number of foreigners entered again in the late 1970s, followed by another period of negative net migration during the recession of the early 1980s. In 1985 net immigration became positive again for the first time since the recession. It then increased continuously throughout the years of German unification. This period is also one during which the composition of arriving foreigners shifted from southern Europe and Turkey toward eastern European countries, in particular Poland. Growing immigration pressure by new immigrant groups makes the late 1980s an interesting period for our study. Excluding the unification period seems prudent, since many other labor market influences may have been confounding immigration effects since 1990. Furthermore, the late 1980s were a period where aggregate unemployment was still relatively high, between 7 and 9%, thus making fears of job loss to immigrants of particular relevance for German workers. The cost of using this time frame is that it covers a period of strong expansion, where absorption of immigrants into the labor market may be easier than in periods of economic slack, despite the existing high level of unemployment.

We analyze the impact of immigration on local labor markets using data for 328 counties in West Germany for the years from 1985 to 1989. Since there are often large commuter flows between counties, we aggregate these into 167 larger labor market regions. Unlike larger regions such as states, these labor market regions strike a good compromise between preserving much of the interregional variation in the data while also representing economically more meaningful units than counties.

A major problem in studying the impact of immigrants on natives by comparing regions is that immigrants may self-select into booming labor markets, thus creating an endogeneity problem in the estimation. If immigrants choose their location on the basis of observable variables, then it is sufficient to condition on these variables to purge the regression of the self-selection bias. We argue that immigrant location is most likely based on past labor market conditions for which we can easily control. We find no detrimental effect of immigration on the labor market outcomes for natives.

There is some concern that foreign migration may be offset by migratory patterns of natives. To address this issue, we also look at migration flows between counties and labor market regions for foreigners and natives in 1987. We do not find evidence that higher immigration depresses the in-migration of natives. Instead, foreigners and natives seem to be attracted to the same locations. This suggests that our results are not simply due to the fact that any impact of immigrants is quickly dissipated throughout the country.
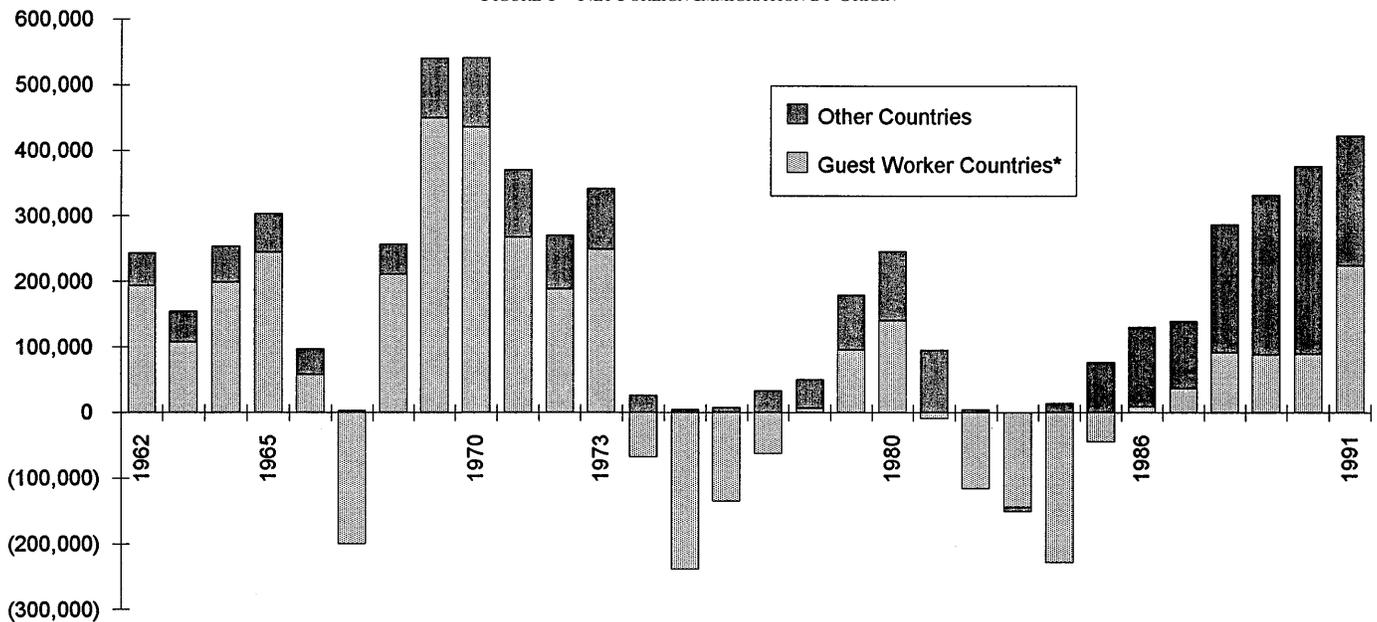
In the next section we discuss some of the theoretical ideas on the impacts of migration, review the previous

© 1997 by the President and Fellows of Harvard College and the Massachusetts Institute of Technology

FIGURE 1—NET FOREIGN IMMIGRATION BY ORIGIN

*Source: Federal Statistical Office, *Statistical Year Book,* several issues. Guest worker countries are Italy, Spain, Greece, Yugoslavia, and Turkey.

empirical literature in this field, and motivate our empirical specification. Section III describes the data we use. Section IV presents the empirical results, followed by conclusions in section V.

II. Analytical Framework

A. Theoretical Motivations and Previous Literature

The concerns about the effects of immigrants on the host economy have a long history, but the 1980s have been a period of particularly active investigation of this question in the United States and, more recently, in Europe as well.[1] One approach to studying the impact of immigration on the labor market is a partial equilibrium view focusing on the labor demand side. Since immigrants are often less skilled than native workers, it is possible to treat them as a separate input in the production function, derive a system of demand equations for foreign and domestic labor, and estimate the implied substitution elasticities (e.g., Grossman (1982) and LaLonde and Topel (1991)). This approach has not been used for Germany because separate wage data are typically not available for immigrants and natives.

Even without wage data it is possible to study the effect of immigrants on natives by looking directly at the reduced-form relationship. In a standard competitive model, an increase in the supply of foreign labor reduces the wage and the employment of natives, and raises total employment. The comparative statics result can be written as

$$\Delta \log w_{it} = \frac{A \Delta F_{it}}{P_{it-1}} \qquad (1)$$

[1] For more complete surveys see Greenwood and McDowell (1986), Borjas (1990, 1994), and Friedberg and Hunt (1995).

where F_{it} is the number of foreigners in the labor market, P_{it} is the entire active population, w_{it} is the wage, and A is a function of the supply and demand elasticities (see, e.g., Altonji and Card (1991)). Substituting the result in equation (1) into a labor-supply curve yields an analogous result for employment.

