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IMPROVING US AND EU IMMIGRATION SYSTEMS

The Labor Market Challenge Does International Migration Challenge Labor Markets in Host Countries? A Critical Review of the Recent and Traditional Literature

by Herbert Brücker



Robert Schuman Centre for Advanced Studies

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**Improving EU and US Immigration Systems' Capacity for Responding to Global
Challenges: Learning from experiences**

**Research Report
Background paper
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**The Labor Market Challenge
Does International Migration Challenge Labor Markets in Host Countries?
A Critical Review of the Recent and Traditional Literature**

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Improving EU and US Immigration Systems' Capacity for Responding to Global Challenges: Learning from experiences

The project is co-funded by the European Commission in the framework of the Pilot Projects on “Transatlantic Methods for Handling Global Challenges in the European Union and United States”. The project is directed at the Migration Policy Center (MPC – Robert Schuman Centre for Advanced Studies – European University Institute, Florence) by Philippe Fargues, director of the MPC, and Demetrios Papademetriou president of the Migration Policy Institute (MPI) the partner institution.

The rationale for this project is to identify the ways in which EU and US immigration systems can be substantially improved in order to address the major challenges policymakers face on both sides of the Atlantic, both in the context of the current economic crisis, and in the longer term.

Ultimately, it is expected that the project will contribute to a more evidence-based and thoughtful approach to immigration policy on both sides of the Atlantic, and improve policymakers’ understanding of the opportunities for and benefits of more effective Transatlantic cooperation on migration issues.

The project is mainly a comparative project focusing on 8 different challenges that policymakers face on both sides of the Atlantic: employment, social cohesion, development, demographic, security, economic growth and prosperity, and human rights.

For each of these challenges two different researches will be prepared: one dealing with the US, and the other concerning the EU. Besides these major challenges some specific case studies will be also tackled (for example, the analysis of specific migratory corridor, the integration process faced by specific community in the EU and in the US, the issue of crime among migrants etc.).

Against this background, the project will critically address policy responses to the economic crisis and to the longer-term challenges identified. Recommendations on what can and should be done to improve the policy response to short-, medium- and long term challenges will follow from the research. This will include an assessment of the impact of what has been done, and the likely impact of what can be done.

Results of the above activities are made available for public consultation through the websites of the project:

- <http://www.eui.eu/Projects/TransatlanticProject/Home.aspx/>
- <http://www.migrationpolicy.org/immigrationsystems/>

For more information:

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Abstract

This paper addresses a classical question: Does immigration reduce wages and increase unemployment in receiving countries? Fears that immigrants take jobs away from natives have been fuelled by the current financial and economic crisis in host countries on both sides of the Atlantic and resulted in tighter immigration policies. From a theoretical perspective, an increasing labor supply through immigration does not necessarily reduce wages, or, if labor markets are not perfect, increase unemployment. In contrast, economic theory predicts that capital stocks adjust to labor supply changes such that aggregate wage levels and the real interest rate remain constant. Similarly, trade and the adjustment of production can absorb changes in labor supply such that immigration leaves wages and employment opportunities unaffected. It remains thus an empirical question, whether and to which extent immigration does actually affect labor markets in host countries.

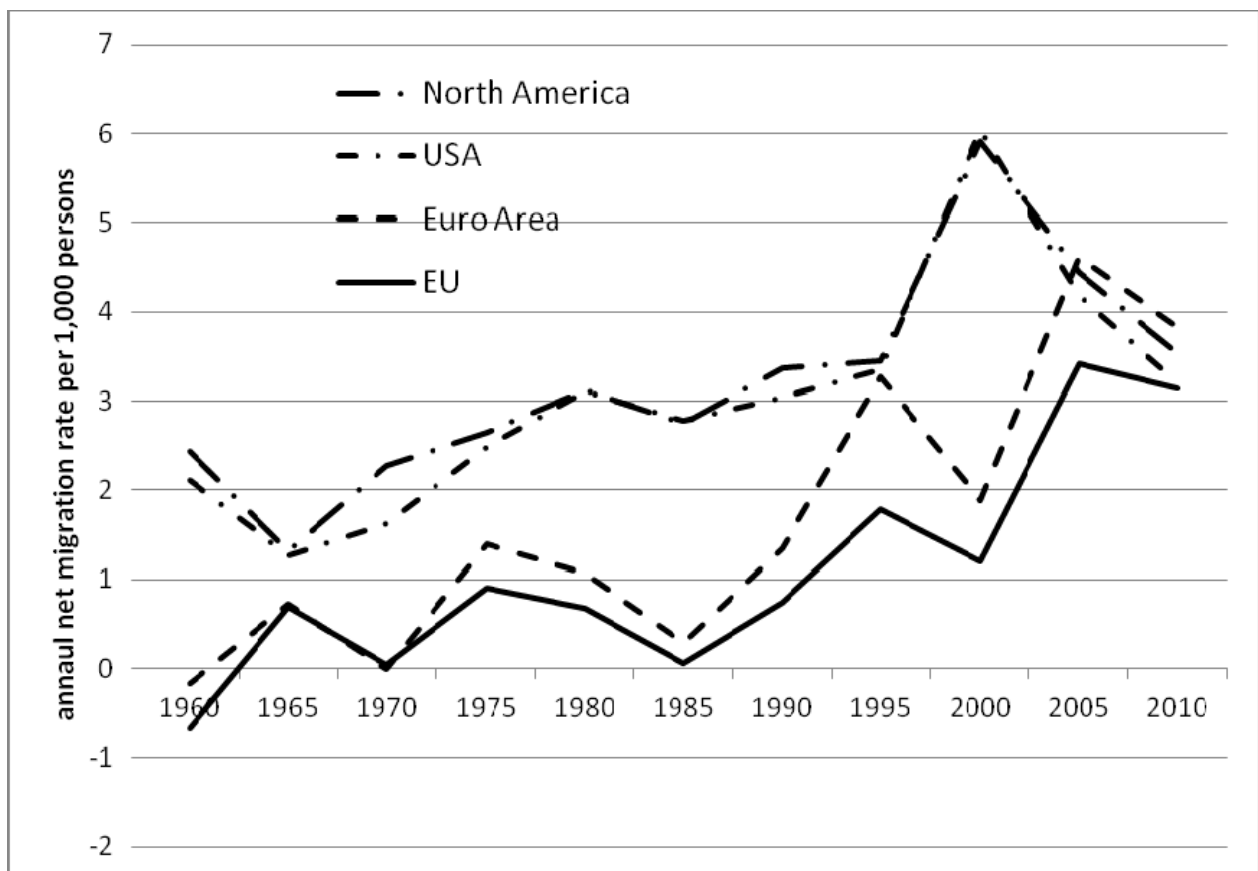
There exists a comprehensive empirical literature addressing these issues. The overwhelming share of this traditional literature uses the variance of the foreigner share across local labor markets for the identification of the immigration effects. Meta-studies of this literature indicate that an immigration of 1 percent of the labor force reduces wages by no more than 1 percent and increased the unemployment rate by less than 1 percentage point. Even these small effects need not to be significant. This literature has been challenged by an increasing criticism which states that the area approach systematically underestimates the wage and employment effects if other factors such as native migration, regional trade and capital mobility equilibrate the effects of immigration across local labor markets. A recent literature uses therefore the variance of the foreigner share across education and work experience groups at the national level for identification. Although some of these studies find effects which are substantially larger than those of the traditional literature, there exist meanwhile a number of studies which find similar aggregate effects as the traditional area approach. These studies consider that capital stocks adjust to labor supply shocks and that natives and immigrants are imperfect substitutes in the labor market, i.e. do not perfectly compete even if they possess the same education and work experience level.

