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Characteristics and performance of East European migrants in Germany: What prospects for integration?

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FLOWENLA Discussion Paper

Characterisitcs and performance of East European migrants in Germany: What prospects for integration?

Dragos Radu *

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ABSTRACT

This paper analyses empirically the labour market performance of East European migrants in Germany. To this end it makes use of a large set of German administrative employment data provided by the Federal Labour Office.

Briefly summarised, the paper shows first, that the human capital composition of East-West flows of labour polarised towards the upper and the lower ends of the formal skills scale. Second, the trends in the occupational distribution of East European workers indicate that they have only restricted access to climb up the job ladder. Third, and building on this, the findings suggest that there are no assimilation effects - in terms of earnings and labour market characteristics - to be expected for the East Europeans who already entered employment in Germany. While there are no signs of direct labour market discrimination the paper finds strong evidence for East Europeans being discriminated against by „equal pay for equal work, but unequal work“.

Keywords: East-West Migration, EU-Enlargement, Human Capital, Earnings Functions, Discrimination

JEL code: F22, J31, J61, J79

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1 Introduction

The main topics of economic migration research might be categorised into three broad areas. A first one is related to microeconomic migration decision making. A second addresses the economic performance and the labour market integration of immigrant workers. Eventually, a third field is concerned with the impact of immigration on the host economy in terms of economic growth, employment or social security.

This paper belongs to the second strand of research. Its aim is to analyse empirically the labour market performance of East European migrants in Germany. To this end it makes use of a large set of German administrative employment data provided by the Federal Labour Office. The data were derived from the social security registers and cover a 1% random sample of all socially insured employees in Germany.

The novelty of the paper follows first from the level at which it tries to look at East-West labour migration, namely the individual level. Second, the paper attempts to use this dis-aggregated perspective to formulate some conclusions relevant for the labour market integration of East-West migrants after EU's eastward enlargement.

Two main features of the paper require a preliminary justification. First, why use microeconomic evidence for analysing migration patterns from Eastern Europe in the context of EU-enlargement? Second, why would Germany's immigration experience of the early 90s be relevant when trying to figure out possible outcomes of post-enlargement mobility?

A considerable amount of economic literature addressing the East-West migration of labour abounded in the first decade after the breakdown of the iron curtain. This literature started by looking at aggregate numbers and predicted potentials for huge inflows from Eastern Europe. After an initial stance that fed fears of mass migration, rather moderate predictions were stemming from the economists' forecasting exercises. The evidence showed that for the vast majority of the Central and East Europeans (CEEs) a "settlement into mobility" or migration remains still the exception.

Consequently a consensus arose, that after EU's eastward enlargement and the introduction of free movement of workers, the aggregate flows of labour from the new member states will be relatively small.[1]

[1]See [Brücker, Boeri 2000], [Schmidt, Fertig 2001] or [Straaubhaar 2002]. For a complementing view: [Sinn et al. 2001]. For reviews: [Fassmann, Münz 2002], [Alecke, Untiedt 2001], [Fertig 2001].

It has also been recognised that the EU-membership will not significantly change this mobility patterns (at least for most of the candidate countries) but will have rather a "preventing" effect: expectations of future positive developments in the home regions due to EU-accession will diminish the incentives to out-migrate.[2]

Thus, if at all, the effects of migration will be very small and mainly due to concentration into specific sectors or regions of destination. This brought about the need to change the perspective from the aggregate level of predicting overall flows to a better understanding of their skill-composition, of the possible timing and, of the integration patterns of prospective immigrants.

For the relevance of the limited analysis - imposed by data availability - to the case of Germany in the period 1988-95 the justification is twofold. On the one side, about 70% of the East-West flows of labour targeted Germany in the early 90s. On the other side, the period 1988-95 covers the "migrationist" shock from Eastern Europe which peaked in 1992 (see Figure 1). Recent forecasts leave little doubts that the shock provoked by enlargement will by far not reach the same magnitude in a similarly short period.

The remainder of the paper is organised as follows.

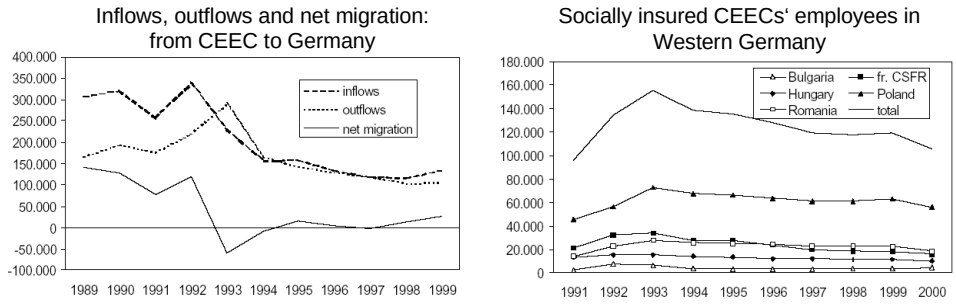
Section 2 briefly describes the theoretical approach used to look at the performance of immigrants as compared to natives in the host labour market. Section 3 presents the IABS data, the methodology applied in constructing new variables and eventually some descriptive statistics on foreign employees in Germany. Section 4 introduces the specifications and the results of estimating the wage equations and the standard and extended decompositions. Section 5 summarises the results and concludes by rising some policy-relevant aspects for the integration prospects of labour migrants from Eastern Europe.

2 Theoretical framework

2.1 The human capital approach

The theoretical foundation of the analysis undertaken in this paper is a simple human capital model such as that formalised by Eckstein, Weiss [2003 and 1998]. This model justifies the wage equations estimated for natives and immigrants and allows insights on the wage growth

[2]See e.g. [Kraus, Schwager 2003].



Source: *Hönekopp, Dietz 2002*, with data from the Federal Statistical Office and the Federal Labour Office

Figure 1: Migration flows and stocks of CEE employees in Germany

of the later.

One main feature of the model is the distinction between two ways in which immigrants can enhance their economic performance in the host labour market:

- improved job matching associated with a gradual climb up on the occupational ladder and thus with increasing the transferability of and the returns to imported skills;

- investment into local human capital through schooling, on the job training or learning by doing in the host labour market.

The aim of sketching this model is to stress the interplay between imported and locally accumulated human capital for the immigrants' catching-up with the labour market output of natives.

To this end, the human capital, K, is defined as the productive capacity of all skills an individual working in occupation j possesses:

$$K_j = F\left(\sum \theta_{sj} x_s\right), \tag{1}$$

whereby x_s is the quantity of skill s, $s = 1, 2...S$, θ_s $(\theta_s \geq 0)$ represents the "rate of return" (or "price") of skill s in the respective occupation

and $\frac{\partial F}{\partial x_s}, \frac{\partial F}{\partial \theta_s} > 0$.

In a frictionless economy with perfect information each individual i allocates his human capital into the occupation with the highest rewards to his vector of skills X_i (=

$(x_{i1}, x_{i2}...x_{iS})$). The earning capacity of individual i in occupation j is:

$$Y_{ij} = R \cdot K_{ij} \tag{2}$$

where R is the market determined rental rate of human capital.

Given that the occupational assignments are the outcome of a two sided search process[3], in the presence of frictions and asymmetric information the immigrants are most likely to first enter jobs that do not fit their skills well. After this initial occupational downgrading immigrants will gradually climb up the occupational ladder due to improved information and thus better matching and higher returns to imported human capital.[4]

Immigrants vary in their schooling endowments and jobs differ in their minimal skill (schooling) requirements. Assuming that upon arrival employers convert S_2 years of schooling in the home country into S^* equivalent natives' years of schooling, if a job J_1 requires S_1, S^* must exceed S_1 in order to the immigrant to receive the job offer. Thus, whereas a worker falling beneath the threshold of minimal schooling requirements will not obtain the job, a worker with more than the minimum schooling will produce the same output and receive the same wage as if he would posses just the required minimum.

The decision of an immigrant worker to accept a job offer depends on his reservation rule and the (exogenous) speed with which he receives offers. In the presence of frictions he will not wait for an offer perfectly fitting his skills, but accept one under his qualifications: facing therefore a "skill-waste" (Fig.2). [Weiss et al. 2000] put the "loss of skill" in a dynamic context by capturing the gradual ascent on the occupational ladder.

Along with this appreciation of the skills already acquired in the home country, an immigrant might decide to augment his human capital by investing in local skills. For describing this investment decision the skills of immigrants are partitioned into two groups: imported, S_0, and locally accumulated, S_1 (by definition, natives do not possess imported skills).

$$\begin{cases} s \in S_0 \Rightarrow x_s = x_s(0), & \text{prices vary} \\ s \in S_1 \Rightarrow \theta_s = \theta_s(0), & \text{skills vary} \end{cases} \tag{3}$$

The amount of imported skills is fixed ($x_s(0)$) but their prices might vary, i.e. the value

[3] [Weiss 2000], [Weiss et al. 2000]

[4] [Schmidt 1992], uses a contract model as alternative to the human capital model for interpreting the earnings dynamics of immigrants.