While the competitive model predicts a negative effect of immigration on native labor, there are a variety of reasons why these wage and employment effects could be small or positive instead. First, natives and foreigners could be complements in production. Second, labor markets may not be well described by a competitive model. Schmidt et al., (1994) discuss the impact of migration in a market where low skilled wages are set by a monopoly union. In this case, the outcomes depend crucially on what are the union's constituents and instruments. In particular, their model generates unemployment, and they show that increased immigration could possibly lead to declining unemployment when skilled and unskilled workers are complements and the union cares strongly enough about skilled workers. Another noncompetitive alternative would be a segmented labor market, where foreign workers tend to enter the secondary sector while natives tend to stay in the primary sector. If spillovers between sectors are limited, this segmentation would lead to little direct labor market pressure from increased immigration.

This leaves the sign of the direct effect of foreigners on the labor market outcomes of natives theoretically undetermined. In addition, there is also a general equilibrium effect with a more clear impact. While foreigners may compete with natives for local jobs, they will also demand goods and services produced by natives. Many of these will be produced locally. This demand effect will tend to increase

the demand for native labor, thus raising native wages and employment. The higher the share of immigrant demand going to goods produced in other cities or imported, the more this general equilibrium effect will be dissipated.

Since theoretical analysis does not make unambiguous predictions about the impact of immigration nor does it suggest a particular empirical specification, most empirical work has taken an agnostic approach. A reduced-form specification based on equation (1) will capture both supply and demand effects created by foreign workers. The reduced form will look similar whether the labor market is regarded as competitive or characterized by imperfections. Numerous studies have relied on estimating an equation such as equation (1), typically by comparing local labor markets with differing immigration rates. Examples are Altonji and Card (1991), Butcher and Card (1991), and Simon et al. (1993).

The estimation of equation (1) based on data for local labor markets may be affected by an important endogeneity problem if foreigners choose to locate in areas that have particularly strongly growing labor markets. This will lead to an upward bias in estimating the employment effects of immigration (or a downward bias for unemployment). To address this problem, Altonji and Card (1991) instrument the change in the share of foreigners between 1970 and 1980 with its 1970 level and its square. The idea underlying this strategy is that foreigners tend to locate in cities where a large number of foreigners live already. This has originally been suggested by Bartel (1989). Furthermore, the instrumentation requires that the stock of foreigners not influence the changes in employment or unemployment directly; specifically the stock of foreigners has to be weakly exogenous. If the change in the foreign share affects the unemployment rate, then the unemployment rate has to follow a random walk for the lagged foreign share to be weakly exogenous in the unemployment equation. We will argue below that this is unlikely to be the case for our data, in particular for unemployment rates. The simultaneity issue due to the self-selection of foreigners is addressed more directly in studies that analyze the effects of isolated, exogenous inflows of migrants, such as Card's (1990) analysis of the effect of the Mariel boatlift on the Miami labor market or Hunt's (1992) study of the repatriation of French after the Algerian War.

The tenor of this entire literature for the United States is that the employment effects of immigration are negligible while there may be some negative wage effects of recent immigrants (see the surveys by Borjas (1994) and Friedberg and Hunt (1995)). Some studies on Germany have found stronger effects of immigration. Winkelmann and Zimmermann (1993) have analyzed whether unemployment incidence in the late 1970s and early 1980s was affected by the presence of foreigners. In a companion study, De New and Zimmermann (1994) looked at wage effects. In both papers, the fraction of migrants in a worker's industry was merged to the German socioeconomic panel. Unlike for the United

States, these studies found detrimental effects of migration on unemployment and on wages. However, it is unclear whether the presence of foreigners in the affected industries is causal in this case. For example, foreigners were recruited in the 1960s mainly into manufacturing sectors that were booming at that time. But many of the booming industries of the 1960s became the troubled industries of the late 1970s and 1980s. This will lead to the observed correlation between the number of foreigners in an industry and the incidence of unemployment without revealing much about the labor market impacts of migration. The De New and Zimmermann study tries to circumvent this problem by instrumenting the foreign share by industry dummies and trends. This is still problematic since these variables might also capture features of the wage structure unrelated to the foreign share and should therefore not be excluded from the regression.

The work closest in spirit to ours is two recent studies by Hatzius (1994) and Velling (1995), who base their analyses on a comparison of the impact of immigration on different regional labor markets. Hatzius constructs regional data at the level of the 11 West German states from the Socioeconomic Panel in addition to using published aggregate data. Velling uses regional data on 141 West German labor office districts. While this regional demarcation comes close to the one we use in this paper, our definition is preferable because it explicitly approximates local labor markets based on commuter flows. Looking at the period between 1989 and 1993, Velling (1995) finds no wage effects but small negative unemployment effects, which differ in size by migrant group. Less qualified workers suffer the most from migration and highly qualified migrants have the smallest overall impact on unemployment. In contrast to our study, Velling's results concern a period of higher immigration rates and less favorable business cycle conditions. Hatzius (1994) finds negative but insignificant unemployment effects, but substantial effects on wages in his analysis of aggregate state-level data for the period of 1975 to 1991.

Analyses based on the shares of foreigners in either a locality or an industry are also subject to the criticism that natives may react to an increased inflow of foreigners by locating elsewhere, thus dissipating the adverse effects of increased migration (Chiswick (1992, 1993)). This will bias the estimated effects of immigration toward zero. There is conflicting evidence for the United States whether this is an important issue. Filer (1992) finds large responses in the migration behavior of natives in the 1970s, whereas Butcher and Card (1991) find no evidence of this for the 1980s. No direct evidence is available on this issue for Germany. Therefore we also look at native migration patterns in this paper to assess the relevance of the Chiswick–Filer criticism for our estimates.

Since regions within a country are small open economies, not just internal migration but also internal trade flows can dissipate the effects of immigration to a particular region (the factor price equalization theorem). If this is the case and

it occurs quickly enough, then regional-level analyses are not able to reveal the true impact of immigration on the national labor market, as all regions will be affected alike. This will also bias estimates of immigration effects toward zero. Only time-series studies at the national level will be able to uncover the impact of immigration. Our analysis therefore assumes that the internal economy of Germany is far from a Heckscher–Ohlin world, or the wage equalization effects of trade take a long enough time to occur. Friedberg and Hunt (1995) argue for the case of the United States that cross-sectional studies using regional variation and aggregate time-series studies resulted in very similar estimates of the labor market impact of immigration. Decressin and Fatás (1995) show that labor market adjustments in Europe and the United States take a similar amount of time. This makes us more confident in exploiting regional variation in the German case as well.

B. Empirical Specification

Our approach to studying the impact of foreigners on the employment and unemployment of natives follows the reduced-form approach based on a comparative statics relationship, as in equation (1). We interpret equation (1) as describing the impact of an exogenous increase in the share of foreigners and thus on the labor supply. In a neoclassical, constant returns to scale economy, the local market will eventually return to a new steady state with total employment higher by the number of immigrants, the same employment of natives and the same wage as before. In this case, cross-sectional estimation based on equation (1) will seek to exploit short-term disequilibria due to immigration. In other models, immigration may have long-run impacts as well. Altonji and Card (1991), for example, present estimates both in levels and in first differences. Since we feel less confident about the impact of immigration on the long-run levels of labor market variables, we only present estimates based on changes over time below.