A shortcoming of most of the recent literature is that it does not address the impact of immigration systematically in a setting with imperfect labor markets and persistent unemployment. Novel approaches which consider wage-bargaining and other imperfections, find that immigration can do both, reduce wages and increase unemployment. Although the effects disappear in the long-term when capital stocks adjust, they may affect labor markets significantly in the short term. The most important challenge for immigration and integration policies is however the finding that different groups in the labor markets are affected by immigration in very different ways: While natives tend to benefit across all education groups from immigration, immigrants lose substantially from further immigration in terms of lower wages and higher unemployment. Addressing these inequalities forms the main challenge for immigration, integration and related labor market policies.

1. Introduction

The international migration of workers is an often underrated dimension of globalization: Against the background of large and persistent differences in wages and per-capita income levels between the destination and sending countries of migration, falling costs of transport and communication and institutional changes such as introducing the free movement of workers in the enlarged European Union (EU) and the liberalization of immigration conditions for high-skilled immigrants all over the world, migration rates have tended to increase during the last decades. Net migration rates in Europe have step by step converged to rates common in the United States and number meanwhile 3 persons per thousand (World Bank, 2011, see Figure 1). High immigration levels in the Southern European countries and the EU's Eastern enlargement have substantially contributed to this trend. At present, migration stocks amount to almost ten per cent of the population in the high income countries of the OECD and tend to increase further. Clearly, the global financial crisis has resulted in a backlash. Migration rates have declined in the course of the crisis in many receiving countries as it was the case in past downturns of the business cycle. Tighter immigration policies which are pursued in many important destination countries on both sides of the Atlantic today have further contributed to this trend. As Figure 1 shows, the decline in migration rates is particularly emphasized in Northern America. Nevertheless, it is reasonable to expect that migration rates will again achieve or even exceed levels before the crisis in the course of an economic recovery. Labor supply shortages in the context of demographic change and ages might further contribute to increasing migration rates in the future.

Figure 1. Net migration rate per 1,000 in the EU, the Euro Zone, the USA and Northern America, 1960-2008



Source: Own calculations based on World Development Indicators data.

The high level of immigration has raised concerns in the population and the workforce of receiving countries. Beyond problems of economic and social integration, these concerns focus mainly on the impact of immigration on labor markets, or more specifically, on two questions: Does the increasing supply of labor through immigration reduce wages of natives in receiving countries? And, if labor markets are not perfect, does it increase unemployment? For long periods of time, the academic and political discussion in the United States focused more on the question whether immigration might reduce wages, while in Europe, where labor market institutions have been more rigid and unemployment rates higher, the question whether immigrants take jobs away from natives has been much more important. Meanwhile, as a consequence of the financial crisis and the great recession, unemployment rates in the US have achieved or even exceeded European levels. Thus, the question, whether immigration increases unemployment, has become increasingly important on both sides of the Atlantic.

The question whether and to which extent immigration reduces wages and increases unemployment is controversial in the theoretical and empirical literature. Starting with the 1990s, a large literature which meanwhile comprises several hundred studies has evolved which addresses these questions. During the last years there has been important progress in the empirical literature in the US and in Europe, which provides new insights on the labor market effects of immigration. Drawing on previous surveys of the traditional literature (e.g. Friedberg and Hunt, 1995) this paper reviews the traditional and recent literature with a particular focus on the empirical findings. The argument is structured as follows: First, against the background of insights drawn from theories of the labor market and international trade and factor movements different hypotheses of the labor market effects of international migration are discussed (Section 2). Second, traditional and more recent approaches to measure the labor market effects of immigration are presented. In this section, we draw a special attention to the question, whether these approaches are useful to measure the labor markets effects of migration in an environment with imperfect labor markets and unemployment which is meanwhile relevant for both sides of the Atlantic (Section 3). The final section draws conclusions for economic policies (Section 4).

