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Restrictive immigration policy in Germany: pains and gains foregone?

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Abstract Many European countries restrict immigration from new EU member countries. The rationale is to avoid adverse wage and employment effects. We quantify these effects for Germany. Following Borjas (in Q J Econ CXVIII(4):1335–1374, 2003), we estimate a structural model of labor demand, based on elasticities of substitution between workers with different experience levels and education. We allow for unemployment which we model in a price-wage-setting framework. Simulating a counterfactual scenario without restrictions for migration from new EU members countries in Germany, we find moderate negative wage and employment effects for incumbent foreigners, but positive effects for natives. Our results indicate that for the native German population as a whole the immigration restrictions are not welfare enhancing.

Keywords Migration · Labor demand · Wages · Unemployment · EU enlargement

JEL Classification F22 · F15 · J23

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1 Introduction

The treaties governing the entry of 12 Central and Eastern European countries (CEECs) into the European Union enable incumbent member states to maintain their immigration restrictions vis-à-vis new members for a maximum of 7 years.[1] The majority of countries have opted for such transitional restrictions. In 2004, the United Kingdom, Ireland, and Sweden were the only exceptions, and when Bulgaria and Romania became members in 2007, the UK and Ireland too have joined the countries invoking the transitional agreement. Germany, the largest and closest country to those new members, has been particularly strict and, like Austria, intends to extend restrictions until the year 2011.

What is the economic rationale for transitional restrictions? Policy makers in Germany and elsewhere fear a large inflow of workers from accession countries and seem to expect rising native unemployment and lower wages. But what is the empirical support for this presumption? Would native workers on average suffer from immigration from the accession countries? If so, by how much? Which types of workers would gain, which would lose? Could the labor inflow give rise to a native welfare gain on the aggregate level?[2]

In this paper we give tentative answers to these questions, proceeding in two steps. First, we estimate a set of disaggregate labor demand elasticities that determine whether immigrant and native workers are substitutes or complements in general equilibrium, as well as wage-setting equations that characterize labor market institutions responsible for unemployment. In a second step, we then use these elasticities in order to numerically simulate a counterfactual scenario where Germany would have abstained from the aforementioned transitional immigration restrictions. We compute employment and wage effects, as well as overall welfare effects, thus quantifying the pains and gains foregone by invoking the transition agreement.

We follow Borjas (2003) in specifying a system of labor demand functions disaggregated by levels of education and work experience. Using wage and employment data for natives and immigrants from German household survey data, we estimate elasticities of substitution that govern labor demand, allowing for imperfect substitution between native foreign workers.[3] Our contribution is to extend this approach by incorporating wage-setting equations along the lines suggested by Layard et al. (2005). This allows us to allow for equilibrium unemployment in our numerical simulation, which is crucial in the European

[1] On May 1st of 2004, Cyprus, the Czech Republic, Estland, Hungary, Latvia, Lituania, Malta, the Slovak Republic, and Slovenia have joined the EU. Bulgaria and Romania have followed on January 1st of 2007.

[2] This is the so-called immigration surplus; see Borjas (1999). For a general treatment see Felbermayr and Kohler (2007).

[3] More recent applications of this approach to the US and Canada are found in Ottaviano and Peri (2006, 2008) and Aydemir and Borjas (2007). An alternative approach, mainly followed in earlier literature, is to focus on evidence across regions receiving different inflows of foreign workers. A well known study is Card (1990) who uses the natural experiment provided by a strong but short-lived inflow of Cubans into Miami; see Card (2009) for a recent survey. For a general survey, see Hanson (2008).

context. For our counterfactual scenario, we utilize information on the recent flows of workers from accession countries into the UK, in order to proxy the size and educational composition of the additional immigration that Germany would have received under free movement without transitional restrictions.

Our paper is closely related to D'Amuri et al. (2009) and Brücker and Jahn (2008), but it features key differences in terms of the data used and the empirical strategy employed to model labor market imperfections. Importantly, it focuses on a special policy scenario which is motivated against the backdrop of eastern EU enlargement.[4] Our results indicate that in the long run these restrictions have a negative effect on native workers and on overall welfare of native-German factor owners. The only group that profits from the transitional restrictions are incumbent foreigners. In the short run we find a negative, but very small effect on native workers. Hence, it appears difficult to rationalize the use of transitional restrictions in Germany on grounds of political economy.

Section 2 explains the theoretical background and estimation framework. It also describes the data and presents key estimation results. Section 3 uses these results to simulate our counterfactual scenario, focusing on how wages and employment of natives as well as foreign workers would have evolved had Germany not imposed transitional restrictions. We also present calculations for forgone welfare effects of natives. Section 4 concludes.

2 Theoretical framework and estimation

Our framework follows Borjas (2003) who attempts to measure the wage effects of immigration for the US, assuming full employment. In applying the approach to Germany, we want to allow for unemployment. The basic idea is that for any type of labor employment is subject to the condition that the marginal value productivity is equal to the ongoing wage rate. Our first step thus involves estimation of inverse labor demand functions for different types of labor characterized by levels of education and experience. However, a fundamental premise of our approach is that labor markets are non-Walrasian in that institutional wage-setting generates unemployment. We stipulate that the wage-setting process takes into account the degree of unemployment within and across education × experience-segments of the labor market. We thus derive estimation equations from the paradigm of *"price-wage-setting"* that has been proposed by Layard et al. (2005) in order to understand European unemployment. The estimated wage-setting elasticities may then be combined with the estimated labor demand parameters in order to simulate the wage and employment effects of immigration. We restrict the following presentation of our estimation framework to the bare essentials; more details may be found in Felbermayr et al. (2008).[5]

[4] The working paper versions of all three studies came out at around the same time; see Felbermayr et al. (2008).

[5] A revised version of that paper is available upon request.