There are two ways of turning equation (1) into an estimating equation. The first is to interpret it as a differenced version of an equation that describes the level of wages or employment, dependent on the stock of foreign workers, other observable characteristics, and possibly an unobserved fixed effect. Accordingly, the estimating equation has the form

$$\Delta z_{it} = \alpha \Delta f_{it} + \Delta x_{it}\gamma + \Delta \epsilon_{it}. \tag{2}$$

In our case z_{it} is a measure of the labor market performance of natives, such as employment or unemployment rates, Δf_{it} is the change in the number of foreigners divided by the total population aged 15 to 64 in the local labor market, and the x_{it}'s are other variables that influence the level of the labor market outcomes of natives, but not including wages or employment. The differencing has purged the equation of the fixed effect and any potential biases arising from it. This is the interpretation taken by Altonji and Card (1991) and

Hunt (1992) in their work. The coefficient of interest α will capture both supply and demand side effects of the presence of foreigners in the labor market. The equation can therefore be regarded as a semireduced form.

An alternative interpretation is to regard equation (1) as the model and assert that other labor market influences, the levels of the x_{it}'s, influence the dynamics of employment directly. Thus the estimating equation would take the form

$$\Delta z_{it} = \alpha \Delta f_{it} + x_{it-1}\gamma + \epsilon_{it}. \tag{3}$$

In this case, covariates are entered as lagged levels. We prefer this interpretation because the comparative statics result in equation (1) only makes sense in that changes and characteristics of the labor market in the region might influence the evolution of employment. Hence next we present only results from estimating equation (3). Entering covariates in differences does not affect our conclusions in any way. An additional advantage of equation (3) over equation (2) is that the contemporaneous covariates x_{it} might themselves be endogenous. For example, changes in the female labor force participation rate might depend on changes in the wage level. In this case, equation (3) could be regarded as a reduced form with respect to these influences, only using predetermined values of the endogenous regressors.[2] Moreover, in our analysis using flow data we do not have current values of the covariates x_{it} available, so equation (3) is the only possible specification.

In order to deal with the self-selection issue, we could follow Altonji and Card (1991) and use the lagged foreign share as an instrument. If α is nonzero, weak exogeneity of f_{it} requires that the dependent variable evolve as a random walk. We present evidence below that this might be acceptable for the employment rate, but certainly not for the unemployment rate. To cope with the fact that regional unemployment rates during the 1985–1989 period tended to be strongly mean reverting, and in the absence of any alternative credible instrument, we use a different strategy to identify the effect of immigration on the unemployment rate. The key assumption we make is that immigrant inflows depend only on the level of the previous unemployment rate, not on current or future unemployment rates, or permanent differences in unemployment across regions. It seems reasonable that location decisions are mostly made based on past labor market conditions, rather than on the change in these conditions. The following linear relationship is a simple but natural way to model the immigrant selection process in this case,

$$\Delta f_{it} = \beta u_{it-1} + v_{it}. \tag{4}$$

Following equation (1), we continue to assume that it is immigrant inflows, not levels, that yield an unemployment

---

[2] This argument is slightly incomplete, since in this case the dynamic structure of the entire model determines the set of admissible instruments. Given that the data at our disposal limit us to using two periods only, we do not explore this issue further.

rate above its steady-state level. Unemployment can follow some arbitrary process over time,

$$u_{it} = g(u_{it-1}, u_{it-2}, \ldots) + \alpha \Delta f_{it} + \epsilon_{it}. \tag{5}$$

The confounding influence in estimating α is the presence of the lagged unemployment rate in equation (4). It is sufficient to condition on this variable to get a consistent estimate of α. Putting this differently, in running the regression

$$u_{it} = b_1 u_{it-1} + b_2 \Delta f_{it} + e_i \tag{6}$$

we assume that v_{it} and e_{it} are uncorrelated. In this case we get a consistent estimate for α,

$$\text{plim } \hat{b}_2$$

$$= \frac{\begin{aligned}\text{var }(u_{it-1}) \text{ cov }(\Delta f_{it}, u_{it}) - \text{cov }(\Delta f_{it}, u_{it-1}) \\ \times \text{ cov }(u_{it}, u_{it-1})\end{aligned}}{\text{var }(u_{it-1}) \text{ var }(\Delta f_{it}) - \text{cov }(\Delta f_{it}, u_{it-1})^2}$$

$$= \frac{\begin{aligned}\text{var }(u_{it-1})[\beta \text{ cov }(u_{it}, u_{it-1}) + \alpha \sigma_v^2] \\ - \beta \text{ var }(u_{it-1}) \text{ cov }(u_{it}, u_{it-1})\end{aligned}}{\begin{aligned}\text{var }(u_{it-1})[\beta^2 \text{ var }(u_{it-1}) + \sigma_v^2] \\ - [\beta \text{ var }(u_{it-1})]^2\end{aligned}} \tag{7}$$

$$= \alpha.$$

It is important to point out, however, that this result depends crucially on our assumption that self-selection of immigrants is only based on past values of the unemployment rate. Since it is the mean reversion in the unemployment rate that prevents us from using, for example, the lagged level of the foreign share as an instrument, we refer to equation (6) as the mean reversion model. In the estimation below we augment equation (6) by other lagged covariates analogous to equation (3). Hatzius (1994) estimates a similar specification so that his results are likely to be the most comparable to ours.

III. The Data

The bulk of our data is taken from Bundesforschungsanstalt für Landeskunde und Raumordnung (1992), a tabulation of aggregates on a variety of issues at the level of counties and statistical regions, as well as a previous issue of the same publication. In addition, we have added other county-level information from the Statistisches Bundesamt (Federal Statistical Office) and various issues of the *Amtliche Nachrichten der Bundesanstalt für Arbeit* (Official Employment News). Most of the relevant variables in this data set pertain to the years 1985 and 1989. Some variables, such as unemployment rates and migrant flows, are also available for the intervening years. Therefore we present two sets of regressions. The first set compares changes from

1985 to 1989, the second looks at variables we have available for the intervening period in year-by-year regressions.

There are 328 counties in West Germany with a population ranging from 2.1 million in Berlin to 33,000 in Zweibrücken. In the cases of larger cities, counties will coincide with the city boundaries. Often these are surrounded by one or more suburban counties. Therefore a county is unlikely to be the ideal definition of a local labor market. In particular, foreigners are more likely to live in cities rather than in the suburbs, but their presence may still affect native commuters. To counter these problems we aggregate the counties to 167 labor market regions, as suggested by Eckey and Klemmer (1991). They aggregated municipalities to regions based on the complete commuter matrix constructed from the 1987 Census. Their algorithm first defined municipalities with net commuter inflows as labor market centers, and assigned all other municipalities to the center to which they send the most commuters. In a second step, the regions formed in this fashion were combined with neighboring regions if the fraction of commuters leaving a region exceeded 7.5% of the workforce, unless this lead to commuting times exceeding 45 minutes. In a final step, these local labor markets were reanalyzed to form a partition of the German counties. This procedure captures well our goal of obtaining economically meaningful regional units without sacrificing too much of the regional variation in the data. The coarser the regional aggregation, the more easily biases can be avoided which arise from commuter flows between regions. On the other hand, the coarser groupings will be less efficient as they eliminate between-county variation in the variables. We feel that the labor market regions strike a good balance between consistency and efficiency. Nevertheless, many ambiguities remain in forming local labor markets in a densely populated country like Germany. For example, the Rhein–Main area consists of three labor market regions (Frankfurt, Wiesbaden, and Mainz), while there is doubtlessly much integration between these three.

