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Economic Impact of International Migration and the Economic Performance of Migrants

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**Economic Impact Of
International Migration And The
Economic Performance of Migrants**

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The Economy And The State**

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ECONOMIC IMPACT OF INTERNATIONAL MIGRATION AND THE ECONOMIC PERFORMANCE OF MIGRANTS

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1. Introduction

Empirical research on the economic impact of international migration has proliferated during the last two decades (Greenwood and McDowell, 1986). This occurred at a time when in many developed countries immigration became an increasingly important determinant of population growth. In principle, these countries should benefit from immigration because the resulting labor supply shift leads to increased returns to capital and to other productive factors. These welfare gains also apply to native workers when their skills complement those of immigrants. Nevertheless, every developed country regulates the flow and composition of its immigrant population. Their intent is to mitigate the adverse effects that these population flows have on the distribution of income and on the costs of social welfare systems. If immigrants tend to be relatively unskilled, their presence may lower unskilled natives' earnings and increase the demands on government transfer programs – including those providing health and education services.

In the following section of this chapter, we begin by documenting the numbers and characteristics of international migrants to selected developed countries. We next survey some of the economic factors motivating international migration. We find empirical research on the determinants of international migration lags far behind work on the determinants of domestic migration. In light of this, we devote a larger portion of this section to examining how developed countries' regulatory policies affect the composition of their immigrant populations.

Section 3 examines the impact of immigration on the receiving country's labor markets. We begin by explaining why most research on this question has concentrated on its "distributional" rather than its "efficiency" consequences. We then develop an econometric model that relates increased immigration to the labor market outcomes of different demographic groups. Finally, we survey the existing evidence which shows that immigrants usually have relatively modest impacts on the receiving country's labor market.

In Section 4, we examine the extent to which immigrants "assimilate" to the receiving country's labor market. This question is important for two reasons. First, as immigrants spend time in the receiving country's labor market, they acquire skills that are specific to that country. As a result, although they arrive relatively unskilled, with the passage of time they become less similar to the most unskilled native workers, and more like skilled ones. Consequently, an immigrant cohort's adverse impact on the welfare of unskilled natives should be larger in the short run than in the long run. Another reason that immigrant assimilation is important is that persons' use of social welfare programs usually depends on their earnings. Although many immigrants arrive relatively unskilled, if they quickly acquire country-specific skills that significantly raise their earnings, they may make relatively little use of government transfer programs.

Finally, in Section 5, we survey several studies of immigrants' effects on the social welfare system. We begin by documenting immigrants' use of this system and show

how their use of it rises with time spent in the receiving country. This finding is somewhat puzzling because, as documented in Section 3, immigrants' earnings usually rise during this period, thereby making it less likely that they would be eligible to participate in many social welfare programs. We next discuss immigrant fertility and how it might be linked to use of the social welfare system. Finally, we conclude this section with some calculations comparing the benefits natives receive from immigrants' tax payments to the costs of their claims on the social welfare system. These calculations suggest that, at least in the US, natives derive modest pecuniary benefits from immigration.

Before beginning our discussion of migration to developed countries, we should note that this chapter focuses heavily on the experiences of Australia, Canada, and the US. This emphasis reflects the large share of recent empirical research devoted to the labor market consequences of immigration in these countries. However, as we observe in the following section, immigrants now constitute significant percentages of many European countries' work forces. Their increased visibility in these countries has led governments to reexamine their regulatory policies and also has spawned new research.¹ Nevertheless, we believe that the questions that have informed research on Australian and North American immigration, and the research strategies used to address them, also are relevant for assessing the European experience.

2. Migration between source and receiving countries

2.1. Magnitude and characteristics of immigration

In most developed countries, immigrants account for a relatively small percentage of the labor force. Even in the US, which is often called a "nation of immigrants", the percentage of foreign-born persons in the work force (8% in 1990) is comparable to the percentages in countries such as Sweden, France, and Germany, and is substantially below the percentages in countries such as Switzerland, Canada, and Australia (Simon, 1989). However, the flow of new immigrants into developed countries has increased of late, which has raised new concerns about the economic effects of immigration on receiving countries.

As shown by panel A of Table 1, the flow of immigrants into the US accelerated during the 1970s and recent figures indicate that this acceleration continued during the 1980s (Abowd and Freeman, 1991). This increased flow has caused the percentage of foreign-born persons in the US to rise, after declining during the early postwar period.

¹ For example, see "Europe Tries to Shut the Floodgates", *Financial Times*, June 3, 1993, p. 3; "French Parliament to Debate Bill to Curb Immigration," *Agence France Presse*, June 15, 1993; "Anti-Immigration Debate Opens", *Associated Press*, June 15, 1993.

Table 1
Stock of immigrants in selected countries
A: Stock and flow in Australia, Canada and the US^a

Year	Percentage of population foreign-born			Percentage of population arriving during previous decade		
	Australia	Canada	US	Australia	Canada	US
1950	9.8	14.7	6.9	—	4.7	0.7
1960	16.8	15.6	5.4	—	11.0	1.5
1970	NA	15.3	4.7	—	7.9	1.7
1980	21.8	16.1	6.8	—	6.7	2.7

B: Stock of foreign persons in selected European countries

Country	Total foreign (%)	From outside European Union (%)
Germany	6.9	5.1
France	6.3	4.0
Italy	1.4	1.1
Spain	1.2	0.5
Sweden	10.0	NA
United Kingdom	4.3	2.9

^aThe 1950 figure for Australia is from 1947; the 1950 figure for Canada is from 1951; the 1960, 1970 and 1980 figures for Australia and Canada are from 1961, 1971 and 1981, respectively, the 1980 figures for the US include estimates of the undocumented population.
Source: Abowd and Freeman (1991: p. 4, Table 1); Bloom and Gunderson (1991: p. 327, Table 12.2); Gregory et al. (1991: p. 387, Table 15.1). Source for (B): Zimmerman (1994), except for Sweden (Wadensjö, 1994).

By 1990, immigrants comprised more than 8% of the US working-age population (Meisenheimer, 1992). Panel A also indicates that immigration is an even more important factor in Australia and Canada, where immigration stocks and flows are greater than in the US. Indeed, current immigration to Australia and Canada is comparable in magnitude to the rates experienced in the US at the turn of the century. Panel B of Table 1 underscores the point that immigrants also play a significant role in northern European labor markets. Further, the table shows that the immigrant population in those countries is not simply from other countries in the European Union.

Traditional analyses of the economic impact of immigration assume that immigrants are unskilled prime-aged adults (Reder, 1963). This view is only roughly consistent with the facts. In most developed countries the percentage of foreign-born working-age persons between the ages of 25 and 44 is modestly larger than the corresponding percentage for the native population (Simon, 1989: pp. 31–38). According to the November 1989 US Current Population Survey (CPS), 48% of male US immi-

Table 2
Education attainment of natives and immigrants in the US, Canada and Australia
(years of completed schooling in 1980)

	Australia	Canada	US
Natives	11.6	11.3	12.7
All immigrants	11.7	11.7	11.7
By area of birth			
Asia	12.9	13.6	14.6
Africa	13.1	14.0	15.3
Europe	11.4	10.9	12.1
Latin America	12.1	12.1	9.4

Source: Borjas (1991b: p. 64, Table 1.10).

grants fell into this age category, compared with 44% of male natives (Meisenheimer, 1992: p. 6). The percentage of recent immigrants in this age category is slightly larger.

While immigrants are younger than the native-born working-age population, they are not necessarily less educated. As shown by Table 2, average schooling levels among Australian, Canadian, and US immigrants are similar to the corresponding levels for natives. The small difference in schooling levels between immigrants and natives in the US is accounted for by the large number of immigrants from Latin America, mainly Mexico, where schooling levels are low. Immigrants to the US from other parts of the world are as educated as natives, and they have more schooling than immigrant populations in Australia and Canada.

Instead of characterizing the immigrant populations in developed countries as unskilled, it is better to characterize them as having a more unequal distribution of skills than natives.² For example, Table 3 shows that a larger proportion of US immigrants than natives has fewer than eight years of schooling. Yet equal percentages are college graduates. Among Asians, who comprise a growing fraction of US immigrants, the proportion with fewer than eight years of schooling is more than double the figure for natives. But half of Asian immigrants are college graduates, compared with only a third of natives. This diversity of skills means that gross statistics on immigration flows will be poor indicators of the effects of immigration on labor supply and on natives' welfare. We elaborate on this point below.

Perhaps the most striking difference between the immigrant and native populations is in their geographic distributions (Stark, 1991: Chapter 3). Immigrants are much

² Further, some immigrant skills may be less valuable in the host country. Proficiency in the source country's language is an obvious example. Some occupation-specific skills, say, knowledge of Indian law, also are imperfectly portable. Thus, among the highly skilled, those with portable skills (doctors) are more likely to migrate than those with country-specific ones (lawyers).