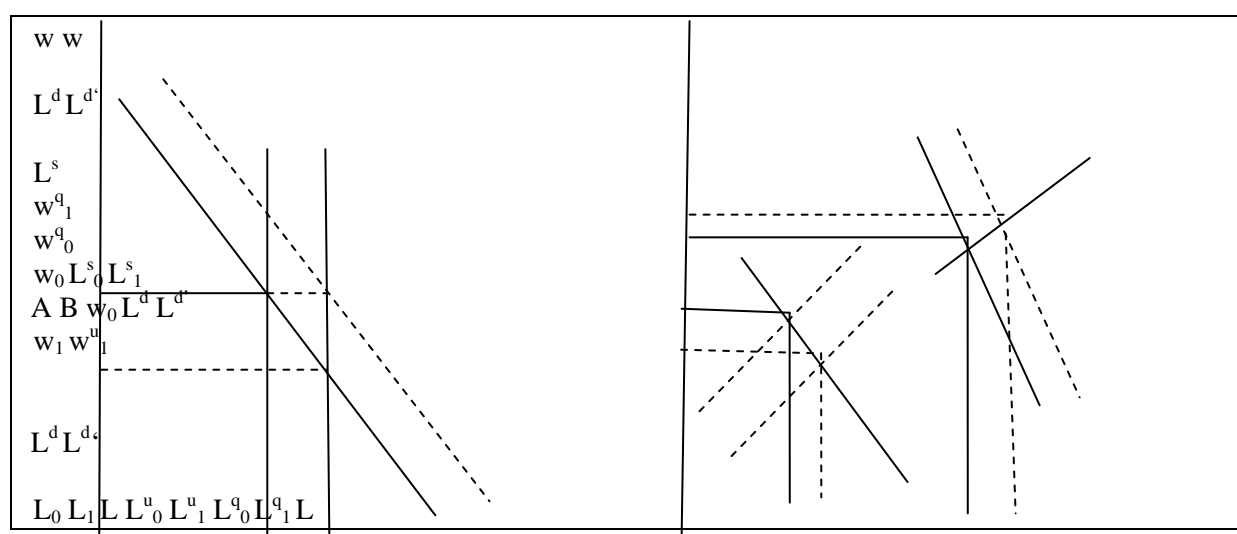
2. Insights from theories of the labor market and international trade

At first glance, it seems reasonable to propose that an increasing supply of labor through immigration reduces wages, and, if labor markets are imperfect and wages are rigid, increases unemployment. However, from a theoretical perspective this result is far from self-evident. For an analysis of the mechanisms how immigration can affect labor markets we proceed here step by step. As a starting point, we analyze the impact of immigration in a closed economy with perfect labor markets. This corresponds to the textbook case which has shaped also the public perception on the consequences of immigration. Building on this, we analyze the impact of immigration in economies with wage and price rigidities.

2.1 Immigration in economies with perfect labor markets

Let's start with the standard case of an economy with clear labor markets, a fixed capital stock and without any international trade and other factor movements beyond migration. For the sake of convenience, we also assume that labor supply is inelastic, i.e. that the labor supply does not fall if wages decline. As the left-hand side graph in Figure 2 shows, an increasing labor supply through immigration from L_0 to L_1 results in a decline of wages from w_0 to w_1 . Thus, the loss in earnings of workers who already live in the receiving country equals the area A. Enterprises benefit from falling wages and the expansion of production, such that a fixed capital stock and the falling wage demand curve, L^d , increase profits by the areas A + B. Altogether, the increase in total earnings of the native population in the receiving country increase by the area B. The converse case is true for the sending countries: Wages increase there, profits of capital owners fall and the earnings of the population which stays behind fall. They can only benefit if migrants transfer some of their earnings back home (see e.g. Wong, 1995).

Figure 2. Adjustment of wages to labor supply changes



Heterogeneity of workers: net substitutes and complements

So far we have simplified the analysis by assuming that workers are homogeneous. In fact labor can be distinguished by many dimensions – education and occupation, work experience, age, language proficiency, cultural factors and ethnic background. The graph on the right-hand side of Figure 2 illustrates the case of immigration, where we have two types labor, let's see less-skilled workers and skilled workers. We consider moreover the case of elastic labor supply, i.e. the case where the labor supply declines and (voluntary) unemployment is increasing if wages are falling.

If immigration increases under these assumptions the supply of less-skilled labor, the labor supply curves shift, from L^S to $L^{S'}$. The wage of qualified workers falls from w^q_0 to w^q_1 , and employment increases from L^q_0 to L^q_1 , but less than the number of the immigrated workers. This can be traced back to the fact that the labor supply is falling if the wages declines.

For the other segments of the labor market, in our example for the high-skilled workers, we have two ambiguous effects. On the one hand, the increasing supply of labor expands production. This increases the labor demand for skilled workers (the so-called scale-effect). On the other hand, skilled labor can be substituted by unskilled labor, since the wage for unskilled labor has declined. This so-called substitution effect reduces labor demand for skilled workers (e.g. Hamermesh 1993).

It remains an empirical question, which of these two effects dominates. As an example, it is not very likely that engineers can be substituted by low-skilled workers, such that this group will most likely benefit from low-skilled immigration. But it is perhaps more likely, that low skilled workers might replace some workers with a vocational training degree, such that those workers might suffer at the end. The graph at the right-hand side of Figure 2 assumes that the scale-effect dominates the substitution effect such that the net effect on skilled workers from unskilled immigration is positive, i.e. that their wages tend to increase and, at a given labor supply curve, that their employment tends to increase.

Adjustment of capital stocks

However, this textbook case is far from realistic. In particular, the assumption that capital owners will hold capital stocks fixed contradicts any economic intuition. Profits and the real interest rate is increasing, such that firms which tend to maximize profits will invest until capital stocks adjust, i.e. until we are eventually back to the same capital-labor ratio which we had before the immigration of labor. This is exactly what growth theory predicts, i.e. the standard neoclassical growth model with constant

savings (Solow, 1956) and endogenous savings (Ramsey, 1928; Cass, 1965; Koopmans, 1965). In case of international capital mobility, the adjustment of the capital stock might be even faster. However, if the capital stock adjusts completely, the labor demand curve in Figure 2 would shift from L^d to $L^{d'}$, while the wage stays constant at w^0 – i.e. there would be no loss in earnings for the workers.

These considerations might look arbitrary at first glance. Actually, it is one of the few robust empirical facts in economics that the ratio of capital to output remains constant in developed countries irrespective of labor supply shocks or other shocks to the economy. This has been first described by Nicholas Kaldor already in 1961 and been supported by numerous studies since then. However, if the ratio of capital to output remains constant, the ratio of capital to labor remains constant as well if we adjust for productivity changes. It is also important to note that these adjustments take place in rather short periods of time: As Ottaviano and Peri (2006) have shown for the US and Brücker and Jahn (2008) for Germany, it takes only a couple of years until the capital-output ratio is back to its old levels after significant labor supply shocks if it changes at all. This can be traced back to international capital mobility and to the fact that most labor supply changes take place continuously and are thus anticipated by investors. We can thus conclude that there exists strong empirical evidence that capital stocks eventually adjust to labor supply shocks, such that aggregate wages tend to remain constant at least in the long-run.

