

ECONOMIC IMPACTS OF IMMIGRATION: A SURVEY*

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This paper surveys recent empirical studies on the economic impacts of immigration. The survey first examines the magnitude of immigration as an economic phenomenon in various host countries. The second part deals with the assimilation of immigrant workers into host-country labor markets and concomitant effects for natives. The paper then turns to immigration's impact for the public finances of host countries. The final section considers emerging topics in the study of immigration. The survey particularly emphasizes the recent experiences of Northern Europe and Scandinavia and relevant lessons from traditional destination countries like the US. (JEL: H53, J23, J31, J61, J68)

1. Introduction

International migration is a mighty force globally. Over 175m people, accounting for 3% of world's population, live permanently outside their countries of birth (UN 2002). At the start

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of the new millennium, European migration patterns are very different than those from even 50 years ago. Europeans emigrated heavily in the late 19th and early 20th centuries, but today the reception and assimilation of immigrants is a significant economic and social phenomenon in many previous emigration countries. Altogether 27m foreign nationals lived in European Union (EU15) countries in 2007, accounting for about 7% of the population. Figure 1 shows that most of the recent population growth in Europe results from migration.

This paper surveys the economic impacts of immigration for host countries. Empirical evidence is drawn from the older and extensive literature regarding traditional destination countries like the US and Canada. However, this re-

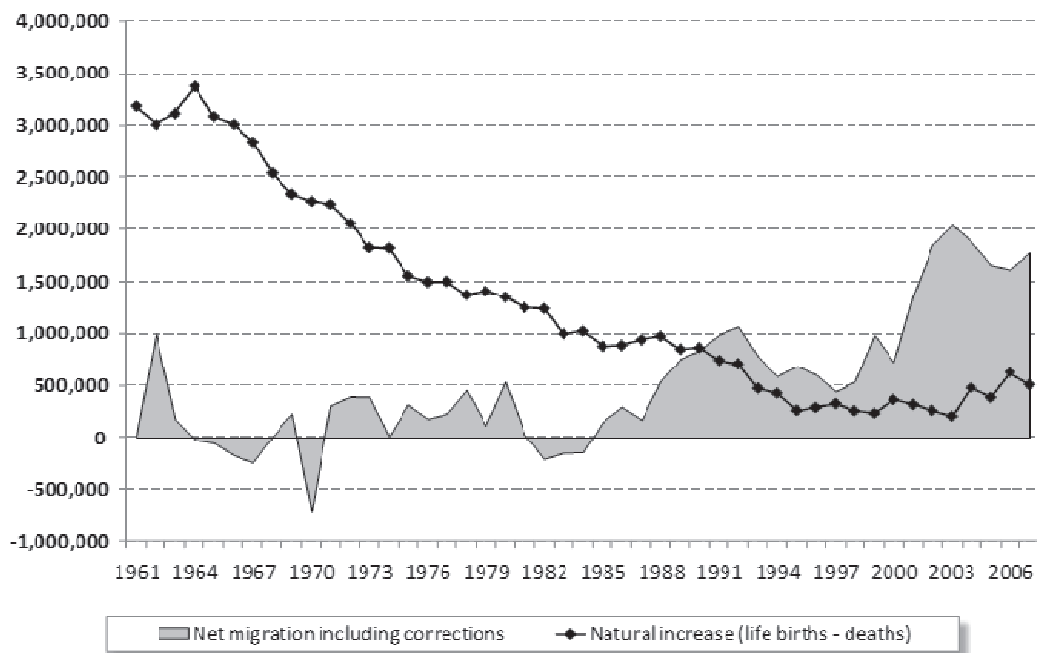


Figure 1. Components of EU25's population change
Source: Eurostat 2006.

view also emphasizes the recent experiences of Northern Europe and Scandinavia; a central goal is to highlight studies and lessons that have particular application within this region. Migrant flows to some European countries are now of similar magnitude to flows to the US, and it is helpful to identify relevant lessons from the experiences of the US and other traditional destination countries. Looking forward, the heterogeneity in recent European experiences and policy environments provides an excellent laboratory for identifying immigration's effects in a new setting.

Section 2 begins by describing recent European immigration patterns. Section 3 considers immigrant assimilation in the labor markets of host countries, while Section 4 surveys evidence on possible displacement effects for natives. Section 5 evaluates how immigration impacts the public finances of host countries. This is of particular policy importance for Europe given its ageing populations and fiscal imbalances. Section 6 identifies new areas of study regarding immigration that move beyond these traditional topics; examples include the effects of immigra-

tion on housing markets, prices, and innovation. The final section concludes.¹

2. European migration patterns

Immigration is now a prominent feature in the economic, social, and political landscape of many European countries. In 2007, over 27m people living in EU15 countries were foreign nationals. This figure partially represented migration within the EU region, which accounted for approximately a third of total migration. The larger share was citizens of countries outside of the EU25 area, which comprised two-thirds of migrants and 5% of the EU15 population. The aggregate size of this foreign national population was larger than the US' comparable stock.

¹ Interested readers should also consult classic surveys of immigration like Greenwood and McDowell (1986), Borjas (1994, 1995a, 1999c), Friedberg and Hunt (1995), Bauer and Zimmermann (1999), Card (2005), and Bodvarsson and Van den Berg (2009). Some of these surveys provided formal theoretical backgrounds on the economics of immigration that are touched upon very lightly in this paper. Zimmermann (1995) described the history of EU migration.

Table 1 shows that the majority of these EU15 foreign nationals resided in large countries like Germany, France, Spain, and the UK. Measured in terms of population shares, foreign nationals were of comparable importance for many of the smaller economies in Northern Europe. The mean population share of EU15 foreign nationals of 7% was similar to the US share. Smaller and geographically-remote nations like Finland or Portugal tended to have below average shares.

Table 1 mostly presents Eurostat statistics that are based upon nationality status. Defining immigrants through country of birth yields a similar picture, although some differences emerge. Table 1 continues by documenting differences in the rate at which European countries grant citizenship to migrants. Europe as a whole had substantially lower rates of citizenship acquisition than the US. Northern European countries tended to have higher rates of citizenship attainment relative to Southern Europe for migrants; this was especially true for Sweden and the Netherlands. Immigration is an even larger force in these countries than statistics using foreign nationals indicate. Likewise, the US immigrant population share in 2000 defined through country of birth was 11% versus 7% defined through citizenship.

The directions of migrant flows are very asymmetric. A significant share of early migrants moved from Europe to the US, Canada, and Australia. While migration into these countries remains very strong, the composition of source countries changed substantially over the last 30 years or so. Most migrants to the US, for example, now come from Latin America and Asia instead of Europe. This composition change of migration flows is also observed in Europe. Table 2 presents the major source countries of immigration by host country for 1997. This table considers legal migrants only; illegal migration would further increase the migrant share coming from outside the OECD for most host countries. Composition shifts were quite dramatic across Northern European countries with the largest immigrant population shares. Sweden, for example, received most of its migrants from other Nordic countries until the late 1970s, but a substantial portion of its recent immigration has been refugees. Germany has re-

ceived large inflows from Turkey, while Moroccan immigrants were the largest share for the Netherlands.²

This broader pool of migrants has led to greater heterogeneity in immigrant traits. The US case is best documented. Recent immigrants from Latin America tended to be less educated than earlier European migrations to the US. Over 35% of high-school dropouts in the US were foreign born in 2000 (calculation based on the Current Population Survey), far greater than the overall immigrant population share. On the other hand, the US has recently received large flows of highly-educated immigrants. Asian inflows have been particularly important in science and engineering sectors and account for the majority of the US' 1990s growth in these occupations.³

Heterogeneity in immigrant types is also an important dimension of European flows. Table 1 documents differences in the 2001 foreign national share of workers with primary/secondary or tertiary educations. As discussed below, immigrants have weaker labor force participation rates than natives, which generally leads to lower worker shares compared to population shares. This is particularly evident in countries accepting more refugees and asylum seekers. Most highly-educated immigrants originated from other European countries or the OECD more generally; only a third came from developing countries. Despite these high-skilled inflows, the majority of recent immigrants to Europe had a lower level of education than natives.⁴

² Germany also experienced inflows in the 1990s of ethnic Germans from the former Soviet Union that were substantially larger than the listed immigration flows (e.g., Brücker and Jahn 2010). These inflows are not captured, however, by nationality surveys as citizenship was automatically granted to ethnically German migrants. While typically preferred, surveys collecting country of birth are unfortunately not consistently available.

³ For example, Cervantes and Guellec (2002), Freeman (2006), Kerr (2007), and Kerr and Lincoln (2010).

⁴ Recent work has begun to more systematically compare immigrants across countries. Antecol, Cobb-Clark and Trejo (2003) and Aydemir and Borjas (2007) provided studies of quality differences in immigrants across several non-European countries. Europe is relatively under studied in this respect, with Algan et al. (2010) an important exception.