2.1 A structural model of labor demand

Suppose L_{ex}^N and L_{ex}^M denotes aggregate employment of native and migrant workers, respectively, with education-level e ($e = 1,\ldots, E$) and experience level x ($x = 1,\ldots, X$). From the first-order condition for profit maximization, wages w_{ex}^N and w_{ex}^M must satisfy

$$\ln\left(w_{tex}^N/w_{tex}^M\right) = -\frac{1}{\sigma_e^M}\ln\left(L_{tex}^N/L_{tex}^M\right) + D_{tex}^N + u_{tex}, \tag{1}$$

where σ_e^M denotes the elasticity of substitution between natives and migrants, which is assumed constant across x but allowed to vary across e. We have also added a time index and an error term u_{tex}. This equation may be estimated using variation across e, x and t. The term D_{tex}^N represents a collection of fixed effects, whereby we assume $D_{tex} = d_{ex} + d_{et} + d_{xt}$. Intuitively, for each $e \times x$-segment of the labor market, native and foreign workers combine to generate an aggregate labor input L_{ex}. Notice that for a constant marginal value productivity of L_{ex}, we have $\mathrm{d}\ln w_{ex}^N = \left(s_{ex}^M/\sigma_e^M\right)\mathrm{d}\ln L_{ex}^M$, where s_{ex}^M is the share of immigrant wage payments in the overall payments for L_{ex}. This describes complementarity between native workers and migrants within the $e \times x$-segment of the labor market. Note that s_{ex}^M $\sigma_e^M > 0$ if σ_e^M is finite.[6] Assuming CES production technology, we may use the estimate $\hat{D}_{tex}$ to recover the CES share parameter associated with native labor according to $\hat{\lambda}_{tex}^N = \left(1 - \lambda_{ex}^M\right) = \exp\left(\hat{D}_{tex}\right)\left[1 + \exp\left(\hat{D}_{tex}\right)\right]^{-1}$. Using the estimates $\hat{\sigma}_e^M$ and $\hat{\lambda}_{tex}^N$, we may calculate $\hat{L}_{ex}^N$, as well as minimum cost functions $w_{ex}(w_{ex}^N, w_{ex}^M)$. Evaluating these with sample values w_{tex}^N and w_{tex}^M we obtain $\hat{w}_{ex}$, which may now be treated as the wage rate for employment of $\hat{L}_{ex}^N$.[7]

The first-order condition for employment of L_{ex} leads to our next estimation equation

$$\ln\hat{w}_{tex} = -\frac{1}{\sigma^x}\hat{L}_{tex} + D_{tex} + v_{tex} \tag{2}$$

where inputs L_{ex} with different experience levels x combine in CES fashion with an elasticity σ^x to generate an aggregate labor input L_e with education level e. Note that we assume a uniform elasticity σ^x for all education levels. The term D_{tex} may be interpreted as $D_{ex} = q_{te} + \ln L_{te}/\sigma^x + \ln\lambda_{ex}$, where q_{te} is the period-t marginal value productivity of L_{te}, and λ_{ex} is the CES share parameter associated with L_{ex}, assumed to be time-invariant. Imposing the identifying restriction $D_{tex} = d_{ex} + d_{et} + d_t$, we may recover $\hat{\lambda}_{ex}$ from estimates of the fixed effects d_{ex} by complete analogy to $\hat{\lambda}_{tex}^N$ above.

Complementarity between natives and foreign workers within a given $e \times x$-segment of the labor market may be described by $\mathrm{d}\ln w_{ex}^N = \left[s_{ex}s_{ex}^M/\sigma^x + s_{ex}^M\left(1/\sigma_e^M - 1/\sigma^x\right)\right]\mathrm{d}\ln L_{ex}^M$, where s_{ex} is the share of wage payments

[6] Borjas (2003) assumes an infinite σ_e^M a priori, while Ottaviano and Peri (2006, 2008) stress imperfect substitutability. See also the discussion in Borjas et al. (2008). We don't take a stance a priori, but let the data "speak".

[7] In this section we synonymously refer to migrants and foreign workers. In the simulation we shall make a distinction between the pre-existing foreign work force and the new flow of migrants.

for $e \times x$-type labor in the cost of L_e. This assumes a constant marginal value product of L_e. Notice that—other things equal—a larger employment of L_{ex}^M implies a lower marginal productivity of L_{ex}. If $\sigma_e^M > \sigma^x$, as perhaps expected a priori, and depending on the wage shares, the complementarity relationship between natives and migrants may turn into one of substitutability, meaning that a *rise* in L_{ex}^M leads to a *fall* in w_{ex}^N. However, there is now an additional complementarity effect that arises across different experience levels, such that $\mathrm{d}\ln w_{ex}^N = \left(s_{ex}^M s_{ex}/\sigma^x\right)\mathrm{d}\ln L_{ex'}^M > 0$, for $x' \neq x$, again assuming a constant marginal value productivity of L_e.

Using estimates $\hat{\sigma}^x$ and $\hat{\lambda}_{ex}$, we may now calculate $\hat{L}_{te}$, as well as the corresponding values of the dual unit-cost functions $\hat{w}_{te}$. Assuming, by analogy to the above, that labor of different education levels e combine in CES fashion with an elasticity σ^e to generate an aggregate labor input L, we may write down a final estimation equation

$$\ln \hat{w}_{te} = -\frac{1}{\sigma^e}\ln \hat{L}_{te} + D_{te} + v_{te} \tag{3}$$

The procedure is now familiar from earlier steps, whereby the identifying restriction for the fixed effects reads as $D_{te} = d_t + \delta_e t$. The time-fixed effect d_t controls for all time-varying determinants of the marginal value productivity of aggregate labor L, such as the overall amount of output to be produced, or the capital-labor ratio.[8] The time trend captures education-specific evolutions of the different CES share parameters λ_{te}.

For a constant marginal value productivity of L, within-$e \times x$-complementarity (or substitutability) between natives and immigrants is given by $\mathrm{d}\ln w_{ex}^N = [s_{ex}^M s_{ex} s_e/\sigma^e + s_{ex}^M s_{ex}(1/\sigma^x - 1/\sigma^e) + s_{ex}^M\left(1/\sigma_e^M - 1/\sigma^x\right)]\mathrm{d}\ln L_{ex}^M$, with an obvious interpretation of the wage share s_e. It now becomes obvious that the more we take into account upper level effects, the lower the degree of complementarity. The "turning-point" between complementarity and substitutability is specific to each $e \times x$-segment. By complete analogy to the above, we may denote complementarity across education levels according to $\mathrm{d}\ln w_{ex}^N = \left(s_{ex}^M s_{ex} s_e/\sigma^e\right)\mathrm{d}\ln L_{e'x}^M$, for $e' \neq e$.

We close our model of labor demand by assuming that aggregate labor L combines with a capital stock K to generate a final output. Assuming linear homogeneity, and normalizing the output price to 1, the marginal productivity of labor L as well as capital depend only on the capital-to-labor ratio. It is important to note that in our estimation framework the influence of K/L on the marginal productivity of L is controlled for by d_t, but in the simulation below we separate the short-run effect from the long-run effect of immigration. In the short run, immigration will lower K/L, thus depressing the marginal productivity of L. For Cobb–Douglas technology, this adds a further impact effect of immigration on $\ln w_{ex}^N$ equal to $-(s_{ex}^M s_{ex} s_e \alpha)\mathrm{d}\ln L_{ex}^M$, where α is the share of wage-payments to L. For the long-run effect, we assume that any increase in L installs an incentive to capital accumulation, provided that the steady state user cost of capital remains constant. As the capital stock expands during the adjustment, there will be a positive effect on $\ln w_{ex}^N$ equal to $\alpha \mathrm{d}\ln K$, until capital accumulation restores the initial capital-to-labor

[8] More specifically, we have $d_t = z_t + \ln L/\sigma^e$, where z_t is the marginal value productivity of L.

ratio and, thus, the initial marginal value productivity of L. We follow Ottaviano and Peri (2006, 2008) in assuming that the adjustment to long-run capital stocks takes place with a rate of 10 percent per annum.