Table 3
Educational attainment of US natives and immigrants
(percentage of men 25–54 years old in category, November 1989)

	Years of completed schooling				
	8	9–11	12	13–15	16+
<i>US-born</i>					
All	4	9	38	21	27
Asians	5	6	32	22	34
Blacks	8	17	41	22	13
Hispanics	12	18	39	21	11
Whites	3	8	38	21	30
<i>Foreign-born</i>					
All	23	8	25	15	28
Asians	12	3	23	14	49
Blacks	6	10	43	11	30
Hispanics	43	12	24	13	9
Whites	7	6	28	19	39

Source: Meisenheimer (1992: pp. 7, 9, Tables 4 and 5).

more concentrated in large metropolitan areas. This is especially true in the US. The 25 largest metropolitan areas in the US contain 40% of the native population, but 75% of the immigrant population. About 40% of US immigrants reside in just six metropolitan areas: New York, Los Angeles, Chicago, Miami, San Francisco, and Houston (LaLonde and Topel, 1991a: p. 170). This geographic concentration may cause the costs and benefits of immigration to be similarly concentrated in particular areas or among particular groups of natives.

Immigrants' geographical concentration depends on their skills and ethnicity. Highly educated immigrants are less likely to reside in the large population centers. Similarly, US immigrants from English speaking countries, such as Great Britain, are no more geographically concentrated than the native population (Bartel and Koch, 1991: p. 123). But immigrants from southern European countries, such as Italy and Greece, are as geographically concentrated as their counterparts from Asia and the Americas. This tendency for less-skilled immigrants to reside in "enclaves" suggests that there are benefits from living among persons of similar ethnicity or who speak the same language. The data also suggest that these benefits are greatest among the least skilled.

Geographic concentration of immigrants does not diminish with time in the host country (LaLonde and Topel, 1991a). Thus an increase in immigration to a particular area has an enduring impact on the area's ethnic composition and on its labor force. This lasting impact occurs because new arrivals tend to remain in ethnic enclaves, and

also because *future* immigrants are more likely to flow toward existing enclaves. Thus new immigration can have a “multiplier” effect on local labor supply.

While immigrant populations are geographically concentrated, immigrants are not immobile. In the US, immigrants’ internal mobility is comparable to that of natives (Bartel and Koch, 1991: pp. 125–126). This mobility does little to dissipate their geographic concentration, however, because immigrants tend to move among ethnic enclaves. Because of this pattern of mobility, the existence of an enclave in a locale is a better predictor of where immigrants reside, and where they might move, than are other measures of prevailing economic conditions.

2.2. *Economic incentives to immigrate*

...[R]ecent researches are indicating more and more clearly that differences in net economic advantages, chiefly differences in wages, are the main causes of migration. (J.R. Hicks, 1963: p. 76.)

Economists and demographers have developed a variety of theories to explain the population movements observed above. The most basic model posits that international migration is driven by differences in the net present value of earnings between the sending and receiving countries (Sjaastad, 1962; Todaro, 1969). An implication is that as living standards in the source and receiving countries converge, the flow of immigration between them should decline. Hence, immigration from Western Europe to North America has declined during the postwar period. Another implication is that immigrants should be young, because they have a longer time horizon over which to realize the gains from moving. As we have observed above, this prediction also is consistent with the facts.

This model also predicts the relative skills of migrants from a source country. Skilled persons are more likely to migrate if the difference between their expected earnings in the receiving and source countries exceeds the corresponding gain for the less-skilled. In turn, these relative gains depend on the returns to skills in the sending and receiving countries. A receiving country with a compressed earnings distribution is less likely to attract high-skilled immigrants than a receiving country with similar average earnings, but greater earnings inequality. Thus Germany and Sweden, with a relatively narrow income distribution, attract few skilled immigrants, while the US, with much greater returns to skill, attracts more. Borjas (1987b) finds empirical support for this model.

Of course, factors other than earnings differences influence migration decisions. The theory can be broadened to explain why migration sometimes fails to occur even when substantial earnings differences exist, or why migration will continue even without such differentials. For example, income uncertainty in the receiving country may deter risk-averse persons from migrating, even if expected earnings gains are

positive (David, 1974). Even more important, family ties and cultural differences between source and receiving countries raise the costs of immigration. Therefore, ethnic enclaves in the receiving country encourage new migrants.³

This observation also points to the important role of the family in migration decisions. If the current generation altruistically values the utility of their offspring, then utility-maximizing migration decisions will be dynastic. It may pay the current generation to migrate even if the change in their own wealth is small or negative, because their descendants will be better off in the receiving country. These gains depend on the extent to which first and second generation migrants "assimilate" into the receiving country's labor market (Chiswick, 1978a; Borjas, 1985; LaLonde and Topel, 1991b, 1992). Evidence on assimilation is presented below.

The idea that immigration results from a family's optimizing decisions also has implications for which family members will migrate, for the sequence of migration among family members, and for patterns of remittances to the home country. So long as the family can induce income transfers among its members, it will send abroad the members that maximize the family's net wealth (Mincer, 1978). In such instances, even nonmigrant family members benefit from the migrants' earnings gains.

Other explanations for remittances do not depend on a model of familial optimization. Instead, one alternative explanation suggests that altruism toward family members back home motivates remittances. This view predicts that these transfers will be larger when family members' incomes are low. A second explanation suggests that remittances constitute immigrants' savings or investments in the source country, such as in land, a taxicab, or a house. It is reasonable to expect that it is more advantageous for the immigrant to remit to a trustworthy family member, who will effectively manage the investments, than to a third party (Stark, 1991: Ch. 16).

Evidence of the sizable impact that remittances can have on source countries is found in official statistics showing, for example, that in 1980 remittances equaled total exports in Pakistan, and were equal to 60% of exports in Egypt, Turkey, and Portugal (Stark, 1994). Evidence of their impact on households is found in a study by Funkhouser (1992) on El Salvadorian immigrants to the US. He found that these immigrants remitted an average of \$140 per month back to their families in El Salvador. This amount was more than two times what these immigrants would have earned had they not migrated. Moreover, sustained payments at this level would quickly reimburse their families for the estimated \$1600 cost of migration.

³ Another extension of the theory turns on whether persons' well-being depends in part on interpersonal comparisons they make between themselves and others in their community. If people derive satisfaction not only from their absolute well-being, but also from their relative standing in their community, they may migrate so as to improve that standing or perhaps change their "reference" community. As a result, the outcomes of these interpersonal comparisons may generate migration even when it would not have been generated by prevailing earnings differences. So "relative deprivation", as measured, for example, by the difference between their source country earnings and the median earnings in their community, would predict migration flows (Stark, 1991).

That migration decisions are often made by families is suggested by the apparent existence of “tied” or “chain” migration, where one family member’s immigration is accompanied, either simultaneously or later, by others. In this instance, the decision to move depends on the net utility gain for the family as a whole rather than for an individual. The “tied” decision clearly affects the type of selection that occurs in the sending country’s population: some individuals migrate as part of a family who otherwise would stay, and some stay even though the individual gains to migration might be large. The result is that there will be less systematic sorting on individual talent, and so greater heterogeneity of talent in the immigrant population. For example, income equality and low returns to skill in Sweden raise the possibility of a “brain drain” in which the most talented individuals may leave. The importance of this effect is reduced, however, when families migrate together. So long as the talents of individual family members are imperfectly correlated, there will be less selection on talent in the pool of movers (Borjas and Bronars, 1991).

2.3. *Estimating the determinants of immigration*

These theories have been implemented in a number of empirical studies of *internal* migration; that is, of movements among locales in a particular country. The goal in these studies is to estimate the determinants of migratory behavior: who moves and who stays among a population of potential migrants? We are not aware of any work that directly estimates the determinants of international migration decisions. The reason is that large usable micro-data sets on both individual immigrants *and* nonimmigrants from a source country are rarely available. For example, data that could be used to model immigration decisions among, say, Mexicans, should include a contemporaneous sample of persons who immigrated from Mexico to the US, as well as a representative sample of Mexicans from the nonimmigrant population. Researchers have collected such data in a few Mexican villages, but representative samples of Mexican migrants and nonmigrants are unavailable (Stark, 1991: Ch. 9).

Internal migration studies can still be informative about some of the economic factors that affect decisions to move. Using micro-data on individuals, these studies relate migrant status to a list of observable personal, family, and socio-economic characteristics. As one might expect, efforts to estimate “structural” models normally include some estimate of the potential earnings gain from migration among the explanatory variables.

As noted by Greenwood (1983) and many others, this approach has some obvious difficulties. Even when both “movers” and “stayers” are observed, micro-data will (at most) report a person’s earnings in the receiving or in the source country, but not in both. So the potential earnings gain from migration, or its proxy, must be imputed from observable information. In the most sophisticated studies, econometricians estimate the earnings potential of nonmigrants in the receiving country from the observed

earnings distribution of immigrants with similar observed characteristics such as age, years of schooling, or marital status. This approach is not very satisfying because if the two groups are really the same, they should presumably exhibit the same migratory behavior. So, for consistency, one must assume that the difference between the groups' migratory behavior depends on unobserved characteristics.

Studies that push ahead in spite of these difficulties account for differences between immigrants' and nonimmigrants' unobserved characteristics using the econometric approaches developed in the sample selection literature (Heckman, 1978, 1979). These approaches effectively identify the unobserved differences between migrants' and nonmigrants' characteristics using either problematic exclusion restrictions or nonlinear functional forms to relate individuals' characteristics to the probability of migration (Stark, 1991: Ch. 9). Other studies estimate "reduced form" models that relate persons' decisions to migrate to a vector of exogenous characteristics. Such models are informative for predictive purposes, but cannot test the importance of earnings differentials in explaining international migration flows.