4 Table 1. European migration patterns

Country	Foreign national population 2007	Total foreign national population share 2007	EU25 foreign national population share 2007	1990s annual rate of citizenship acquisition Percent of migrants	Per thousand population	2002 refugees and asylum seekers	2001 foreign national share of educated workers Primary and secondary	Tertiary and above	2001 foreign share or tertiary enrollments
Austria	826 013	10.0%	3.0%	2.5%	0.89	43 624	7.5%	3.9%	12.0%
Belgium	932 161	8.8%	5.8%	2.8%	2.41	32 425	n.a.	n.a.	10.6%
Denmark	278 096	5.1%	1.4%	2.5%	1.22	79 665	3.3%	4.2%	6.5%
Finland	121 739	2.3%	0.8%	1.7%	0.32	15 816	1.1%	1.3%	2.3%
France	3 650 100	5.8%	2.0%	1.2%	1.18	136 770	3.7%	4.8%	7.3%
Germany	7 255 949	8.8%	2.9%	1.1%	0.83	953 000	8.1%	5.1%	9.5%
Greece	887 600	7.9%	0.8%	0.2%	0.09	4 526	7.1%	6.0%	n.a.
Ireland	452 300	10.5%	6.8%	0.4%	0.28	12 347	5.1%	11.0%	4.9%
Italy	2 938 922	5.0%	0.4%	0.5%	0.14	15 852	2.0%	3.6%	1.6%
Luxembourg	198 213	41.6%	35.9%	0.4%	1.37	2 244	33.4%	46.3%	n.a.
Netherlands	681 932	4.2%	1.5%	3.7%	3.19	206 521	4.2%	4.1%	3.3%
Portugal	434 887	4.1%	0.8%	0.2%	0.04	707	2.1%	3.5%	1.6%
Spain	4 606 474	10.4%	2.4%	0.9%	0.22	13 089	3.7%	4.7%	2.2%
Sweden	491 996	5.4%	2.4%	3.6%	3.64	175 209	4.8%	5.9%	7.3%
United Kingdom	3 659 900	6.0%	2.3%	1.2%	0.80	200 036	7.3%	16.1%	10.9%
EU15 sum	27 416 282					1 891 831			
EU15 unwt'd mean		6.7%	2.4%	1.6%	1.09		4.6%	5.7%	6.2%
EU15 wtd mean		7.0%	2.1%	1.2%	0.87		5.2%	6.5%	6.6%
United States	18 600 000	6.6%	n.a.	1.9%	1.98	878 488	7.3%	5.9%	3.5%

Notes: EU15 unwt'd mean excludes Luxembourg. US population data refer to 2000. Data taken from Eurostat (2008), Lucas (2005), and the 2000 US Census IPUMS.

Looking forward, observers place alternating fear and hope in the role of immigration for Northern Europe. These fears often relate to the perceived fiscal and social strains that would accompany the assimilation of a large number of less-educated workers. Cultural and social cohesion is also a central policy concern. These issues have been strongly debated in the lead up to and evaluation of the integration of European labor markets following the accession of Eastern European states beginning in 2004.⁵ These issues and concerns are increasingly focused on expanding immigration from developing economies and the assimilation of refugees.

Other observers, however, hope that future immigration can partially rectify fiscal imbalances resulting from ageing populations. By 2015, Europe's natural rate of population growth will turn negative with deaths outnumbering births. Net migration to the region is expected to maintain a positive overall growth rate for the region's population until 2035, but thereafter projected immigration is insufficient to maintain a positive rate (Eurostat 2009). While many observers conclude that immigrants cannot fully rectify these fiscal and ageing imbalances (e.g., Freeman 2006, Feldstein 2006), it is clear that immigration will grow in importance for Europe over the next 50 years (Coleman 2008). This is particularly true with respect to labor markets and public finances, to which this survey turns next.

3. Immigrant assimilation in the labor market

This section and the next consider the impact of immigration on the labor market. The choice to migrate is first analyzed, as different motivations can yield distinctly different economic outcomes. Assimilation of immigrants into the host-country labor market over time in terms of wages and employment is then discussed. The section closes with future research needs. The

next section surveys how immigrants affect the labor market outcomes of natives.

3.1. Migration choices

People move across countries for many reasons. Economic theory most prominently highlights the international labor mobility that descends from wage differences across countries. Likewise, many students from developing economies migrate to advanced countries, for either short or long durations, to study in the schools and universities of advanced countries (e.g., Borjas 2009). Sadly, many migrations are also the result of hardships or oppressions, as the growth of refugees in Northern Europe attests. The nature of the migration will impact education levels, ages, and tenures of immigrants, and consequently their probable assimilation. When migrants have the power to choose, the nature of the migration will also impact the host country selected.

Unfortunately, the causes and decision frameworks of immigration are significantly less studied empirically than the economic impacts of resulting flows. International questionnaires provide some evidence of migrant rationales, particularly surrounding the choice of destination country. Migrants frequently cite higher income levels, better personal safety, short distance to home countries, and established immigrant networks as the main reasons for choosing their new host countries. Econometric studies tend to support these conclusions, and the importance of income differentials is also evident in comparisons of income or GDP levels between host and source countries.⁶

This demand for entry meets with supply restrictions set by nations through immigration quotas. Ruhs (2008) reviewed the considerations inherent in immigration policy with particular application to the UK's framework. His work noted that economics provides more powerful lessons for the selection of migrants, due to fac-

⁵ For example, IOM (1991), Layard et al. (1992), Coleman (1993), OECD (1998), Bauer and Zimmermann (1999), Fertig and Schmidt (2001), and Boeri and Brücker (2005). Zaiceva and Zimmermann (2008) described the modest initial migration.

⁶ For example, Lucas (1975), Straubhaar (1986), Long, Tucker and Urton (1988), Faini and Venturini (1993), Zimmermann (1995), Massey et al. (1998), IOM (1998), Bauer and Zimmermann (1999), Hatton and Williamson (1998), OECD (2000), Coppel, Dumont and Visco (2001), Munshi (2003), Mandorff (2007), and Kerr (2008b).

Table 2. Primary source countries of OECD immigration, 1997–1998

Host country - Source country	Immigrant flow	Immigrant population	Host country - Source country	Immigrant flow	Immigrant population	Host country - Source country	Immigrant flow	Immigrant population
Australia			Finland			Norway		
New Zealand	22 %	8 %	Russia	30 %	24 %	Sweden	22 %	11 %
United Kingdom	10 %	27 %	Sweden	10 %	9 %	Denmark	8 %	12 %
China	7 %	3 %	Estonia	8 %	12 %	Great Britain	5 %	7 %
South Africa	6 %	1 %	Somalia	4 %	7 %	Germany	4 %	3 %
Philippines	4 %	2 %	Iraq	3 %	3 %	Somalia	4 %	-
Belgium			France			Sweden		
France	15 %	12 %	Algeria	14 %	16 %	Iraq	15 %	5 %
Netherlands	12 %	9 %	Morocco	14 %	17 %	Finland	8 %	18 %
Morocco	9 %	15 %	Turkey	6 %	5 %	Yugoslavia	5 %	6 %
Germany	6 %	4 %	China	5 %	0 %	Norway	5 %	6 %
United States	6 %	1 %	Tunisia	5 %	6 %	Iran	4 %	5 %
Canada			Germany			United States		
China	11 %	5 %	Poland	11 %	4 %	Mexico	20 %	22 %
India	9 %	5 %	Yugoslavia	10 %	10 %	China	6 %	3 %
Philippines	5 %	4 %	Turkey	8 %	29 %	India	6 %	2 %
Hong Kong	5 %	5 %	Italy	6 %	8 %	Philippines	5 %	5 %
Pakistan	5 %	-	Russia	5 %	2 %	Dom. Republic	3 %	2 %
Denmark			Netherlands			Japan		
Somalia	9 %	4 %	Morocco	7 %	20 %	China	21 %	17 %
Yugoslavia	7 %	14 %	Turkey	6 %	17 %	Philippines	18 %	6 %
Iraq	6 %	3 %	Germany	6 %	8 %	United States	10 %	3 %
Germany	6 %	5 %	United Kingdom	6 %	6 %	Brazil	8 %	16 %
Norway	5 %	5 %	United States	4 %	2 %	Korea	6 %	44 %

Sources: Coppel, Dumont and Visco (2001). Immigrant flows refer to 1998 except for Australia and Denmark (1999). Immigrant stocks refer to 1997 except for Australia, Canada, and Denmark (1996). Immigrant populations refer to foreign-born population for Australia, Canada, and the US.

tors reviewed next, than for levels of immigration or the rights conferred to migrants. Lucas (2004) and Aydemir and Borjas (2007) compared immigration policies in North America. Europe is understudied in this respect. Recent moves towards more uniform policies by EU members, however, are an especially interesting topic for future research.⁷

3.2. Earnings assimilation

The assimilation of immigrants into host-country labor markets is typically studied through a comparison of wages and employment rates of immigrants versus natives at the time of entry and over the duration of stay. Various studies have employed cross-sectional data, repeated cross-sections, or panel data. Most studies estimate a wage equation of the form

$$(1) \ln w_{it} = \sum_j \alpha^j C_i^j + \beta X_{it} + \delta YrsMig_{it} + \varphi YrsMig_{it}^2 + \varepsilon_{it},$$

where i indexes individuals and t indexes time. Immigration cohorts C , defined through the year of entry j , have separate intercept terms that are of direct interest. w_{it} is the natural logarithm of earnings of individual i in year t . Annual wages are often considered, or averages of hourly, weekly, or monthly pay. X_{it} is a vector of individual characteristics that typically includes age, education, region of residence, marital status, work experience, and language spoken.

Where several years of data are available, studies typically control for both years since migration ($YrsMig$) and migrant cohort fixed effects C_i^j . The latter may be more broadly measured using five-year intervals or similar. Year fixed effects can further control for aggregate wage changes with repeated cross-sections or panel data. Variations in specification (1) exist across studies, depending upon the emphasis of researchers, as one cannot identify cohort effects, time period effects, time since migration, and immigrant age simultaneously at a detailed level.

⁷ While beyond the scope of this survey, the political economy of immigration is an important and growing literature. Facchini and Mayda (2009) provide a recent evidence and review.