Taking into account all levels of aggregation, native wages relate to employment changes of various types of labor as follows

$$\mathrm{d}\ln w_{ex}^{N} = \frac{1}{\sigma^{e}}\mathrm{d}\ln L + \left(\frac{1}{\sigma^{x}} - \frac{1}{\sigma^{e}}\right)\mathrm{d}\ln L_{e} + \left(\frac{1}{\sigma^{M}} - \frac{1}{\sigma^{x}}\right)\mathrm{d}\ln L_{ex} - \frac{1}{\sigma^{M}}\mathrm{d}\ln L_{ex}^{N} \quad (4)$$

This equation takes a long-run perspective in assuming a constant marginal productivity of L. An analogous equations holds for $\mathrm{d}\ln w_{ex}^{M}$, i.e., wages of foreign workers. Note that the terms $\mathrm{d}\ln L_{e}$ and $\mathrm{d}\ln L$ in (4) incorporate cross-effects from employment of workers with experience levels $x' \neq x$ and education levels $e' \neq e$, as well as cross-effects from employment of foreign workers. For instance, $\mathrm{d}\ln L_{ex} = s_{ex}^{M}\mathrm{d}\ln L_{ex}^{M} + s_{ex}^{N}\mathrm{d}\ln L_{ex}^{N}$, and analogously for $\mathrm{d}\ln L_{e}$ and $\mathrm{d}\ln L$. Armed with estimates of all elasticities of substitution and direct observations of wage shares s_{ex}^{M} and s_{ex}^{N}, we may use $E \times X \times 2$ equations of the form (4) in order to simulate the wage effects for natives and foreign workers. But wage effects of what? Immigration is all about a change in labor *supply*, and not directly about *employment*. We need to know how exogenous labor supply changes lead to endogenous employment changes, which now leads us to wage-setting.

2.2 Wage-setting and unemployment

In macroeconomic contexts, it has become customary to explain European unemployment through an interaction of price- and wage-setting; see Layard et al. (2005). For the present purpose, we employ what Layard et al. (2005) have called "normal-cost price-setting". Assuming perfect competition on output markets, prices are equal to marginal cost, and the usual negative price-setting relationship between the real wage rate and employment (given labor supply) then derives from the presence of a fixed non-labor input, like the capital stock. In our context, we thus arrive at price-setting relationships that coincide with the inverse labor demand functions presented in the preceding section.

In turn, wage-setting is assumed to be responsive to the rate of unemployment. We define $e \times x$-specific rates of unemployment as $u_{ex}^{N} := 1 - L_{ex}^{N}/N_{ex}$, and accordingly for foreign labor (denoted by M), where M_{ex} and N_{ex} denote native and foreign labor supply of type $e \times x$. We stipulate disaggregate wage-setting equations of the form $w_{ex}^{N} = \bar{w}_{ex}^{N}\left(1 - u_{ex}^{N}\right)^{\eta^{N}}(1 - r)^{-1}$, where $\bar{w}_{ex}^{N}$ is a reference wage for wage-setting, and r is the replacement rate for the unemployment benefit.[9] This translates into the following estimation equation:

$$\ln w_{ext}^{N} = \eta^{N}\ln\left(L_{ext}^{N}/N_{ext}\right) + a\ln w_{ext-1}^{N} + \kappa_{ext} \quad (5)$$

[9] If this reference wage is set equal to the market clearing wage rate for ex-type labor, and if $r = 0$, then the natural rate of unemployment is zero for all types of labor. Of course, theory implies $\eta^{N} > 0$.

where κ_{ext} is an error term. The lagged wage is added to allow for lagged adjustment, with a long-run elasticity of $\eta^N/(1 - a)$.[10] Estimation of $E \times X \times 2$ equations of the form (5) completes our estimation exercise. Together with estimated Eq. (4), they allow us to solve for both, equilibrium wage and employment responses to a given scenario of exogenous changes in immigrant labor supply; see below. We stress that our framework involves a direct implementation of the price-wage-setting paradigm, as opposed to estimating a reduced-form relationship between employment and immigrant labor supply, in lieu of Eq. (5), as for instance in D'Amuri et al. (2009). Before turning to our simulation, we briefly describe the data and present key estimation results.

2.3 Data

To estimate the parameters of the simulation model we use micro-level data on wage rates and labor market status (employed, unemployed, out of labor force), as well as characteristics such as the education, work experience, and immigrant/native status. Typically, researchers draw on census data, as in Borjas (2003), Ottaviano and Peri (2006, 2008) and Aydemir and Borjas (2007), or social security data, as in Bonin (2005) and Brücker and Jahn (2008). In contrast, we use survey data from the German Socio-Economic Panel (GSOEP). Employing year-specific weights for all relevant individual characteristics, supplied by the DIW and based on micro-census data, we obtain representative information for the German economy at large.[11]

By census standards, our sample size is relatively small, including about 12,000 households and 20,000 persons. However, the GSOEP data offer unique advantages over social security data, such as the IAB Employment Samples used in D'Amuri et al. (2009) and Brücker and Jahn (2008). First, it allows to define immigrants as individuals born outside of Germany. Using nationality as the relevant criterion, as in social security data, is sensitive to (volatile) naturalization policy.[12] Second, the GSOEP provides information about education attainments in line with the International Standard Classification of Education adopted by the UNESCO in 1997 (ISCED-97). This allows us to avoid problems that might otherwise arise from the peculiarities of German educational institutions, such as the apprenticeship

[10] Brücker and Jahn (2008) follow a similar procedure. Not shown in (5), we also take into account education-specific time trends and squared education-specific time trends, to take into account exogenous long-run changes in reference wages. In the relevant table below, we also report estimates for an alternative equation with the unemployment rate replacing $\ln\left(L^N_{ext}/N_{ext}\right)$. Equation (5) allows for a more convenient formulation of the numerical simulation; see below.

[11] Manacorda et al. (2006) use a similar strategy in their study for the UK, combining the Labour Force Survey (LFS) and the General Household Survey (GHS).