2.4. Regulation of international migration

Along with economic incentives, the regulatory apparatus that restricts emigration from source countries and immigration into receiving countries also determines the magnitude and composition of international migration. Perhaps because of customs in democratic countries or because of existing international treaties, countries usually do not restrict the exit of their citizens to the same extent that they restrict entry of non-citizens (ILO, 1980). Nevertheless, restrictive emigration policies have limited emigration from many former eastern bloc and less-developed countries. A recent illustration of the impact of emigration restrictions was seen in the movement of approximately one-half million persons to Israel in a span of less than three years after the former Soviet Union relaxed its emigration controls (Flug and Kasir, 1993).

Policy makers have established immigration restrictions to achieve a variety of economic, political, and social objectives. For example, during the early 1920s US policy makers came to believe that recent immigrants were less skilled than those from earlier cohorts. The evidence was a change in the relative contributions of various source countries to the immigrant population; recent arrivals were predominantly Southern and Eastern Europeans instead of the Western Europeans who dominated immigration flows in the middle and late nineteenth century. In addition to any ethnic concerns that this shift may have caused, it also raised fears that new arrivals were adversely affecting the welfare of unskilled natives, with whom they competed in the labor market (Douglas, 1919).

To limit these effects and maintain the ethnic composition of the population, Congress established "national origins" quotas that restricted the flow of immigrants from the Eastern Hemisphere and required that the ethnic composition of new arrivals con-

form to the 1920 US population.⁴ The number of slots or "visas" available each year ranged from more than 65 000 for persons from the United Kingdom to 100 for persons for all Asian countries, including China. These policies remained in place until Congress passed the Immigration Reform Act of 1965. Consequently, it is not surprising that during this period only a small percentage of US immigrants were of Asian descent.⁵

Current immigration controls in developed countries usually restrict flows to three categories of persons. These controls allow entry because (i) persons have close relatives in the receiving country, (ii) they have skills that immigration authorities determine are "scarce", or (iii) they are political refugees. Definitions of these categories differ widely. For example, until recently it was much easier to qualify as a political refugee in Germany and Sweden than in the US.⁶ Within each of the three categories, the extent of the rationing varies substantially among countries. For example, during 1992 and 1993, Australia, the developed country with the largest share of foreign-born persons, allowed 80 000 persons to permanently immigrate. Of these, 56% were allowed to enter because of family ties, 30% because of their skills, and 13% because of their status as refugees (Minister for Immigration, 1992). By contrast, the US has no restrictions on the entry of spouses and their young children, nor are there specific quotas on the number of persons entering as refugees. But the annual quota for the Eastern Hemisphere is set at 270 000, about 80% of which is accounted for by families of current US residents. The rest are admitted for their skills. The quota for the Western Hemisphere is rationed on a first-come first-served basis (US INS, 1990).

Because immigration authorities in developed countries usually set binding annual quotas, rationing is the rule. There are, however, many ways to allocate the available slots. One (unused) method is an auction, in which rights to immigrate would go to those most willing to pay. Assuming that willingness to pay and productivity are correlated, an auction would select those who will be most productive among any given class of potential entrants. As a result, it would achieve the goals of skill-based quotas, while raising revenue for the receiving country. In practice, immigration authorities do sometimes "sell" rights to immigrate. In the US and Canada potential immigrants can receive a visa by investing a specified amount or by creating a certain number of jobs. Between 1987 and 1992, approximately 10 000 persons and their dependents entered Canada annually under these criteria (IC, 1992: various issues, Table S1). But the main method of rationing slots is by rules: the US, Canada, and Australia admit most immigrants based on either family ties or on an evaluation of skills.

⁴ For a survey of the political, economic, and demographic forces that led the US Congress to enact immigration restrictions beginning with the 1917 literacy tests and culminating with the 1929 National Origins Act, see Goldin (1993).

⁵ For a description of postwar immigration policy in Europe, especially Germany, see Zimmerman (1994).

⁶ The German government has recently changed these laws.

The Canadian and Australian systems are instructive in showing how policies might alter the characteristics of the immigrant pool. Applicants are awarded points based on their education, labor market experience, age, language proficiency, and family ties. Those with point totals that exceed a threshold are admitted. Both the points awarded for individual characteristics and the threshold can vary from year to year, depending on policy goals. The idea is to admit persons who are most likely to assimilate and to succeed in the receiving country's labor market.

2.5. The impact of immigration regulations

In principle, immigration controls could be more important than economic incentives in determining the flow and composition of immigrant populations. But whether attempts to regulate the quantity and quality of immigrants have the desired effects is an open question. Do skill-based quotas and point systems really raise immigrant "quality"? What are the effects of family unification criteria on the size and quality of immigrant flows? Do immigration quotas really bind, or are they largely offset by illegal immigration? Recent research has tackled these questions with some success.

Consider the impact of skill-based controls. Many countries have periodically altered their policies in hopes of raising immigrants' average skill levels. For example, after Canada liberalized its immigration policies in 1956, the numbers of unskilled immigrants arriving from Southern and Eastern Europe expanded substantially. In response, the government began to screen the skills of potential immigrants from that part of Europe. Several years later they extended the policy to all potential immigrants except dependents of Canadian residents.

Borjas (1991b) compared the characteristics of US and Canadian immigrants in order to evaluate the impact of these controls. He found that Canadian immigrants of the 1960s and 1970s were more educated. The difference was attributable to source countries: a larger portion of US immigrants came from source countries with low educational levels, such as Mexico. Within source countries, however, average schooling levels differed little between the two countries. Borjas also concluded that Canada's skill-based system did not prevent the same deterioration of immigrants' relative skills that occurred in the United States, a country without such controls. Between 1970 and 1980, the earnings of new arrivals relative to natives fell in both countries by approximately 15 percentage points. This decline can be attributed to a change over time in the source countries from which the US and Canada draw their immigrants (LaLonde and Topel, 1992). Together, these conclusions suggest that skill-based immigration controls are less effective than policy makers might hope in altering the skill levels of their immigrant population.

Family unification policies have implications for current and future immigrant flows, as well as for average immigrant "quality". For example, under US law, naturalized citizens can more easily sponsor a relative's immigration to the US. Because an

immigrant can become a US citizen after being a permanent resident for five years, this regulation can produce “chain” migration. Once granted a visa to the US, a new immigrant creates a set of potential future immigrants through family ties.

The dramatic rise in the number of Asian immigrants arriving in the US during the 1970s and 1980s illustrates this point. As noted above, prior to 1965, immigration from Asia to the US was severely limited. After that, US policy shifted to emphasize family reunification and, to a more limited extent, labor market skills (Chiswick, 1986). The initial impact of the new reunification policies was slight because the stock of Asians in the US was small. But the small initial flow of immigrants admitted for their skills had a multiplier effect on later immigration due to family reunification. Further, because the skills of family members are only imperfectly correlated, those admitted for family reasons were less skilled, on average, than the initial wave of Asian immigrants (Chiswick, 1986).

Borjas and Bronars (1991) provide somewhat broader evidence on the role of chain migration. Using the public use files of the US Census for 1970 and 1980, they studied the incidence of immigrants from the same household who arrived in different years. Despite some substantial data limitations,⁷ they found evidence of chain migration. The strongest connections are for close relatives such as spouses and children. Among immigrants who had resided in the US for 0–5 years, 18% of the 1970 respondents and 27% of the 1980 respondents lived with an immigrant who arrived before they did. The corresponding figures for persons with 5–10 years residency are 14% and 22%. These proportions differ widely among source countries. Forty percent of Mexicans who arrived in 1975–1980 lived with a Mexican immigrant who had arrived before 1975. Among Filipinos the proportion was 43%, but among immigrants from Canada or the UK the figure was only 9%.

Census data provide some evidence of the extent of chain migration, but they do not allow us to gauge the size of the “multiplier” effect that is implied by family unification policies. It would be useful to know how many expected future immigrants will be generated by the admission of one current immigrant.

To address this issue, Jasso and Rosenzweig (1986) analyzed INS records of legal immigrants who arrived in the US in 1971. They found that about 40% of the 1971 immigrants were naturalized within ten years. This proportion varied widely among source countries. Immigrants from source countries in which English was the official language were more likely to become naturalized citizens. Persons from countries with high per capita incomes, were close to the US, or had low literacy rates were less likely to become naturalized. The tendency for the naturalization rates to vary among groups indicates that the “multiplier” is likely to vary according to the relative economic and social conditions in the source countries.

⁷ For example, the Census only records the date of arrival in five-year intervals, so some chain migrants who arrived at different times will fall in the same interval. This leads to an understatement of the extent of chain migration in Census data.