Adjustment of trade and goods markets

Not only capital stocks, but also goods markets adjust to labor supply changes in open economies. According to the standard model of foreign trade theory, the Heckscher-Ohlin-Samuelson model, each economy will export those goods which use intensively those factors in production which are abundant in the economy, and import those goods, which use intensively factors in production which are relatively scarce. Increasing the labor supply through immigration will thus result that the share of labor intensive production will increase, while the share of capital intensive production will fall (so-called Rybczynski effect). As a consequence, the economy will import less labor intensive goods and export less capital intensive goods. In case of a small country, for which prices on global goods markets are given, the prices on the goods markets remain constant although the endowment with labor has changed. This in turn has the consequence that the prices on factor markets, i.e. wages and the returns to capital, remain constant.

2.2 Immigration in economies with imperfect labor markets and unemployment

All models discussed so far rely on the assumption that labor markets are perfect, i.e. that wages are flexible and that markets clear. Under these assumptions the labor supply can fall as a consequence of declining wages, but all unemployment is voluntary. However, the main concerns related to labor migration focus on the question whether extending the labor supply through immigration will result in increasing unemployment. These concerns form the background of the restrictive immigration policies most continental European countries pursued after the oil price shocks in the 1970s and the 1980s and implement again today in the course of the financial and economic crisis. It is therefore difficult to derive from neoclassical models of the labor market meaningful *propositions* for immigration and economic policies which have to deal with imbalances in the labor markets in the receiving countries. To this end, we need models which systematically address the impact of migration in a context with imperfect labor markets and temporary or persistent unemployment.

Theories of the labor market and the macroeconomics provide a wide range of explanations for the phenomenon of structural, frictional and cyclical unemployment, which can all contribute in one way or another to understand the implications of immigration in economies with imperfect labor markets. To address all these approaches is beyond the scope of this review. We focus here on a simple framework, which analyze these effects of immigration in an environment where wages and prices adjust not perfectly to labor supply changes (see e.g. Layard et al., 2005). In these models the

traditional labor supply function is replaced by a “wage-setting curve”, which assumes, that the wage tends to decline if the unemployment rate is increasing. This macroeconomic relationship is well supported by strong empirical evidence. In fact, wages tend to adjust to changes in the unemployment rate, but not perfectly. As a consequence, temporary or structural unemployment can emerge. The existence of a wage-setting curve can be explained by a number of microeconomic theories of the labor market, e.g. by collective wage bargaining theories, by efficiency wage theories and by search-and matching theories.

Meanwhile there exist a number of studies which use wage-setting models for the analysis of the wage and employment effects of immigration (Boeri and Brücker, 2005; Brücker and Jahn, 2011, Felbermayr et al., 2010; Levine 1999) the impact of immigration on unemployment is ambiguous in these models. In the simple case of only one type of labor an increase in labor supply would result in both lower wages and higher unemployment, if the capital stock does not adjust completely to the labor supply change. In the case of different types of labor the aggregate unemployment rate can also decline: The aggregate effects depend on how wages respond to an increase in labor supply in the respective segments. If the wages are relatively flexible in labor market segments where the labor supply is extended, the aggregate unemployment may also fall, since the expansion of labor supply creates an additional labor demand in the less flexible segments. Of course, we can also consider the converse case, where immigration into the less flexible segments of the labor market increases aggregate unemployment (see e.g. Boeri and Brücker, 2005; Brücker and Jahn, 2011).

Even more complicated is the case when immigration itself affects the wage-setting mechanism. This can be easily the case if the labor supply of immigrants reacts more elastically to changes in the unemployment rate, or if they reduce the bargaining power of trade unions in collective bargaining since they participate less in unions and underbid collective wage agreements. This might result in falling wages, higher wage flexibility and, hence, lower unemployment. At the same time, the shape of the Phillips-curve, which maps the relationship between inflation and wages, would become flatter, such that the room for expansionary macroeconomic policies would increase (Binyamini and Razin, 2008; Bentolila et al., 2008).

Whether this is indeed the case, it is not yet sufficiently empirically proved. A study on Spain claims that immigration has substantially shifted the Phillips-curve, which in turn explains why the immigration of about ten per cent of the population there has gone hand in hand with a reduction of the unemployment rate by 6 percentage points before the financial crises (Bentolila et al., 2008). It is thus possible, that the immigration might result in declining unemployment rates, albeit the reduction in unemployment has been the consequence of falling wages at least in parts of the labor markets.

To sum up, our theoretical considerations suggest that the wage and employment effects of immigration depend heavily on the assumptions of the respective models. While the standard model of a closed economy with a fixed capital stock predicts that immigration will reduce wages and/or increase unemployment at least in the labor market segments which are directly affected by immigration, the aggregate effects of immigration can be neutral if capital stocks or the international goods markets adjust to the increasing labor supply. Nevertheless, in this case we still expect that immigration changes wages and employment opportunities for different groups of workers, depending on how they are affected by the labor supply shock. In models with imperfect labor markets immigration can do both, reduce wages and increase unemployment, depending again on the adjustment of the capital and goods markets. However, unemployment rates don't have to increase necessarily: If immigrants enter flexible segments of the labor market the additional labor demand created in the inflexible segments by the expansion of production may result in an aggregate decline of the unemployment rate. Finally, immigration can change the wage-setting mechanism and, by reducing the bargaining power of workers, increase wage flexibility and reduce unemployment. Overall, it remains an empirical question which kind of effects dominate.

3. Empirical findings in the traditional and novel literature

The empirical literature on the labor market effects of immigration has experienced a comeback in the last decade as a consequence of a number of methodological innovations. There has already existed a broad empirical literature comprising several hundred studies in the US and Europe which has emerged during the 1980s and 1990s, which have tempted to measure the wage and employment effects of immigration. The new literature draws of course on this traditional literature, such that it is of course worthwhile to look first at the findings of this older strand.