The first studies in this vein found that US immigrants earned less than natives when entering the country but converged to the native wage level in 15 years (e.g., Chiswick 1978; Carliner 1980). After 30 years, immigrants were found to earn more than natives of similar age and education. These results led many to conclude that immigration had a positive net impact on the US economy. A large debate subsequently emerged about whether more recent immigration cohorts to the US were of lower education and skill due to a shift in source-country composition after the 1965 Immigration Act. Particular concern focused on whether these newer cohorts would integrate as well into the US economy.⁸

Table 3 surveys the wage studies on immigrant assimilation in Northern Europe. There are a large number of studies concerning the US, of which Table 3 presents a subset for comparison. Similar to the US, European immigrants typically earn less than natives at entry and over time. These earnings gaps do vary greatly across countries and time, however, and some groups of immigrants earn more than natives (e.g., Bell 1997; Grant 1999). Hence, the within-country differences can be as large as between-country differences. It is usually found that these earnings gaps are largely explained by lower education levels among immigrants, although Clark and Drinkwater (2008) described the larger conditional gaps for immigrants from recent accession countries to the UK. The latter occurs when highly educated migrants work in low wage positions.

Beyond the levels of earnings gaps at entry, most studies agree that the earnings gap diminishes with time spent in the host country. Earnings assimilation happens as immigrants improve their language skills or obtain more education (e.g., Chiswick 1991; Borjas 1994). There are several studies on linguistic adjustment of immigrants⁹, including the important work of Dustmann (1994), Dustmann and van Soest

⁸ Borjas (1985, 1995a, 1999b) and Yuengert (1994) were pessimistic with respect to recent cohorts, while Chiswick (1986), LaLonde and Topel (1991), Card (2005), and Lubotsky (2007) were more optimistic. Borjas (1993) and Baker and Benjamin (1994) considered the Canadian evidence.

⁹ For example, McManus, Gould and Welch (1983), Evans (1986), Chiswick and Miller (1988, 1992, 1995), Robinson (1988), and Tainer (1988).

Table 3. Survey of immigrant-native wage differences

Study	Country	Year (Cohort)	Wage difference
A. European studies			
Constant and Massey (2005)	Germany	1984–97 (–1997)	–13%
Ekberg (1994)	Sweden	1970–90 (–1970)	–2%
Edin et al. (2000)	Sweden	1970 (1965–70) 2000 (1995–2000)	–12% –46%
Arai and Vilhelmsson (2004)	Sweden	1991 (Nordic, –1991) 1991 (Europe, –1991) 1991 (Other, –1991)	±0% –3% –7%
Hammarstedt (2003)	Sweden	1990	–43% to +11%
Bell (1997)	Great Britain	1973–92 (–1989)	–34% to +31%
Büchel and Frick (2005)	Spain	1994–97	+4%
	Ireland	1994–97	+12%
	Great Britain	1994–98	+6%
	Italy	1994–97	+5%
	Austria	1995–98	–2%
	Luxembourg	1994–96	+3%
	Germany	1995–99	–26%
	Denmark	1994–97	–53%
B. North American studies			
LaLonde and Topel (1991)	USA	1970 (1965–69) 1980 (1965–69) 1980 (1975–79)	–20% –14% –35%
Yuengert (1994)	USA	1980 (1965–69)	–26% to +82%
Borjas (1994)	USA	1990 (1985–89)	–30%
Funkhouser and Trejo (1995)	USA	1989 (1985–89)	–30%
Card (2001)	USA	1990 (–1984) 1990 (1985–90)	–6% –29%
Butcher and DiNardo (2002)	USA	1990 (–1989)	–10%
Blau et al. (2003)	USA	1980 (1975–79)	–15%
Borjas (1993)	Canada	1980 (1975–80)	–16%
Grant (1999)	Canada	1981–91 (1976–90)	–30% to +7%

Sources: Reported studies. Estimates were calculated using sample averages reported in the studies. Wage differences are reported as mean or maximum–minimum differences for various immigrant groups. Differences do not control for immigrant observable characteristics in most cases.

(2002), and Dustmann and Fabbri (2003) for Europe. Unfortunately, the relative importance of language skills in many contexts is difficult to study due to data constraints. The recent literature mostly concludes that immigrant-native wage gaps diminish over the duration of stay but that permanent gaps nonetheless persist (e.g., LaLonde and Topel 1992; Schoeni, McCarthy and Vernez 1996). Similar to the US, recent immigrant cohorts in most European countries are not expected to achieve full convergence to native wage levels.

Proper accounting for re-migration is essential for determining the economic impacts for host countries. Every fourth or third immigrant to the US permanently leaves the US at a later time.¹⁰ The available evidence suggests higher re-migration rates exist in Northern Europe. Edin, LaLonde and Åslund (2000) found that 30%–40% of immigrants to Sweden left the country within five years of arrival, and those who re-migrated were those who did not assimilate well into the Swedish labor market. Constant and Massey (2003) and Bellemare (2003) found similar patterns in Germany. These higher re-migration rates are not surprising given the geographical proximity of Northern European nations to each other and to migrants' home countries. They may also descend from more challenging economic and cultural assimilation vis-à-vis traditional destination countries like the US, although these determinants have not been systematically studied.

To the extent that re-migration is negatively selected—that is, those who re-migrate performed worse in terms of assimilation—empirical estimates are apt to both overstate the economic success that immigrants attain with duration of stay and overstate the expected costs of immigration to society. They may also misjudge longitudinal changes in cohort quality. Recent work highlights the potential biases that exist in studies using repeated cross-sections.

In a careful and credible study Lubotsky (2007) accounted for these effects using confi-

dential longitudinal data on immigrants from the US Census Bureau. He found that immigrant earnings grew 10%–15% more over their first 20 years in the US compared to native workers. This convergence was only half of the achievement that would have been calculated off of repeated cross-sections noted above. The selective emigration by immigrants with poor earnings in the US led to a systematic overstatement of assimilation. Lubotsky (2007) also found that more recent cohorts of US immigrants were of lower quality, but that the decline was less than originally perceived.

The existing evidence suggests that less successful immigrants were more likely to re-migrate from Northern European countries, too. The direction of this selection effect and the high rates of re-migration would suggest that the Lubotsky (2007) critique holds for the existing European evidence. Indeed, this study provides the strongest lessons of the US experience for Europe going forward. Much more attention should be devoted to these re-migration decisions that can seriously affect the estimation of assimilation profiles and other trends related to the duration of stay. As a positive, the Northern Europe experiences can be particularly informative regarding re-migration issues given the recent development of labor market datasets of sufficient longitudinal quality in many Nordic countries to replicate the Lubotsky (2007) approach.

Another issue typically ignored by the assimilation studies are the actual mechanisms through which earnings assimilation takes place. While it is over time in the host country, that information does not necessarily lead to any relevant policy conclusions. More important would be to understand whether the observed assimilation is caused, for example, by improved language skills, education obtained in the host country, or new networks and contacts developed during the stay. Many of the potential assimilation mechanisms can be affected by policy measures and hence knowing what helps migrants to do better over time can offer valuable lessons for policy makers. For example, many Scandinavian countries offer language courses to new immigrants as part of their assimilation training, but no evidence exists on the effective-

¹⁰ For example, Lubotsky (2007), Warren and Peck (1980), and Friedberg and Hunt (1995). Dustmann (1996, 2003) and Dustmann and Weiss (2007) provide models and evidence from Europe.

Table 4. Immigrant-native participation and unemployment rates, 1995–1999

Country	Relative participation rate of non-EU immigrants to natives				Overall unemployment rate	
	Males arriving 1995–99	Males arriving pre-1995	Females arriving 1995–99	Females arriving pre-1995	Natives	Immigrants
	Denmark	0.75	0.84	0.42	0.81	6 %
Finland	0.90	0.95	0.67	0.87	15 %	17 %
France	0.77	0.99	0.45	0.78	12 %	19 %
Germany	0.86	0.98	0.67	0.91	8 %	17 %
Great Britain	0.79	0.96	0.61	0.84	8 %	12 %
Netherlands	0.62	0.87	0.55	0.79	5 %	15 %
Norway	0.84	0.85	0.58	0.80	5 %	9 %
Sweden	0.70	0.91	0.49	0.81	8 %	23 %

Sources: Angrist and Kugler (2003). Relative participation rates are calculated as the ratios of non-EU immigrant to native participation rates. Participation rates are the labor force divided by the working-age population. European figures are derived from Eurostat labour force surveys (LFS). LFS estimates differ substantially from actual employment for Finland due to small LFS sample sizes.

ness of such training in terms of the success of job search or improved earnings.

Finally, some debate exists about whether earnings assimilation depends on the economic conditions that immigrants face when entering the country—that is, a scarring effect due to initial labor market experiences independent of immigrant quality. Åslund and Rooth (2007) found that immigrants to Sweden during the very severe 1990s recession still faced inferior wage development seven years later. The evidence from the US and Canada on this is ambiguous.¹¹

3.3. Employment assimilation

European researchers and policy makers are particularly interested in the employment rates of immigrants relative to natives. These outcomes are distinct from the wage differentials for employed immigrants discussed above. This European focus is due to both higher unemployment rates in most European countries vis-à-vis the US over the past few decades and the greater generosity of European unemployment benefits systems. Long-term unemployment among immigrants can be a much larger fiscal burden for European public finances than in the US.