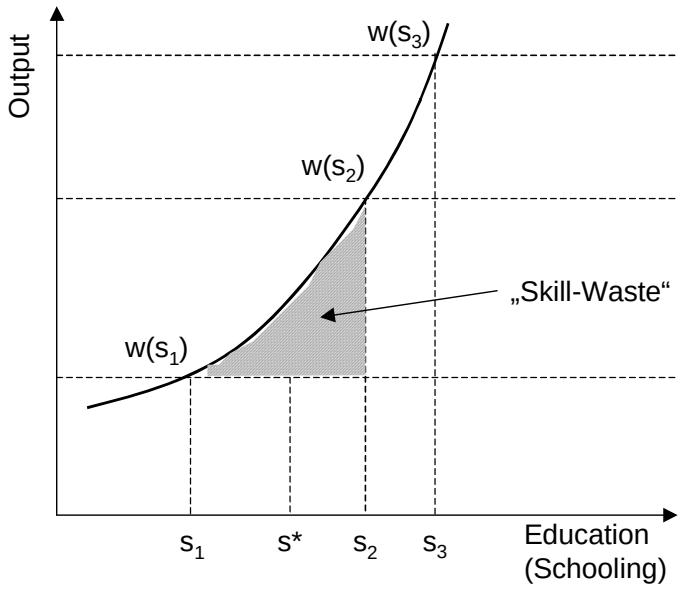


Figure 2: Output and wages as functions of schooling in different jobs (drawing on Weiss 2000)

of imported human capital (K_0) rises by rising returns to $x_s(0)$. While a price-taker in the case of local skills (for which returns are assumed to be exogenous) an immigrant can choose to upvalue his local human capital (K_1) and enhance his earning capacity by schooling or training on the job.

$$\begin{cases} K_0(t) = \exp(\sum\limits_{s \in S_0} \theta_s(t) x_s) \\ K_1(t) = \exp(\sum\limits_{s \in S_1} \theta_s x_s(t)) \end{cases} \tag{4}$$

2.2 The wage equation

For the statics of the above sketched model the existence of a semilogarithmic human capital production function is assumed. The standard form of Mincerian wage equations as applied by Chiswick [1978] is:

$$\ln W_i = \beta_1 X_i + \delta \cdot MIG_i + \beta_2 \cdot YSM_i + \beta_3 \cdot (YSM)_i^2 + \beta_4 \cdot COH_i + \varepsilon_i \tag{5}$$

whereby $\ln W_i$ refers to the logarithm of the wage earned by individual i, X_i is a vector of his socio-economic characteristics, MIG_i a set of dummy variables to capture the nationality

of i. YSM_i (years since migration) captures the effects of spending more time in the host labour market - economists usually call these assimilation effects - whereas COH_i captures the entry cohorts effects (not to be confused with births cohorts)

2.3 Wage differentials: discrimination or skills?

In order to assess the wage differentials between native German workers and CEE foreigners an Oaxaca Blinder decomposition is performed. The differential of observed mean wages for Germans and CEEs is:

$$\Delta = \ln \overline{W}_G - \ln \overline{W}_{EE} \tag{6}$$

where $\ln \overline{W}_G$ and $\ln \overline{W}_{EE}$ are the predicted mead (log) wages for Germans and CEEs respectively.

Using the estimated coefficients of the wage equations instead of the observed values (9) becomes:

$$\Delta = \widehat{\beta}_G \overline{X}_G - \widehat{\beta}_{EE} \overline{X}_{EE} \tag{7}$$

$\overline{X}$ are the mean vectors of wage determining variables (human capital variables) and $\widehat{\beta}$ the vectors of estimated returns to the wage determinants.

Through a simple algebraic reformulation (adding and subtracting $\widehat{\beta}_G \overline{X}_{EE}$) (10) could be written as:

$$\begin{aligned} \Delta &= \widehat{\beta}_G \overline{X}_G - \widehat{\beta}_G \overline{X}_{EE} + \widehat{\beta}_G \overline{X}_{EE} - \widehat{\beta}_{EE} \overline{X}_{EE} \\ &= \underbrace{\widehat{\beta}_G \cdot \left(\overline{X}_G - \overline{X}_{EE} \right)}_{\text{explained part (characteristics)}} + \underbrace{\left(\widehat{\beta}_G - \widehat{\beta}_{EE} \right) \cdot \overline{X}_{EE}}_{\text{unexplained part (coefficients)}} \end{aligned} \tag{8}$$

The first term on the right-hand-side represents the part of the wage differentials which is due to differences in qualifications. The second term reflects the differences in coefficients (in the literature it is often denoted as the discrimination or unexplained part[5]).

[5]This three denominations - discrimination, unexplained part and coefficients effect - are being used interchangeably here. However, describing the difference as the coefficients'

2.4 Extended decompositions: the "assimilation" dimension

The traditional Oaxaca specification ignores the effects of assimilation[6] processes on the immigrant wage gap: i.e. that the wage gap tends to decline over time. (See [Chiswick 1978], [Borjas 1987])

In (11), $\left(\widehat{\beta}_G - \widehat{\beta}_{EE}\right) \cdot \overline{X}_{EE}$, the estimated parameter vector for Germans $\widehat{\beta}_G$ does not include a parameter for the immigrants' specific variable YSM in (8).

Drawing on [Nielsen et al. 2001] the decomposition will be extended to include this effect. For doing this, two polar states are defined: (1) an "unassimilated" state defined for newly arrived immigrants, i.e. $YSM = 0$ and (2) an "assimilated" state supposed to capture the extent to which observed wage differences could be reduced as immigrants gain experience in the host country, i.e. $YSM \geq t$.

For both hypothetical states (*) (11) could be reformulated as:

$$\begin{aligned}
\Delta^* &= \widehat{\beta}_G \overline{X}_G - \widehat{\beta}_{EE} \overline{X}_{EE} \\
&= \widehat{\beta}_G \cdot \overline{X}_G - \widehat{\beta}_G \cdot \overline{X}_{EE} + \widehat{\beta}_G \cdot \overline{X}_{EE} - \widehat{\beta}_{EE} \cdot \overline{X}_{EE} \\
&= \widehat{\beta}_G \cdot \overline{X}_G - \widehat{\beta}_G \cdot \overline{X^*}_{EE} + \widehat{\beta}_G \cdot \overline{X^*}_{EE} - \widehat{\beta}_{EE} \cdot \overline{X^*}_{EE} + \\
&\quad + \widehat{\beta}_{EE} \cdot \overline{X^*}_{EE} - \widehat{\beta}_{EE} \cdot \overline{X}_{EE} \\
&= \underbrace{\widehat{\beta}_G \cdot (\overline{X}_G - \overline{X^*}_{EE})}_{\Delta \text{ due to skills in (*)}} + \underbrace{(\widehat{\beta}_G - \widehat{\beta}_{EE}) \cdot \overline{X^*}_{EE}}_{\text{unexplained } \Delta \text{ in (*)}} + \underbrace{\widehat{\beta}_{EE} \cdot (\overline{X}^*_{EE} - \overline{X}_{EE})}_{\Delta \text{ assimilation in (*)}}
\end{aligned} \tag{9}$$

The first term on the right-hand measures the effect of differences in human capital characteristics between native and a sample of unassimilated (assimilated) immigrants. The second term captures the coefficients effects respectively for the two states. The third term measures the effects of assimilation, i.e. differences in the characteristics of the unassimilated (assimilated) and the observed sample of immigrants.

Chiswick's seminal approach has been criticised most prominently by [Borjas 1987] for not taking into account the changing quality of entry cohorts. One alternative to take these cohorts' quality into consideration would be the following reformulation of (11):

(price) effects is obviously the most rigorous alternative.

[6] Assimilation is to be understood here strictly in the sense used in the economic literature: increasingly similar pay to equal characteristics and, increasingly similar characteristics. Confront [Brubaker 2001] for a discussion of arguments in favour of this concept.

$$
\begin{aligned}
\Delta^* &= \widehat{\beta}_G \overline{X}_G - \widehat{\beta}_{EE} \overline{X}_{EE} \\
&= \widehat{\beta}_G \cdot \overline{X}_G - \widehat{\beta}_G \cdot \overline{X^*}_{EE} + \widehat{\beta}_G \cdot \overline{X^*}_{EE} - \widehat{\beta^*}_{EE} \cdot \overline{X^*}_{EE} + \\
&\quad + \widehat{\beta^*}_{EE} \cdot \overline{X^*}_{EE} - \widehat{\beta}_{EE} \cdot \overline{X^*}_{EE} + \widehat{\beta}_{EE} \cdot \overline{X^*}_{EE} - \widehat{\beta}_{EE} \overline{X}_{EE} \\
&= \underbrace{\widehat{\beta}_G \cdot (\overline{X}_G - \overline{X^*}_{EE})}_{\Delta \text{ skills in (*)}} + \underbrace{(\widehat{\beta}_G - \widehat{\beta^*}_{EE}) \cdot \overline{X^*}_{EE}}_{\text{unexplained } \Delta \text{ in (*)}} + \\
&\quad + \underbrace{(\widehat{\beta^*}_{EE} - \widehat{\beta}_{EE}) \cdot \overline{X^*}_{EE}}_{\Delta \text{ assimilation in (*)}} + \underbrace{\widehat{\beta}_{EE} \cdot (\overline{X^*}_{EE} - \overline{X}_{EE})}_{\Delta \text{ cohort quality in (*)}} \qquad (10)
\end{aligned}
$$

The assimilation effect is defined here in terms of different returns to similar human capital characteristics of the unassimilated (assimilated) immigrants and the observed immigrants. The last term on the right hand captures the differences in human capital characteristics between immigrants in the different states (1 or 2) and the observed sample of existing immigrants.

3 Data set and descriptive statistics

3.1 The IABS data

Due to its sample size, the included socio-economic characteristics and its panel-similar structure the IAB employment subsample (IABS) is a unique source of microdata fitting the aims of the present paper.

The IABS data are derived from the notifying procedure for health insurance, statutory pension schemes and unemployment insurance in Germany. For the 21 years covered it contains 7,847,553 notifications for 559,540 persons[7]. It covers 1% of all employees registered by the social insurance system - representing nearly 80% of all employed persons in Western Germany.

The information at individual level includes: a person's identification code, the person's gender, year of birth, education, occupational status, job content and wages.

Due to the procedure by which the IABS data are generated, for a person included in the sample accurate daily information on its employment status and socio-economic charac-

[7] [Bender et al 2000]

teristics are in principle available for the whole period of active participation in the German labour market.

The wage variable in the IABS - measuring gross labour income per day - is censored from above. This results from the upper limit for wages to which contributions to social security are paid proportionally.

After the anonymisation procedure[8], from a total of 188 nationalities originally found in the sample the nationality variable of the IABS shows nine nationalities and seven aggregated nationality groups.