3.1 Traditional approaches to estimate the wage and employment effects

The overwhelming share of the empirical literature uses the variance of the foreigner share across different regions of a country (municipalities, labor market districts, etc.) or across countries for the identification of the wage and employment effects of immigration. These regressions explain wages (or (un-)employment rates) by the foreigner share in the respective region and a number of covariates, which should control the effects of other variables. Under the stark assumption, that the foreigner share is not correlated with the wage or the (un-)employment rate, it is possible to identify the labor market effects of immigration correctly by this procedure (Borjas et al., 1997). Of course, this assumption is usually not satisfied: Migrants tend to move into regions where wages are above and unemployment rates below the national average. However, if the distribution of migrants is correlated with wages or (un-) employment rates, then the labor market impact of migration cannot be properly estimated. A naïve estimation equation, which simply regress the wage rate or the (un-)employment rate against the foreigner share, could therefore easily yield the spurious result that migration increases wages and reduces unemployment.

Empirical studies which use the regional variance of the foreigner share have therefore applied different strategies to address this endogeneity problem. The first strand of this literature uses natural experiments where migration has been triggered e.g. by political events rather than by economic motives to identify the migration effects. The seminal example in the literature is the Mariel Boatlift, i.e. the event of a mass emigration from Cuba into the region Miami which has been made possible by a surprising emigration permission issued by Fidel Castro in 1982. This episode has increased the population in the Miami region, where 50 per cent of these migrants have moved, by 8 per cent. David Card (1990) has exploited this natural experiment and has not found any significant correlation between the immigration from Cuba and the development of wages and unemployment in the Miami region. Similar studies have used other natural experiments such as the return migration of French nationals after the Algerian independence (Hunt, 1992) as well as the return migration of colonists from Portugal after the independence of Angola and Mozambique in the course of the 1974 revolution (Carrington and Da Lima, 1996). All these studies find only moderate wage and employment effects if at all. A recent study has used the migration of ethnic Germans (“Spätaussiedler”) to Germany after the fall of the Iron Curtain in 1989, which have been arbitrarily distributed across German municipalities by the government as a natural experiment. This study also finds negligible wage effects, but substantial employment effects.

If the distribution of foreigners across regions is indeed driven by political or other measures rather than by economic motives, it is reasonable to assume that the foreigner share depends not on labor market variables. However, pure natural experiments are relatively scarce. The overwhelming share of the empirical literature applies therefore statistical methods to address the potential endogeneity problem. The standard approach is to use instrumental variable technique in the regression. Instrumental variables are variables which are correlated with the foreigner share, but not with the labor market variables which the regression tempts to explain. By using proper instrumental variables it is possible to correct for the estimation bias which results from the endogeneity of the foreigner share. The problem is to find proper instruments. Most studies uses lags of the foreigner share as an instrument, which, however, does not help if past migration is already correlated with the current

situation in the labor market. Other approaches use so-called differences-in-difference estimation procedures, where changes of the relevant variables are used in the regression (e.g. Gavasto et al., 1999). This would help if the wage growth or the (un-)employment growth is uncorrelated with the growth of the foreigner share, however, this is again not necessarily true. Thus, this literature is subject to criticism which states that the wage and (un-)employment effects of immigration might be underestimated by the overwhelming share of the literature.

To sum up, studies based on natural experiments have better reputation in the field compared to those which rely only on instrumental variable estimators or differences-in-differences estimation procedures for the identification of immigration effects. Nevertheless, there is also an increasing criticism of all studies applying the area approach, including natural experiments: Studies which use the regional variance of the foreigner share for identification of the immigrant effects rely all on the assumption that regional labor markets are closed entities. However, this is questionable. As George Borjas argues, the influx of immigrants may trigger the outflow of natives, such that the effects of immigration spill-over also to other regions (Borjas et al. 1997; Borjas 2003). However, the empirical evidence for this argument is weak – there is hardly any correlation between the inflow of migrants into a region and the outflow of natives from there (Card and Di Nardo, 2000; Card 2001; Card 2005). However, recent evidence proves that there is a negative correlation between migration inflows and the inflows of natives into the same region in Italy (Brücker et al., 2011). Even more importantly, trade and capital flows are likely to equilibrate the immigration effects across regions. As a consequence, studies which use the regional variance of the foreigner share tend to underestimate the immigration effects systematically (Borjas, 2003; Borjas et al., 1997). This is indeed what we would expect if we consider the insights from the theories of trade and factor movements as relevant.

**Table 1. Wage- and employment effects of immigration:
findings of selected regional regression studies**

Study	Sample and country	Wage effect ¹	Employment effect ²
<i>Meta-Studies</i>			
Longhi et al. (2008)	854 effects in 21 countries	-0,10	--
Longhi et al. (2006)	165 effects in 7 countries	--	-0,024
<i>Selected international studies</i>			
Card (1990)	Miami in comparison to other US regions (natural experiment)	no correlation	no correlation
Borjas et al. (1997)	regionen and states across the USA	-0,11 to -0,21	--
Hunt (1992)	regions in France (natural experiment)	0,00 to -0,80	up to -0,20
Carrington/DaLima (1996)	regions in Portugal (natural experiment)	-0,15 to -2,50	--
Winter-Ebmer/ Zweimüller (1996)	regions in Austria		
Dustmann et al. (2005)	regions in UK	Insignificant	insignifikant
DeNew/Zimmermann (1994)	regionen in Germany	0,00 to -0,10	--
Haisken-DeNew/ Zimmermann (1995)	regions in Germany	0,00	--
Bauer (1997)	labor market regions in Germany	0,00	--
Gavasto et al. (1999)	differences-in-difference estimation across Italian labour market regions	0.00	0.00
Glitz (2008)	distribution of „Spätaussiedler“ (ethnic Germany) across German regions (natural experiment)	-0,06	-0,13
Pischke/Velling (1997)	167 regionen in Germany	--	insignificant, u-rate between 0,00 and 0,20
Winter-Ebmer/ Zimmermann (1998)	industry branches in Germany	-0,02	0,025
Mühleisen/ Zimmermann (1994)	regions in Germany	--	insignificant
Winkelmann/ Zimmermann (1993)	regions in Germany	--	Insignificant
1) Change in % at an increase of the foreigner share in employment or the labor force by 1 %-point.-- 2) Change in %-points at an increase of the foreigner share by 1 %-point.- All calculations have been harmonized.			

Sources: Own compilation and harmonized calculations based on findings of studies mentioned.