Table 4 documents the relative employment rates of non-EU immigrants to natives across

European countries, taken from Angrist and Kugler (2003). Immigrants had both lower participation rates and employment rates (conditional on participation). Similar to wages, gaps in participation rates were substantially larger among more recent immigrants than earlier cohorts. These differentials can again reflect immigrant assimilation over time or deteriorations in immigrant quality with recent cohorts. Recent influxes of refugees to Europe further lowered relative participation rates due to restrictions on the initial ability of refugees to seek employment. Table 4 also shows that relative participation rates were lower among female immigrants, perhaps partially due to cultural reasons.¹²

To characterize these effects more rigorously, most studies estimate an employment equation akin to the wage equation (1). The dependent variable is usually an indicator variable for employment status, and linear probability or non-linear estimation techniques are utilized. Similar to the wage debate, the employment results regarding US immigrants are conflicting. While all researchers found large differences in employment rates at time of entry, some argued that these gaps disappear after ten years (e.g., Chis-

¹¹ For example, Nakamura and Nakamura (1994), Chiswick, Cohen and Zack (1997), McDonald and Worswick (1998), and Chiswick and Miller (2005).

¹² While most studies analyze the assimilation of immigrant men, foreign-born females are a sizeable share of the labor force in many countries (e.g., 5% in the US). This lack of research is due in part to the weaker labor market attachment of women, selection biases, and the resulting lack of wage information. This weaker attachment, however, makes a study of female assimilation even more interesting and relevant to policy. Schoeni (1998) surveys the labor market assimilation of immigrant women.

Table 5. Survey of immigrant-native employment heterogeneity

Study	Country	Measure	Year (Cohort)	Percentage difference
Arai and Vilhelmsson (2004)	Sweden	Unemployment	1992–95 (1968–91)	Non-EU: +69% to +101% EU: +17% to +34% Nordic: +9% to +23%
Nekby (2002)	Sweden	Employment	1990–2000 (1946–99)	Men: –32% Women: –30%
Roodenburg et al. (2003)	Netherlands	Employment	2000	Western countries: –4% Non-western: –18%
Sarvimäki (2010)	Finland	Employment	1993–2003 (1970–98)	Men non-OECD: –12% to –9% Men OECD: –18% to –15% Women non-OECD: –9% to –4% Women OECD: –13% to –9%
Ekberg (1991)	Sweden	Employment	1989	–17%
Card (2001)	USA	Employment	1989 (pre-1986) 1989 (1986–89)	–3% –16%

Sources: Reported studies.

wick et al. 1997) while others argued that permanent gaps remain (e.g., Borjas 1995a,b). Most again believed that the employment rates of recent immigrant cohorts will not converge completely to native rates.

Table 5 surveys further European evidence. The most important explanatory variable for immigrant employment gaps tends to be source country. Taking the Swedish example, most immigrants in the 1970s were from other Nordic countries and did not display weaker employment rates than the native Swedes.¹³

The relative employment rates of immigrants, however, have worsened with recent cohorts and greater numbers of refugees. Nekby (2002), for example, found that migrants from other Nordic countries did well in the Swedish labor market, whereas those from outside of Europe did worse. Nevertheless, relative employment rates of all immigrants improved over the duration of their stay. Men and women who moved less than five years ago were 44% and 48% less likely to be employed, respectively, but the gaps for both genders declined to less than 15% after 20 years of stay.

As noted earlier, immigrant traits vary dramatically across source countries. It is likely that

¹³ For example, Ekberg (1991, 1999), Wadensjö (1997), Lundborg (2000), and Vilhelmsson (2000).

the high explanatory power of source countries partly reflects poor measurement of observable characteristics like immigrant education, language ability, and work experience. It is also difficult in practice to discern cohort effects from assimilation effects due to longitudinal limitations in most immigration datasets. The recent growth of longitudinal datasets represents a genuine opportunity to refine these estimates and account for re-migration selection issues. One example is Sarvimäki (2010), who found that many immigrant groups in Finland rapidly converged towards native employment levels despite large initial employment gaps. Sarvimäki recognized the effects of selective re-migration that limit most assimilation studies. The same criticism pointed out by Lubotsky (2007) for the wage assimilation studies is also applicable here.

3.4. Conclusions and future research opportunities

The surveyed evidence finds that recent migration cohorts to Northern Europe are likely to enter with reduced employment and earnings; over their durations of stay they will only achieve partial convergence to native levels. Fu-

ture research will mainly focus on the magnitudes of these effects. As noted, proper accounting for re-migration is essential. Closer attention is also needed on assimilation patterns under conditions of native population decline. The studies above evaluated countries and periods undergoing population expansion, especially the US studies. As Europe moves into an era of natural population and workforce decline, the assimilation of immigrants may be different from earlier experiences.

Second, the heterogeneity of immigrant experiences within countries is understudied. The existing evidence suggests that assimilation is faster with greater education (e.g., Schoeni 1997). More research is required into the specifics of labor market assimilation for refugees, past asylum seekers, and similar categories. As the migration is not motivated for employment reasons, assimilation is likely to be slower and less successful. Indeed, many studies have not accounted for the fact that some immigrant groups are not eligible to work in the host country, at least not immediately upon arrival. This is particularly true for asylum seekers and the spouses of migrants. Separate analyses of these groups would be warranted, as well as evaluations of assimilation after the potential employment limitations have been removed. Understanding better how cultural assimilation (e.g., Bisin et al. 2008) affects labor market assimilation is also important, and Aleksynska and Algan (2011) review progress to date.

Third, the mechanisms of wage and employment assimilation are poorly understood. Immigrants may face various obstacles to employment, including issues with the recognition of educational degrees, lack of language skills, poor professional connections or networks, and regulations that prevent them from working legally. These obstacles are not generally accounted for in the assimilation studies. Furthermore, as these obstacles generally diminish during the stay in the host country, researchers should evaluate how it affects employment and wage assimilation. A better understanding of the assimilation mechanisms would help in developing more relevant policy recommendations.

Finally, recent research has begun to better document the assimilation of second-generation

immigrants. Card (2005) found that children of immigrants assimilated reasonably well into the US labor market. This is encouraging as recent US cohorts will likely have persistent gaps to the average native in both education levels and wages conditional on these traits. On the other hand, Algan et al. (2010) did not find consistent evidence for strong second-generation convergence in Germany, France, and the UK. Nor was there a clear link to the assimilation policies of the countries studied. This remains an important frontier in immigration studies.

4. Displacement effects in the labor market

This section moves from immigrant assimilation to the effects of immigration on labor outcomes of native workers. The conceptual framework is first presented, followed by a review of earnings and employment displacement studies. As multiple high-quality surveys are devoted to the extensive literature on displacement effects, this paper presents highlights most relevant for this discussion. Interested readers should consult referenced surveys below for additional details.

4.1. Conceptual framework

Immigration affects the wages of the host country in several ways. Abstracting from lower participation rates, immigration increases the labor force of the receiving country. This growth in labor supply affects average wages in the economy if other factors of production like capital are fixed due to changes in relative scarcities. Even if other factors of production adjust, this labor growth directly affects the average wage due to simple composition effects if the distribution of educations and skills of immigrants differs from the native population. For most European economies, this composition effect has reduced the average wage as immigrants were of lower average skill than native workers.

More interestingly, immigrants are also expected to lower the relative wages or employment of natives for whom they are close substitutes. This decline is due to a change in the rela-

tive supply of worker types. On the other hand, wages and employment of complementary workers or factors of production may increase. These predictions follow directly from a standard labor supply-demand framework. They are short-run predictions absent any changes in capital stocks, industry mixes, and similar. Hence, the welfare of certain populations in the host country may deteriorate even if the aggregate impact of immigration is positive.

Accordingly, studies have sought to quantify effects for native groups viewed as particularly at risk of displacement. Typical examples include high-school dropouts, previous immigrant cohorts, and US scientists and engineers. Estimating these effects is quite challenging, however, as substitutability has many dimensions (e.g., personal traits, spatial and time variation).

Most studies employ regional comparisons or, to a lesser extent, general equilibrium frameworks. Regional studies typically compare labor markets in cities with high immigration flows to those with smaller flows. While readily implementable, these studies face several challenges: overcoming integration and spillovers across neighboring labor markets; small datasets with few cities and years; and ignoring general equilibrium effects like price changes. These issues are particularly acute in smaller countries with a few dominant cities. Card (2005) discussed this approach in detail.

Alternatively, general equilibrium frameworks identify a single immigration event where a clear comparison group exists. This focus helps isolate immigration's effect from contemporaneous innovations in the labor market. The challenges, of course, are the identification of suitable case studies and asserting the external validity of findings. Okkerse (2008) provided a detailed survey of these techniques and related approaches.

4.2. Earnings displacement effects

Immigrants tend to concentrate in certain regions of host countries, often the major cities. For large nations like the US, geographical distances of cities to home countries also play an important role. Immigrant networks from past

migrations are important for location decisions, although skilled and unskilled immigrants of the same nationality may sort differently across cities in the host country.

A typical wage displacement study attempts to exploit this spatial heterogeneity across locations in an estimating equation of the form

$$(2) \ln w_{irt} = \mu p_{rt} + \beta X_{irt} + \phi_r + \eta_t + \varepsilon_{irt},$$

where w_{irt} is the natural logarithm of earnings of individual i in region r and year t . X_{irt} includes controls for observable traits like education, experience, and appropriate interactions. Panel fixed effects for regions and years are included. The regressor of interest, p_{rt} , is the immigrant density in region r at year t , and μ captures the partial correlation between wages and immigration density. This simple framework only considers region-year variation in immigrant density, but the approach is readily extended to cells constructed by education, experience, industry, occupation, or some combination of these.