As our dependent variables we use employment and unemployment rates. Since our data do not allow a disaggregation by skill, we use the employment rate both for all residents and for Germans only in a local labor market, defined as employment covered by social security[3] divided by the population aged 15 to 64. The unemployment rate also refers to all residents and is based on unemployment insurance claims.

We do not analyze wages in this paper because German unions are relatively successful in implementing uniform wages across regions of the country. We therefore feel that regional wage changes are more likely to reflect compositional effects that we cannot control for rather than potential

---

[3] The uncovered sector consists primarily of part-time workers, the self-employed, and public servants who are covered by their own social insurance institutions. In 1985, 79.5% of all workers were covered by social security.

impacts of immigration, so that little can be learned from the wage data we have available.

Defining an economically meaningful measure of immigration in Germany is not straightforward. Statistical authorities in Germany, as in many European countries, typically do not distinguish demographic groups by place of birth or entry into the country but rather by citizenship. Citizenship is granted on the basis of ethnicity rather than place of birth or residence. This means that many guest workers who may have lived in Germany for many years are regarded as foreigners. Their children, even if born in Germany, typically do not become German citizens automatically, although some limited options for naturalization exist for this group of second-generation immigrants. Since Germany does not officially admit immigrants, many foreigners enter the country as asylum seekers. During the period we study, asylum seekers were not allowed to work immediately after entering the country. On the other hand, Germany admits ethnic Germans (called *Aussiedler*) as citizens. These are descendants of German migrants who settled in eastern Europe during the last century. Small numbers of these ethnic Germans returned to Germany throughout the postwar period, but the number has increased strongly since 1988, when eastern European countries started to ease restrictions on emigration. About 10% of immigrants were ethnic Germans in 1985 while their share rose to more than a third by 1989.[4]

We use two different measures of immigration. In our analysis of the 1985 and 1989 data, our key independent variable is the change in the number of foreign citizens divided by the total population in 1985, using the age group 15 to 64, that is, the economically active population. This variable includes all foreigners who are registered with the local authorities, thus excluding short-term visitors, diplomats, and foreign military personnel. As discussed above, it excludes immigrants who are of German ethnicity. Since some of the included foreigners may still belong to groups who are not economically active, for example, asylum seekers not allowed to work, we also look at the effects of Turks only. This represents a nationality that we believe has migrated to Germany primarily for economic reasons and a group that consists almost exclusively of relatively low skilled blue-collar workers (see Schmidt (1992)).

The change in the foreign share also captures variations in the demographic composition of this group. For example, the foreign share is growing since many children of guest workers enter their economically active lives while relatively few foreigners retire during the period we study. Furthermore, it will include domestic migration of foreigners. While an argument can be made that any increase in the foreign labor force threatens the position of natives, second-generation immigrants or well assimilated foreigners are presumably not the group the public is most concerned with. In order to isolate recent immigrants, we analyze migration flows from abroad. This also allows us to study the internal

migratory patterns of foreigners already present in Germany and internal migration of natives. We have gross flow data for each county separately for Germans and foreigners and for domestic and international flows for each year from 1985 to 1989. For example, the gross inflow of foreigners from abroad to a county consists of all persons without German nationality arriving from abroad in a particular year. Except for migrants who lived in Germany previously, returned to their home countries, and reentered Germany later, this group will consist of recent immigrants, that is, arrivals within the past year. Unfortunately we could not obtain the complete 328 × 328 matrix of domestic flows; thus we cannot aggregate the internal gross flows to labor market regions. Net flows defined as domestic inflows minus domestic outflows can be aggregated. These net flows may not be the economically most relevant measures. For example, an immigrant from abroad may subsequently move on to another location in Germany. Unfortunately, due to data limitations, we are restricted to use this measure of internal migration at the level of the labor market regions. Our analysis for migration flows covers the period of 1986 to 1989 because we had to form lags.

The number of illegal immigrants, who by definition are not captured in the official statistics, is unlikely to be as big a problem in Germany as, for example, in the United States. One reason is that it used to be difficult to cross the eastern borders outside official ports of entry. Furthermore, it is difficult to obtain any public services, housing, or services of the employment agencies without official registration. Nevertheless, black market work by foreigners is believed to be an issue in sectors such as construction and agriculture, where sites of employment might change and monitoring (both by official authorities and works councils and unions) is harder. However, the extent of these black market activities is likely to be small compared to a country like the United States. Due to these reasons we feel that it is unlikely that illegal employment creates major distortions in our data.

Given that our dependent variables are coarse indicators of employment opportunities for natives that will be affected by a multitude of influences, we control for a variety of variables capturing the composition of the local workforce. These will typically be correlated with local labor market performance for reasons very different from foreign–native substitution. We use the shares of employment in 12 industries, the share of highly skilled workers, the share of unskilled workers, the share of part-time workers, the share of female workers, the share of workers over age 55, and the ratio of the population aged 15 to 64 to the total population. Furthermore, we use the logarithim of the population density in the region because foreigners tend to be concentrated in more highly populated areas, which may differ in their labor market performance.

Table 1 displays some summary statistics for the main variables of interest. These are unweighted means over the labor market regions. Thus they do not accurately reflect aggregate values. We present unweighted statistics as our

---

[4] Despite these complications, we use the terms "immigrant" and "foreigner" interchangeably elsewhere in the text.

TABLE 1.—MEANS AND STANDARD DEVIATIONS OF KEY VARIABLES, LABOR MARKET REGIONS

Variable	1985 (%)	1989 (%)	Changes (percentage points)
Population, persons	365,392 (475,162)	375,324 (490,914)	9,932 (25,383)
Employment-to-population, ages 15–64	44.5 (6.3)	46.5 (6.4)	2.9 (1.5)
Employment-to-population, Germans	44.4 (6.3)	46.8 (6.5)	2.9 (1.5)
Employment-to-population, foreigners	47.0 (13.4)	42.8 (11.9)	4.7 (4.7)
Unemployment rate, June	9.4 (3.4)	6.5 (2.7)	−2.9 (1.7)
Foreign share, population	4.9 (2.9)	5.6 (3.1)	0.8 (0.4)
Foreign share, ages 15–64	5.3 (3.0)	6.2 (3.3)	1.0 (0.5)
Share of Turks, population	1.6 (1.1)	1.9 (1.3)	0.3 (0.3)

Note: Number of observations is 167.