[12] Official German statistics (and the IAB Employment Samples) define migrants according to citizenship (*ius sanguis* principle). Traditionally, naturalization rates have been extremely low in Germany, so that children of immigrants often do not have the German citizenship. Moreover, the naturalization law has changed drastically in 1999. On the other hand, after the collapse of the Soviet Union, almost two million ethnic Germans migrated to Germany and—according to *ius sanguis* rules—immediately qualified for German citizenship.

system.[13] Third, the GSOEP directly reports the experience of workers, and it even differentiates between experience earned in full-time and part-time jobs. This is a unique advantage compared to US census data or the IABS, where experience needs to be approximated by time elapsed since an individual has left school. As this measure is distorted by possible unemployment spells or maternity leaves, the literature using census data is usually restricted to male workers; see Borjas (2003). Our data avoids this restriction. Fourth, and most importantly, the SOEP reports gross wages on a monthly basis, without the top-censoring that is typical for social security data and which requires substantial imputation. Using information on working hours per week, we calculate hourly wages.[14]

We cluster workers into 16 different groups of education and experience levels. The four educational groups are defined as follows: ISCED levels 0 through 2 (lower secondary education or second stage of basic education), ISCED level 3 (upper secondary education), ISCED levels 4 and 5 (post-secondary up to first-stage tertiary education), and ISCED level 6 (second-stage tertiary education). Regarding experience, we take the sum of observed full-time and part-time experience and use four categories, each covering a span of 10 years, up to a maximum of 40 years. Drawing on data from 1984–2005, we have a perfectly balanced sample of 352 observations (704 when differentiating between migrants and natives).

Our time span goes back beyond German unification in 1990. Therefore, we restrict our observations to the western part of Germany, but treat persons born in the eastern part as perfect substitutes to natives of the western part. Unfortunately, available data do not allow us to treat workers from eastern Germany as an "immigrant" category sui generis. D'Amuri et al. (2009) classify persons who have come from eastern Germany as immigrants, which amounts to treating them as perfect substitutes to all non-German migrants, but not to natives of western Germany. Both assumptions seem extreme. We argue that our approach is more plausible, given the cultural and linguistic similarities between the two parts of Germany.

2.4 Estimation results

Table 1 presents estimates of the various elasticities of substitution. In our baseline estimation we instrument labor demand by labor supply. The remaining columns contain robustness checks. Rows 1 through 5 address the elasticity of substitution between natives and migrants. For the baseline specification we find $1/\hat{\sigma}^M = 0.136$ with a robust standard error of 0.04, which implies an elasticity value of 7.4. Rows 2

[13] For example, the French high school system allows for professional education (the Bac-pro); individuals enrolled in this system are treated as students. In Germany, a similar educational aim is achieved outside the high school system through the apprenticeship scheme (or dual education system). If education is measured by years of schooling, the two systems would assign different values to a student who achieves the same objective.

[14] D'Amuri et al. (2009) provide an in depth comparison of the GSOEP and the IABS. Education structure of foreigners and natives, as well as average wages, hardly differ between the two data sets. This comparison indicates that, at least for our purposes, randomness or reliability of the GSOEP do not cause problems.

Table 1 Parameter estimates—structural form of German labor demand

Elasticities of substitution	Baseline	Robustness checks					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Natives/foreigners: $1/\sigma^M$	0.136 (0.040)	0.136 (0.040)	0.148 (0.044)	0.098 (0.034)	0.098 (0.034)	0.129 (0.052)	−0.033 (0.043)
ISCED 0–2: $1/\hat{\sigma}_1^M$	0.111 (0.047)	0.111 (0.047)	0.108 (0.052)	0.106 (0.060)	0.106 (0.060)	0.121 (0.058)	0.079 (0.086)
ISCED 3: $1/\hat{\sigma}_2^M$	0.113 (0.035)	0.113 (0.035)	0.133 (0.051)	0.112 (0.041)	0.112 (0.041)	0.135 (0.043)	0.061 (0.41)
ISCED 4–5: $1/\hat{\sigma}_3^M$	0.094 (0.139)	0.094 (0.139)	0.087 (0.147)	0.036 (0.112)	0.036 (0.112)	0.055 (0.134)	−0.078 (0.055)
ISCED 6: $1/\hat{\sigma}_4^M$	0.233 (0.069)	0.233 (0.069)	0.307 (0.053)	0.221 (0.069)	0.221 (0.069)	0.213 (0.076)	−0.035 (0.127)
Across experience: $1/\hat{\sigma}^x$	−0.072 (0.038)	−0.061 (0.030)	−0.086 (0.038)	−0.071 (0.034)	0.199 (0.907)	−0.072 (0.038)	−0.080 (0.043)
Across education: $1/\hat{\sigma}^e$	0.218 (0.047)	0.263 (0.169)	0.243 (0.042)	0.241 (0.030)	0.139 (0.066)	0.216 (0.048)	0.223 (0.048)

(1) Labor supply as instrument for employed labor; (2) As (1) but for the elasticities of substitution between experience and education levels only natives are considered; (3) First lag as instrument for employed labor; (4) No instrumentation; (5) As (4) but foreign employed labor as instrument for the elasticities between education and experience levels; (6) As (1) but foreigners defined as people who are born abroad; (7) As (1) but foreigns defined as people who do not have the German citizenship. Numbers in parentheses are standard errors. Number of observations: 352 (for education 88). Degrees of freedom: Natives/foreigners 188, experience 251, education 62 (baseline)

through 5 allow for education-specific elasticities $\hat{\sigma}_e^M$, revealing some variation across educational branches.[15] Our estimates indicate that natives and migrants are somewhat closer substitutes for each other in Germany than in the US or the UK, but with an elasticity of substitution well below infinity; for the UK see Manacorda et al. (2006). This is in line with the results of Brücker and Jahn (2008) and D'Amuri et al. (2009). By and large, our finding of a fairly large, yet finite elasticity of substitution $\hat{\sigma}^M$ also survives the robustness checks reported in Table 1.

Row 6 turns to $1/\sigma^x$, the elasticity of substitution across experience levels. We are unable to reject the hypothesis of $\sigma^x \to \infty$.[16] US studies have found much lower values of this elasticity, also well below the estimates for σ^M, as perhaps expected from intuition.[17] Manacorda et al. (2006) obtain $\hat{\sigma}^x > \hat{\sigma}_e^M$ for the UK, as we do for Germany, but with an estimated value for σ^x clearly below infinity. Large estimates for σ^x (in the vicinity of 30) are also reported by Brücker and Jahn (2008), whereas D'Amuri et al. (2009) find an elasticity of only 3, both on German social security data.