The variable for education classifies the achieved schooling and vocational training into eight categories. An occupational code delivers details on the job contents and covers 334 occupations. The variable for occupational status differentiates first between full employment and two categories of part-time employment. In case of full-time employment the variable differentiates between the categories of "apprentice, trainee, student trainee", "unskilled workers", "master, craftsman, foreman", "salaried employee" and "outworker" (see [Bender et al. 1996] and [Bender et al. 2000]).

Besides the richness of information on socio-economic and demographic characteristics one further advantage of the IABS over survey-data is the reliability of administrative data.

Apart from the censoring of the wage variable, two other major disadvantages arise when using the IABS for migration research. First, due to the anonymisation procedure, some of the nationalities are shown only as aggregated nationality groups - so that it is not possible to differentiate e.g. between CEE-countries of origin. Second, there is no indication in the data on the time spent in Germany by foreigners after they entered the country.

There are until now only few studies using the IABS data for migration reseach and none trying to analyse explicitly the relatively small and heterogenous group of CEEs.

[Bauer et al. 2002] used the IABS data to assess the economic performance of Portuguese migrants in the German labour market. They matched the IABS with Portuguese data in order to look at the self-selectivity of guest-workers' migration.

[Bauer 1998] uses cross-sectional data from the IABS to analyse the long term effects of immigration on wages in Germany. He specifies a translog-production function and a system of wage equations and finds only marginal income-effects of immigration.

[8]Details on the anonymisation are given by [Bender et al. 1996].

[Wolburg 1996] and [Wolter, Wolburg 1996] used the IABS for examining empirically how the qualification level of foreign employees in Germany changes over time.

[Bender, Seifert 1996] searched on grounds of the IABS the effects of ethnicity and gender on the employment opportunities and performance of foreigners in Germany.

[Velling 1995] used IABS data for analysing the labour market discrimination of foreigners in Germany. More recently, [Brücker, Trübswetter 2003] used the the regional file of the IABs for a refined analysis of German-German East-West migration.

Equivalent sources of administrative data (stemming from social security registers) have been employed in other EU countries for migration research. [Pacelli et at. 2002], [Venturini Villosio 1998], and [Venturini, Villosio 2001] used an analogical data set to the IABS for Italy (Italian Social Security Institute).

3.2 The constructed data set

For the present analysis a set of data has been extracted from the IABS to cover the years 1988 to 1995.

The characteristics of the re-coded and generated variables for the extracted data are shown in Table 1.

The main shortcoming of using the IABS for migration research is that it does not allow to depict the "migration histories" of foreign workers. This is because it contains no indication on the point of time when foreigners enter Germany. However one could seek out the year of the first spell in the IABS for each foreign worker and generate thus a variable to control for "experience in the German labour market" (i.e. the years spent as a socially insured employee).

This is not to be put on a par with the "Years Since Migration" (YSM) variable usually deployed in assimilation studies: it is impossible to capture from the IABS the time spent in Germany before being recorded by the German social insurance system; i.e. periods after arrival when the migrant was either not participating in the labour market, or marginally employed (geringfügig beschäftigt), or self-employed.

There are nevertheless some arguments to hypothesise that the "experience in the German labour market" variable is a rather good proxy for YSM in the case of CEE-employees. For the vast majority of the CEEs working in Germany it is unlikely that they had other revenues before becoming socially insured employees: (i) they were not entitled to receive

social benefits (exceptions are the aussiedler, but they would not appear later on as CEEs employees in the IABS, and some retirees from Eastern Europe whose claims for pensions were recognised in the early 90s, but, again, they are unlikely to have entered employment afterwards); (ii) it is implausible that CEE-employees in the IABS were previously self-employed or entered Germany as entrepreneurs, since usually they were not allowed to[9]; (iii) in the absence of other sources of income (e.g. families) longer periods of part-time employment as geringfügig beschäftigt should have been rather the exception for CEEs.[10]

3.3 Characteristics of foreign employees in the IABS

The shares of CEE workers in the total number of employees covered by the IABS were calculated, using the extracted cross-sections, for the first of each month. Figure 3 shows the evolution of these shares - compared to those of Portuguese and of Italian workers. Similarly to the trends observable in the aggregate data - Figure 1 - the results confirm a rapid inflow of CEEs in 1990-92 followed by a stabilisation of the stock of CEEs in the IABS at about 0.7% of all employees. The share of CEEs figures out comparatively large fluctuations which might be explained by seasonal employment.

Table 2 shows the descriptive statistics for the cross-sections of May 1989, ,1992, and 1995.

The difference in the average monthly wages between Germans and CEEs grows from about 15% 1989 to 24% in 1992 and declines to about 17% 1995. CEE workers also appear to be on average 3 years younger than Germans and to have a relatively similar distribution of their employers' size. In 1995 a larger share of CEEs is employed in small and medium size firms compared to Germans.

The occupational distribution of CEE workers in 1989 is similar to that of native Germans although there are proportionally less CEEs in white collar jobs. This is striking given the substantially higher proportions of CEEs with higher education. The occupational dis-

[9]This is slowly changing due to the ECJ case law on the interpretation of the Europe-Agreements provisions on the right of establishment. For details, Bruha in [Straubhaar et al 2002].

[10]A further alternative would be the niches in the informal labour market. Besides regular employment, or as a continuation of this (temporary or project-tied workers who choose not to return) numerous CEEs worked illegally for different periods of time. Given that Germany had not regularised illegals, the number of those entering regular employment after illegality might be negligible as well.

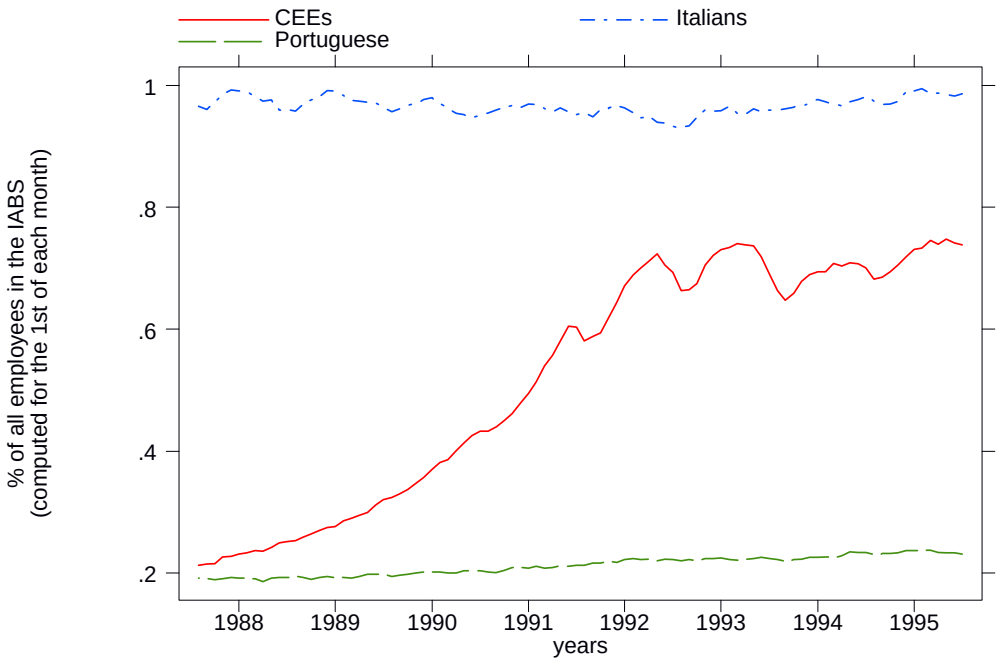


Figure 3: Relative shares of selected foreign employees in the IABS (own calculation, IABS data)

tribution becomes even less favourable for CEEs later on, which indicates that the formal skills acquired in Eastern Europe is less transferable or that due to information asymmetries CEE workers were not able to climb up the occupational ladder.

This restricted access to higher occupational positions for CEEs is confirmed in Tables 3 and 4 where the occupational status and the level of achieved education are cross-tabulated for Germans and five other nationality groups.

4 Empirical implementation

Two alternative methods are usually employed in the empirical literature in order to compare the earnings attainment of immigrant workers to that of natives:

(i) Either the estimation of a single wage equation for both natives and foreigners specifying dummy variables for each nationality group;

(ii) Or the estimation of separate functions for each nationality group with the estimated parameters of the different groups being then used to perform Oaxaca-Blinder-type decompositions.

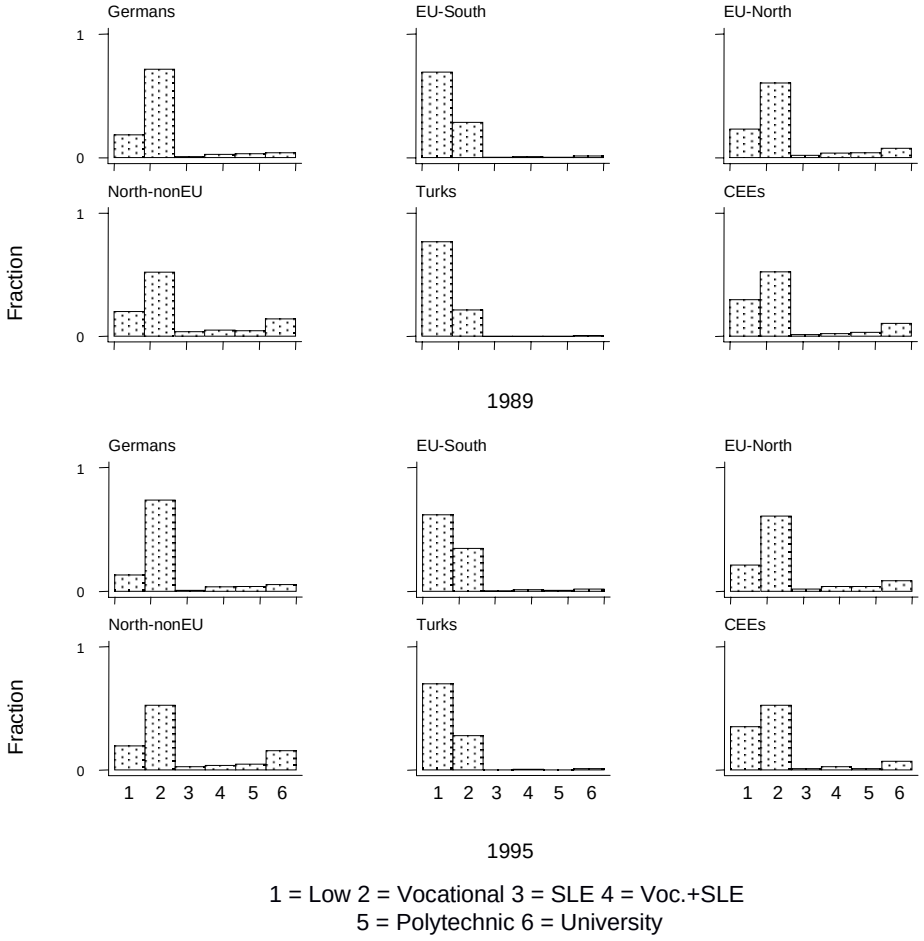


Figure 4: Achieved level of education: distribution by nationality groups 1989 and 1992 (own calculation, IABS data)