FIGURE 2—UNEMPLOYMENT RATE 1985, LABOR MARKET REGIONS

☐	0 - < 6
	6 - < 8
	8 - < 10
	10 - < 12
■	12 - 20

regressions are also unweighted. The size of a labor market region should not influence the precision in our regressions as all variables are in ratio form. Table 1 gives means for 1985 and 1989 shares and for changes between these years. For the employment-to-population ratio, these were calculated as the change in employment divided by population in 1985 and analogously for the foreign share. For the unemployment rate, differences of the 1989 and 1985 variables are given. Employment-to-population ratios were higher for foreigners than for Germans in 1985, but fell strongly until 1989. However, from the last column it is clear that employment of foreigners expanded strongly while the foreign working-age population, through immigration and aging, grew even more rapidly. The late 1980s were an expansionary period with the unemployment rate falling by 3 points. There is a good deal of dispersion in the changes of all variables.

The maps in figures 2 and 3 show the regional distribution of unemployment and the foreign share, respectively. Unemployment is higher in the north, and in the Ruhr and Saar regions in the west, where heavy industry is concentrated. Relatively high rates of unemployment are also recorded in the rural regions of the Bavarian Forest in the southeast. Foreigners are concentrated in the southwest (the lowest unemployment region), along the Rhine valley, in the Ruhr, and in the major metropolitan centers. These are the important locations of German metal and chemical industries, indicating that the spatial distribution of foreigners is still largely determined by the recruiting of guest workers 15 to 20 years earlier.

IV. Empirical Results

A. 1985 and 1989 Immigrant Shares

We start by presenting some features of the dynamics of the regional employment and unemployment rates we study.
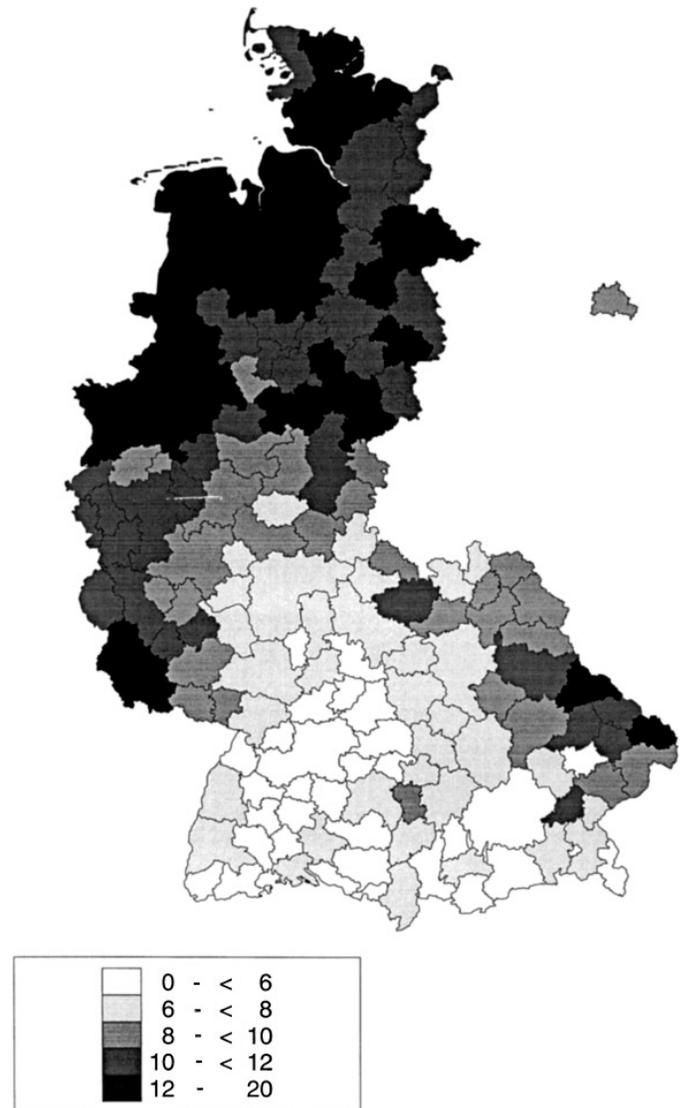
Regressing the change in the employment-to-population ratio from 1985 to 1989 on the 1985 level yields a coefficient of 0.07 with a standard error of 0.024. This indicates that regions with higher employment rates had higher employment growth. In contrast, for the unemployment rate we find a coefficient of −0.31 (standard error 0.040). High-unemployment regions tend to benefit more from falling unemployment.

These results indicate two things. First, since the coefficients for the employment-to-population ratio and the unemployment rates are of opposite sign, there have to be regional migration flows or participation effects. Otherwise there would be a mechanical relationship between the two coefficients, and they had to be of the same sign. Second, the unemployment rate is mean reverting, and the point estimate on the lagged value indicates that regional-level unemployment rates are far from a random walk. Employment-to-population ratios seem to be closer to a random walk,

FIGURE 3—FOREIGN SHARE OF POPULATION 1985, LABOR MARKET REGIONS

0 - < 2.5	
2.5 - < 5	
5 - < 7.5	
7.5 - < 10	
10 - 14	
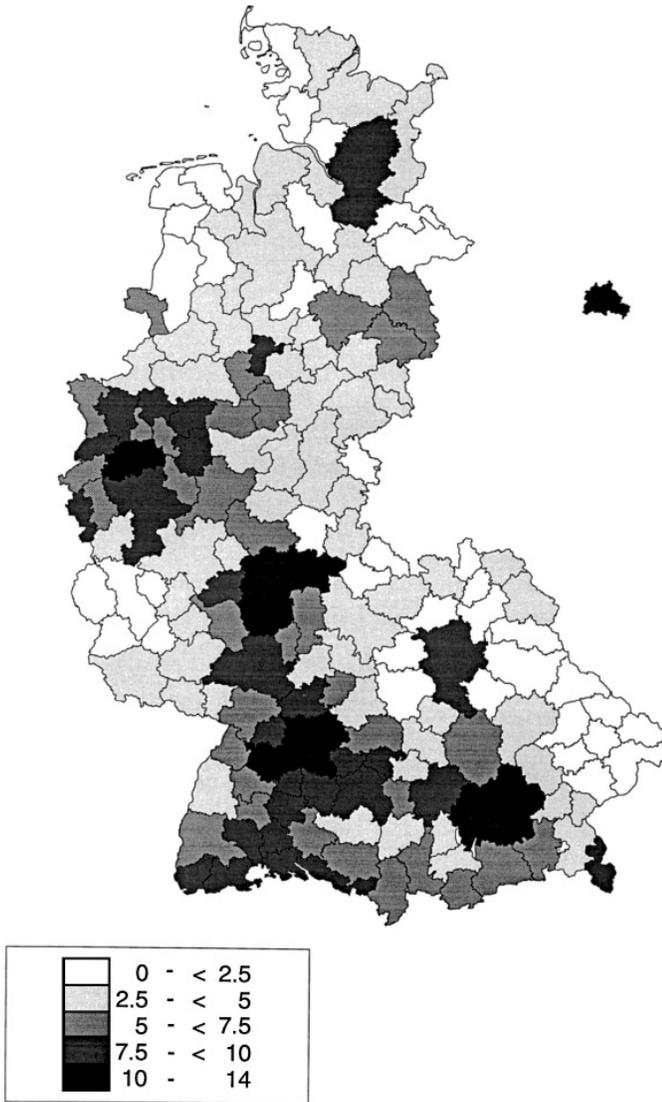
although we can still reject a zero coefficient at the 1% level. These results correspond closely to the conclusions of Decressin and Fatás (1995), who studied larger regions in Europe over a longer time span.