As regards educational groups, our baseline estimate is $1/\hat{\sigma}^e = 0.218$, hence $\hat{\sigma}^e \approx 4.6$. This is somewhat larger than the estimates reported by Borjas (2003), Ottaviano and Peri (2006) and Aydemir and Borjas (2007), but in line with estimates obtained by Brücker and Jahn (2008) for Germany. Columns (2) to (7) of Table 1 point to a fairly robust picture.

Overall, then, the different types of labor considered here for the German economy feature a larger degree of substitutability in production than was found for a similar disaggregation of the US and UK labor markets. Note that our empirical strategy is consistent with non-Walrasian labor market institutions, as already emphasized above. Our estimated elasticities of substitution thus reflect the technological environment, to be combined with the institutional feature of wage-setting in the simulation below.[18]

Table 2 reports the estimation results for our wage-setting equation. We have also run estimations on the employment rate instead of the log-employment ratio. Our baseline uses pooled regression, with an estimated η-value of 0.08, and a long-run value $\eta/(1 - a)$ of 0.55. Our robustness checks show individual-specific effects using Arellano–Bond, as well as conventional fixed effects that are broadly in line with Brücker and Jahn (2008).

[15] In particular, the top level of education (ISCED 6) exhibits an elasticity in the vicinity of 4, while for lower levels of education the elasticity is in the vicinity of 10. The large difference between the elasticities for ISCED 4 + 5 and ISCED 6 and the insignificant estimate for ISCED 4 + 5 are probably due to the fact that ISCED 4 + 5 mainly contains degrees that are specific to the German educational system. This means that most foreigners in this group have been educated in Germany.

[16] It should be noted that an infinite value of σ^x is perfectly consistent with more experienced workers being more productive (in a Harrod-neutral sense) than less experienced ones, thus also receiving higher wages.

[17] Borjas (2003) assumes $\sigma^M \to \infty$, and he estimates values $\sigma^x = 3.5$ and $\sigma^e = 1.3$, while Ottaviano and Peri (2006) estimates σ^M-values between 5 and 10, σ^x-values between 3 and 5, and σ^e-values around 2.

[18] In Felbermayr et al. (2008) we use our parameter estimates to portray a detailed set of elasticities of complementarity/substitutability between German natives and immigrants.

Table 2 Parameter estimates—German wage curve

	Short run		Long run	
	Pooled OLS			
Employment ratio	0.084 (0.043)		0.550 (0.144)	
Unemployment rate		−0.108 (0.052)		−0.703 (0.180)
Lagged wage	0.839 (0.045)	0.839 (0.045)		
	Arellano–Bond/Random-effects estimator[a]			
Employment ratio	0.004 (0.044)		0.137 (0.053)	
Unemployment rate		−0.014 (0.050)		−0.186 (0.067)
Lagged wage	0.336 (0.050)	0.336 (0.050)		
	Fixed-effects estimator			
Employment ratio			0.105 (0.051)	
Unemployment rate				−0.143 (0.064)

Loglinear specification (except unemployment rate); dependent variable: wage rate. Standard errors (in parentheses) are adjusted for clustering in education-experience-nation groups. All regressions include education-specific time trends. Number of observations: 672

[a] Short run: Arellano–Bond, long-run: random-effects estimator

3 Simulating transitional immigration restrictions

3.1 The counterfactual scenario

Germany was among the incumbent EU countries who have maintained their immigration restrictions vis-à-vis the new members of the two eastern enlargements of 2004 and 2007. Unlike most others, it has chosen to prolong its restrictions upon the midterm review. The reason was to avoid negative labor market effects of large labor inflows from new member countries. Five years on, we can now observe the inflows received by countries who have abstained from such restrictions, like the UK. Based on these observations, we should be able to construct a counterfactual scenario of enlargement-induced immigration that Western Germany[19] would have received, had it abstained from transitional restrictions. Suppose we have rough estimates of such counterfactual immigration ΔM_{ex} for all of our $e \times x$-segments of the German labor market. Combining these with the parameter estimates in Eqs. (4) and (5), we may then calculate the wage and employment effects of these inflows, in order to see whether the fears fuelling the transition agreements seem justified.

In the run-up to EU enlargement, a large number of empirical papers have used gravity-type models to estimate migration flows from accession countries to Western Europe, caused by freedom of movement.[20] Unfortunately, there is a lot of heterogeneity in predictions across studies. Moreover, these estimates have mostly been focusing on the aggregate migration potential. For our simulation exercise, we require information on the education × experience profile of the worker inflow. We

[19] All numbers in the following refer to Western Germany; over 90% of the immigrant population in Germany lives in Western Germany.

[20] See Baas and Brücker (2008) and Zaiceva (2006) for overviews of this literature.

draw on migration from new EU member countries to the UK observed subsequent to EU enlargement in 2004, in order to obtain such estimates. The UK is by far the largest of the countries that have lifted all restrictions immediately upon enlargement.[21] The migration flow from new member countries has turned out to be larger than expected; see Blanchflower and Shadforth (2009). Given the importance of geographical factors for observed migration patterns, as documented in Zaiceva (2006), it seems reasonable to assume that the migrants that have actually sought work in the UK would have gone to Germany, had they been allowed to do so. We thus take the size and the composition of the UK inflow from Eastern Europe as the guideline for our counterfactual German immigration scenario. Needless to say that this is but a rough approximation. Indeed, in view of the gravity forces and cultural ties, this guideline most likely leads to a lower bound estimate of the inflow that Germany would have received with an immediate freedom of movement upon enlargement.

We use the British Labour force surveys (LFS) for the fourth quarters of 2003 and 2006[22] to calculate the inflow of Eastern European workers into the relevant education $\times$ experience cells in the UK.[23] Based on observations of 2003 for the total population, we calculate the yearly percentage increases in the various cells. Using the overall population size in the corresponding cells from the GSOEP for 2005, we then calculate counterfactual immigration numbers for Germany.

Table 3 gives an overview of our counterfactual scenario. Panel A gives end-of-sample (2005) status quo numbers. Panel B reports the absolute numbers ΔM_{ex} and the associated percentage increases that we have calculated following the procedure outlined above. Our baseline scenario holds that the total inflow would amount to just under 700,000 additional workers. Notice that this must be interpreted as inflow of full-time workers. The total inflow would be much larger, as it also includes persons who are outside the labor force. The number of 700,000 is roughly consistent with the forecast of immigration flows to be found in the literature for a time span of 5–10 years.[24] Panel C translates the flow into percentage increases of the entire size of the various labor force cells. The first column for each experience level gives $\Delta(M_{ex} + N_{ex})/(M_{ex} + N_{ex})$.