The cross-sectional data extracted from the IABS will be used for both estimation alternatives. In a first step, a statistical wage equation will be estimated with the functional form given by:

$$\begin{aligned}\ln[\text{wage}] &= \beta_i \cdot (\sum_{i=1}^{5} NATIONALITY) + \beta_{5+j} \cdot (\sum_{j=1}^{5} EDUCATION) + \\ &+\beta_{11} \cdot age + \beta_{12} \cdot age^2 + \beta_{12+k} \cdot (\sum_{k=1}^{3} OCCUPATION) + \\ &+\beta_{15+l} \cdot (\sum_{l=1}^{19} SECTOR) + \beta_{34+m} \cdot (\sum_{m=1}^{4} FIRMSIZE) + k + \varepsilon \qquad (11)\end{aligned}$$

In a second step, separate wage equations will be estimated for Germans and CEEs. The form of these equations will be given by:

$$\begin{aligned}\ln[\text{wage}] &= \beta_i \cdot (\sum_{i=1}^{5} EDUCATION) + \beta_6 \cdot age + \beta_7 \cdot age^2 + \beta_8 \cdot experice + \\ &+\beta_9 \cdot experice^2 + \beta_{10} \cdot tenure + \beta_{11} \cdot tenure^2 + \\ &+\beta_{11+k} \cdot (\sum_{j=1}^{3} OCCUPATION) + \beta_{14+l} \cdot (\sum_{k=1}^{19} SECTOR) + \\ &+\beta_{33+m} \cdot (\sum_{l=1}^{4} FIRMSIZE) + k + \varepsilon \qquad (12)\end{aligned}$$

For the categorical variables (written in capital letters) sets of dummy variables were introduced to capture the categories described in Table 1. The lowest categories of these variables were used for constructing the reference groups, i.e. German nationals with low education, working as Blue Collar1 in the construction sector and in firms smaller than 10 employees.

Tobit models[11] were used for the estimations, since the wage variable in the IABS is censored from above, usually at 300 DM.

In order to have a proper measure of fit for the Tobit models, a pseudo-$R^2$is computed using the McKelvey-Zavoina[12] method. Veall and Zimmermann [1994 and 1996] showed that for models with censoring McKelvey-Zavoina's-$R^2$is the single best choice under the comparability criterion - i.e. the closest predictor of what OLS-R^2would be on uncensored

[11]See [Amemiya 1984] for a survey on Tobit models.
[12][McKelvey, Zavoina 1975].

data - and thus preferable to the common McFadden-R^2.[13]

4.1 Wage equations

The estimates for equation (14) are reported in Table 5.

Confirming the results of other investigations on how foreign workers are performing in the German labour market (e.g. Schmidt 1994, Constant, Massey 2003...) the estimation reveals that no statistically significant discrimination can be measured against foreign workers in Germany: all the estimated dummy parameters for the nationality variable are positive in sign and statistically significant. Thus, the results demonstrate on the contrary that foreign workers realise earnings advantages (to some extent depending on the nationality group) over Germans with a similar vector of observable skills.

For the period under investigation all the estimated parameters are stable in sign, excepting the constant term. Particularly for the case of foreign workers this variation could be explained due to changes in their endowments with unobserved human capital: the constant of the estimated equation captures in average the effects of unobservable skills on wages. This aspect will be detailed by decomposing the wage differentials (Section 5.2).

Tables 6, 7 and 8 show the results of estimating separate wage equations for Germans and CEEs in 1989, 92 and 95 respectively.

Both for Germans and for CEEs the coefficients for the *Education* dummies are significant and stable in signs. The only exception are CEEs who possess School Leaving Examination (SLE) - which reveals to have no effect for their wages in Germany. An explanation for this might be the incomparability of the schooling systems in Germany and Eastern Europe. It is however worth noting that the significance level of the SLE variable is changing (decreasing) over time, i.e. an indication that an increasing number of CEE-employees entering the German labour market in the early 90s brought SLEs achieved in Eastern Europe and were by this unable to transfer their human capital.

The returns to ocupational status are similar for CEEs and Germans. The Blue Collar2 category shows a trend similar to that of SLE: whereas significant in 1989 it is hardly significant later on.

[13] For this paper the McKelvey-Zavoina-R^2has been computed using a Stata routine for fit statistcs. Details in: J. S. Long, J. Freese: "Scalar Measures of Fit for Regression Models", (http://fmwww.bc.edu/repec/bocode/f/fitstat.pdf)

Unlike age - which has significant and analogical coefficients for Germans and CEEs (positive coefficients for age and, as expected, negative and small for age squared) - the variables experience and tenure are not significant for the CEEs. Interestingly for the CEEs is that the variable experience is significant in the late '80s and becomes slightly significant towards the end of the investigated period too. This signals lacking assimilation effects for the earnings of immigrants in Germany. Numerous previous studies documented this lack of earnings assimilation on grounds of various data sources, e.g. [Lang 2001], [Constant, Massey 2003], [Pischke 1993], [Licht, Steiner 1994] with the GSOEP-data, [Granato, Kalter 2002] with the Mikrozensus, [Schmidt 1994] with ALLBUS data, etc.

4.2 Wage differentials

The Tobit-estimates of the wage equations for the two nationality groups, Germans and CEEs, are used in a first step to perform a simple Oaxaca-Blinder decomposition of the wage differentials. In a second step this decomposition will be augmented with assimilation and cohorts effects.

Because the labour income variable is censored, the wage differential between Germans and CEEs was calculated not using the observed wages in the IABS but using the estimated parameters of equation (15) for Germans and CEEs respectively.

The total (predicted) wage differential as well as its unexplained part derived from the Oaxaca decomposition for selected groups are presented in Table 9. Figure 6 shows the trends of the differentials for the 1988-95 period.

The average Germans appear to have had an income advantage bellow 10% over the average CEEs in the late 80s.[14] After 1989 this differential is first sharply growing -until 1991, and slowly decreasing afterwards. It seems to stabilise at about 15% in the mid 90s.

In the late 80s the wage differential shows to be equally attributable to both differences in observable and in unobservable skills. Later on most of the income advantage of native Germans is to be attributed solely to their better endowments with observable human capital. Thus, whereas for the first part of the period one could identify signs that CEE-workers were statistically discriminated against, after 1991, on contrary, the decomposition signals higher returns to similar skills for CEEs compared to Germans.

[14] [Bauer et al. 2002] found for the same period a similar 10% differential between Germans and Portuguese migrants.

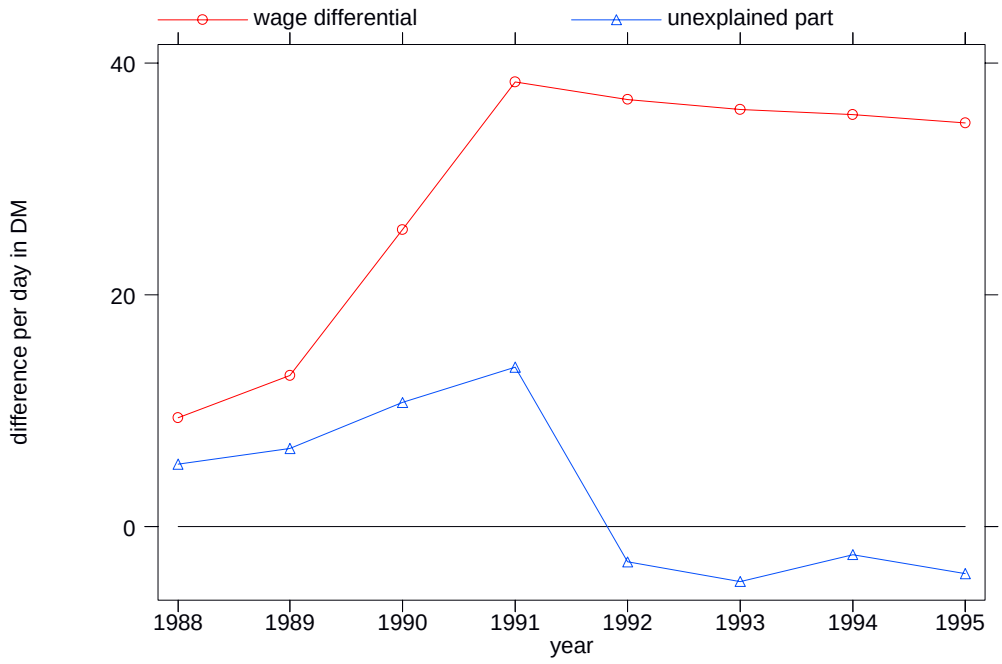


Figure 5: Wage differentials: total predicted and unexplained (own estimation, IABS data)

The unexplained part of the averaged wage differentials between Germans and CEEs has negative signs after 1991. One interpretation of this unexplained differential refers to a positive self-selection of CEE-workers with regard to unobservable human capital characteristics when compared to the average German workers. [Bauer et al. 2002, p. 488] suggest that even if it is impossible to control for working hours in the IABS - which might partly "explain" the unexplained part of the wage differential - this interpretation is still valid since the hours worked are not a human capital characteristic but rather a proxy for unobservable skills, like motivation.