To examine this possibility, Jasso and Rosenzweig estimated the following model:

$$I_t^i = \delta_0^i + \delta_{T+2.5}^i N_{5t} + \delta_{T+7.5}^i N_{10t} + \dots + \sum_l \delta_l^i X_{lt} + \varepsilon_t^i. \quad (1)$$

According to Eq. (1), the flow of legal immigrants arriving in the US from source country t under visa category i depends on the number naturalized citizens, N_{jt} , that arrived from source country t , j years in the past, and a vector of source country characteristics, X_t . The estimated parameters indicated that, holding constant source country characteristics, most chain migration occurs when immigrants have been in the US between five and ten years. Further, the long-run multiplier implies that each naturalized citizen brings in about 1.5 subsequent immigrants. However, because less than half of immigrants become naturalized citizens, the overall immigration multiplier is less than one. Accordingly, the authors concluded that their findings for the 1971 cohort implied that "chaining" resulting from US policy's emphasis on family reunification was unlikely to lead to an immigration "explosion" in the US.

2.6. Enforcing immigration controls and counting the undocumented

Studies of the impact of Canada's skill-based immigration controls raise doubts about whether policies can greatly affect the skill composition of immigrants. The US experience raises an even more fundamental question about whether these controls can even limit the *quantity* of immigrants. There is substantial evidence that a large portion of US immigrants entered the country illegally. This evidence includes Census counts of foreign-born persons, mortality and birth statistics for different ethnic groups, and border control reports showing as many as one million apprehensions annually along the US-Mexican border.

The most direct evidence of a large undocumented US population is found in the Census. The Census does not ask foreign-born persons whether they legally entered the country. But because the number of foreign-born counted in the Census substantially exceeds the numbers legally admitted into the US, some respondents must be illegal. Warren and Passel (1987) estimate that, despite their illegal status, about two million undocumented persons responded to the 1980 Census. As shown by Table 4, this figure constitutes more than one-quarter of the nonnaturalized foreign-born population.

Warren and Passel's study also indicates that most undocumented aliens in the United States are from Mexico. As shown by Table 4, Mexicans accounted for nearly 55% of the undocumented Census respondents. No other source country accounted for more than 3%. Further, unlike other immigrant groups, undocumented aliens account for nearly half of the Mexican foreign-born population (as measured by the sum of legal and illegal aliens plus naturalized citizens). For all other source countries combined the corresponding figure is only 16%.

Table 4
Estimates of 1980 foreign-born population from Census and INS records
(total entered US since 1960 in 1000s)^a

Country or area of birth	Undocumented aliens	Census aliens	I-53 aliens	Naturalized citizens (revised)
All countries	2057	7440	5383	1627
North and South America	1608	4215	2608	497
Mexico	1131	2326	1195	42
El Salvador	51	89	38	NA
Haiti	44	77	33	NA
Europe	150	1239	1089	551
United Kingdom	38	219	181	NA
Asia: East, South and Near East	213	1787	1574	541
Iran	58	112	55	NA
Africa	65	147	82	32

^aThe five countries listed in the table are the source countries with the largest number of undocumented persons in the 1980 US census.

Source: Warren and Passel (1987: pp. 378–381, Tables 1 and 2).

The accuracy of these estimates depends on whether the Census was as successful in enumerating the undocumented population as it was enumerating the legal population. Because it is unlikely that the percentage of uncouned undocumented persons was as small as the percentage (1%) of uncouned persons in the legal population, Warren and Passel's estimates likely understate the true 1980 undocumented population.

Additional evidence on the size of the undocumented population can be derived from the death and birth figures compiled by *Vital Statistics of the United States*. Assume that death and birth figures in *Vital Statistics* are accurate. The number of recorded "events" (deaths or births) is

$$R_i = r_c * P_i + r_u * U_i \quad (2)$$

In Eq. (2), R_i is the number of events for age group i , P_i and U_i are the numbers of persons in the counted and uncouned populations, and r_c and r_u are the death rates of those populations. If the two populations have the same death rates, the uncouned population among group i is equal to

$$U_i = R_i / r_c - P_i \quad (3)$$

So Eq. (3), which combines information from *Vital Statistics* and the Census, provides an estimate of the uncouned population of type i . This estimate will be too large if, as seems likely, the uncouned population's death rate exceeds that of the counted population.

Using this framework, Borjas et al. (1991) estimated that the 1980 Census missed approximately 700 000 Mexican-born persons. Not surprisingly, most of the uncounted were young adults, between 15 and 34 years old. Using the same approach for births, they estimated that 40% of the uncounted were women. This percentage was only slightly below the proportion of women among the counted population. Adding the estimated 700 000 illegals to the 1.1 million undocumented Mexican-born persons counted in the Census yields an estimate of 1.8 million undocumented Mexican-born persons in the US.

These calculations also suggest that Warren and Passel's figures understate the entire undocumented population, perhaps by as much as 40%. If other ethnic groups were undercounted to the same extent as were the Mexican-born aliens, then the US was home to approximately three million undocumented persons in 1980. That figure equals approximately 20% of the US immigrant population.

Additional evidence about the numbers and characteristics of the US's undocumented population resulted when Congress granted many of them amnesty as part of the Immigration Reform and Control Act (IRCA) 1986. The Act allowed undocumented aliens to become legal permanent residents if they could show either that they had (i) resided continuously in the US for more than four years or (ii) worked for more than 90 days as an agricultural worker during 1986. Under this program, approximately three million aliens applied for amnesty. Records of these applicants show that more than 80% were from Mexico and other Latin American countries. By contrast, 5% were from Asia and only 1% were from Europe. At the time of their application, this group was much more likely to be employed than either natives or other foreign-born workers. However, these persons worked predominantly in low-skilled blue-collar production or services occupations (Tienda et al., 1991).

The experience of the US with its undocumented population demonstrates that immigration controls cannot be costlessly established and enforced. Annual quotas and skill-based evaluations of potential immigrants may be of little importance without mechanisms to ensure that they actually restrict immigration. Therefore, as part of the IRCA, US policy makers augmented resources available for enforcing its immigration controls. This legislation substantially increased the funding of border control activities and for the first time imposed sanctions on employers who knowingly hired undocumented aliens. Such legislated provisions increase the likelihood that authorities can limit the flow and composition of the immigrant population. Yet little is known about the effectiveness of these programs, or whether their benefits warrant their additional costs (Ethier, 1986).

2.7. Emigration from the receiving country

Policy makers establish immigration controls to reduce the flow of immigrants into the receiving country. But immigrants often return to their home country, which

means that even binding quotas may overstate the effects of immigration on the population and labor force.

There are several different explanations for return migration to the source country that yield different predictions about the durations of migrants' stays in the receiving country and whether high- or low-skilled workers are more likely to emigrate. The most straightforward explanation of emigration parallels that of immigration: migrants return when the present discounted value of earnings in the receiving country is less than that in the source country. There are two ways that this relation could hold. First, migrants might learn that they are not as productive in the receiving country as they had anticipated and accordingly they revise downward their expectations of future earnings. Second, conditions in the source country might have unexpectedly improved, making life back home more attractive.

In many cases we might expect the less successful or less-skilled migrants to be most likely to return home. But whether the unskilled or skilled are more likely to return also depends on changes in the distribution of earnings in the source and receiving countries. For example, market reforms in the source country that substantially increased earnings inequality would likely encourage skilled more than unskilled migrants to return home. Likewise, trends toward greater income equality in the receiving country are more likely to encourage skilled immigrants to leave.

Among alternative explanations of emigration is its role in managing the family's optimal income insurance. In this case, families that desire greater income insurance are more likely to have a family member migrate. When conditions at home change so that the variance in the family's income declines, the demand for such insurance diminishes and the migrant is likely to return home. Another explanation turns on the "possibility that consumption at home is preferable to consumption abroad" (Stark, 1994: p. 8). In this case, immigrants return home when their savings are sufficiently high. When this case holds, we expect that more skilled immigrants would have shorter stays in the host country than their less-skilled counterparts. Finally, a related explanation holds that some immigrants arrive in the host country intending to return once they acquire skills that make them more productive back home.

Many countries collect statistics both on immigrant arrivals and on departures. For these countries it is easy to compute emigration rates. For example, Australian statistics covering the period 1959–1982 indicate that the ratio of departures to arrivals was approximately 0.22 for English speaking immigrants and 0.04 for immigrants from Southern Europe (Beggs and Chapman, 1991: p. 371). These figures indicate that an immigrant group's ethnicity may determine whether statistics on "gross" flows adequately characterize their impact on a receiving country's population.

The US stopped collecting information on emigrants in 1957. Historical statistics indicate that nearly one-third of US immigrants subsequently emigrate. This fraction is based on the ratio of the 15.7 million persons admitted between 1908 and 1957 and the 4.8 million persons who departed during the same time period. These figures suggest that current statistics on the "gross" flow of legal and illegal US immigrants, such

as those shown in Table 1, may be substantially larger than the "net" flow of this population.

Absent statistics on emigration rates from the US, there is no straightforward way to estimate net immigration rates. However, because of this issue's policy significance, several studies have inferred US emigration rates from other data. The strategy compares estimates of the foreign-born population in two different years, but adjusts for expected mortality and the number of new arrivals between the two years. More formally, the number of emigrants from group i , E_i , is given by

$$E_i = P_{t,i} - D_i + I_i - P_{t',i} \quad (4)$$

In Eq. (4), $P_{t,i}$ and $P_{t',i}$ are the number of foreign-born persons in years t and t' ; D_i is an estimate of the number of deaths occurring between years t and t' for persons in group i ; and I_i is the number of new immigrants arriving during that time period.