Despite all this methodological and empirical criticism, several hundred studies have applied the area approach to identify the impact of immigration on wages and (un-) employment in the US and many European countries. Table 1 presents the findings of meta-studies of this literature and some selected studies which are particularly important and might be representative for this literature. The overwhelming share of this literature does find only moderate wage and employment effects of immigration if at all. Increasing the share of the foreign population in the labor force or employment by one percentage point reduces wages by less than one percent and increases the unemployment rate (or reduces the employment rate) by a mere 0.026 percentage points, as the meta-studies of this literature by Longhi et al. (2006, 2008) indicate. These moderate effects do not only hold for the US, even the findings in the continental European countries display no larger effects: The wage elasticity varies in Europe between 0.00 and -0.1, while the unemployment elasticity is about zero in most European studies. Even the methodologically sophisticated study by Pischke and Velling (1997) does not find a significant impact of immigration on wages in Germany, while the effects on the unemployment rate vary by between zero and 0.2 percentage points depending on the specification of the model.

Altogether, we can conclude that the traditional literature, which uses the regional variance of the foreigner share for identification, finds that the impact of immigration on wages and employment opportunities is either neutral or very small. However, due to other factors which might equilibrate the immigration effects across regions, this literature has become subject of increasing criticism since the end of the 1990s.

3.2 New approaches to estimate the wage and employment effects

Against the background of the methodological problems of the area approach, George Borjas (2003) has suggested to use the variance of the foreigner share across education and work experience segments of the labor market at the national level instead of its regional variance for the identification of the wage effects of immigration. Under the assumption that immigration is not driven by wage differences across education and work experience groups, this approach would allow identifying the immigration effects properly without being affected by the endogeneity trap of the area approach. Although the wage premium across skill groups might somewhat affect migration decisions, the identifying assumption of this approach seems not to be too demanding.

In this paper, George Borjas (2003) pursues two estimation strategies: The first strategy is a simple regression approach, where a complex set of dummy variables controls for education, experience and time fixed effects as well as an all possible interaction of these effects. The second strategy derives the immigration effects from a production function framework, where the parameters of the production function are estimated and the immigration effects are calibrated. This allows considering also cross-effects of immigration, e.g. not only the direct effects on workers of the same skill and work experience groups, but also the effects which are created for workers in other cells of the labor market e.g. via the expansion of production. At least theoretically the second approach would be more appropriate to capture the entire effects of immigration. However, measurement error and other sources of imprecise estimation might affect the findings of the second approach.

The results in the Borjas (2003) study suggest that the findings of both approaches are very similar. However, he finds much larger effects of immigration than the previous literature: An immigration of one percent of the labor force reduces wages by between 0.3 and 0.4 percent in the US. Particularly affected are less skilled workers, e.g. high-school dropouts. Interestingly enough, these findings are also supported by estimates based on the same approach for Canada and Mexico (Aydemir and Borjas. 2005).

However, the results of Borjas (2003) have been challenged some years later in a study by Ottaviano and Peri (2006, 2011). They also apply the national-level approach and use a similar dataset for the US. Two main aspects distinguish their approach: First, they consider the adjustment of the capital stock. Their estimation results support the Kaldor (1961) stylised fact that the capital-output-

ration remains constant in the long-term. Moreover, they find that the capital stock adjusts relatively fast to labor supply shocks. Second, their study considers that natives and immigrants might be imperfect substitutes in the labor market, even if they share the same skill level and work experience. This can be caused by different factors, i.e. language proficiency, cultural and ethnic differences or simply labor market discrimination. Considering both aspects has far-reaching consequences: First, they find much smaller aggregate effects of immigration on wages compared to the Borjas (2003) study. This is mainly caused by the consideration of capital stock adjustment. Overall, their aggregate effects look very similar to those in the traditional literature based on the area approach. Second, their study highlights that immigration affects individual groups in the labor market very differentially: While most groups of native workers tend to win through immigration, immigrants already living in the US tend to lose from further immigration (Ottaviano/Peri 2006, 2011).

The question, whether immigrants and natives are indeed imperfect substitutes in the labor market remains highly controversial. While Borjas et al. (2008) claim that the Ottaviano and Peri (2006, 2011) finding is basically driven by a misclassification of education groups, Ottaviano and Peri (2008) tempt to demonstrate that their findings are robust even if other classification procedures are applied. While this controversy will be hardly ever resolved, there exist meanwhile evidence in a number of studies in other countries which support the imperfect substitution hypothesis: This is inter alia proved for the UK by Manacorda et al. (2006, 2011), and for Germany by Brücker and Jahn (2011), D'Amuri et al. (2010) and Felbermayr et al. (2010).

**Table 2. Wage and employment effects of immigration:
Findings of regression studies and structural models at the national level**

Study	Method	Wage effect ^{1,3}			Employment effect ^{2,3}		
		All	Natives	Foreigners	All	Natives	Foreigners
Borjas (2003), USA	Regression analysis	-0.40	--	--	-0.37	--	--
	Production function	-0.32	--	--	--	--	--
Aydemir/ Borjas (2005), (Canada, USA, Mexico	Regression analysis	Canada	--	--	-0.24	--	--
		Mexico	--	--	0.06	--	--
		USA	--	--	-0.35	--	--
	Production function	Canada	--	--	--	--	--
		Mexico	--	--	--	--	--
		USA	--	--	--	--	--
Ottaviano/ Peri 2006 (USA)	Production function	-0.10 (0.00)	0.11 (0.16)	-1.85 (-1.80)	--	--	--
Ottaviano/ Peri (2011) (USA)	Production function	-0.10 (0.00)	-0.04 (0.06)	-0.68 (-0.58)	--	--	--
Bonin (2005) (Germany)	Regression analysis	-0.10	--	--	insignificant	--	--
Brücker/ Jahn (2011) (Germany)	Wage-setting model	-0.18 (0.00)	-0.08 (0.11)	-1.11 (-1.09)	-0.31 (-0.08)	-0.09 (0.06)	-1.97 (-1.16)
D'Amuri et al. (2010) (Germany)	Production function	(0.00)	(0.69)	(-3.42)	0.07 to 0.33	0.10 to 0.27	0.00 to -0.20
Felbermayr et al. (2010) (Germany)	Wage-setting model	--	-0.02 (0.06)	-0.32 (-0.58)	--	-0.17 (0.10)	-1.88 (-0.34)
1) Change in % at an increase of the foreigner share in employment or the labor force by 1 %-point.-- 2) Change in %-points at an increase of the foreigner share by 1 %-point.—3) Long-run effects, i.e. under consideration of complete capital stock adjustment, in parentheses.							