Our scenario comes in four different versions: (i) A *baseline-scenario*, which takes the numbers detailed in Table 3. (ii) A "*high immigration*" scenario, where we double the total inflow, but keep the composition in line with Table 3. This

[21] Sweden and Ireland have granted free mobility too, but have received migrant flows that are smaller by at least one order of magnitude.

[22] Office for National Statistics (2006, 2007a).

[23] Education levels (ISCED) are derived according to the LFS Users Guide (Office for National Statistics 2007b). The distinction between ISCED 5 and 6 differs from the one in the GSOEP. As ISCED 4 + 5 are mainly specific German degrees, we assume that all persons with ISCED 4–6 have ISCED 6. Experience is calculated as age −16 for ISCED 0–2, age −19 for ISCED 3 and age −22 for ISCED 4–6. Moreover, we replace negative changes in the highest experience group by zero, as this probably reflects a mere cohort effect.

[24] See for instance Zaiceva (2006). Our estimate of 700,000 additional immigrants seems plausible but is of course based on strong assumptions. Sinn et al. (2001) have predicted an inflow of 3 million within 10 years.

Table 3 Counterfactual immigration scenario without German transitional restrictions

Experience	0–10 years		11–20 years		21–30 years		31 years or more		Total	
[A] Number/share of foreign workers in western German labor force; status quo 2005										
ISCED 0–2	646,959	25%	297,894	29%	266,124	23%	238,834	23%	1,449,812	25%
ISCED 3	695,348	17%	396,767	9%	319,290	9%	331,476	10%	1,742,882	11%
ISCED 4–5	236,601	16%	143,821	8%	132,079	13%	93,811	12%	606,311	12%
ISCED 6	298,953	14%	482,065	22%	279,750	18%	265,180	22%	1,325,947	19%
Total	1,877,862	18%	1,320,547	14%	997,243	14%	929,301	14%	5,124,952	15%
[B] Absolute/relative (within-cell) increase of foreign labor force, baseline scenario (i)										
ISCED 0–2	78,854	12%	23,123	8%	1,591	1%	0	0%	103,569	7%
ISCED 3	273,652	39%	177,289	45%	34,465	11%	14,530	4%	499,937	29%
ISCED 4–5	0	0%	0	0%	0	0%	0	0%	0	0%
ISCED 6	68,138	23%	20,417	4%	5,922	2%	0	0%	94,478	7%
Total	420,644	22%	220,829	17%	41,979	4%	14,530	2%	697,982	14%
[C] Relative (within-cell) increase in western German labor force, left col. scenario (i), right col. scenario (iv)										
ISCED 0–2	3.0%	3.1%	2.3%	10.0%	0.1%	5.9%	0.0%	4.5%	1.8%	5.1%
ISCED 3	6.6%	1.8%	4.0%	1.8%	0.9%	1.8%	0.4%	1.3%	3.2%	1.7%
ISCED 4–5	0.0%	1.4%	0.0%	1.5%	0.0%	1.1%	0.0%	0.9%	0.0%	1.3%
ISCED 6	3.1%	1.3%	0.9%	0.7%	0.4%	0.8%	0.0%	0.7%	1.3%	0.9%
Total	4.0%	2.0%	2.4%	2.4%	0.6%	2.1%	0.2%	1.7%	2.1%	2.1%

Scenario	Number	Share ISCED 0–2 (%)	Share ISCED 3 (%)	Share ISCED 4–6 (%)
Alternative simulation scenarios, distribution of new immigrants over education groups				
(ii) "High immigration" scenario	1,395,965	14.8	71.6	13.5
(iii) "High education" scenario	697,982	20.9	35.7	43.4
(iv) "Low education" scenario	697,982	38.6	41.4	20.0

See text for explanation

reflects our interpretation of the baseline scenario as a lower bound, as argued above. (iii) A "*high education*" scenario which assumes that the composition of the inflow equals the one observed for Eastern Europeans in Canada between 1995 and 2000.[25] Finally, (iv) we run a "*low education*" scenario which sets the composition of the inflow equal to the one observed for all immigrants from the accession countries in Germany in 2005.[26]

For all scenarios, we report short-run and long-run effects. We assume that the total inflow occurs over a time span of 7 years. This is equal to the maximum duration of transitional restrictions allowed for by the agreements. Our short run assumes partial adjustment of the capital stock. More specifically, we assume that in each of these 7 years, the gap between the capital stock and its steady state level is narrowed by 10%, whereby investors take the stock of immigrants achieved as permanent. Our short run looks a the position that the economy thus reaches after the initial 7 years envisaged by the transitional agreements. The long run then assumes that the capital intensity has returned to its steady state level. Also, in all scenarios we contrast wage effects when labor markets are Walrasian to a situation where, due to wage-setting institutions, they are not.

3.2 Wages and employment

Table 4 summarizes the simulation results. To save space we aggregate to high- and low-skilled labor, the latter being defined as ISCED 0–3. The underlying bottom-level elasticity estimates (see Table 1) are as follows: $\sigma_1^M = 9$, $\sigma_2^M = 8.9$, $\sigma_3^M = 10.6$, and $\sigma_4^M = 4.3$. The elasticity of substitution across experience levels has been set to $\sigma^x = 100$,[27] while the elasticity of substitution across educational branches is $\sigma^e = 4.6$. For wage-setting (see Table 2), we use $\eta = 0.08$ for the short run and $\eta/(1-a) = 0.14$ for the long run. The first two columns repeat the relevant shocks (see Table 3).

First, turning to the baseline scenario with perfect labor markets, we find negative short-run wage effects for both foreigners and natives. On average, the wage of foreigners would decrease by 2.1% and that of natives by 0.5%—wage cuts that are substantial, but surely not extreme. Indeed, keeping in mind that the assumed migrant inflow equals 14% of the foreign labor force in Germany and 2% of the native labor force, our simulated wage effects seem rather modest. Assuming perfect capital adjustment the results are much more favorable. We still observe a negative effect on the wages of foreigners, but the average wage cut is now only 1.5%. For native wages, we obtain an *increase* of 0.2%.

Allowing for unemployment due to non-Walrasian wage-setting, the signs of the wage effects are the same, but the effects become much smaller. With imperfect capital adjustment the average wage of foreigners decreases by 0.6%, while for

[25] Data come from the OECD-DIOC Database (OECD 2008). It is further assumed that the distribution over experience levels and the overall number of immigrants equal the ones in the baseline scenario.

[26] The experience structure is treated similarly. Data are from the GSOEP.