Consistent with this view are the higher returns to unobservable skills - the negative signs for the unexplained part in Table 9 - for CEEs with an university degree or for those under 35 years of age, i.e. the usual suspects for having a higher motivation to work.

An interesting evolution is the declining trend of the income disadvantage for CEEs with a polytechnic degree. After being relatively high in the late 80s - about 15% - it becomes almost negligible and negative in sign by the mid 90s. Its unexplained part remains high and positive, signalling discrimination or lower unobservable and, simultaneously, better observable skills for CEEs compared to native Germans.

One additional alternative to look at the unexplained part of the wage differential is to construct age-earnings profiles for different groups, e.g. by education. Figures 6 and 7 show this profiles for the years 1989 and 95. The gap between the solid line (predicted wages of CEEs) and the dashed line (predicted wages of CEE-workers using the coefficients estimated for Germans) describes the unexplained part of the wage differentials (i.e. $\left(\widehat{\beta}_G - \widehat{\beta}_{EE}\right) \cdot \overline{X}_{EE}$ in (11)). A comparison of these distances for 1989 to those for 1995 reveals three features. First, the unexplained part of the wage differential in the case of CEEs with low education or vocational training remained relatively unchanged. Second, the gap tended to widen for CEEs with school leaving examination as well as for those with post-secondary vocational training. Third, the gap narrowed for both CEEs with a polytechnic and those with an university degree.

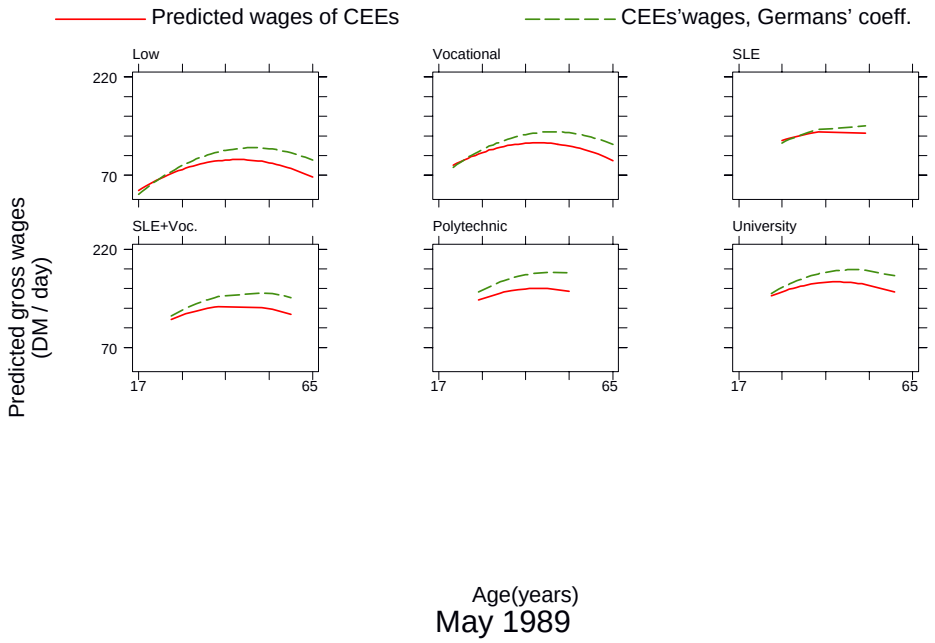


Fig.6: Age-earnings profiles 1989, by education

4.3 Extended decompositions

The results of estimating (12) and (13) for the whole period under investigation are presented in Figures 8 and 9.

The two hypothetical states introduced to capture the "assimilation" effects for CEE-workers (see 3.4) in terms of their labour market characteristics and returns are defined as

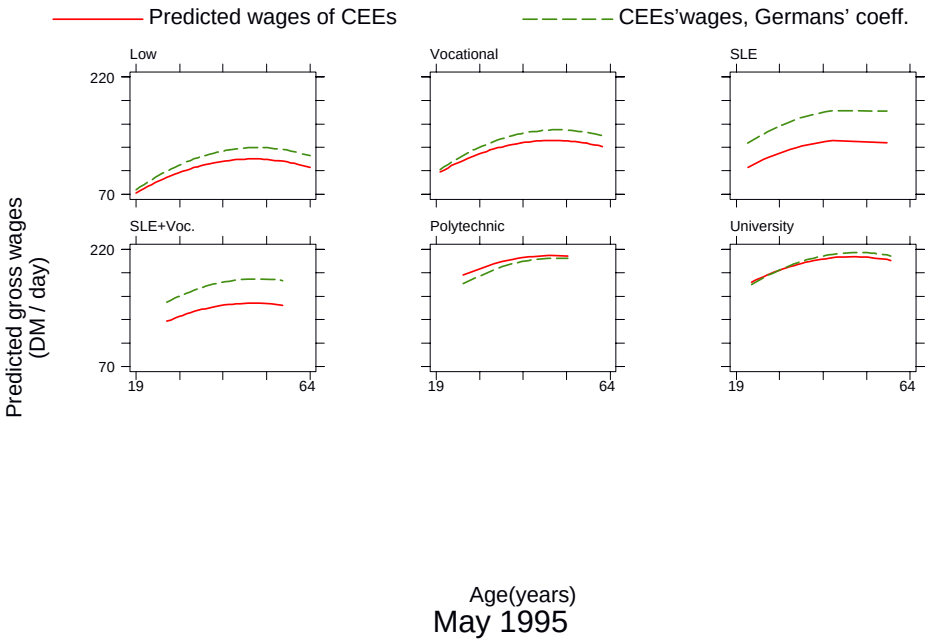


Figure 6: Age-earnings profiles 1995, by education

follows. The "unassimilated state" for the CEEs is defined as the state when they first enter the German labour market, i.e. when the *Experience* variable equals 0. The "assimilated state" is defined for those CEEs for which $Experience \geq 5$ years.

Figure 8 shows first that the over the whole period CEEs newly entering the German labour market have on average steadily declining qualifications (including education, age, sectoral distribution and access to higher positions on the occupational ladder) than native German workers (Δ skills unassimilated, corresponding to the first term on the right hand in (13)). Second, the unexplained part of the wage differential between new entrants from Eastern Europe and Germans is negative over the whole period and has a point of inflexion in 1991 (Δ unexplained unassimilated, corresponding to the second right-side term in (13)). This indicates the absence of discrimination against CEEs and confirms moreover their better endowments with unobservable human capital. Third, the difference between the wages of unassimilated CEEs and the observed sample of CEEs in the IABS is fluctuating around negligible values (Δ assimilation unassimilated, corresponding to the third term in (13)). As expected, this confirms the documented lack of assimilation to be expected by East-Europeans entering the German labour market in the 90s. Eventually, the results also

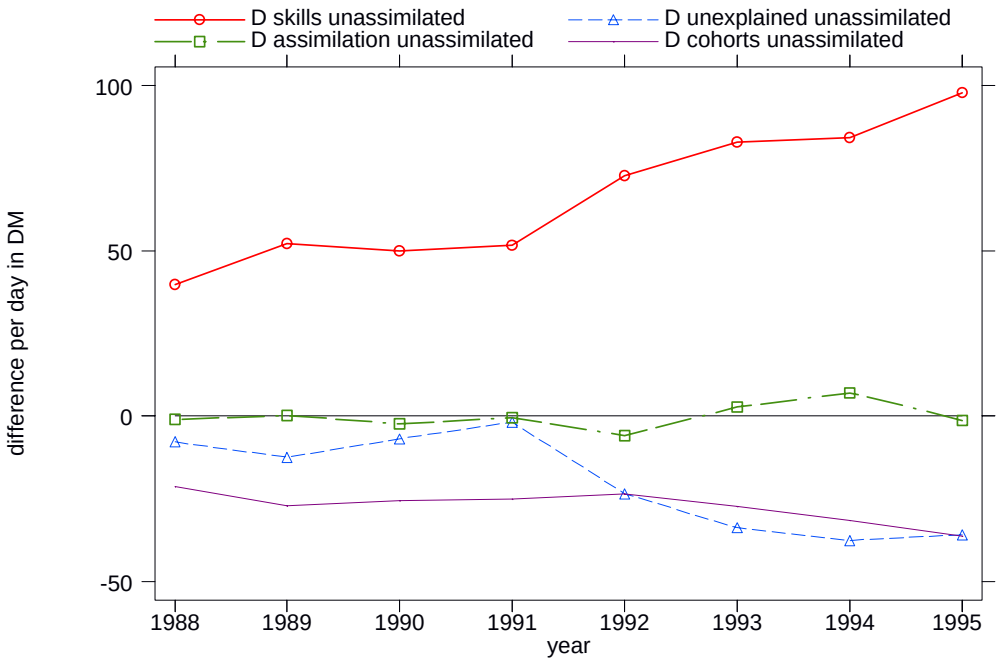


Figure 7: Predicted wage differentials - unassimilated state

confirm that the skills of the newly entered CEE-workers are constantly below those of their observed counterparts in the IABS (Δ cohorts unassimilated, last term on the right hand in (13)).