Warren and Peck (1980) used this strategy to estimate the number of emigrés who left the US between 1960 and 1970. They used Census data to estimate the number of foreign-born persons, standard mortality tables to estimate death rates by age and gender, and INS figures on legal immigration to estimate immigration flows. Based on this strategy, they estimated that 1.1 million of the 13.4 million immigrants in the US during the 1960s emigrated by 1970. More importantly, they found that recent immigrants were much more likely to emigrate than earlier arrivals. For example, 18% of the immigrants who arrived between 1960 and 1970 left before the decade was over. The figure for those who arrived before 1960 was only 5%. Extrapolating over arrival cohorts and ignoring any possible "cohort effects" in propensities to leave, these estimates imply that about one-third of all new arrivals will leave the US within 40 years. This is roughly the same as the figures from INS data covering the first half of the twentieth century.

Borjas and Bratsberg (1993) extended the Warren and Peck analysis to cover immigrants who arrived during the 1970s. They find very similar results. Together, these studies indicate that a substantial number of immigrants – say 30–40% – eventually remigrate. This means that current INS quotas overstate the effect that legal immigration has on the size of the labor force.

Given the magnitude of remigration, it may be as important for policy purposes to know *who* stays as to know just how many stay. As one might expect, there is some evidence that remigration rates differ by country of origin – for example, Mexicans are more likely to leave the US than Asians.⁸ But the main interest of policy makers

⁸ Borjas and Bratsberg also show that Asian immigrants were less likely than other immigrants to remigrate. They estimate that only 4% of the Asians who arrived in the US between 1975 and 1980 had left by 1980. Jasso and Rosenzweig (1982) find similar evidence in their analysis of INS records. This finding implies that average remigration rates may decline, because the Asian share of all immigrants to the US has been rising.

may be in the skills of those who stay and leave. Just as there is little direct evidence about which types of workers choose to emigrate from source countries, there also is little direct evidence about whether it is high- or low-skilled workers who choose to return home (Ramos, 1992).

3. Labor market adjustments to new immigration

The immigration flows described in the previous section increase labor supply in the receiving country. The consequent increase in employment, if it takes place, raises total output and per capita income of natives, but it also redistributes income among factors of production. Indeed, redistribution seems to be the central issue for policy makers. Most of the policy debate about immigration relates to its effects on income distribution. Accordingly, this section develops both a theoretical framework and an empirical strategy for assessing the distributional gains and losses associated with immigration.

3.1. Gains and losses from new immigration

To see how these distributional consequences arise, consider a country whose aggregate production is subject to constant returns to scale. Then a proportional increase in all inputs (including capital) will leave per capita income unchanged and will not affect the distribution of income among factors. By contrast, immigration has important effects because it increases the relative supply of some types of workers, changing factor proportions and relative prices. Consider Fig. 1, which shows a marginal productivity schedule for a given type of native labor. If immigration raises labor supply by dL units, then workers' wages must fall. Area T in the figure is a transfer of income from these workers to capital, consumers, and other factors. Area I is the income received by new immigrants, and area W is the surplus – received by consumers (including the native workers), capital and other factors – caused by the increase in labor supply. By the usual calculations for small changes in supply, the amount of this surplus is

$$W = 0.5Y(1/\eta)(dL/L)^2, \quad (5)$$

where Y is native workers' aggregate earnings and η is the elasticity of demand for their services.

This simple analysis has several implications. First, on net, natives gain from immigration. Second, as shown by Eq. (5), natives' gain is larger (i) the more inelastic the demand native workers, and (ii) the larger the total income, Y , they earn. For example, consider immigration policies that could admit either skilled (denoted by s)

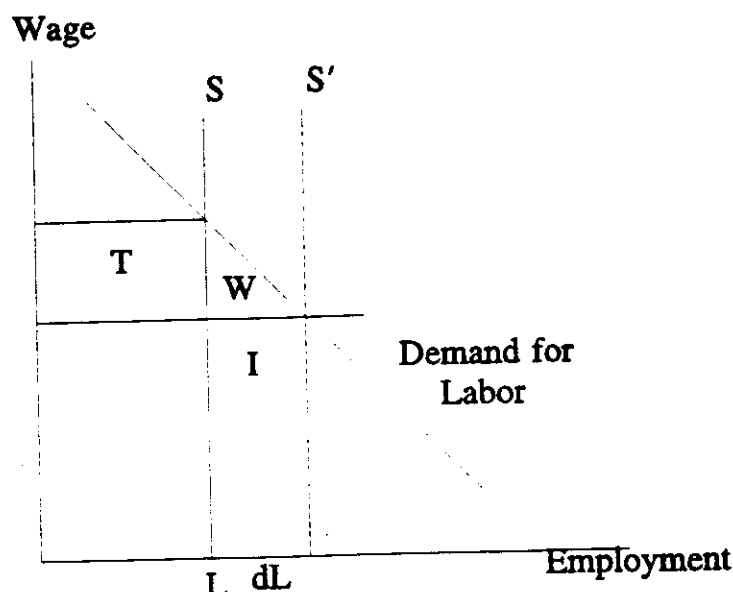


Fig. 1. Gains and losses from new immigration.

workers who would earn wages in the highest quintile of the wage distribution, or unskilled (denoted by u) workers whose wages would fall in the lowest quintile. Which group produces a larger surplus for natives? When these groups are of equal size and skilled workers command higher wages, $Y_s > Y_u$, other things the same, the skilled immigrants produce the larger surplus by a factor proportional to their productivity. Further, econometric studies of labor demand (Hamermesh, 1986) suggest that skilled workers are more inelastically demanded, which also favors admission of skilled individuals. Consistent with this result, we noted above that Australia and Canada ration immigration using point systems that are meant to favor skilled persons.

Another, perhaps more important, implication of Eq. (5) is that immigration redistributes income. In Fig. 1, area T is a transfer of income from the native workers to other factors. Some algebra shows that this transfer equals

$$T = Y(1/\eta)dL/L = 2W(dL/L)^{-1}. \quad (6)$$

Eq. (6) makes two important points. First, welfare gains and income transfers of immigration go together. Second, for reasonable values of dL/L , Eq. (6) states a practical theorem of welfare economics: rectangles are bigger than triangles. That is, income transfers from immigration exceed the net welfare gains.

This result explains why distributional effects are at the center of policy debates over immigration controls, and it also explains the positions taken by various groups. Labor unions commonly advocate stronger immigration controls because immigrants are thought to compete with blue-collar workers. Owners of capital advocate more

open immigration policies.⁹ And, in light of policy concerns over income inequality, evidence that new immigrants compete in the labor market with less-skilled natives strengthens arguments for immigration controls or redistributive policies meant to offset the effects of immigration. As a result, a key empirical issue is how immigration affects labor market outcomes of natives, especially less-skilled natives.

A similar analysis can be used to assess the allocative and redistributive effects of immigration on the country of origin. Although there is less empirical evidence about the importance of immigration on source countries' economies, there are instances where these effects may be substantial. For example, during the 1970s, the number of Jamaican immigrants to the US was equal to 7.3% of the 1970 Jamaican population. In cases such as these, the "leftward" shift in the supply of labor is associated with an increase in the marginal product of labor and a decrease in the marginal product of capital. As a result, nonmigrants' wages rise in the source country and the returns to capital decline. Therefore, emigration from the source country involves a transfer of income from other productive factors to workers. If migrants remit some of their earnings back home, this redistribution likely is reinforced.

3.2. *Estimating the labor market effects of immigration*

Attempts to estimate increased immigration's distributive effects treat it as an exogenous shift in the supply of labor. Then wage adjustments among native workers depend on own and cross-wage elasticities of labor demand – that is, how well immigrants substitute for natives – and on elasticities of native labor supply. These issues are closely related to ones that arise in more traditional empirical studies of labor demand (Hamermesh, 1986). Therefore, the methodology used to study the impact of immigration draws heavily on that literature.

The sizes and geographic distributions of immigrant populations also have implications for empirical methods. As indicated above, in most industrialized countries immigrants constitute relatively small percentages of the population and total labor force growth. This means that immigration flows are unlikely to have large effects on these countries' aggregate wages and labor force participation rates. In the United States, for example, new immigration increased aggregate labor supply by about two million persons during the 1970s. This shift is fairly small in comparison to the 20 million new workers who entered the labor force because of the baby boom and increased participation of women. In this environment, effects of immigration on wages or other employment outcomes are likely to be small and difficult to detect from aggregate time-series data.

Yet immigrant populations are highly concentrated in particular geographic areas and industries. We noted earlier that new immigrants to the US locate in a small num-

⁹ In the US, the Wall Street Journal editorializes for open immigration policies.

ber of immigrant "enclaves", where substantial populations of previous immigrants and natives of similar ethnicity already reside. This means that immigration will have a larger impact on overall labor supply in these areas. For example, during the 1970s new immigration increased total labor supply in metropolitan Los Angeles by over 30%. That increase constituted two-thirds of total labor force growth over the decade. The corresponding figures for Miami were 38% and 37%, respectively. These shifts are large enough that immigration may have important effects on wages within a geographic market, at least in the short run, when other factors of production are inelastically supplied. Further, the wage and employment effects of immigration should be largest among natives whose skills substitute well for those of immigrants. Young Hispanics in Los Angeles or young blacks in Miami are prime candidates.