Since the level of the foreign share tends to correlate closely with the level of the unemployment rate (the correlation coefficient is -0.39) and unemployment rates are mean reverting, the Altonji and Card (1991) strategy of instrumenting the change in the foreign share with the lagged level will not yield consistent estimates for our data. We therefore rely on estimates of equation (6), which specifically allows for mean reversion in the unemployment rate and relies on the exclusion of current-period labor market conditions from the immigration equation for identification. The results are displayed in column 2 of table 2. For comparison with other studies, we present results for changes in the employment variables (equation (3)) as well. This amounts to restricting the coefficient on the lagged unemployment rate to 1. We estimate this specification alternatively by ordinary least squares (OLS) (column 3) or using the lagged foreign share and its square as instruments for the change in the foreign share (column 4). For the employment-to-population ratio, this estimation strategy is more likely to yield meaningful results.

Focusing on column 2 for a moment, there is some evidence that a larger inflow of foreigners lowered employment for natives but depressed overall employment even more. This latter result is inconsistent with a competitive labor market since an increased number of foreigners should raise overall employment. Such an outcome could be obtained, however, in the union wage setting model of Schmidt et al. (1994) when immigrants are unskilled, and skilled and unskilled labor are complements. Alternatively, labor force participation rates for immigrants may have been lower than for those foreigners already in the country, for example, because asylum seekers are not immediately allowed to work. This may lead to falling employment rates

TABLE 2.—IMPACT OF FOREIGNERS ON LOCAL LABOR MARKET OUTCOMES[a]

Dependent Variable (1)	All Foreigners			Turks Only		
	Mean Reversion Model (2)	Diffs (OLS) (3)	Diffs (IV) (4)	Mean Reversion Model (5)	Diffs (OLS) (6)	Diffs (IV) (7)
Employment-to-population, ages 15–64	-0.75^b (0.22)	-0.20 (0.23)	0.54 (0.41) [0.178]	-0.24 (0.42)	0.77 (0.43)	-0.11 (0.74) [0.643]
Employment-to-population, ages 15–64 (Germans only)	-0.44^b (0.22)	-0.34 (0.23)	0.52 (0.43) [0.188]	-0.06 (0.42)	0.46 (0.50)	-0.55 (0.75) [0.591]
Unemployment rate	0.12 (0.16)	1.07^b (0.21)	1.98^b (0.41) [0.015]	-0.32 (0.37)	1.57 (0.48)	2.28^b (0.71) [0.004]

Notes: Analysis at the level of labor market regions. Each entry represents a separate regression. Numbers shown in columns 2 to 4 are coefficients on the change in the number of foreigners aged 15–64 divided by the total population in this age group in 1985. Numbers shown in columns 5 to 7 are coefficients on the change in the number of Turks divided by the total population in 1985. Regressions also control for the change in the number of Germans aged 15–64 divided by the total population in 1985. Additional regressors are a constant, 12 industry employment shares, 2 dummies for missing industries, the share of highly qualified workers, the share of unqualified workers, the share of workers over age 55, the share of part-time workers, the share of female workers, the logarithm of population density, and the ratio of population aged 15–64 to the total population. These regressors are entered in 1985 levels. Columns 2 and 5 also include the lagged unemployment rate as regressor. The change in the share of foreigners is instrumented in column 4 by the foreign share in 1985 and the same variable squared. First-stage R^2 is 0.60. The change in the share of Turks is instrumented in column 7 by their share in 1985 and the same variable squared. First-stage R^2 is 0.74. The overidentification test is the Hansen–Sargan test. Number of observations is 167.
[a] White standard errors are in parentheses; p-values for overidentification test are in brackets.
[b] Significant at the 5% level.

overall. We also find no effect of increased immigration on the unemployment rate.

The results based on equations (3) in columns 3 and 4 indicate more positive coefficients throughout, in particular in the instrumented regressions and for the unemployment rate. It is easy to see how this result comes about. Foreigners tend to be concentrated in lower unemployment areas. It is these areas where unemployment falls the least between 1985 and 1989. We therefore find a strong positive association between the lagged foreign share and the change in the unemployment rate. A similar argument explains the higher coefficients for the employment-to-population ratio. The differences compared to column 2 are more pronounced for the unemployment rate, which is farthest from a random walk.

The problem that the foreign share seems to proxy for unobserved business cycle effects in these regressions is akin to what happens in Hunt's (1992) study of the French-Algerian repatriates of 1962, who tended to settle in départements that were particularly hard hit by the recession later in the 1960s. Despite this confounding business cycle effect, Hunt finds little evidence that the settlement of repatriates increased unemployment. She therefore interprets her results as an upper bound of the impact of immigration. This is not useful in our case, where there is a strong association between changes in the unemployment rate and the foreign share. We therefore regard these estimates largely as uninformative.

Columns 5 to 7 show similar regressions using Turkish immigrants only.[5] This group should be more homogeneous and reflect better the stylized picture of an economically motivated migrant. The results are generally comparable to the previous columns. The results for the employment rates are imprecisely estimated, and they do not exhibit any clear pattern. The results from the mean reversion model show little impact of additional immigration.

These results are robust to a variety of changes in the specification. Increases in the labor force due to native immigration or growth of the native population may have similar effects as immigration. Adding the growth in the share of natives in the labor market region to the regressions had little effect on the estimates for the foreign share. Berlin plays a special role as a gateway for many immigrants. We re-ran all regressions excluding Berlin from the sample and obtained generally similar results to those shown in table 2. We also constructed unemployment rates for Germans only and for unskilled workers, which involves some approximations for the total labor force in the county in these groups. They also produced similar results.[6]

---

[5] Unlike in table 3, we use the share of Turks in the population including all age groups, not just ages 15 to 65. The breakdown by age and nationality is not available in our data.

[6] These results are available upon request.