Figure 9 complements these findings with the results for CEEs who have been working in the German labour market for more than 5 years. The wage advantage for the CEEs over Germans determined by better observable skills (Δ skills assimilated) is small in the late 80 and vanishes after 93 - with a point of inflexion in 91 suggesting that CEEs entering the labour market after 1987 have constantly had lesser observable skills than native Germans. The changing values for the unexplained part of the wage differential suggest again that CEEs who entered employment after 1987 are not discriminated and positively self-selected with regard to unobservable skills. The differential between the wages of CEEs who already have more than 5 years experience and the wages of those observed in the IABS is negligible over the whole period: neither newly entered CEEs nor those present in the IABS have to expect assimilation effects as they gain experience in Germany. The gap between the observable skills of CEEs with more than 5 years experience and those of the whole sample reached a peak in the early 90s. This proves the declining quality of cohorts arriving after 1988, which

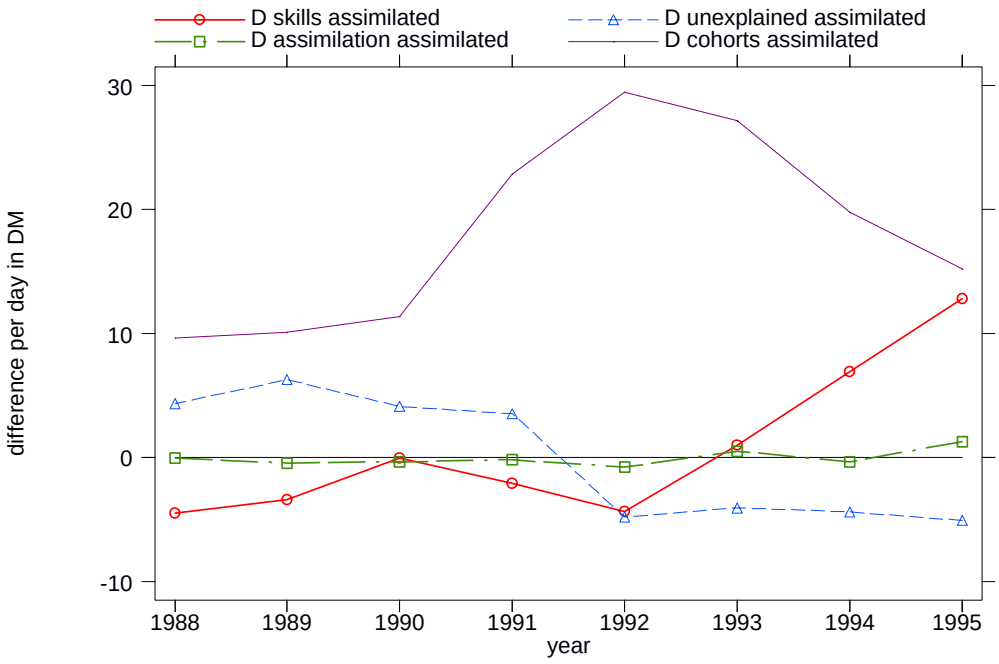


Figure 8: Predicted wage differentials - assimilated state

is afterwards equilibrating the relation between the skill composition of experienced CEEs and that of all CEEs working in Germany.

5 Conclusions

Using pooled cross-sections extracted form German administrative registers, this paper addressed two main sets of questions relevant for understanding the integration patterns of CEE migrants in the German labour market.

On the one side, how comparable are the CEE workers - in terms of personal characteristics, i.e. skills and employment opportunities - to their German counterparts?

On the other side, what explains the unequal performances of CEE workers, native Germans and other nationality groups in Germany? Do the differentials in human capital characteristics fully explain the wage gaps? What is the part of "coefficients" - i.e. diverse returns to these human capital characteristics - in explaining the differentials?

By means of descriptive statistics and cross-tabulations of variables on educational attainment and on employment status at individual level, the paper first finds the average

human capital endowment of CEE workers to be relatively similar to that of native Germans and to that of other EU-nationals employed in Germany too. However, the level of education of CEEs tends to be more polarised towards the lower and the upper ends of the distribution. The CEEs employed in Germany appear to be more highly educated than the traditional guest-workers but significantly lower than workers from industrialised non-EU countries (for the covered period these were mainly Austria and Switzerland). When controlling also for the occupational status a different picture emerges: a significant share of higher educated CEE migrants are trapped in occupations at the lower end of the job ladder. This "loss of skill" (in the US literature "glass ceiling" describes the persistent exclusion of women or specific minority groups from top-level jobs[15]) has various explanations, e.g. asymmetric information, limited cross-border transferability of skills or indirect discrimination of the type "unqual pay to equal work, but unequal work".

Through extending the standard decomposition analysis it was possible to shed more light on the factors explaining the wage differentials. First, the differences in characteristics (including occupation related variables) explain a large proportion of the wage gap. Second, there is no evidence of integration for CEEs into the German labour market (in terms of assimilating human capital characteristics and converging earnings).

Given the institutional characteristics of the German labour market (degree of unionisation, collective agreements, etc.) and the conditions under which East-West migration took place in the early nineties, this pattern is no news and unsurprising. However, from a policy perspective, it is one core criterion underlying the evaluation of immigration policies. Particularly in the aftermath of EU-enlargement the labour market integration of workers from CEE-countries will gain relevance. Since immigration policy measures will anyway be tied up, at least after the introduction of free movement for CEEs EU-policymakers will be forced to shift their discourses and actions from (immigration) policies about numbers and being applied at the borders to (integration) policies oriented towards the settled workers and which target inter alia the labour market (fostered transferability of foreign skills), the education of immigrants (mutual recognition of qualifications, incentives to invest into local human capital) and the general debates (acceptance of diversity in all strata of occupational hierarchies).

[15]Good for Business: Making Full Sense of the Nation's Human Capital, Report from the Glass Ceiling Commission, Department of Labor, 1995, Washington D.C.

Further research will be needed to refine the understanding of ethnicity and gender effects on the integration of specific immigrant groups. Such a comprehensive evaluation would be particularly rewarding for the case of East Europeans entering EU labour markets after the introduction of free movement. The reason therefor is that, given their mobility patterns - usually characterised by circular movements and repeat migration - their performance will sensitively react to policy changes expected to affect their integration prospects.

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Variable	Definition	Categories/ value label	
Original Variables:			
Wage	gross daily wages (in DM)	0 - 300 (censored from above)	
Education	level of achieved schooling	Low School Leaving Examination (SLE) Polytechnic	Vocational SLE+ Vocational University
Recoded Variables:			
Nationality	country of citizenship (6 out of 19 categories)	Germans Turks EU-North	CEEs EU-South North-non-EU
Occupational status	type of employment (4 out of 9 categories)	Blue collar 1 White collar 1	Blue collar 2 White collar 2
Sectors	industry /employment sector (20 out of approx. 100)	Construction Mining Energy Trade Transport Banking Wood, Paper Textiles, Leather Food, Tobacco Electro + Fine Mechanics	Agriculture Chemistry Metalworking Machinery Hotel Cleaning Education Health Civil Service Others
Firm size	number of employees (5 out of 10 categories)	<10 20-99 >500	10-19 100-499
Generated variables:			
Age	year - year of birth (16-65 years)		
Experience	time spent in the German labour market:year - year of first spell		
Tenure	time spent as employed with the same employee		

Table 1: Constructed data set with the IABS 75-95

	1989		1992		1995	
	Germans	CEEs	Germans	CEEs	Germans	CEEs
Observations	99395	439	129121	1157	125675	1187
Gross wages(DM/day)	132.677	112.781	141.584	115.741	157.807	133.712
Age	40.192	39.514	40.117	36.497	40.904	38.052
Experience (YSM)	-	7.022	-	4.369	-	6.339
Tenure	7.790	4.248	6.624	2.532	7.538	3.749
Education						
Low	18.55	29.61	14.54	36.99	13.08	35.21
Vocational	71.35	52.16	73.25	49.87	73.61	52.40
SLE	0.67	1.59	0.58	1.38	0.58	1.10
SLE + Voc.	2.55	2.73	3.00	3.20	3.48	3.12
Polytechnic	3.10	3.42	3.82	1.56	3.93	1.18
University	3.77	10.48	4.81	7.00	5.33	6.99
Total	100.00	100.00	100.00	100.00	100.00	100.00
Ocupational status						
Bl.collar1	21.63	39.28	19.27	50.21	18.39	46.87
Bl.collar2	27.12	21.44	28.90	24.77	28.33	25.62
Wh.collar.1	2.31	0.90	2.16	0.60	2.11	0.41
Wh.collar2	48.94	38.37	49.67	24.43	51.17	27.10
Total	100.00	100.00	100.00	100.00	100.00	100.00
Sector						
Construction	6.87	5.64	7.48	13.53	8.77	13.18
Agriculture	0.99	2.03	1.76	2.89	1.59	3.38
Energy	1.44	0.23	1.58	0.09	1.56	0.08
Mining	1.01	0.23	0.64	0.09	0.54	0.08
Chemistry	6.65	5.64	5.96	8.60	5.70	7.17
Metalworking	4.03	4.74	3.72	5.11	3.52	4.86
Machinery	11.57	9.93	10.95	9.02	10.11	8.65
El.+Fine Mech.	9.13	11.06	8.12	7.57	7.33	6.10
Wood, Paper	3.97	2.71	3.62	3.57	3.59	3.54
Textiles, Leather	2.16	3.61	1.60	2.98	1.28	2.22
Food, Tobacco	3.24	3.61	3.10	4.68	3.03	4.12
Trade	12.98	6.77	12.09	8.43	12.41	9.31
Transport	4.62	3.39	5.63	3.66	5.51	4.20
Banking	4.45	2.48	3.76	1.02	3.99	1.24
Hotel	2.86	8.58	2.82	7.66	3.04	8.15
Cleaning	1.10	0.90	1.08	1.53	1.15	1.40
Education	3.42	7.22	3.86	3.23	4.07	3.71
Health	5.20	8.13	5.14	6.55	5.40	6.75
Civil Services	8.80	6.09	10.91	3.49	10.33	5.27
Others	5.51	7.00	6.15	6.30	7.09	6.59
Total	100.00	100.00	100.00	100.00	100.00	100.00
Firmsize						
<10	15.77	14.00	14.10	16.94	15.27	18.78
10-19	8.70	8.80	8.28	11.91	9.33	12.03
20-99	21.96	25.06	22.83	30.30	24.98	30.15
100-499	23.52	22.12	24.91	21.36	24.80	20.59
>500	30.05	30.02	29.88	19.49	25.63	18.45
Total	100.00	100.00	100.00	100.00	100.00	100.00

Table 2: Summary statistics (own calculation with the IABS 7595)