Although their industrial concentration is less pronounced, immigrants are somewhat more concentrated than natives in low-wage industries. For example, in 1980, 38% of US apparel industry employees and 16% of restaurant employees were immigrants (Altonji and Card, 1991). As with their geographic concentration, this may lead to lower wages for natives in these industries, as well as mobility of natives to other industries in which immigrant concentration is lower.

In light of these facts, attempts to estimate labor market adjustments to immigration exploit variation in the fractions of immigrants across local labor markets and industries (Grossman, 1982; Borjas, 1987a; LaLonde and Topel, 1991a; Altonji and Card, 1991). One approach is to compare the fraction of recent immigrants in a locale with the wages or participation rates of some target population that might be affected by immigration. Young unskilled natives or other (recent) immigrants are examples.

Altonji and Card (1991: p. 220) find that less-skilled US natives who reside in metropolitan areas with large immigrant shares have lower labor force participation rates, employment-population ratios, and weeks worked in the previous year than similarly skilled natives in other cities.¹⁰ Their results suggest that a 10% increase in the supply of immigrants would lower these employment related outcomes by approximately 2%. By contrast, their evidence on a connection between immigration and wages is mixed, but Grossman (1982) and Borjas (1987a) find that natives' wages are not significantly lower in cities with high percentages of immigrants. In fact, Borjas finds that black and Hispanic natives have slightly higher wages when they live in areas with large concentrations of Hispanic immigrants. But Grossman and Borjas, as well as LaLonde and Topel (1991a: p. 175) all find that US immigrants' weekly wages are substantially lower when they reside in cities with a large fraction of other immigrants. Borjas

¹⁰ Altonji and Card define lesser skilled natives as white males with less than 12 years of completed schooling, and white females and blacks with less than 13 years of completed schooling. LaLonde and Topel define recent immigrants as those who had arrived in the US within ten years of the Census.

(1987a: p. 391) finds that this relationship is especially strong among Hispanic immigrants: a 10% increase in their supply to a locale lowers their wages by 10%.¹¹

These results suggest that increased immigration modestly reduces the labor market opportunities of natives and significantly reduces the earnings of other immigrants. Yet these findings are subject to several criticisms. One is that the underlying economic model strains credulity. In order for native wages to be lower in cities with large immigrant populations, the price of their skills must be lower than elsewhere. These price differences are difficult to square with a long-run equilibrium of the labor market with geographically mobile workers. At best, one might argue that these "snapshots" obtained from cross-sectional comparisons reflect short-run equilibrium adjustments to recent changes in the pace of immigration.

But if this criticism is correct, why is there a cross-sectional relationship between immigrant shares and, for example, immigrant wages? One possibility is selection bias. If less-skilled immigrants tend to gather in cities with large immigrant enclaves, then immigrant wages are lower in areas with large immigrant shares. However, this relationship has nothing to do with wage adjustments to changes in supply. For example, LaLonde and Topel (1991a) report that immigrant wages are 64% lower than those of white males in cities with large immigrant shares in the local labor force, but only 28% lower in cities with small immigrant shares. These differences are much too large to attribute to equilibrium wage adjustments. Extending this argument further, if the average skills of natives are also lower in these locales, then it will look in cross-sectional data as if immigration adversely affects natives.

Two approaches to this selection bias problem have been used in the literature. Using Census data for the US, the first approach examines the relationship between the relative earnings of different immigrant and native groups and their relative shares in a locale's population. By looking for evidence of labor market substitution among natives and immigrants within a locale this approach circumvents some of the difficulties associated with "across-city" comparisons. The second approach examines the relationship between *changes* in labor market outcomes and *changes* in the fraction of immigrants in a locale. This approach seeks to eliminate selection effects associated with immigrant enclaves by "differencing out" city-specific effects.

3.3. *Econometric methods for estimating the effects of immigration*

Before summarizing the results from studies adopting these methods we present some details of the econometric strategies. We begin by assuming that immigration repre-

¹¹ In her study of the wage impacts of late nineteenth- and early twentieth-century immigration into the US, Goldin used a similar empirical strategy and found that the wage growth of low skilled workers was significantly depressed in cities that experienced the largest growth in the fraction of foreign-born persons. By contrast, wage growth of higher skilled workers in those cities was relatively unaffected by these demographic changes (see Goldin, 1993).

sents an exogenous shift in labor supply to geographically distinct labor markets. The key idea is that immigrants and other identifiable groups form input aggregates that substitute imperfectly in local production. Then wage adjustments to changing supply will vary among different native and immigrant groups.¹²

To formalize these ideas, consider a concave local production function that combines immigrant or native labor, M_{ck} , separately from capital and materials, N_{cl} ,

$$Q_c = Q(\theta_c g(M_{c1}, \dots, M_{ck}), \alpha_c h(N_{c1}, \dots, N_{cL})). \quad (7)$$

In Eq. (7), Q_c refers to total output produced in locale c and M_{cj} is total human capital supplied by group j in locale c . Each member of group j supplies one unit of relevant human capital. The number of different groups included in $g(\cdot)$ reflects judgments about substitution possibilities among different labor aggregates. Thus some natives who are thought to be close substitutes for immigrants – for example, young native Hispanics or immigrants from earlier arrival cohorts – should be included as separate factors.

The form of $Q(\cdot)$ imposes several additional restrictions that facilitate the interpretation of the resulting parameters in the model. First, a reasonable assumption about $g(\cdot)$ is that it has constant returns to scale: a doubling of all labor quantities within a locale should leave relative wages unchanged. Second, the (weak) separability assumption between labor and other inputs implies that changes in these other inputs do not change relative wages. The advantage of this assumption is that (hard to obtain) measures of local capital stocks can be ignored.¹³ Finally, we capture the effects of shifts in local labor demand through the locale-specific parameters θ_c and α_c . This specification implies that local demand shifts also leave relative wages unchanged.

Given these assumptions, the wage of group j workers at locale c is their marginal product of labor or

$$W_{cj} = Q_1(\cdot) \theta_c g_j(M_{c1}, \dots, M_{ck}). \quad (8)$$

In Eq. (8), subscripts to functions denote partial derivatives with respect to the indicated argument. At this stage, the relationship between wages and the labor aggregates M_{ck} depends on the functional form given to $Q(\cdot)$. Grossman (1982) assumed that local output is generated by a translog production function, whereas Borjas (1987a) assumed a generalized Leontief production function. LaLonde and Topel (1991a) adopt another form by first expressing the log wage of group j workers in locale c as

$$w_{cj} = \ln(Q_1(\cdot) \theta_c) + \ln g_j(M_{c1}, \dots, M_{ck}). \quad (9)$$

¹² Our discussion follows LaLonde and Topel (1991a).

¹³ A weaker assumption is that capital is perfectly mobile among locales, so that it has a fixed price.

The first term on the right-hand side of Eq. (9) is an area-specific term that is independent of j and is fixed for all labor inputs within a locale. The second step in their specification replaces $\ln(Q_1(\cdot)\theta_c)$ with an area-specific fixed effect, β_c , and expands $\ln g_j(M_{c1}, \dots, M_{ck})$ to first order in logs to arrive at

$$w_{cj} = \beta_c + \sum_i \gamma_{ji} \ln M_{ci}. \quad (10)$$

Finally, to complete the empirical specification, they allow individuals to contribute different amounts of human capital to the labor aggregate M_j . Accordingly, an individual l 's stock of human capital, m , depends on his characteristics, X , according to

$$m_{cjl} = \exp\{X_{cjl}\delta + \varepsilon_{cjl}\}.$$

Among the characteristics included in X are years of schooling, potential labor market experience, marital status, and the number of children in the household. For immigrants, X also includes years in the receiving country and the immigrant's source country. With these assumptions, the log wage of individual l is:

$$w_{cjl} = \beta_c + X_{cjl}\delta + \sum_i \gamma_{ji} \ln M_{ci} + \varepsilon_{cjl}. \quad (11)$$

The controls in Eq. (11) for city "fixed effects" (β_c) explicitly address the ambiguities associated with comparisons between labor market outcomes and immigration levels across locales. Unobserved differences across areas in average immigrant "quality" are subsumed into β_c . Second, controlling for city-specific effects implies that estimates of γ_{ji} are unaffected by differences in demand conditions, local amenities, or the cost of living across markets, so long as these conditions have factor-neutral effects on relative wages within a locale. So demand-induced shifts in the flow of immigrants to a locale are not an issue unless they have differential effects on particular immigrant or native groups.

The assumptions associated with this model imply that the parameters γ_{ji} ($i = 1, 2, \dots, k$) in Eq. (11) are "elasticities of complementarity" that satisfy $\sum_i \gamma_{ji} = 0$ because of constant returns to scale. The only restriction implied by economic theory is $\gamma_{jj} < 0$ – an increase in the supply of group j workers reduces their wage. However, we expect $\gamma_{ij} < 0$ (for $i \neq j$) when recent immigrants are close labor market substitutes with group i and $\gamma_{ij} > 0$ when they are labor market complements with group i (Hamermesh, 1986).