Sources: Own compilation and harmonized calculations based on findings of studies mentioned.

Table 2 summarizes the results of the recent studies. In some studies it is important to distinguish the short-run effects, i.e. the effects of immigration when the capital stock has not or not completely adjusted to the labor supply change, from the long-run effects, when the capital stock has completely adjusted and the capital-output ratio has been restored. The long-run effects are presented in parentheses. While Borjas (2003) and Aydemir and Borjas (2005) find that a one percent increase of the labour force through immigration reduces the average wage level by 0.3 to 0.4 percent depending on the model and the country, the findings of Ottaviano and Peri (2006, 2011) suggest that aggregate wages fall only by 0.1 percent in the short-term. Similarly, the German studies find an elasticity of about 0.1 in the short-term (0.18 at the maximum). In the long-run, after the adjustment of the capital stock, there is no impact of immigration on the aggregate wage level.

An intriguing finding of this literature is that different groups in the labor markets are affected in very different ways by immigration: The wages of the native population tend to increase in almost all education groups in those studies which consider that immigrants and natives are imperfect substitutes at least in the long-term. In the short-term, when capital stocks have not yet adjusted, some of these studies find small losses of native workers, others small gains. In contrast to natives, the foreign labor force suffers substantially from further immigration: their wages decline by between 0.3 and 3.4 percent, depending on their skill levels and the skill composition of the labor supply shock. The large losses of immigrant workers can be traced back to two main causes: First, observable human capital characteristics such as education and work experience of the new arrivals are much more similar to those of the preexisting immigrant workforce compared to that of the natives. Second, immigrants and natives are imperfect substitutes even if they share the same observable human capital characteristics. Both aspects have the consequence that newly arrived immigrants compete much more with the preexisting foreign workforce than with natives in the labor market.

3.3 Novel approaches which consider imperfect labor markets

The approaches discussed in the previous section either ignore the impact of immigration on unemployment completely or analyze the impact of immigration on unemployment separately in wage and employment regressions. In particular the approaches which derive the wage effects of immigration from structural models based on production functions rely on the assumption that labor markets clear. However, there is striking evidence that labor markets are not perfectly competitive and that wage are characterized by rigidities (see e.g. Boeri and van Ours, 2008). Most European countries are characterized by high and persisting unemployment rates for long periods of time. Moreover, the financial and economic crisis has demonstrated that unemployment is a highly relevant phenomenon also in labor markets which have a lower level of employment protection and welfare benefits such as the US labor market. Models which rely on the assumption of clearing labor markets might therefore yield misleading conclusions. Note also that approaches which analyze the wage and employment effects separately can deliver spurious results if wage and employment effects interact with each other and if there are demand spillovers between different segments of the labor market.

A new empirical approach to analyze the wage and employment effects of immigration simultaneously has been proposed by Brücker and Jahn (2011).¹ This approach is based on a wage-setting model (see above). Consider the case of collective wage bargaining, where trade unions and employer federations agree on wage levels. If unions act in a rational way, they will reduce wage requests if the unemployment rate increases. Agreed wages tend therefore to decline if the unemployment rate is increasing and vice versa. Once wages are fixed, the firms adjust employment in a way that maximizes profits. This ‘right-to-manage’ assumption has interesting implications for the identification of the wage and employment effects of immigration: The elasticity between the wage and the unemployment rate can be estimated empirically, as well as the labor demand functions of the

¹ See Felbermayr et al. (2010) for an approach which applies a similar framework.

firms. Combining these two pieces, allows calculating the wage and employment effects of immigration simultaneously.

In the empirical implementation of their approach, Brücker and Jahn (2011) estimate the wage-setting curves and the labor demand functions separately for different groups in the labor market. This allows considering different levels of wage flexibility in different segments of the labor market. They find indeed that the wage flexibility varies largely for different types of workers. It is particularly high for young workers and for workers with a university degree. The first finding is highly relevant in the migration context, since many immigrants are young when they arrive in the host country. The labor demand functions are derived from a nested production function approach in a similar way as in the Borjas (2003) and Ottaviano and Peri (2006/2011) studies.

The findings of this study indicate that an immigration of one percent of the labor force in Germany reduces aggregate wages in the short-term by 0.18 percent, while the long-run effects are zero. The average unemployment rate increases in the short-term by 0.32 percentage points, but only by a mere 0.09 percentage points in the long-term (Brücker and Jahn, 2011). These results are based on the assumption that the education and age structure of the new arrivals equals that of the structure of the immigrant population at the sample average during the 1980 to 2004 period in Germany. This implies that immigrants have very low skill levels compared to the native workforce. This explains also that unemployment increases in the long-term, i.e. after the adjustment of capital stocks: the immigration of workers which are characterized by an average unemployment risk which is much higher than that of the total workforce increases the average unemployment rate. This is a composition effect rather than a replacement effect.

For a comparison of this approach with the standard model relying on the assumption of perfect labor markets it is useful to calibrate the effects under the counterfactual assumption of clearing labor markets: In this case, the short-term wage effects would be about one-third larger, while the impact on unemployment is by definition zero (Brücker and Jahn, 2011). Thus, the standard models which assume clearing labor markets tend to overestimate the wage effects of immigration.

More important than the average immigration effects is the impact on specific groups in the labor market. Again, there are striking differences in the labor market effects between natives and immigrants: While native workers benefit in all education groups from immigration in terms of higher wages and lower unemployment at least in the long-term, wages and employment opportunities of the immigrant workforce are substantially reduced: at an immigration of one percent of the labor force, the wages of the pre-existing immigrant workforce decline by 1.1 percent and the unemployment rate increases by 1.16 percentage points. Thus, we can explain about one-third of the fall in wages and increase in unemployment which we can observe in the foreign labor force in Germany during the 1990s by further immigration.

Changing the skill and age structure of the immigrant labor force would substantially improve the overall effects of immigration: The higher the skill level of the immigrant labor force and the lower their age is, the more favorable are the effects of immigration on the labor market at least at the aggregate level. More specifically, if the immigrants are sufficiently young and the share of individuals with a university degree is sufficiently large, immigration would reduce the average unemployment rate in Germany. This is caused by the fact that an increase in these flexible segments of the German labor market would increase labor demand in the less flexible segments which are disproportionately affected by unemployment. Similar effects are likely to emerge in other countries.