	Blue-Collar1	Blue Collar2	White Collar1	White Collar2
Germans				
Low	62.54	8.72	4.69	5.71
Vocational	36.78	90.66	91.35	74.96
SLE	0.40	0.10	0.34	1.11
SLE+Voc.	0.20	0.41	1.71	4.69
Politechnic	0.03	0.08	1.43	6.06
University	0.04	0.03	0.48	7.47
Total	100.00	100.00	100.00	100.00
EU-South				
Low	90.77	31.01	14.29	13.75
Vocational	8.97	68.74	78.57	60.82
SLE	0.13	2.41	0.00	0.24
SLE+Voc.	0.13	0.00	0.00	4.81
Politechnic	0.00	0.00	0.00	4.81
University	0.00	0.00	7.14	13.40
Total	100.00	100.00	100.00	100.00
EU-North				
Low	66.34	11.06	3.13	7.18
Vocational	32.45	88.47	90.63	59.45
SLE	0.73	0.00	0.00	3.15
SLE+Voc.	0.00	0.24	3.13	7.30
Politechnic	0.24	0.24	3.13	7.56
University	0.24	0.00	0.00	15.37
Total	100.00	100.00	100.00	100.00
CEEs				
Low	65.32	7.45	0.00	5.95
Vocational	31.79	88.30	50.00	52.98
SLE	1.16	0.00	0.00	2.98
SLE+Voc.	1.16	3.19	25.00	3.57
Politechnic	0.00	0.00	0.00	8.93
University	0.58	1.06	25.00	25.60
Total	100.00	100.00	100.00	100.00
Turks				
Low	91.94	35.71	0.00	15.92
Vocational	7.75	63.96	100.00	56.22
SLE	0.18	0.00	0.00	2.99
SLE+Voc.	0.06	0.11	0.00	4.48
Politechnic	0.03	0.00	0.00	5.97
University	0.03	0.22	0.00	14.43
Total	100.00	100.00	100.00	100.00
North non-EU				
Low	67.12	15.09	0.00	7.94
Vocational	30.14	83.02	100.00	50.79
SLE	1.37	0.00	0.00	5.16
SLE+Voc.	1.37	1.89	0.00	7.14
Politechnic	0.00	0.00	0.00	7.14
University	0.00	0.00	0.00	21.83
Total	100.00	100.00	100.00	100.00

Table 3: Cross-tabulation of education and occupational status for 1989 (own calculation, IABS data)

	Blue Collar 1	Blue Collar 2	White Collar 1	White Collar 2
Germans				
Low	52.25	5.51	2.42	3.86
Vocational	46.81	93.54	89.84	71.64
SLE	0.34	0.12	0.46	0.91
SLE+Voc.	0.43	0.62	3.98	6.06
Politechnic	0.08	0.16	2.54	7.35
University	0.09	0.05	0.76	10.18
Total	100.00	100.00	100.00	100.00
EU-South				
Low	87.72	25.37	10.00	13.21
Vocational	11.73	74.01	75.00	65.15
SLE	0.30	0.12	0.00	1.82
SLE+Voc.	0.25	0.50	5.00	5.01
Politechnic	0.00	0.00	5.00	4.33
University	0.00	0.00	5.00	10.48
Total	100.00	100.00	100.00	100.00
EU-North				
Low	66.10	7.79	6.06	6.69
Vocational	33.47	91.39	87.88	58.66
SLE	0.21	0.00	0.00	2.94
SLE+Voc.	0.21	0.61	3.03	7.09
Politechnic	0.00	0.20	3.03	7.60
University	0.00	0.00	0.00	17.02
Total	100.00	100.00	100.00	100.00
CEEs				
Low	66.19	6.89	20.00	8.18
Vocational	31.48	90.16	60.00	52.83
SLE	0.54	0.66	0.00	2.52
SLE+Voc.	1.07	1.97	0.00	7.86
Politechnic	0.18	0.00	0.00	4.09
University	0.54	0.33	20.00	24.53
Total	100.00	100.00	100.00	100.00
Turks				
Low	89.06	28.69	12.50	12.47
Vocational	10.59	70.80	62.50	65.90
SLE	0.15	0.10	12.50	2.29
SLE+Voc.	0.12	0.31	0.00	5.34
Politechnic	0.03	0.10	12.50	3.56
University	0.06	0.00	0.00	10.43
Total	100.00	100.00	100.00	100.00
North non-EU				
Low	66.67	14.75	0.00	5.32
Vocational	29.17	81.97	100.00	53.90
SLE	4.17	1.64	0.00	2.84
SLE+Voc.	0.00	1.64	0.00	5.32
Politechnic	0.00	0.00	0.00	7.80
University	0.00	0.00	0.00	24.82
Total	100.00	100.00	100.00	100.00

Table 4: Cross-tabulation of education and occupational status for 1995 (own calculation, IABS data)

	1989		1992		1995	
	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio
Nationality						
EU-South	3.721443	6.06	6.127383	9.33	4.258779	5.58
EU-North	7.846587	9.21	13.27144	15.52	14.36403	14.96
North non-EU	7.921054	4.48	16.62347	9.28	18.80619	9.30
Turks	3.883892	7.08	5.00377	8.76	3.580648	5.51
CEEs	3.433923	2.07	18.87927	16.85	15.3436	12.35
Education						
Vocat.	12.9626	47.07	13.06929	46.80	13.26933	40.44
SLE	21.62336	20.02	25.41434	23.38	30.15396	24.03
SLE+Voc.	25.38405	40.73	27.98036	49.71	32.7341	53.19
Politech.	51.43765	88.46	46.37379	88.65	56.72237	95.19
University	63.16714	115.59	61.05029	124.91	72.66932	132.79
Age	3.616063	51.64	2.037699	33.52	1.827734	26.52
Age2	-.0382239	-46.26	-.022507	-30.82	-.0212373	-25.94
Occupation						
Bl.col.2	10.95841	36.86	8.849247	31.22	10.96433	33.69
Wh.col.1	42.416	67.36	41.23507	66.55	49.97004	69.43
Wh.col.2	24.37573	83.97	23.62908	84.86	31.779	99.64
Sectors						
Agriculture	-14.89322	-15.86	-27.63897	-40.17	-29.02639	-36.05
Energy	12.91597	15.92	4.650851	6.32	9.84903	11.81
Mining	10.04801	10.97	3.517863	3.31	-4.033847	-3.08
Chemistry	5.433578	11.15	-3.539116	-7.64	-.1235548	-0.24
Metalwork	4.018553	7.42	-5.861084	-11.28	-2.308885	-3.94
Machinery	7.005796	16.13	-1.138129	-2.82	1.188849	2.66
Fine Mech.	-1.454798	-3.19	-9.224438	-21.48	-5.771488	-11.97
Wood, Pap.	.3230605	0.59	-5.395359	-10.23	-3.232885	-5.48
Textiles	-20.74393	-30.74	-31.71166	-44.87	-31.82461	-36.68
Food	-14.94589	-25.21	-23.23499	-41.44	-23.59995	-37.44
Trade	-12.9396	-30.00	-19.67808	-48.98	-18.84068	-43.27
Transport	-1.2087	-2.29	-9.422521	-20.18	-8.186733	-15.80
Banking	4.852315	8.62	2.419341	4.39	5.069581	8.38
Hotel	-23.25013	-38.25	-29.86887	-52.35	-30.22267	-48.78
Cleaning	-30.86932	-34.47	-37.83369	-45.19	-38.73533	-42.21
Education	-14.19117	-23.94	-17.19931	-32.05	-17.6125	-29.93
Health	-22.71841	-42.34	-25.75055	-51.28	-28.00407	-50.89
Civil Serv.	-18.52436	-39.77	-22.86317	-54.91	-23.48153	-51.13
Others	-4.519243	-8.83	-9.500921	-20.56	-9.510968	-19.41
Firm size						
10-19	13.00654	35.06	14.88258	40.97	15.67089	39.95
20-99	13.00654	70.15	22.73064	80.22	24.47895	79.12
100-499	13.00654	91.90	28.18032	99.06	32.73101	103.33
>500	33.63407	110.43	35.12182	120.18	41.84466	126.08
Constant	-25.9795	-18.94	2.549867	2.02	7.932856	5.37
Pseudo-R^2	0.4546		0.4965		0.4767	

Note1: reference group: Germans, Low Education, Blue Collar1, Construction, <10 employees.
Note2: the pseudo-$R^2$is computed after the definition patterned by McKelvey, Zavonia 1975.