This interpretation of the parameters γ_{ji} assumes that other inputs to local production are held fixed. As we noted above, this assumption might be misleading if other factors are highly mobile in response to immigration. For example, when immigration changes factor ratios and wages, existing workers may either reduce (or increase) their participation in the labor market or migrate to (or from) areas with lower immigrant

concentrations and with higher (lower) wages. These labor supply responses reduce the effects of immigration on local wages. More generally, the parameters γ_{ji} subsume the adjustments of other factors that may occur in response to immigration. By Le-Chatelier's Principle, labor demand is more elastic – the effects of immigration on wages are smaller – when other factors can freely adjust. In the extreme, local wages are unaffected by immigration, even in the short run, because other factors adjust rapidly, leaving factor ratios unchanged.¹⁴

These considerations indicate that the γ_{ji} 's capture the net changes in the relative earnings of different native and immigrant groups *within* a locale. These adjustments are generated by changes in relative factor shares. Because of constant returns to scale, the estimable substitution parameters are $\gamma_{ji} - \gamma_{ki}$, $j = 1, \dots, k-1$. If changes in the stocks of immigrants do not affect the wages of prime age natives denoted by k , then $\gamma_{ki} = 0$. In this case, $\gamma_{11} < 0$ implies that in a locale with a large share of recent immigrants, wages of these immigrants will be low relative to the earnings of other workers in that area. Further, because the cross-substitution effects γ_{ji} (for $j \neq i$) typically will be nonzero, an increase in the supply of all immigrants may have a larger negative impact on immigrant earnings than would be implied by the own substitution effects (γ_{jj}) alone. Even though the estimated area effects, β_c , subsume wage adjustments for each locale, it is still true that an increase in the supply of all immigrant groups likely reduces immigrant and other native groups' wages relative to those of prime-aged natives. These relative wage adjustments also can be evaluated from Eq. (11).

3.4. *Econometric evidence of immigration's effects*

LaLonde and Topel (1991a) use this model to evaluate the effects of immigration to the US. They estimate relative wage adjustments among five immigrant cohorts – defined by year of entry to the US – as well as among young black and Hispanic natives. Their rationale is that the effects of immigration on wages should be largest among immigrants themselves: the best substitute for an immigrant is another immigrant. This means that wage adjustments among immigrant cohorts will form reasonable upper bounds for the effects that immigration may have on natives.

Estimates of these effects are shown in Table 5. The first row shows that higher immigration modestly lowers the wages of more recent immigrant cohorts (those in the US for less than five or ten years), but it has little if any effect on other groups, including young natives. For example, a doubling of the relative fraction of new immigrants to a locale would lower the wages of new immigrants by less than 3%, and

¹⁴ One might argue that factor mobility simply spreads the effects of immigration across a broader geographic area. But the economy-wide effects of immigration on wages are likely to be small: recall that immigration flows are minor in comparison to overall labor supply, at least in a country like the US. In other words, either immigration affects labor market outcomes within local labor markets, or it is unlikely to have any appreciable effects.

Table 5
Impact of immigration on labor market outcomes in the US
(percentage change due to doubling of recent immigrants)

	0-5	6-10	11-15	Hispanics	Blacks
Wages	-0.032	-0.021	-0.010	+0.007	-0.010
Earnings	-0.026	-0.018	-0.010	+0.015	-0.006

Source: LaLonde and Topel (1991b: Tables 6.7, 6.9, 6.10).

of young black natives by less than 1% relative to other natives. As seen in the table's second row, because the results for earnings are similar to those for wages, immigration primarily affects wages and not employment rates or hours worked. If increased immigration simultaneously reduced wages and hours and weeks worked, the earnings estimates should exceed (in absolute value) the wage estimates. In fact, the two sets of estimates are identical.

An advantage of this framework is that the parameters in Eq. (11) can be estimated from a single cross-section. Yet the existence of even modest wage adjustments in the cross-section may be surprising because the mobility of natives or other productive factors should arbitrage long run wage differences. As a result, Eq. (11) may underestimate the true effects of immigration on wages and employment. An alternative is to estimate within-locale *changes* in relative wages that are caused by *changes* in immigration flows. If cross-sectional data are available at two points in time, this "differencing" method eliminates the biases associated with city-specific effects in Eq. (11).

Differencing Eq. (11) over time is equivalent to

$$w_{cjt} = \beta_{cj} + \beta_t + X_{cjt}\delta + \sum_i \gamma_{ji} \ln M_{cit} + v_{cjt}, \quad (12)$$

where t indexes different years. In Eq. (12), differences in groups' relative earnings across areas are subsumed in the β_{cj} 's, which vary by area and group (but not by year). The parameters γ_{ij} are identified from within-area-group *changes* in relative immigrant shares over time. For example, $\gamma_{11} < 0$ implies that new immigrants' wages will decline relative to other workers when their share of the work force increases.

LaLonde and Topel (1991a) find that the estimates from Eq. (12) are nearly identical to those generated by the cross-section model Eq. (11). They conclude that the effects of immigration on wages and employment are modest. Consistent with this, Altonji and Card (1991: p. 221) find that differencing reverses the negative relationship between employment outcomes and the fraction of immigrants across cities. This reversal indicates that immigrant concentrations are larger in cities where unskilled native participation rates are lower for reasons other than immigration flows. Accordingly, they conclude that there is "little evidence that inflows of immigrants are asso-

ciated with large or systematic effects on employment or unemployment rates of less-skilled natives". They also find that wages are only weakly related to a locale's immigrant concentration.

A shortcoming of the differencing approach is that the change in the fraction of immigrants in a locale may be determined by transitory changes in that locale's demand for immigrant labor. This would bias least squares estimates of wage adjustments. In an attempt to deal with this possibility, Altonji and Card use the fraction of immigrants in a locale in the first cross-sectional year as an instrument for the change in the fraction of immigrants between the two cross-sections. This procedure yields a much larger negative relationship between immigration and unskilled natives' wages. Although the standard errors associated with their estimates are large, their results suggest that a 10% increase in the fraction of immigrants to a locale will reduce the wages of less-skilled natives by 10%.

This estimate aside, most studies in the literature find only small effects of immigration on labor market outcomes of natives. As mentioned above, one explanation for these findings is that native workers and other factors may be geographically mobile. An area can more easily absorb immigrants if natives are elastically supplied to the area. A historical example of this effect is the acceleration of black migration from the rural south to the urban north after the US Congress tightened immigration controls during the early 1920s. Reder (1963) has observed that "the broad outline of the temporal pattern of rural to urban migration of Negroes is what would be expected if Negroes and immigrants were close labor market competitors". Thus the 1920s immigration controls probably had little effect on unskilled native and immigrant living standards in urban areas, because they encouraged domestic migration among natives. In recent times, Filer (1992) finds that net migration among US natives tends to be away from areas of high immigration concentration. Although native migrants (in industrial countries) are often more skilled than immigrants, and therefore less likely to be close labor market substitutes, Filer's results provide one explanation for why most studies find so little effect of immigrants on labor market outcomes.

These considerations about the migratory patterns of immigrants and natives underscore the potential value of studies of specific events in which the flow of immigrants to a locale might be characterized as an exogenous shift in labor supply (Butcher and Card, 1991). An example of such an event is the migration that followed Fidel Castro's April 1980 proclamation allowing Cubans who wanted to emigrate to leave the country. During the following three months, more than 125 000 persons arrived in Miami, Florida, where ethnic Cubans previously constituted 27% of the city's population. One-half of these new arrivals, known as the Mariels, settled permanently in Miami, thereby increasing the city's labor force by 7% and the Cuban labor force by 20%. Moreover, because these new arrivals were relatively unskilled, the unskilled work force increased by an even larger amount. Yet despite this sudden supply shock, Card (1990) found no evidence that the wages and unemployment rates of Miami's unskilled blacks, other blacks, non-Hispanic whites, non-Cuban Hispanics or even

Cubans were affected by the new arrivals.¹⁵ Only the Cubans' wages declined relative to other workers, but this decrease resulted from the "dilution" of this group's work force with the relatively unskilled Mariel immigrants. One explanation offered by Card for these findings is that after 1980 there was a marked slowdown in the migration of natives into the Miami area compared to other cities in the region.

An example of a similar migratory event in Europe occurred when 900 000 repatriates reentered France from Algeria during the year following March, 1962.¹⁶ These relatively high-skilled persons increased the French labor force by 1.6%, with substantially larger concentrations in low-wage areas of Southern France. Hunt (1992) examined the effects of Algerian repatriates on regional unemployment rates and earnings.¹⁷ Her results suggest that the Algerian repatriates had a greater adverse effect on the labor market opportunities of French natives than did the Marielitos in Miami. She found that doubling repatriates' share of an area's work force raised the locale's unemployment rate by approximately 0.3 percentage points and reduced its average earnings levels by 1.3%.¹⁸ Further, she found no evidence that the adverse wage and unemployment effects were dampened by nonimmigrant migration.

4. Assimilation of immigrants

Do immigrants easily assimilate to their host country? The term "assimilation" can mean many things. At one extreme it may refer to the ability of immigrants to adopt the culture, values, and traditions of the host country; that is, to become American or French or Japanese, as the case may be. Whether immigrants assimilate in this sense can have important social and public policy implications. For example, proponents of greater immigration controls often point to the costs of ethnic and cultural heterogeneity in a society, which are alleged to degrade the social cohesiveness of the host country. Thus the Japanese government views its opposition to immigration as an effort to protect Japanese culture, and they point to the alleged costs of ethnic diversity in the US to buttress their view. Immigration controls in Australia and Israel, as well as incipient nationalist movements in Europe also reflect this "cultural" view of assimilation.