[27] This takes account of the fact that our estimation results do not allow us to reject $\sigma^x \longrightarrow \infty$, while retaining computability of the model.

Table 4 Simulating German transitional restrictions: wages and employment

	Magnitude of the shock		Employment		Unemployment		Wage-setting		Walrasian wages	
	Inflow ΔM_{ex}	% of $M_{ex} + N_{ex}$	Short (%)	Long (%)	Short (%)	Long (%)	Short (%)	Long (%)	Short (%)	Long (%)
(i) Baseline scenario										
Foreigners low skilled	603,505	18.90	8.43	11.73	6.60	4.52	−0.98	−1.14	−2.74	−2.09
Foreigners high skilled	94,477	4.89	1.08	2.33	3.01	2.03	−0.29	−0.30	−1.43	−0.78
Foreigners total	697,982	13.62	5.48	7.96	5.58	3.89	−0.64	−0.74	−2.11	−1.46
Natives low skilled			−0.41	0.47	0.34	−0.39	−0.05	0.05	−0.58	0.07
Natives high skilled			−0.17	0.61	0.16	−0.56	−0.01	0.08	−0.40	0.25
Natives total			−0.32	0.52	0.27	−0.45	−0.03	0.06	−0.50	0.15
(ii) ''High immigration'' scenario										
Foreigners low skilled	1,207,009	37.81	16.86	23.45	11.39	7.81	−1.95	−2.29	−5.48	−4.18
Foreigners high skilled	188,955	9.78	2.15	4.65	5.76	3.87	−0.57	−0.60	−2.86	−1.56
Foreigners total	1,395,964	27.24	10.96	15.91	9.97	6.94	−1.29	−1.48	−4.22	−2.92
Natives low skilled			−0.82	0.93	0.67	−0.77	−0.09	0.10	−1.17	0.14
Natives high skilled			−0.34	1.23	0.31	−1.12	−0.03	0.16	−0.80	0.50
Natives total			−0.64	1.05	0.54	−0.89	−0.06	0.13	−0.99	0.31
(iii) ''High education'' scenario										
Foreigners low skilled	394,918	12.37	5.20	7.55	4.78	3.21	−0.59	−0.65	−1.81	−1.13
Foreigners high skilled	303,064	15.68	3.76	6.04	8.55	6.91	−0.90	−1.18	−3.92	−3.24
Foreigners total	697,982	13.62	4.63	6.95	6.17	4.58	−0.74	−0.91	−2.83	−2.14
Natives low skilled			−0.30	0.54	0.25	−0.44	−0.03	0.07	−0.50	0.19
Natives high skilled			−0.23	0.49	0.21	−0.45	−0.02	0.06	−0.56	0.13
Natives total			−0.27	0.52	0.23	−0.45	−0.03	0.06	−0.53	0.16

Table 4 continued

	Magnitude of the shock		Employment		Unemployment		Wage-setting		Walrasian wages	
	Inflow ΔM_{ex}	% of $M_{ex} + N_{ex}$	Short (%)	Long (%)	Short (%)	Long (%)	Short (%)	Long (%)	Short (%)	Long (%)
(iv) ''Low education'' scenario										
Foreigners low skilled	558,354	17.49	7.05	10.17	6.66	4.67	−0.93	−1.08	−2.67	−1.99
Foreigners high skilled	139,628	7.23	2.88	4.56	3.36	2.06	−0.35	−0.35	−1.29	−0.62
Foreigners total	697,982	13.62	5.38	7.92	5.65	3.91	−0.65	−0.73	−2.00	−1.33
Natives low skilled			−0.52	0.45	0.43	−0.37	−0.04	0.06	−0.57	0.11
Natives high skilled			−0.29	0.56	0.26	−0.51	−0.02	0.07	−0.44	0.24
Natives total			−0.43	0.49	0.37	−0.42	−0.03	0.07	−0.50	0.17

natives the cut now a mere 0.03%. With perfect capital adjustment, we find a wage reduction of 0.7% for foreigners, and an increase of 0.06% for natives. It is remarkable that the negative effect is stronger with perfect capital adjustment than with imperfect adjustment. This is due to a stronger effect of immigration on employment with perfect capital adjustment; the increase in supply of foreign labor of 13.6% increases the number of employed foreigners by 5.5% with imperfect adjustment, and by 8.0% with perfect adjustment. The relatively weak link of labor supply to employment implies a strong increase in the unemployment rate of foreigners; with imperfect capital adjustment the unemployment rate goes up by 5.6 percentage points and with perfect adjustment it increases by 3.9 percentage points. The effect on native employment is modest. With imperfect capital adjustment the unemployment rate of natives increases by 0.3 percentage points and with perfect adjustment actually decreases by 0.5 percentage points. Altogether, our simulation results indicate that the transitional restrictions have a strong positive effect on incumbent foreign workers. Their effect on native workers, however, is less clear-cut. In the short run, with incomplete capital adjustment, additional immigration has a negative effect also on native workers. However, once capital has adjusted to restore the initial real rate of return, native workers gain from additional immigration.

Looking at the "high immigration" scenario, we find the same pattern of effects as in the baseline scenario, but the numbers are of course larger. From this scenario, two main results of our simulation exercise become obvious: First, immigration to Germany can have a strong effect on employment or unemployment, respectively, but its effect on wages is not substantial. On the one hand, an average decrease in foreign wages of less than 1.5% following an increase of the foreign workforce by 27% is very modest. Even the decrease of 4.2% under the assumption of perfect labor markets and imperfect capital adjustment is not overly large. On the other hand, the unemployment rate of foreigners is quite sensitive, increasing by as much as 10 percentage points in the short run, and by 6.9 percentage points in the long run. To some degree this large employment effect could be due to our model setup (especially the uniform parameter η). However, it is commonly believed that collective labor agreements in Germany magnify the employment effects of labor supply shocks and minimize wage cuts, and that foreigners are likely to be outsiders to the wage-setting process. Hence, foreigners are the main group that would be negatively affected by a more liberal immigration regime.