Table 6 catalogues several wage displacement studies. As the surveys of Borjas (1994) and Friedberg and Hunt (1995) provided excellent summaries of wage displacement effects until the early 1990s, this survey concentrates on more recent studies and European experiences. The table reports estimated wage elasticities. These elasticities are often calculated for a particular worker population, and the impact on at-risk groups should not be generalized to the population level. Comparisons across studies are challenged by differences in how narrow or wide this population subsample is; they are also challenged by studies alternatively examining numbers of immigrants versus their share in the labor force. Nonetheless, broad patterns of this phenomenon are evident.

The documented wage elasticities are small and clustered near zero. Dustmann, Glitz and Frattini (2008) likewise found very little evidence for wage effects in their review of the UK experience. This parallels an earlier conclusion by Friedberg and Hunt (1995) that immigration had little impact on native wages; overall, their survey of the earlier literature found that a 10% increase in the immigrant share of the labor

Table 6. Survey of immigration's wage effect for natives

Study	Country	Year	Percentage of wage elasticity
A. European studies			
DeNew and Zimmermann (1994a)	Germany	1984–89	-0.16
DeNew and Zimmermann (1994b)	Germany	1984–89	-0.35 (-0.54 to +0.12)
Bauer (1997)	Germany	1994	+0.082
Bauer (1998)	Germany	1994	-0.021 to +0.035
Pischke and Velling (1994)	Germany	1985–89	±0 (+0.033)
Hatzius (1994)	Germany	1984–91	-0.058 to ±0
Brucker and Jahn (2010)	Germany	1975–2004	-0.1
Winter-Ebmer and Zweimüller (1996)	Austria	1988–91	regional +0.037 industry +0.01
Winter-Ebmer and Zimmermann (1998)	Germany Austria		±0 to +0.01 -0.16 to ±0
Gang and Rivera-Batiz (1994)	Netherlands Great Britain France Germany	1986–89	-0.09 to +0.02 -0.08 to +0.02 -0.11 to -0.01 -0.05 to +0.11
Zorlu and Hartog (2005)	Netherlands Great Britain Norway	1998 1997–98 1996	-0.04 to +0.02 -0.036 to +0.056 -0.063 to +0.180
Hunt (1992)	France	1968	-0.08 to -0.14
Dolado et al. (1996)	Spain		+0.02 to +0.04
B. North American and other studies			
Grossman (1982)	USA	1970	-0.1
Card (2001)	USA	1989	-0.04 to -0.01
Goldin (1994)	USA	1890–1921	-1.6 to -1.0
LaLonde and Topel (1991)	USA	1970, –80	-0.6 to -0.1
Borjas, Freeman, and Katz (1992)	USA	1967–1987	-1.2
Altonji and Card (1991)	USA	1970, –80	-0.86, -1.2
Borjas (2003)	USA	1960–2001	-0.4 to -0.3
Pope and Withers (1993)	Australia	1881–1981	±0
Friedberg (2001)	Israel	1994	+0.03

Sources: Bauer and Zimmermann (1999), Friedberg and Hunt (1995), reported studies. Table shows elasticity of wages with respect to a one percent increase in the share of immigrants in labor force (or population).

force reduced native wages by about 1%. Recent meta-surveys by Longhi, Nijkamp and Poot (2005, 2008) and Okkerse (2008) found comparable, small effects across many studies.

This consistent finding of small effects has led to many additional efforts to understand its origin. Several studies assess whether endogenous location decisions by immigrants weaken displacement. One strand uses natural experiments of major, exogenous immigration waves to a region: the Card (1990) study of the 1980 Mariel boatlift from Cuba to Miami, the Hunt (1992) study of the 1962 repatriation of European-origin Algerians to France upon Algeria's independence, and the Friedberg (2001) study of Russian Jewish immigration to Israel in 1990–2004. These studies found very weak effects after these events despite increases of up to 10% of the local labor force. These types of studies are generally credible, especially if they can demonstrate external validity of results. A second strand uses an interaction of past immigrant stocks and migration trends to instrument for observed local changes.¹⁴ These estimations again find comparable results.

Other work focuses on whether economic integration across cities dampens the measured effects (e.g., Borjas, Freeman and Katz 1992, 1997). Potential out-migration from cities by natives due to immigration could counteract changes in relative supply. Card and DiNardo (2000), Card (2001), and Peri (2007a) found this to be very small in the US context, although Partridge, Rickman and Ali (2008) found out-migration important for immigration's impact on rural counties. Likewise, Card and Lewis (2007) found that industry adjustment across US cities in response to immigration is very small.

Despite this success, Angrist and Krueger (1999) stressed that researchers must be very careful about assessing the differences-in-differences assumptions embodied in (2). They, for example, show different labor market trends among seemingly comparable cities in a falsification exercise for a potential Mariel boatlift in 1994 that was diverted at the last minute. Future studies of similar nature should therefore con-

sider demonstrating external validity through these types of falsification exercises. Lewis (2010) provided evidence that technology choice and capital-skill complementarity can explain some of the limited findings in area-based studies. Aydemir and Borjas (2011) also highlighted the role that sampling error can play in immigration analyses.

Borjas (2003) provided the strongest criticism of regional studies and their limited displacement effects. Borjas argued that the US comprised a national labor market. Looking within cohort-schooling-experience cells, Borjas found large, negative wage effects due to immigration. He measured that a 10% increase in immigrant labor supply reduced native weekly earnings by 3%–4%. Much of the recent literature has debated these methodologies and findings, with particular emphasis on how substitutable immigrant and native workers are.¹⁵ A second debate is about the extent to which labor markets are national versus local in nature. Also, if a third factor (such as skill biased technological change) affects the wage structure at the same time when large numbers of less skilled immigrants enter the host country, this could bias estimates of the extent to which immigration causes native wage displacement effects.

The displacement evidence collected for Europe is comparable to the US, although most European studies do not exploit natural experiments or other experimental settings. European studies are generally based on large influxes of immigrants into a specific country at a specific point in time, and the estimates could perhaps be characterized as descriptive rather than causal.

Most studies have examined the German experience, typically finding only small wage effects despite large immigration volumes.¹⁶ Impacts can again be different across native groups. DeNew and Zimmermann (1994b) found that unskilled wages in Germany declined as a result of immigration in the 1980s, whereas skilled wages increased. D'Amuri, Ottaviano and Peri

¹⁴ For example, Altonji and Card (1991), Card (2001), Peri (2007a), Hunt and Gauthier-Loiselle (2010), and Kerr and Lincoln (2010).

¹⁵ For example, Peri (2007a), Ottaviano and Peri (2008, 2010), Cortes (2008), and Borjas, Grogger and Hanson (2008).

¹⁶ For example, Bauer (1998), Pischke and Velling (1994), and Winter-Ebmer and Zimmermann (1998).

(2010) found that the wage and employment displacement effects from 1990s immigration to Germany were concentrated among the immigrants themselves, with little impact for natives. In a strong recent paper, Brücker and Jahn (2011) built a general equilibrium model that allowed wage setting. They concluded that a 1% increase in the German labor force through immigration reduced wages by 0.1%, an elasticity comparable to the area-based studies in the US. Their long-run analysis suggested significant capital adjustment as well, so that average wages did not permanently decline.

The small wage elasticities also appear to hold for other European countries. One reason for small wage effects in Europe may be that immigrants do not usually find work immediately. As discussed earlier, a large share of immigrants remains outside the labor force upon arrival. Second, the recent US work emphasizes the extent to which immigrants and natives are substitutes. While comparative assessments do not exist, it seems likely that immigrants will be less substitutable in many European countries than in the US (e.g., greater language differences).¹⁷

4.3. Employment displacement effects

Table 7 catalogues a second set of European studies that consider possible employment displacement effects for natives by immigration (e.g., Zimmermann 1994). Similar to wages, there is little evidence for adverse employment effects, although Borjas (2003, 2009) did find very large displacement effects. The meta-survey by Longhi, Nijkamp and Poot (2006) concluded that limited employment displacement has occurred. Interestingly, they found evidence

¹⁷ *Additional research attempts to quantify the comprehensive effect of immigration on the wages or employment of natives. This work combines elasticities, which are most directly transferable across countries, with levels of immigration. For example, Jaeger (1996) argued that US immigration in the 1980s reduced the real wages of high-school dropouts by 3%, or a third of the change during the decade. Card (2001) estimated that immigration to gateway US cities has reduced wage levels by 1%–3% or less. In a scenario of massive Eastern European immigration, Bauer and Zimmermann (1999) calculated that Western European wages would decline by at most 0.8%.*

that employment displacement was more likely in Europe than in the US, and that to some degree employment displacement substituted for wage displacement. These differences, however, were small and not statistically precise.

Some European studies have also evaluated native unemployment rates, which can be more difficult to compare across countries. Theory also does not predict directly how rates of unemployment and employment will react (e.g., Friedberg and Hunt 1995). These studies again do not point to a significant trend. Bauer and Zimmermann (1999) calculated that native unemployment in the EU15 will increase by 0.2% if immigrants' share in the labor force increases by 1%. Gross (2002) argued that immigration would reduce France's long-run unemployment even if unemployment increased in the short run. Brücker and Jahn (2011) concluded that a 1% increase in the German labor force through immigration raised unemployment by less than 0.1%. This latter finding is particularly striking given the size of the German immigration and the similar ethnic origins of the immigrants.