Table 5: Wage equations

	1989					
	Germans			CEEs		
	Coeff.	t-ratio	p>|t|	Coeff.	t-ratio	p>|t|
Education						
Vocat.	13.42442	46.57	0.000	14.17545	3.24	0.001
SLE	22.13246	19.64	0.000	27.73456	2.21	0.028
SLE+Voc.	26.04103	40.63	0.000	23.7278	2.37	0.018
Politech.	51.93178	86.97	0.000	40.615	4.25	0.000
University	63.98486	112.87	0.000	52.20409	7.79	0.000
Age	3.678651	49.95	0.000	4.47144	3.47	0.001
Age2	-.0387069	-44.65	0.000	-.0523497	-3.39	0.001
Experience	2.203719	15.50	0.000	.2664051	0.16	0.870
Experience2	-.0227231	-2.78	0.005	.0151785	0.15	0.882
Tenure	-.5323371	-6.48	0.000	-.8965939	-0.58	0.563
Tenure2	.0659226	12.36	0.000	.0603728	0.55	0.584
Occupation						
Bl.col.2	11.30748	36.23	0.000	11.14113	2.27	0.023
Wh.col.1	42.33271	65.88	0.000	59.47356	3.57	0.000
Wh.col.2	24.42505	81.25	0.000	26.38582	5.24	0.000
Sectors						
Agriculture	-15.26665	-15.67	-0.000	-11.64965	-0.93	-0.352
Energy	12.95959	15.67	0.000	48.17019	1.50	0.134
Mining	13.05077	13.23	0.000	-	-	-
Chemistry	5.6372	11.02	0.000	-.8648986	-0.10	0.923
Metalwork	3.61239	6.27	0.000	10.47542	1.32	0.187
Machinery	6.871079	15.15	0.000	12.36584	1.34	0.181
Fine Mech.	-.9966877	-2.09	0.037	-8.85405	-1.11	0.268
Wood, Pap.	.6080971	1.06	0.288	3.044515	0.28	0.783
Textiles	-20.7806	-28.86	0.000	-14.05986	-1.40	0.161
Food	-14.75432	-23.88	0.000	-15.55461	-1.56	0.120
Trade	-12.69032	-28.38	0.000	-22.48815	-2.65	0.008
Transport	-1.120372	-2.04	0.041	-8.465884	-0.82	0.412
Banking	5.245619	9.09	0.000	1.29287	0.11	0.912
Hotel	-23.05756	-35.96	0.000	-25.48133	-3.12	0.002
Cleaning	-30.42984	-31.95	0.000	-54.44576	-3.25	0.001
Education	-14.05632	-22.98	0.000	-6.775976	-0.76	0.450
Health	-22.32384	-40.27	0.000	-12.98405	-1.47	0.144
Civil Serv.	-18.23319	-37.90	0.000	-21.67671	-2.38	0.018
Others	-3.886198	-7.33	0.000	-9.800908	-1.15	0.253
Firm size						
10-19	12.85036	-33.61	-0.000	-26.26651	-3.99	-0.000
20-99	20.62609	68.10	0.000	26.5992	5.10	0.000
100-499	27.29698	88.86	0.000	30.24894	5.46	0.000
>500	33.74565	107.17	0.000	35.35718	6.49	0.000
Constant	-30.5261	-21.07	0.000	-25.92013	-0.99	0.325
Pseudo-R^2		0.456			0.597	

Note: reference group: Low Education, Blue Collar1, Construction, <10 employees.

Table 6: Wage equations

	1992					
	Germans			CEEs		
	Coeff.	t-ratio	p>|t|	Coeff.	t-ratio	p>|t|
Education						
Vocat.	13.77078	47.24	0.000	10.20562	3.63	0.000
SLE	26.67276	23.45	0.000	13.05086	1.41	0.160
SLE+Voc.	28.73766	49.90	0.000	12.76938	1.98	0.048
Politech.	46.99207	87.93	0.000	45.82619	5.08	0.000
University	61.87755	122.92	0.000	52.50463	9.74	0.00
Age	2.209065	34.88	0.000	2.324307	2.99	0.003
Age2	-.0241492	-31.81	0.000	-.0298245	-2.94	0.003
Experience	6.786509	89.33	0.000	2.630023	2.66	0.008
Experience2	-.2140549	-50.65	0.000	-.0491111	-0.86	0.391
Tenure	1.147432	15.90	0.000	2.300917	1.95	0.051
Tenure2	-.0158422	-4.02	0.000	-.1154963	-1.59	0.113
Occupation						
Bl.col.2	9.196276	31.23	0.000	5.629235	1.79	0.073
Wh.col.1	41.14174	65.48	0.000	13.62594	0.99	0.324
Wh.col.2	23.59233	82.42	0.000	17.91314	4.60	0.000
Sectors						
Agriculture	-27.86427	-39.57	0.000	-20.96641	-3.14	0.002
Energy	4.619768	6.21	0.000	27.02692	0.76	0.446
Mining	7.260571	6.38	0.000	33.09599	0.95	0.344
Chemistry	-3.624527	-7.51	0.000	-8.468986	-1.81	0.070
Metalwork	-6.343394	-11.62	0.000	-5.172738	-0.96	0.337
Machinery	-1.411889	-3.38	0.001	-3.131213	-0.70	0.485
Fine Mech.	-9.025863	-20.24	0.000	-9.686191	-1.97	0.049
Wood, Pap.	-5.613725	-10.27	0.000	-5.072286	-0.84	0.404
Textiles	-32.27622	-43.01	0.000	-37.06637	-5.62	0.000
Food	-23.37155	-40.15	0.000	-16.18345	-2.90	0.004
Trade	-19.63265	-47.52	0.000	-23.78413	-5.12	0.000
Transport	-9.366039	-19.52	0.000	-6.475812	-1.06	0.290
Banking	2.615906	4.66	0.000	-13.79429	-1.21	0.228
Hotel	-29.27823	-49.09	0.000	-32.76723	-6.95	0.000
Cleaning	-37.94395	-42.89	0.000	-41.37073	-4.77	0.000
Education	-16.96657	-30.90	0.000	-11.33572	-1.59	0.112
Health	-25.40774	-49.33	0.000	-18.06201	-3.16	0.002
Civil Serv.	-22.5217	-52.83	0.000	-28.74042	-4.37	0.000
Others	-9.190771	-19.36	0.000	-10.69548	-2.07	0.039
Firm size						
10-19	14.95142	40.15	0.000	4.972084	1.27	0.205
20-99	22.86765	78.66	0.000	12.79242	4.04	0.000
100-499	28.21787	96.66	0.000	17.33244	4.95	0.000
>500	35.27199	117.52	0.000	26.74527	7.03	0.000
Constant	-3.118729	-2.36	0.018	44.45271	3.04	0.002
Pseudo-R^2		0.503			0.448	

Note: reference group: Low Education, Blue Collar1, Construction, <10 employees.

Table 7: Wage equations

	1995					
	Germans			CEEs		
	Coeff.	t-ratio	p>|t|	Coeff.	t-ratio	p>|t|
Education						
Vocat.	13.98659	40.64	0.000	12.08771	3.97	0.000
SLE	31.68927	24.25	0.000	7.977003	0.72	0.471
SLE+Voc.	33.53398	53.10	0.000	19.36842	2.76	0.006
Politech.	57.51393	94.26	0.000	55.83501	5.10	0.000
University	73.56845	130.23	0.000	68.78784	12.12	0.000
Age	1.912522	26.72	0.000	3.369487	3.88	0.000
Age2	-.0216672	-25.54	0.000	-.0396675	-3.64	0.000
Experience	5.93103	63.54	0.000	1.97013	2.06	0.040
Experience2	-.1412573	-34.42	0.000	-.0181251	-0.40	0.692
Tenure	.5958475	8.87	0.000	.4876073	0.51	0.607
Tenure2	.0069823	2.21	0.027	-.0180233	-0.33	0.738
Occupation						
Bl.col.2	11.41461	33.74	0.000	6.153545	1.81	0.070
Wh.col.1	50.01442	68.45	0.000	41.96647	2.41	0.016
Wh.col.2	31.86281	97.00	0.000	20.78468	5.33	0.000
Sectors						
Agriculture	-29.35097	-35.55	0.000	-15.33478	-2.17	0.030
Energy	9.912001	11.74	0.000	42.70961	1.09	0.275
Mining	-.8225142	-0.59	0.557	24.76048	0.65	0.519
Chemistry	-.0453865	-0.08	0.933	5.084979	0.95	0.342
Metalwork	-2.528212	-4.11	0.000	6.892541	1.17	0.244
Machinery	.8841004	1.91	0.056	8.037216	1.62	0.106
Fine Mech.	-5.568221	-11.13	0.000	2.744899	0.48	0.635
Wood, Pap.	-3.315757	-5.44	0.000	2.56002	0.38	0.702
Textiles	-32.05773	-34.70	0.000	-29.75769	-3.66	0.000
Food	-23.77008	-36.31	0.000	-15.58647	-2.42	0.016
Trade	-18.81115	-42.01	0.000	-14.50546	-2.93	0.003
Transport	-8.116676	-15.25	0.000	-4.356725	-0.70	0.483
Banking	5.345978	8.70	0.000	.3136027	0.03	0.978
Hotel	-29.79422	-46.02	0.000	-28.39635	-5.64	0.000
Cleaning	-38.77874	-40.10	0.000	-38.37415	-3.93	0.000
Education	-17.35882	-28.86	0.000	-3.460791	-0.47	0.637
Health	-27.57268	-48.85	0.000	-18.34614	-3.06	0.002
Civil Serv.	-23.19267	-49.38	0.000	-17.81641	-2.92	0.004
Others	-8.999418	-17.86	0.000	-12.22584	-2.23	0.026
Firm size						
10-19	15.74907	39.13	0.000	2.461106	0.59	0.555
20-99	24.70615	77.80	0.000	13.19625	3.95	0.000
100-499	32.91524	101.15	0.000	21.7957	5.84	0.000
>500	42.08466	123.30	0.000	31.2846	7.61	0.000
Constant	2.422024	1.57	0.117	19.79646	1.19	0.235
Pseudo-R^2		0.481			0.470	
Note: reference group: Low Education, Blue Collar1, Construction, <10 employees.						

Table 8: Wage equations

	1988		1990	
	Total	Unexplained	Total	Unexplained
Total	.0729469	.0303926	.1080216	.0282798
Low Education	.0874406	.0264069	.0867371	.0257972
Vocational	.0883297	.033136	.1126608	.0296686
Polytechnical	.150042	.1475832	.036699	.0097021
University	-.0359323	-.01287	.0530517	.0278492
Age under 35	.0181828	-.0341773	.0606185	-.0227089
Age above 50	.1911089	.0812061	.200611	.1077975
Blue Collar1	.0779727	.0345346	.0506342	.0208189
	1993		1995	
	Total	Unexplained	Total	Unexplained
Total	.1659718	-.0378498	.1529606	-.0259242
Low Education	.1288376	-.0590453	.1052781	-.0389575
Vocational	.1285464	-.0329508	.1140533	-.0251425
Polytechnic	-.0013083	.040023	-.0002685	.120764
University	-.0104944	-.0161061	.0099885	-.0207289
Age under 35	.1500897	-.0529425	.1381677	-.053042
Age above 50	.1081929	-.012361	.139538	.0146404
Blue Collar1	.0677471	-.0651301	.0414182	-.0502873

Note: all numbers are expressed as fraction of the predicted wage for German workers. (own calculation, IABS data)

Table 9: Wage differentials (fitted values) between Germans and CEEs