4. Summary of findings and policy conclusions

While large parts of the public and even the academic audience expects that an increasing labor supply through immigration will reduce wages and increase unemployment in host countries, theoretical

arguments and empirical evidence suggests that the effects are much more ambiguous. From a theoretical perspective, we find that an increasing labor supply does not necessarily reduce wages, or, if labor markets are imperfect and wage rigidities exist, increase unemployment since both the capital markets and the goods markets adjust to labor supply shocks. Particularly important is the adjustment of the capital market, since theoretical considerations suggesting that an increasing labor supply will not affect the labor intensity of production in the long-term is supported by strong empirical evidence. Moreover, in small open economies trade and production structures will adjust to labor supply changes. These adjustments imply that economies can absorb even large labor supply shocks without changing wage levels and employment opportunities in the labor market. Thus, immigration might be neutral for labor markets at the aggregate level, but it may affect earnings and employment opportunities of different groups in the labor market in different ways.

Based on this theoretical literature, a comprehensive empirical literature comprising several hundred studies has emerged in the 1980s and 1990s which uses the variance of the foreigner share across regions for the identification of the wage or (un-)employment effects of immigration. Meta-studies of this literature suggest that these effects are pretty small: An increase of the labor force by 1 percent reduces wages by less than 0.1 percent and increases the unemployment rate by much less than 0.1 percentage points. There is an increasing criticism of this literature, since the area approach might underestimate the true effects of immigration if potential endogeneity problems are not sufficiently addressed and if other factors equilibrate the immigration effects across the borders of local labor markets. Those factors might be the immigration or emigration of the native population, inter-regional trade and capital mobility. As an alternative it has been suggested to use the variance of the foreigner share across education and work experience groups of the labor market at the national level for the identification of the true effects. As long as the influx of migrants is not affected by different returns to education and work experience, this would allow circumventing potential endogeneity problems. The findings of this literature are not homogeneous. While some studies find effects which are substantially larger than those of the area approach, others support the findings of the traditional literature. In particular, studies which consider that capital stocks tend to adjust to labor supply changes and that natives and immigrants are imperfect substitutes in the labor market, find relatively modest effects.

Nevertheless, both approaches suffer from the problem that they rely at least implicitly on the assumption that labor markets clear. Recent studies which consider that labor markets are imperfect suggest that immigration can do both, reduce wages and increase unemployment, depending on the skill and age composition of the newly arrived immigrant workforce. Note that considering labor market imperfections delivers lower wage effects of immigration compared to models which rely on the assumption that labor markets clear.

From the perspectives of immigration and integration policies most important is the finding that immigration has very different effects on different groups in the labor market. While the native labor force gains according to most studies in all education groups from immigration in terms of higher wages and better employment opportunities, the pre-existing immigrant labor force bears the brunt of adjustment. Their wages can decline by more than one percent and their unemployment rate by more than one percentage point at an immigration of one percent of the labor force. This can be traced back to the facts that i. new arrivals have similar observable human capital characteristics as the pre-existing immigrant labor force, and ii. immigrants do not perfectly compete with native workers even if they have similar levels of education and work experience. The latter finding can be traced back to a bunch of factors such as language proficiency, problems to transfer human capital acquired abroad to host labor markets, cultural and ethnic differences which affect labor productivity in one way or another, or simply labor market discrimination. Shedding further light on this issue is an important area for future research.

Overall, immigration does not much affect the distribution of earnings between capital and labor and the average unemployment rate, but has substantial implications for the distribution of wages and

employment opportunities among the different groups in the labor market. The existing empirical evidence suggests that the effects are heavily concentrated on the immigrant labor force. This enables us to draw some conclusions for immigration and integration policies.

First and perhaps not surprisingly, the overall effects of immigration on GDP, wages and employment tend to increase with the skill level of the immigrant labor force. Countries which have labor market institutions and collective bargaining structures in place which hamper wage adjustment in specific segments of the labor market can benefit from immigration policies which channel migrants into the flexible segments of their labor markets. In practice, this is difficult to implement since our knowledge on labor market rigidities is limited. Attracting young skilled workers might be promising at least in some countries. Countries which have for long periods of time skill-selective immigration policies in place such as Australia, Canada and, to a lesser extent, the US, have fared much better than the continental European countries which have closed their labor markets after the first oil price shock and admitted migrants mainly by non-economic channels such as family reunification and humanitarian migration in the past. Whether the introduction of skill-selective immigration policies can substantially increase the share of skilled immigrants and, hence, the beneficial effects of immigration on labor markets today, remains an open question. The recent evidence from immigration reforms in European countries such as the United Kingdom and Germany is at least in quantitative terms not very encouraging so far.

Second, the finding that natives and immigrants do not perfectly compete in the labor market even if they share the same education and work experience has important consequences for immigration and integration policies as well. Of course, addressing the distributional consequences of immigration has always normative implications. The empirical evidence indicates that an increasing competitiveness of immigrant workers would dramatically reduce the inequality in the distribution of earnings and employment opportunities between natives and immigrants, which would in turn reduce the aggregate unemployment rate and transfers by the welfare state. Thus, while the gains of natives in the labor market from migration would be slightly reduced if immigrants are better integrated, they might benefit via the tax-transfer channel from better integration. It is thus an open question whether a better labor market integration of immigrants is eventually beneficial for the native population. However, the total population residing in the host country will certainly benefit. It is beyond the scope of this paper to discuss the policy tools for a better integration of immigrants in detail. Obviously, improving the language proficiency of immigrants, the legal and actual acknowledgment of educational degrees acquired abroad, supporting complementary qualifications in host countries and improving the general integration of immigrants and their children into the education systems of host countries are key areas of those policies.

Overall, the findings of the literature indicate that native workers tend to benefit from further immigration already today without any policy changes. However, movements towards more skill-selective immigration policies and a better integration of immigrants into the labor market will yield large aggregate gains in terms of lower unemployment, a higher equality in the distribution of earnings and employment opportunities between natives and immigrants and less welfare transfers.

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