TABLE 3.—IMPACT OF IMMIGRANT INFLOWS ON UNEMPLOYMENT, 1986–1989[a]

Independent Variable	1986	1987	1988	1989
Counties				
Gross foreign inflow from abroad	−0.30	0.22	0.39	0.33[b]
	(0.30)	(0.27)	(0.22)	(0.08)
Gross foreign inflow from Germany	−0.42	0.03	0.16	0.57
	(0.32)	(0.34)	(0.39)	(0.37)
Gross foreign outflow abroad	0.17	−0.66	−0.56	−0.24
	(0.35)	(0.34)	(0.29)	(0.16)
Gross foreign outflow to Germany	0.35	−0.10	−0.44	−0.38
	(0.30)	(0.29)	(0.27)	(0.20)
R^2	0.973	0.975	0.973	0.948
Net foreign inflow from abroad	−0.27	0.10	0.27	0.39[b]
	(0.30)	(0.26)	(0.21)	(0.07)
Net foreign inflow from Germany	−0.31	0.03	0.39	0.58[b]
	(0.30)	(0.30)	(0.28)	(0.17)
R^2	0.973	0.975	0.973	0.947
Labor Market Regions				
Net foreign inflow from abroad	−0.17	−0.04	0.42	0.24
	(0.53)	(0.46)	(0.25)	(0.19)
Net foreign inflow from Germany	0.31	0.67	0.56	0.48
	(0.56)	(0.44)	(0.34)	(0.25)
R^2	0.980	0.980	0.985	0.957

Notes: All models estimated by OLS. Dependent variable is the unemployment rate. Regressions also include a constant, the lagged unemployment rate, 4/2 variables for gross/net native flows of the respective year (top/bottom panels), 12 industry shares, 2 dummies for missing industries, the share of highly qualified workers, the share of unqualified workers, the share of workers over age 55, the share of part-time workers, the share of female workers, the logarithm of population density, and the ratio of the population aged 15–64 to the total population. All regressors except lagged unemployment and native flows refer to 1985. Top reports regressions for 328 counties, bottom for 167 labor market regions.

[a] White standard errors are in parentheses.

[b] Significant at the 5% level.

B. Immigrant Inflows

Because the change in the foreign share captures many changes in the composition of the foreign population other than immigration, we also analyze immigration flows and regional migration flows directly. We only study the impact of migration flows on unemployment. The regressions are again based on equation (6) and are analogous to the previous table with one difference. Covariates except for the flow variables are from 1985 since these variables are not available for other years. Because we cannot aggregate domestic gross flow data to the level of labor market regions, we present more detailed results for counties as well.

Since we have annual flow data available for the period of our study, we present results for each year from 1986 to 1989 in table 3. 1986 is the first year we can use since county-level unemployment rates are available only from 1985 and we include the lagged unemployment rate. The upper part shows results for counties using gross flows. The coefficients switch signs throughout the table and are all small and mostly insignificant. The flow data are measured per resident (not per 1000 residents, as in table 2), and the dependent variable is measured as a ratio (not in percent), so that the scale of the coefficients is the same as in the previous tables. For example, the coefficient on gross foreign inflows from abroad for 1988, which is 0.39, implies that doubling the rate of such inflows from its mean of 6.1 per 1000 residents

TABLE 4.—NATIVE MIGRATION AND IMMIGRANT INFLOWS, 1987[a]

Independent Variable	Counties				Labor Market Regions
	Gross Native Domestic Inflow	Gross Native Domestic Outflow	Net Native Domestic Inflow	Net Native Domestic Inflow	Net Native Domestic Inflow, LMR
Gross foreign inflow from abroad	0.49 (0.33)	−0.64 (0.58)	1.14[b] (0.44)	—	—
Gross foreign inflow from Germany	2.24[b] (0.64)	0.56 (1.09)	1.67[b] (0.77)	—	—
Gross foreign outflow abroad	0.09 (0.39)	1.13 (0.58)	−1.04[b] (0.45)	—	—
Gross foreign outflow to Germany	−0.63 (0.39)	0.96 (0.98)	−1.57[b] (0.78)	—	—
Net foreign inflow from abroad	—	—	—	1.17[b] (0.43)	1.22[b] (0.22)
Net foreign inflow from Germany	—	—	—	1.57[b] (0.78)	1.16[b] (0.57)
R^2	0.426	0.414	0.331	0.328	0.354

Notes: All models estimated by OLS. Regressions also include a constant, the unemployment rate, the logarithm of the manufacturing wage, the foreign share and the foreign share squared, the logarithm of population density (all these variables are for 1985), a dummy for "Kreisstadt" (not included for LMRs). Top reports regressions for 328 counties, bottom for counties/167 labor market regions.

[a] White standard errors are in parentheses.

[b] Significant at the 5% level.

results in an increase of the unemployment rate by 0.2 percentage point.

We find the same pattern (or rather the absence thereof) in the lower part of table 3 for net flows into counties and labor market regions. Using gross foreign flows for the labor market regions did not yield different results. Coefficients for the migration of Germans, which would include ethnic German immigrants, are equally small and insignificant in these regressions. The only significant effects occur for 1989, and they are only significant for the counties, not for the labor market regions. 1989 may be somewhat atypical because of the large inflow of ethnic Germans in that year. Many of them are housed in a few camps upon arrival. Since their status is often not ascertained immediately when entering the country, they are often first admitted as "foreigners" and later reclassified as Germans. Counties with arrival camps for ethnic Germans therefore have typically large net inflows of foreigners and large net outflows of Germans, presumably referring to the same groups of immigrants. The coefficients on foreign flows are smaller and no longer significant when we eliminate nine counties with such arrival camps. In addition, about 400,000 East Germans entered the West in 1989.

C. Native Migration

The small effects of immigration on employment and unemployment rates we have found may result from migratory responses of natives to the immigration of foreigners. In table 4 we regress internal migration rates for Germans on contemporaneous migration flows for foreigners from abroad and from other regions in Germany. We show results only for 1987 since other years yielded similar findings. These regressions also include the following regressors for 1985: the unemployment rate in the region, the logarithm of the manufacturing wage, the foreign share and its square, the

logarithm of population density, and a dummy variable if the county is a single city (*Kreisstadt;* this variable is not included for labor market regions).

The top part of the table again analyzes counties. Concentrate for a moment on gross domestic inflows of Germans in the first column, presumably the group that could most easily adapt their location decision to the behavior of immigrants. However, gross in-migration seems to be to the same counties in which foreigners arrive. In particular, it is strongly related to in-migration of foreigners already residing in Germany. This indicates that what we are likely to observe in these regressions is that there are destinations that are attractive for both foreigners and Germans rather than possible displacement effects. Outflows of Germans have less of a relationship with foreign flows, but net flows of Germans remain positively related to inflows of foreigners and negatively to outflows. This is consistent with the hypothesis that there are certain attractive cities. The rightmost columns of the table corroborate this finding, using net flows of foreigners for counties and labor market regions.

If there are strong unobserved location-specific amenities attractive to both foreigners and natives, this will obscure any displacement effect foreign in-migration has on the arrival of natives. In the regressions in table 4 we have also included the foreign share in 1985 as a regressor. Arguably natives may not be affected by the stock of foreigners already living in a locality, but only by recent arrivals. In this case the foreign share in 1985 can be used as an instrument for the foreign inflow. If we drop the foreign inflow from Germany and the foreign share as covariates, the coefficient of net foreign inflows from abroad on net native domestic inflows falls to 0.72 (with a standard error of 0.24) using labor market regions. When we instrument the foreign inflow from abroad with the foreign share in 1985 and the foreign share squared, this coefficient becomes 0.63 (with a

standard error of 0.75). If the instrument is valid, there is little evidence that the foreign inflow is endogenous in these regressions.