4.4. Conclusions and future research opportunities

The displacement literature is vast, and this paper has only touched on major points. The large majority of studies suggest that immigration does not exert significant effects on native labor market outcomes. Even large, sudden inflows of immigrants were not found to reduce native wages or employment significantly. Effects that do exist tend to be relatively small and concentrated among natives or past immigrants that are close substitutes (e.g., Okkerse 2008). Overall, the limited substitutability of immigrants for natives in many European economies would suggest that displacement effects are likely to be small. It should be noted, however, that researchers are continuing to debate and refine the methodologies put forth by Borjas (2003) that find larger impacts.

While large, economy-wide displacement effects appear unlikely, it is still possible that specific sectors or population groups experience significant impacts from immigration. Studies

Table 7. Survey of immigration's employment effect for natives

Study	Country	Year	Employment effect
A. European studies			
Winkelmann and Zimmermann (1993)	Germany	1974–84	Small negative employment effect
Mühleisen and Zimmermann (1994)	Germany	1982–89	None
Pischke and Velling (1997)	Germany	1986–89	Employment +2% Unemployment ±0%
Hatzius (1994)	Germany		None
Brucker and Jahn (2010)	Germany	1975–2004	Unemployment +0.1%
Velling (1995)	Germany	1988–93	Employment rate +0.24%
Gang and Rivera-Batiz (1994)	Germany	1988	None
Winter-Ebmer and Zweimüller (1997)	Austria	1988–91	None
Winter-Ebmer and Zimmermann (1998)	Austria Germany		Employment –0.1% Small negative employment effect
Dolado et al. (1996)	Spain		Negative employment effect
Hunt (1992)	France	1968	Unemployment +0.2%
Gross (2002)	France	1975–95	Unemployment rate –0.16%
Angrist and Kugler (2003)	EEA	1983–99	Employment –0.07% to –0.02%
B. North American and other studies			
Card (2001)	USA	1989	Employment –0.12%
Altonji and Card (1991)	USA	1980	Employment rate –0.23%
Friedberg (2001)	Israel	1994	Employment –0.16%

Sources: Bauer and Zimmermann (1999), Friedberg and Hunt (1995), reported studies. Table shows change in native employment or unemployment due to a one percent increase in immigrants' share of population or labor force unless otherwise stated.

evaluating the potential displacement effects for the at-risk groups or sectors, especially those with strong empirical identification, would still have a place in the vast displacement literature.

Cross-country comparisons within Europe offer a great opportunity to refine these assessments. In particular, appropriately aligned data would allow a comparison of national labor market approaches and area-based studies. The integration of datasets and country experiences could also allow simultaneous analysis of effects on sending and receiving countries (e.g., Chiquiar and Hanson 2005). Moreover, this setting allows for a comparison across countries in terms

of policy environments. For example, Angrist and Kugler (2003) found that European labor market rigidities exacerbated the negative impact of immigration on native employment. These labor market rigidities include, for example, centralized wage setting that does not allow for downward wage adjustment and restrictive employment protection laws. The move towards common policies with the integration of EU labor and product markets could potentially offer empirical footholds for causal assessments that have generally not been performed in the European displacement studies.

5. Immigration and public finances

This section turns to immigration's effects on the public finances of host countries. The first part analyzes the use of social benefits by immigrants; the second part studies the net fiscal effects of immigrants over their lifetimes. This area has been less studied and reviewed than the work on labor markets, but this is of central importance for European economies given the stronger social benefits provided compared to the US.

5.1. Immigrants and social benefits

A crucial determinant of the economic impact of immigration on the host country is the amount

of welfare services and other social benefits that immigrants consume. Weaker employment prospects may lead immigrants to depend more on social security and similar programs than natives. Moreover, social security programs in host countries are often more generous than in immigrants' homelands. Borjas (1999a) and others have discussed possible "welfare magnet effects" where migrants are drawn to countries with high social benefits. This section reviews empirical work on immigrants' use of social benefits in the US, Canada, and Northern Europe. The US studies discussed below were exceptionally influential, resulting in policy changes that reduced the welfare services available to immigrants.

The earliest US studies concluded that immigrant families used social benefits less frequent-

Table 8. Survey of immigrants and social benefits

Study	Country, Benefit type	Year	Difference in probability of benefit use	Assimilation: Into or out of?
A. European studies				
Blume and Verner (2007)	Denmark All income transfers	1984–99	1990: +56% to +300% 1999: +57% to +315%	Out of
Hansen and Lofstrom (2003)	Sweden	1990–96	1990: +160% to +418% 1996: +117% to +583%	Out of
B. North American studies				
Borjas and Trejo (1991)	USA	1970 1980	1970: –3% 1980: +10%	Into
Hu (1998)	USA	1980	1980: +36%	Into, but refugees out of
	Social security	1990	1990: +26%	
Borjas (1995b)	USA	1970 1980 1990	1970: –2% 1980: +10% 1990: +20%	Into, but not for refugees
Gustman and Steinmeier (2000)	USA All types of support	1992	Men: –9% Women: +74%	
Baker and Benjamin (1995)	Canada Unemployment benefit	1985 1990	1985: –44% to –16% 1990: –36% to +7%	Into
	Canada Social security		1985: –66% to –29% 1990: –46% to +11%	Into
	Canada Housing support		1985: –32% to +77% 1990: –56% to +51%	Out of

Sources: Reported studies. Blume and Verner (2007) examined welfare dependence. Rate of dependence calculated as percentage of income from social security transfers.

ly than otherwise similar American families; conditional on use, the intensity of benefits were similar (e.g., Blau 1984; Tienda and Jensen 1986). These studies used cross-sectional data from 1976 and 1980, respectively, and hence were unable to identify differences across migrant cohorts from changes in welfare use over duration of stay. More recent studies have relied on repeated cross-sections or panel data to disentangle assimilation effects. Table 8 surveys differences in the probability of social benefits use by immigrants relative to natives, and whether immigrants assimilate into or out of welfare. As an example, immigrants are reported to be 100% more likely to be welfare users if 10% of native families and 20% of immigrant families use social benefits. Thus, larger apparent differences can emerge vis-à-vis wage and employment estimations, especially if absolute use of benefits by natives is small. Most studies consider frequency of use; differences in intensity of use can raise or lower the estimated dependency.

Borjas and Trejo (1991) found that immigrants' use of social benefits in the US increased dramatically in the 1970s. This was mainly due to the weaker labor market status of new immigrant cohorts in the 1960s. Moreover, in contrast to earlier work, immigrants appeared to increase their use of social benefits with duration of stay. Assimilation into welfare may be due to improved knowledge of social institutions of the host country or the ending of legal restrictions on welfare use during the initial years of stay. Hu (1998) also emphasized that older US immigrants used proportionally more social benefits than younger immigrants (in relative comparison to natives of similar ages). Table 8 shows Hu's calculations for age groups 18-64, but she also found that benefits use by immigrants over 55 years old increased from 18% to 64% in 1980-1990. The main determinant of benefits use was age at entry, and newer cohorts were found to use social benefits more than previous cohorts throughout the age distribution. Education, language proficiency, and labor market success were also important determinants of welfare use.

Concerning the amount of social support received, Gustman and Steinmeier (2000) con-

cluded that immigrant males both use social benefits less frequently and receive smaller amounts than natives. The only benefit they used more was food stamps (10% of the total). Immigrant women were more likely than natives to be on welfare and particularly social security; they received about 10% more support than natives. Gustman and Steinmeier calculated that immigrant men by retirement pay 76% of the taxes a comparable native male, but receive in pensions and social security 83% of the amount natives receive. The shares for women are more equal at 78% and 80%, respectively. Yet, larger differences again exist for later cohorts. Borjas and Trejo (1991) calculated that the average immigrant family costs \$13.5k for the welfare system over the course of their US stay, compared to the \$7.9k cost of a native family.

Baker and Benjamin (1995) found the Canadian experience to be somewhat different. Immigrants, apart from refugees, consumed less unemployment benefits, social security, and housing support than natives. They also found that immigrants assimilated towards higher benefit incidence with duration of stay, a result that Crossley, McDonald and Worswick (2001) later disputed. Crossley et al. also did not find evidence that more recent cohorts were more likely to be on unemployment insurance or social assistance than earlier cohorts. They concluded that estimates from cohort fixed-effects models were very sensitive to the choice of survey years. The fact that the Canadian results were so sensitive to the selection of immigrant cohorts and observation years speaks against relying on small data sets, especially those with only cross-sectional information or few time-series observation points, for making conclusions on behavioral changes and trends over time spent in the host country. Their results also argue for careful specification selection and caution when using fixed effects specifications that rely on the common time effect assumption to identify the effect of "years since migration".

Immigrants in most European countries rely more on social security and unemployment benefits relative to natives than in the US or Canada. Nordic countries enjoy the advantage of having access to population level data over longer periods of time. Despite the high data quality, most

of the Nordic studies are not concerned with causal identification or issues such as selective re-migration, instead being more descriptive in nature. Sweden and Denmark are the most studied Nordic countries. Immigrants in these countries are 2–3 times more likely to be below the poverty line than natives, and Blume et al. (2003) found that disparities in immigrant-to-native poverty rates increased from the mid-1980s to late 1990s.¹⁸ Immigrants received over 18% of social benefits in Denmark in 1999, even though their population share was less than 3% (Blume and Verner 2007). Büchel and Frick (2005) calculated that social benefits were the major income source for 40% of the Danish immigrant population, five times higher than the native rate.