Our "high education" scenario delivers interesting results. As one would expect, high-skilled employment and wages are more strongly affected, and low-skilled employment and wages are less strongly affected than in the baseline scenario. This holds true for foreigners as well as for natives. However, it is remarkable that fewer immigrants find employment than in the baseline scenario, although the overall number of immigrants is the same. Foreign employment increases by 4.6% with imperfect capital adjustment, and by 7.0% with perfect adjustment, whereas in the baseline scenario it increases by 5.5 and 8.0%, respectively. In addition, wages of foreign workers decrease by more than in the baseline scenario. With perfect capital adjustment, the effect is now -0.91%, compared to -0.74% in the baseline scenario. The effects on native wages and employment do not differ from the

baseline scenario. Nevertheless, these results do not necessarily mean that low-skilled immigration is better for Germany than high-skilled immigration, as the latter may have beneficial effects that lie beyond our setup (e.g., on total factor productivity). The "low education" scenario delivers wage and employment effects for foreigners that hardly differ from the baseline scenario. However, the effect on native unemployment is clearly worse than in the baseline scenario, with +0.37% under imperfect capital adjustment, and −0.42% with perfect capital adjustment.[28]

3.3 Overall welfare effect of transitional restrictions

The wage and unemployment effects from this immigration counterfactual may be seen as the gains and pains that the German economy was spared through opting for transitional immigration restrictions in eastern EU enlargement. Our simulation results enable us to calculate the welfare effects from the counterfactual immigration scenario. With perfect labor markets, the welfare effects for native labor may be approximated by $\mathbf{N}\cdot\Delta\mathbf{w}^N$, where $\mathbf{N}$ and $\mathbf{w}^N$ denote vectors of native labor supply and wages, respectively, for our 16 different types of education and experience levels, and a dot $(\cdot)$ denotes a scalar product.[29] With labor market imperfections leading to changes in native employment, the welfare effect for native labor must take into account employment effects, in addition to changes in wages. The relevant welfare measure for natives generalizes to $\mathbf{L}^N\cdot\Delta\mathbf{w}^N + \mathbf{w}^N\cdot\Delta\mathbf{L}^N$. For the pre-existing stock of foreign workers the effect is $\mathbf{L}^M\cdot\Delta\mathbf{w}^M + \mathbf{w}^M\cdot\left(\Delta\tilde{\mathbf{L}}^M - \Delta\tilde{\mathbf{M}}\right)$, where $\Delta\tilde{\mathbf{L}}^M$ denotes the general equilibrium effect of immigration on employment of foreign workers.

Table 5 presents such welfare calculations for the wage-setting case with unemployment and perfect capital adjustment. We add the percentage effect on capital income to complete the picture. Gains for capital owners are calculated according to $(1-\alpha)\Delta \ln L$, from the Cobb–Douglas marginal productivity condition. This is a lower bound, because it ignores the triangular gain deriving from capital accumulation. At the same time, however, it ignores discounting which works in the other direction. In the baseline scenario the native labor force gains from migration, whereas the foreign labor force suffers. The welfare effect for the total labor force is negative. However, considering the positive effect on capital holders, the overall welfare effect of immigration is positive; assuming a labor income share of 0.7, the overall welfare effect is +0.09%.

In the "high immigration" scenario the overall effect is even more favorable. This is due to the fact that, relative to the gains of natives, the losses of (incumbent) foreigners are less than proportionally higher, as the negative employment effects are partly borne by the immigrants themselves. In the "high education" scenario, and assuming a labor income share of 0.7, we obtain a negative welfare effect of −0.02%. This would indicate that imposing transitional labor market restrictions

[28] When interpreting the numbers from the "low education" scenario in Table 4, one has to bear in mind that the number of persons with ISCED 0–2 is much larger, and the number of persons with ISCED 3 is much smaller than in the baseline scenario. Indeed, the number of persons with an education level higher than ISCED 3 is higher in the low education scenario.

[29] See Felbermayr and Kohler (2007) for a detailed welfare analysis.

Table 5 Welfare effects of German transitional restrictions (relative to initial values)

	$\mathbf{L}^N \cdot \Delta\mathbf{w}^N(\%)$	$\mathbf{w}^N \cdot \Delta\mathbf{L}^N(\%)$	Total (%)	$\mathbf{L}^N \cdot \Delta\mathbf{w}^N(\%)$	$\mathbf{w}^N \cdot \Delta\mathbf{L}^N(\%)$	Total (%)
	Baseline			High immigration		
	Natives			*Natives*		
Low education: ISCED 0–3	0.05	0.36	0.41	0.10	0.71	0.81
High education: ISCED 4–6	0.08	0.58	0.66	0.16	1.17	1.33
Total	0.06	0.46	0.53	0.13	0.93	1.05
	Foreigners			*Foreigners*		
Low education: ISCED 0–3	−1.14	−6.25	−7.39	−2.29	−10.12	−12.41
High education: ISCED 4–6	−0.30	−1.84	−2.14	−0.60	−3.16	−3.76
Total	−0.74	−4.12	−4.86	−1.48	−6.76	−8.24
	Total labor force			*Total labor force*		
Total	−0.03	−0.07	−0.10	−0.06	0.03	−0.04
	Capital Holders			*Capital Holders*		
Total			0.53			1.07
	High education			Low education		
	Natives			*Natives*		
Low education: ISCED 0–3	0.07	0.47	0.54	0.06	0.47	0.53
High education: ISCED 4–6	0.06	0.44	0.50	0.07	0.55	0.62
Total	0.06	0.46	0.52	0.07	0.50	0.57
	Foreigners			*Foreigners*		
Low education: ISCED 0–3	−0.65	−4.08	−4.73	−1.08	−6.55	−7.63
High education: ISCED 4-6	−1.18	−6.16	−7.33	−0.35	−2.21	−2.56
Total	−0.91	−5.08	−5.99	−0.73	−4.46	−5.18
	Total labor force			*Total labor force*		
Total	−0.05	−0.19	−0.24	−0.02	−0.08	−0.10
	Capital Holders			*Capital Holders*		
Total			0.48			0.52

was welfare enhancing for the German population as a whole. However, we believe that the baseline scenario is much more likely than the "high education" scenario. And this means that, at least in the long run, or with perfect capital adjustment, the German population has suffered a welfare loss from the transitional restrictions. It is remarkable that the only population group who is better off due to the restriction are incumbent foreigners.

4 Conclusions

Our simulation results clearly indicate that German factor owners as a whole, and particularly native workers, are unlikely to profit from the transitional restrictions that limit the inflow of migrants from the new EU member states. In the long run, the detrimental effects are most pronounced. Thus, the decision to impose transitional restrictions on immigration from the new EU countries does not appear like a welfare-improving policy. Indeed, it may well have harmed the German population as a whole. In the short run, the effect may be positive,[30] thus potentially justifying the restrictions. However, the only group that appears to benefit consistently are incumbent foreigner workers. This group is unlikely to be pivotal for the political economy process behind the setting of immigration policy. Hence, our conclusion is that it is very hard to rationalize the use of transitional agreements, based on purely economic grounds.

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[30] However, if Ortega and Peri (2009) are right and capital adjusts every year, not even this is the case.

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