In summary, we find no direct evidence that foreign immigration influences the migration pattern of natives. Thus the migration pattern of natives is unlikely to explain the absence of any effects of immigration on unemployment.

V. Summary and Conclusions

We have analyzed substitution effects between immigrants and natives across local labor markets in Germany. Accounting for the fact that there are dynamics in the unemployment rate or employment-to-population ratio that are correlated with the presence of foreigners in a region, our results consistently show that there is little evidence for displacement effects due to immigration. This is true in particular for unemployment rates. Our results are robust to immigrant self-selection as long as immigrants base their location decisions on past values of the dependent variable only. We then pursue the conjecture that this result may be due to the fact that migrant inflows affect native migration patterns, but we find no such effects. However, the interpretation of these regressions may be problematic since they do not adequately control for the simultaneity in the movement of foreigners and natives and local economic conditions.

Our results are in stark contrast to the findings of Winkelmann and Zimmermann (1993) and De New and Zimmermann (1994), who find higher unemployment and lower wages in industries with a higher share of foreigners. One difference between these studies and ours is that we analyze a boom period where unemployment rates were falling. Immigrant absorption might have been easier than in the 1982 recession, a period that the Winkelmann and Zimmermann study includes. In addition, participation rates of foreigners were lower during the period we study, so that a given number of immigrants translates into less labor market pressure. De New and Zimmermann separate blue- and white-collar workers. While they find negative wage effects only for blue-collar workers, this is only a very coarse indicator of skill, since there are many low-skilled white-collar service workers. Furthermore, their analysis is based on the levels of employment and wages while we have concentrated on changes in these variables as well as immigrant flows. We also suspect that the results of Winkelmann and Zimmermann (1993) and De New and Zimmermann (1994) are likely to reflect the fact that guest workers entered booming manufacturing sectors in the 1960s, which started to decline in the late 1970s and 1980s, the period they study. Instrumenting the foreign share by industry dummies or industry trends, as in De New and Zimmermann, will not remove this problem. Our results more closely resemble those of Hatzius (1994) and Velling (1995), who use a very similar methodology to ours to analyze regional data.

REFERENCES

Altonji, Joseph G., and David Card, "The Effect of Immigration on the Labor Market Outcomes of Less-Skilled Natives," in John M. Abowd and Richard B. Freeman (eds.), *Immigration, Trade and the Labor Market* (Chicago, IL: University of Chicago Press, 1991).
Bartel, Ann P., "Where Do the New U.S. Immigrants Live?," *Journal of Labor Economics* 7 (1989), 371–391.
Borjas, George J., *Friends or Strangers. The Impact of Immigrants on the U.S. Economy* (New York: Basic Books, 1990).
——— "The Economics of Immigration," *Journal of Economic Literature* 32 (1994), 1667–1717.
Bundesforschungsanstalt für Landeskunde und Raumordnung, "Laufende Raumbeobachtung: Aktuelle Daten zur Entwicklung der Städte, Kreise und Gemeinden 1989/90," *Materialien zur Raumentwicklung* no. 47 (Bonn, Germany: BfLR, 1992).
Butcher, Kristin F., and David Card, "Immigration and Wages: Evidence from the 1980s," *American Economic Review Papers and Proceedings* 81 (1991), 292–296.
Card, David, "The Impact of the Mariel Boatlift on the Miami Labor Market," *Industrial and Labor Relations Review* 43 (1990), 245–257.
Chiswick, Barry R., "Review of *Immigration, Trade and the Labor Market* by Abowd and Freeman," *Journal of Economic Literature* 30 (1992), 212–213.
——— "Review of *Immigration and the Work Force: Economic Consequences for the United States and Source Areas* by Borjas and Freeman," *Journal of Economic Literature* 31 (1993), 910–911.
Decressin, Jörg, and Antonio Fatás, "Regional Labor Market Dynamics in Europe," *European Economic Review* 39 (1995), 1627–1655.
De New, John P., and Klaus F. Zimmermann, "Native Wage Impacts of Foreign Labor: A Random Effects Panel Analysis," *Journal of Population Economics* 7 (1994), 177–192.
Eckey, Hans Friedrich, and Paul Klemmer, "Neuabgrenzung von Arbeitsmarktregionen für die Zwecke der regionalen Wirtschaftspolitik," *Informationen zur Raumentwicklung* 9/10 (1991), 569–577.
Filer, Randall K., "The Effect of Immigrant Arrivals on Migratory Patterns of Native Workers," in George J. Borjas and Richard B. Freeman (eds.), *Immigration and the Work Force: Economic Consequences for the United States and Source Areas* (Chicago, IL: University of Chicago Press, 1992).
Friedberg, Rachel M., and Jennifer Hunt, "The Impact of Immigrants on Host Country Wages, Employment and Growth," *Journal of Economic Perspectives* 9 (1995), 23–44.
Greenwood, Michael J., and John M. McDowell, "The Factor Market Consequences of U.S. Immigration," *Journal of Economic Literature* 24 (1986), 1738–1772.
Grossman, Jean, "The Substitutability of Natives and Immigrants in Production," this REVIEW 43 (1982), 245–258.
Hatzius, Jan, "The Unemployment and Earnings Effect of German Immigration," mimeo, Merton College, Oxford University (1994).
Hunt, Jenny, "The Impact of the 1962 Repatriates from Algeria on the French Labor Market," *Industrial and Labor Relations Review* 45 (1992), 556–572.
LaLonde, Robert J., and Robert H. Topel, "Labor Market Adjustments to Increased Immigration," in John M. Abowd and Richard B. Freeman (eds.), *Immigration, Trade and the Labor Market* (Chicago, IL: University of Chicago Press, 1991).
Schmidt, Christoph M., "Country-of-Origin Differences in the Earnings of German Immigrants," *Münchener Wirtschaftswissenschaftliche Beiträge* 92–29, (1992).
Schmidt, Christoph M., Anette Stilz, and Klaus F. Zimmermann, "Mass Migration, Unions, and Government Intervention," *Journal of Public Economics* 55 (1994), 185–201.
Simon, Julian L., Stephen Moore, and Richard Sullivan, "The Effect of Immigration on Aggregate Native Unemployment: An Across-City Estimation," *Journal of Labor Research* 14 (1993), 299–316.
Velling, Johannes, *Immigration und Arbeitsmarkt—Eine empirische Analyse für die Bundesrepublik Deutschland* (Baden-Baden: Nomos Verlag, 1995).
Winkelmann, Rainer, and Klaus F. Zimmermann, "Ageing, Migration and Labour mobility," in P. Johnson and K. F. Zimmermann (eds.), *Labour Markets in an Ageing Europe* (Cambridge, UK: Cambridge University Press, 1993), 255–283.