Hansen and Lofstrom (2003) took a deeper look at the causes of greater welfare reliance by immigrants and found that recent Swedish immigrants used relatively more social security than they did in the 1980s; they traced this increase to changes in the volume and composition of migrant flows and higher overall unemployment rates. In order to develop more useful policy recommendations they evaluate whether welfare usage is related to employability or preferences. They find that differences in observable traits do not explain the gap in welfare take-up rates between immigrants and natives. Immigrants assimilate out of welfare in both Denmark and Sweden (Hansen and Lofstrom 2003; Blume and Verner 2007), but permanent differences exist between immigrants and natives. Immigrants are 5%–8% more likely to receive social benefits than natives after 20 years of stay, which is comparable to the 5%–7% differences measured for the US and Canada (e.g., Borjas and Hilton 1996; Baker and Benjamin 1995).

In a pan-European analysis, Büchel and Frick (2005) emphasized the considerable differences that exist across European countries. Immigrants

used social benefits much more than natives in Denmark, but relative usage levels were more similar in other countries. Most importantly, this study found that controlling for immigrant characteristics did not dramatically change this European heterogeneity. The higher benefit usage thus results more from policy and institutional differences across countries than the characteristics of migrants. Barrett and McCarthy (2008) further described the ambiguity in experiences regarding welfare usage by immigrants.

One issue with many of the welfare assimilation studies is the lack of separation between welfare eligibility and usage. In particular, most studies do not evaluate the extent to which various immigrant groups are eligible to work and/or to receive welfare benefits in the host country. Changes in work eligibility over time might offer interesting insights in the reasons for the greater reliance on welfare by the immigrants. Similar to the wage and employment assimilation studies, welfare assimilation studies also suffer from the issue of selective re-migration that generally has not been accounted for. In addition, none of the studies have estimated the extent to which welfare dependence is related to the "welfare magnet" effects versus employment obstacles such as discrimination, insufficient language skills, transferability of educational degrees and lack of work permits.

5.2. Aggregate impact on public finances

The evidence thus suggests that immigrants are more likely to use social benefits than natives in many Northern European countries. A central policy question is whether immigration burdens the host country's social benefits system, welfare services, education system, and health care sector more than is covered by the taxes paid by the immigrants (OECD 2000). This impact of migration for European public finance is particularly important given the predicted fiscal imbalances that will result from Europe's ageing populations. A number of studies evaluate the fiscal impacts of immigration, often concluding that the total economic impact on the host country is relatively small. These calculations are very difficult, however, and it should be empha-

¹⁸ *Approximately 10% and 15% of native Danes and Swedes, respectively, were below the poverty line at the end of the 1990s. This compared to every third immigrant in Denmark and every fourth immigrant in Sweden being below the line. The comparable US share for immigrants varies between 6% and 37% depending on migrant ethnicity (Borjas 1990). The Canadian share is between 8% and 32% (Kazempour and Halli 2001).*

sized that the estimates can vary substantially depending on assumptions, econometric methods, discounting techniques, and data employed (Coppel, Dumont and Visco 2001, Rowthorn 2008). These challenges are summarized below.

There are two main techniques for evaluating the economic impact of immigration on public sectors. The first tradition employs a simple "immigration surplus method". This technique estimates a percentage GDP gain due to the growth in the supply of workers resulting from immigration. The technique has an intuitive derivation from a constant returns model and builds on the elasticity of demand for substitutes.¹⁹ The second approach applies generational accounting methods (e.g., Auerbach and Kotlikoff 1987). This work estimates the total costs and benefits to the national economy caused by natives and immigrants, taking into account that these costs and benefits vary greatly by stage of life. The calculation is based on assumptions about the taxes immigrants pay over their lifetime, the public goods and services (including social benefits) they consume, and how long they live in the host country. The total economic impact is the discounted difference between tax payments and income transfers received for an immigrant over the duration in the host country.

The earliest studies on fiscal effects of immigration for the US yielded conflicting results. Passel and Clark (1994) calculated that immigrants paid \$27b more in taxes than the benefits they derived from the US social and education systems. By contrast, Huddle (1993) argued that immigrants represented an annual net cost of \$40b in 1992. Borjas (1995a) criticized the earlier studies for making unreasonable assumptions. He estimated the net impact of immigration to range from a \$16b cost to a \$60b benefit depending on the assumptions made. This work highlighted the sensitivity of fiscal estimates to the methods employed. In a later study, Borjas (2001) argued that the positive effects of immigration are created by improved labor market efficiency, with gains accruing to natives between \$5b and \$10b. More recent US studies

have calculated that the average net cost or benefit of a single immigrant is very small.²⁰

In perhaps the most relevant study from the US, Storesletten (2000) calculated that one immigrant provides a net benefit of only \$7.4k over his lifetime. More importantly, Storesletten also modelled the large heterogeneity across migrant groups. Highly-educated immigrants provide new human capital, often succeed in the US labor market, and pay more in taxes than they use in public goods and services. Uneducated and elderly immigrants tend to cause large net economic costs to society. The calculated differences can be striking, ranging from a net \$36k cost to \$96k benefit depending upon the education level of the migrant. Storesletten (2000) also noted that family migration may reduce the estimated benefits of immigration. A typical figure of the discounted social net value by migrant age is given in Figure 2. The figure demonstrates that even though migrants initially represent a net cost to the society, this cost is smaller and lasts a much shorter time than the initial cost of a newborn native that has to be schooled. Indeed, by comparison, a newly-born native represented a discounted net cost of \$80k. As the initial societal cost of newborn natives is so great, immigrants in their 20s and 30s are attractive from a fiscal perspective.

The generational accounting studies (such as Storesletten 2000) typically ignore the impact of immigrants on the natives, including any wage and employment displacement effects. Based on the modest impacts found in the displacement literature discussed above, this may not be such a great omission, but should certainly be recognized in each study. Despite this omission, Storesletten (2000) provides one of the most careful and credible calculations of the total fiscal cost of immigration.

External validity is always a concern for immigration studies given the unique circumstances of each country. This is certainly true for fiscal impacts, as most European countries have a much larger public sector than the US. Public expenditures in the US account for about 36%

¹⁹ For example, Borjas (1995a), Freeman (2006), and Drinkwater et al. (2007).

²⁰ For example, Lee and Miller (2000), Smith and Edmon-ton (1997), Auerbach and Oreopoulos (1999), and Storeslet-ten (2000).

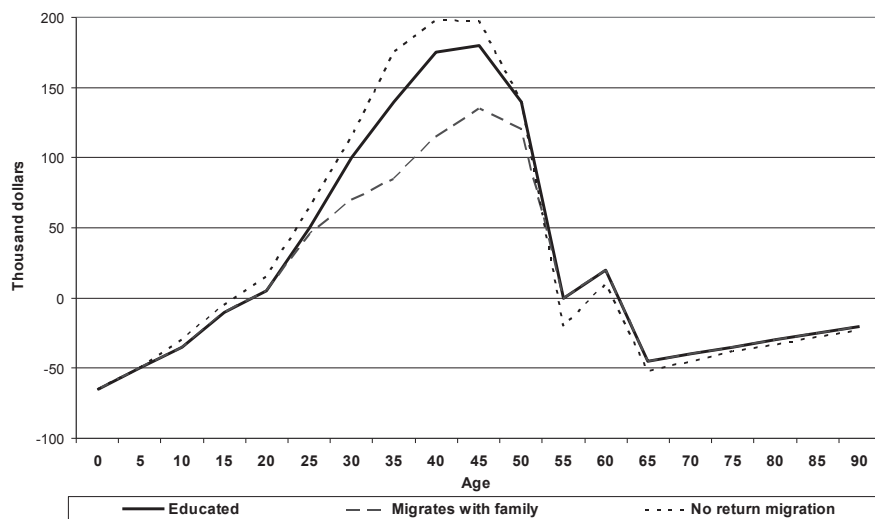


Figure 2. Discounted net value of immigration in the US
Source: Storesletten (2000).

of GDP, whereas the European average is 48%. This higher public share likely increases the European costs of immigration, as most public goods are consumed proportionately by natives and immigrants. Moreover, immigrants have had less success in European labor markets compared to the US, which reduces the realized economic benefits of immigration.

Storesletten (2003) repeated his earlier analysis for Sweden and estimated that the average immigrant to Sweden represented a net cost of euro 20k for the public sector, but the variation across different groups of immigrants was very wide. Young immigrants produced a net gain of euro 24k, whereas immigrants over the age of 50 represented a large net cost. The results again depended greatly on how the immigrants fared in the labor market. It is therefore crucial to evaluate the labor market success in terms of participation and employment rates as discussed earlier. Gustafsson and Österberg (2001) found that more recent immigrants and refugees had weaker labor market attachment and caused much higher costs than immigrants who had been in Sweden for more than five years.

Policy studies of the Netherlands reached similar conclusions to the Swedish experience. Roodenburg, Eurwals and ter Rele (2003) also found that the fiscal net effects varied greatly by

immigrant group but that the average impact remained small. Those who immigrated at a young age or came from a western society produced a net gain, but all other groups represented a net fiscal cost. Moreover, the authors found immigration benefited capital owners. Knaap et al. (2003) supported these conclusions: even if all immigrants had the same level of education as the average native, the net fiscal benefit was only marginal. In reality, immigrants had much lower average education levels, so the possible benefits were also lower. The pessimistic view was a result of the extensive public expenditure on goods and services. Immigrants were calculated as consumers of these services whether or not they paid taxes.

Turning to Germany, a policy study by Sinn and Werding (2001) concluded that immigration represented a net fiscal burden to Germany, at least in 1997, even though long-term immigrants who stayed over 25 years produced a net surplus. Bonin, Raffelhueschen and Walliser (2000) and Bonin (2001) argued that immigrants yield a small net benefit for the public sector over their whole lifespans due to their young average arrival age and the manner through which the German pension system was tied to earned income. Moscarola (2003) and Ablett, Kotlikoff and Leibfritz (1999) similarly estimated that

Italy and Australia, respectively, benefited from the taxes paid by immigrants relative to the cost they represent.

It should be noted that the above studies make various assumptions about how public expenditures on goods such as national defense and infrastructure are divided among natives and immigrants. It is often assumed that pure public goods are produced regardless, so that the consumption of a single immigrant does not increase expenditures. Other studies assumed that both natives and immigrants consume equal amounts of such public goods. Rowthorn (2008) reviewed these differences and concluded that in the great majority of countries the net fiscal impact was, positive or negative, less than 1% of GDP.

5.3. Conclusions and future research opportunities

Research on the role of immigrants in the labor market mostly yields consistent findings across countries and experiences: recent migrants have lower earnings than natives, there is partial convergence with duration of stay, displacement effects tend to be small, the most affected groups are close substitutes, etc. The literature on public finances does not allow as many definitive conclusions. It is clear that recent immigrants to Northern Europe are likely on average to use more social benefits than natives, especially in the case of refugees. Likewise, it is very clear that the net social impact of an immigrant over his or her lifetime depends substantially and in predictable ways on the immigrant's age at arrival, education, reason for migration, and similar.

But strong conclusions on other dimensions are not forthcoming. Studies find conflicting evidence on whether immigrants increase or reduce social benefit usage with duration of stay. The estimated net fiscal impact of migrants also varies substantially across studies, but the overall magnitudes relative to the GDP remain modest. This variance is partly due to different settings and policies, but also due to differences in methodology and assumptions. The more credible analyses typically find small fiscal effects. It is likely that most future research in this area

will continue to evaluate the fiscal impacts of immigration on a country-specific basis. Interesting comparisons might be provided by countries that traditionally have had a very selective migration policy, especially to the extent that they have been able to attract the most economically profitable immigrants.

Two future research areas for public finances and immigration are return migration and remittances. Calculations of fiscal impacts often assume that immigrants remain in the host country after arrival; use of services and taxes paid are estimated through cross-sectional patterns. Going forward, these calculations need to consider more Europe's high rates of return migration and the selective outflow based upon assimilation. This would provide a better estimate of the mean effect and also characterize the heterogeneity in immigrant types. Likewise, the rapid growth in remittances can affect public finances. Many foreign workers transfer money to their home countries, and the World Bank estimated total flows of about \$300b in 2008. Carling (2008) described European patterns. To the extent that remittances remove demand from the host country, some fiscal benefits of migrants weaken.

6. Emerging areas of immigration research

The literatures on how immigration affects the labor markets and public finances of host countries are the most developed. This survey closes by highlighting several areas of new research that should be extended to the European context.

The first focuses on how immigrants impact housing prices and rents. Saiz (2003, 2007) showed that US housing prices rise with immigration at the city level. Moreover, the elasticity is about one, or ten times larger than that found in comparable labor market studies.²¹ Evaluations of immigration and housing prices within Europe would help collaborate and extend these US findings. The estimated elasticities may even

²¹ On the other hand, Saiz and Wachter (2010) found that growth in immigrants at the neighborhood-level within cities was associated with lower housing price appreciation.

be stronger, for example, due to limited building space in small countries vis-à-vis the US. Gonzalez and Ortega (2009) find a similar effect in Spain, calculating that immigration could account for a third of Spain's recent housing boom. This would suggest enormous effects of immigration on the economy through a very understudied channel.

Other research shows, however, that the general effect of immigration on price levels is ambiguous. Similar to housing, aggregate demand for consumer goods in the short run grows with a larger population. If supply adjusts slowly, with housing being a prominent example, then short-run prices are likely to increase. Yet, immigrants may also affect the composition of consumers. Lach (2007) studied the massive inflow of Russian Jewish immigrants into Israel in the early 1990s, and evaluated their impact on store level prices of consumer price index goods. He found that even in the short-run immigrants resulted in lower and more uniform prices because the immigrants had a greater demand elasticity and lower search costs than the existing population. This contrast to the housing studies is very interesting.

Related, recent work quantifies how the supply of immigrant employment affects relative price levels across goods (and thus the consumption bundles of natives). Cortes (2008) found that a 10% increase in the share of low-skill immigrants in the labor force at the US city level decreased the price of immigrant-intensive services by 2%. Prominent examples included housekeeping and gardening. This reduction was primarily through lower wages paid to immigrants. Her work built off of a small open economy model, and examining comparable effects across European economies would be very interesting. Frattini (2008) provided recent, comparable evidence from the UK. The variations in immigrant types across European economies would also provide empirical traction into separating the mechanisms behind these effects (e.g., refugees who are restricted from work but purchase goods and services). They are also important inputs into better general equilibrium frameworks along the tradition of Greenwood and Hunt (1995).

A final area of work investigates the role of immigrants in US innovation (e.g., Stephan and Levin 2001). Immigrants represented 24% and 47% of the US science and engineering (SE) workforce with bachelor's and doctorate educations in the 2000 Census, respectively. This contribution was significantly higher than the 12% share of immigrants in the US working population. Kerr and Lincoln (2010) calculated that immigrant SE workers accounted for more than half of the net increase in the US SE labor force since 1995. Several studies further connect high-skill immigration to growth in innovation by city or state.²² The available evidence suggests that this is mainly due to high-skill immigrants being more involved in SE (e.g., Hunt 2010), with limited evidence of crowding-out of natives. However, mirroring to some extent the wage displacement studies discussed earlier, Borjas (2009) argued that native displacement from SE Ph.D. fields occurred due to immigration.

Within the European context, most papers have analyzed the extent to which high-skilled natives emigrate and to where (e.g., Saint-Paul 2004, Constant and D'Agosto 2008). Less studied are the directions of flows within Europe, and the role of universities and R&D spending by countries in shaping these patterns. The Hunter, Oswald and Charlton (2009) study of the migration of prominent physicists is an important step in this direction. Likewise, the impact of location on productivity is just being discerned (e.g., Kahn and MacGarvie 2009). Given higher rates of return migration from the US, these issues will continue to grow in importance.²³

7. Conclusions

The economic literature on migration is an evolving research tradition with strong relevance

²² For example, Peri (2007b), Kerr and Lincoln (2010), and Hunt and Gauthier-Loiselle (2010).

²³ The broader literature on the "brain drain" effect typically focuses on non-European experiences. Lucas (2005), Freeman (2006), and Kerr (2008a) provide further references.

for policy choices. This survey has presented recent findings on the economic impacts of immigration for host countries, with particular emphasis on Northern European experiences. Immigration levels and flows for some Northern European countries have a relative strength on par with traditional destination countries like the US. These significant economic magnitudes, combined with Europe's ageing population, make immigration a first-order policy question and research concern. Empirical lessons are drawn from several literature strands.

First, evaluations of immigrants' success in host-country labor markets are often based on comparisons of immigrant wages and employment to natives at the time of entry and over the duration of the stay. While the US literature has concentrated on wages, more European studies analyze employment assimilation. Typically, immigrants are found to experience lower employment and wages than natives at entry. Even though these differences are likely to diminish over the duration of a migrant's stay, recent cohorts are expected to experience permanently weaker labor market success. This is particularly clear in European countries.

The likelihood and magnitude of adverse labor market effects for natives from immigration are substantially weaker than often perceived. Within the large empirical literature looking at the effects of immigration on native employment and wages, most studies find only minor displacement effects even after very large immigrant flows. On the other hand, some more recent studies have found larger effects, and many studies note that the negative effects are concentrated on certain parts of the native population. The parts of the population most typically affected are the less-educated natives or the earlier immigrant cohorts—that is, those who are the closest substitutes to the new immigrant flow currently experienced by Europe.

The survey next looked at social benefits use by immigrants. As immigrants are more often outside of the labor force or unemployed, it has been assumed that they spend more time on welfare and other forms of social assistance compared to natives. This assumption is not uniformly confirmed by the literature, however. Welfare dependency varies across immigrant

types in predictable ways, and the recent immigrants to many European countries are more likely to use social assistance upon arrival. But countries differ substantially on levels of use and whether immigrants assimilate into or out of welfare. This is due primarily to policy and institutional differences across nations.

Immigration is often viewed as a large fiscal burden for European public finances—or as a possible saviour if correctly harnessed. This has been palpable in the recent political atmospheres of France, Italy, and Germany, for instance. Most empirical studies, however, estimate the fiscal impacts of immigration to be very small. There certainly exist large differences across migrant groups in the costs and benefits they cause for a host country; the net impact depends heavily on the migrant's age, education, and duration of stay. On average, immigrants appear to have a minor positive net fiscal effect for host countries. Of course, these benefits are not uniformly distributed across the native population and sectors of the economy.

The literature on the economic impacts of immigration has come a long way, making theoretical and empirical advances on multiple dimensions. This survey has sought to balance the extensive research regarding the experiences of traditional host countries like the US with more recent European studies. This balance is important given the substantial differences that exist in European labor markets, welfare systems, and recent migration flows. Both literatures aid in the development of appropriate immigration policies for European countries. Despite persistent data constraints and econometric challenges, many of the short-run effects for labor market outcomes and public finances can be forecast reasonably well. Future research around key factors like re-migration is essential so that long-term impacts are better understood.

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