¹⁵ Card used data from the 1980 Census and the outgoing rotation groups of the 1979–1985 Current Population Survey to estimate annual wages, unemployment, and employment–population ratios of different ethnic groups in Miami.

¹⁶ Another example of such a repatriation occurred when 600 000 ethnic Portuguese returned to Portugal from Africa between 1974 and 1976. See Carrington and deLima (1994).

¹⁷ Hunt's population and employment data for 88 French departments came from the 1962 and 1968 Censuses, published by Institut National de la Statistique et des Etudes Economiques (INSEE). Her earnings and occupation data were departmental averages from private and semi-private employers' tax reports, as provided by the tax service.

¹⁸ Such a doubling corresponds to approximately a 1.6 percentage point increase in the share of repatriates in a locale's labor market.

A narrower, but quantifiable, definition of assimilation is based on the relative earning power of immigrants. Do immigrants earn less than natives? If so, does their earnings disadvantage dissipate over time? There are reasons to believe that this pattern of "earnings assimilation" should be the typical pattern. Many skills that command a price in the labor market are specific to a particular country. Examples include language, institutional knowledge, job-related skills in particular industries or occupations, and even culture. Almost by definition, new immigrants have fewer of these country-specific skills than do otherwise similar natives. This means that new immigrants arrive with a human capital "deficit" that reduces their earning power relative to ethnically similar natives.

But the gap should narrow over time. Immigrants who expect to remain in the host country have strong incentives to invest in human capital. The usual life-cycle reasoning (e.g., Ben-Porath, 1967) indicates that these investments are greatest soon after arrival, and they diminish with time. Time in the labor market is also an aid to search and matching, so we expect that job mobility is high among new arrivals. Then productivity rises with time in the host country because immigrants sort themselves to jobs in which earnings are greatest (Chiswick, 1978b; DeFreitas, 1981).

Even with this narrower, but quantifiable, definition based on earnings, assessing the extent of assimilation depends on how it is defined. For example, the popular idea that the United States is an ethnic "melting pot" suggests that immigrant earnings should be compared to those of a typical native, independent of ethnicity. Then a measurable definition of assimilation is the rate of convergence between immigrants' and natives' wages. Yet it is known from cross-sectional data that earnings differences among ethnic groups exist even in the native population. For example, native Hispanics and blacks typically earn less than whites and Asians. In this sense, it is obvious from the earnings distribution of *natives* that complete assimilation does not occur.

This point can have important policy implications. If, for example, Mexican immigrants to the US never achieve the melting pot ideal of catching up with a representative native, then increased flows of Mexican immigrants will inevitably increase overall income inequality. Ethnicity and culture aside, proponents of immigration controls argue that rising inequality can itself undermine "social cohesion". Rising inequality also places greater burdens on social welfare systems (see Section 5). Without assimilation, those additional social burdens will persist long after immigration occurs.

But the failure of the "melting pot" experiment doesn't mean that earnings assimilation is unimportant. Not only do new immigrants earn less than the average native, they also earn less than natives of similar ethnicity and less than ethnically similar *immigrants* from earlier arrival cohorts. These groups provide alternative, and probably superior, benchmarks for assessing the importance of earnings assimilation and post-immigration human capital growth. With these benchmarks, for example, Mexican immigrants can be said to assimilate if their earnings converge toward

those of native Hispanics, even if they do not converge to the earnings of an average native.

To show how these definitions differ and underscore the measurement difficulties associated with them, we outline an empirical model of immigrant and native wages. Let immigrant wages depend on a vector of observed human capital-related characteristics, X , and unobserved factors:

$$w_{it} = X_{it}\beta_t + e_{it}. \quad (13)$$

In Eq. (13), w_{it} is the log wage of an immigrant from cohort i in year t , where cohort represents the period in which immigration occurred. For example, Canadian and US Census files define time in the host country in discrete intervals. The 1980 US Census records immigrants as having arrived during one of four five-year intervals between 1960 and 1979, a ten-year interval between 1950 and 1959, or prior to 1950. Accordingly, w_{it} refers to wages of immigrants in one of these intervals at calendar time t .

We model the unobserved factor in Eq. (13) as

$$e_{it} = u_i + b_{it} + a_{it}. \quad (14)$$

The first component, u_i , denotes the mean value of unobserved skills in cohort i . Parameter b_{it} is a time effect that accounts for the impact of time t labor market conditions on the wages of cohort i immigrants, so changing market conditions may have differential effects across groups. The main parameter of interest is a_{it} , which denotes the cohort's average (receiving) country-specific accumulated human capital. If human capital accumulates with time in the host country, then $a_{it'} - a_{it} > 0$ for $t' > t$. Alternatively, earnings assimilation occurs if the regression-adjusted earnings of new immigrants are less than those of a cohort that arrived, say, ten years earlier; $a_{it} < a_{i-10,t}$.

We define natives' wages similarly to those of immigrants:

$$w_{nt} = X_{nt}\Theta_t + u_n + b_{nt}. \quad (15)$$

In Eq. (15), natives wages depend on their observed characteristics, X_{nt} , on their fixed unobserved characteristics, u_n , and on year effects b_{nt} . We allow observed characteristics to have different effects on immigrant versus native wages. For example, returns to schooling may be lower among immigrants because of differences in the quality of schools, or because skills learned in the sending country are not perfectly portable.

This framework incorporates the various definitions of earnings assimilation. Consider the melting pot view, where the empirical issue is whether immigrant and native wages converge. Relative immigrant wage growth from year t to t' is

$$\begin{aligned}
(w_{it} - w_{it'}) - (w_{nt} - w_{nt'}) = & \Theta_t[(X_{it} - X_{it'}) - (X_{nt} - X_{nt'})] + [(\beta_t - \beta_{t'})(X_{it'} - X_{nt'})] \\
& + X_{nt'}[(\beta_t - \beta_{t'}) - (\Theta_t - \Theta_{t'})] + (X_{it} - X_{it'})(\beta_t - \Theta_t) \\
& + [(b_{it} - b_{it'}) - (b_{nt} - b_{nt'})] + (a_{it} - a_{it'}).
\end{aligned} \tag{16}$$

Eq. (16) indicates that host-country-specific human capital accumulation is only one of several factors affecting immigrants' relative wage growth. First, as indicated by the first term on the right-hand side of Eq. (16), the time-varying observable characteristics of immigrants and natives may change in different wages. Second, if immigrants have less experience than natives, their earnings should grow more rapidly than natives' because they are on a steeper portion of their experience-wage profiles. Third, relative returns to immigrants' observed characteristics may change. Fourth, immigrants' and natives' returns to observable characteristics may differ. Finally, as indicated by the second-to-last term in Eq. (16), market conditions may affect immigrants and natives differently. The upshot is that immigrant earnings may not grow relative to natives', even if assimilation, in the sense of rising a_{it} , is important.

An alternative to measuring new immigrant earnings relative to natives' is to measure them relative to those of earlier arrivals. The inter-cohort difference between immigrants' wages in year t is

$$(w_{it} - w_{it'}) = (X_{it} - X_{it'})\beta_t + (u_i - u_{i'}) + (b_{it} - b_{it'}) + (a_{it} - a_{it'}). \tag{17}$$

Differences between cohorts' wages may arise from differences in the accumulated stocks of country-specific skills and from any of three other factors. First, successive cohorts' observable characteristics, X , may differ; second, their unobserved characteristics may differ; and finally, economic conditions may have differing effects on cohort wages.

The implication of Eq. (17) is that assimilation cannot be identified from a single cross-section without additional restrictions on the model. The differences between the cohorts' observable characteristics pose no problem because they can be accounted for using a standard wage regression. Evidence that earlier immigrant cohorts earn more than recent cohorts is consistent with assimilation, but it also can be explained by a decline in unobserved skills between successive immigrant cohorts, u_i , or by the differing effects of economic conditions, b_{it} . So an identifying assumption must be that successive cohorts have the same average value of unobserved characteristics (that are orthogonal to X) and that current economic conditions affect all cohorts equally.

This identification problem can be resolved partly by comparing two immigrant cohorts' relative wage growth using cross-sectional data from different years. Subtracting the relative wage growth of cohort i' from that of cohort i , we have

$$\begin{aligned}
 (w_{it} - w_{it'}) - (w_{it'} - w_{it'}) &= \beta_i[(X_{it} - X_{it'}) - (X_{it'} - X_{it'})] \\
 &+ (\beta_i - \beta_r)(X_{it'} - X_{it'}) + [(b_{it} - b_{it'}) - (b_{it'} - b_{it'})] \\
 &+ [(a_{it} - a_{it'}) - (a_{it'} - a_{it'})].
 \end{aligned} \tag{18}$$

Because the unobserved characteristics are fixed, they do not affect wage growth. Instead, the relative wage growth between cohorts depends on changes in time-varying characteristics, on the effects of changing demand conditions, and on differing rates of accumulation of country-specific skills. Relative assimilation is identified so long as time-varying effects of market conditions, b_{it} , affect both cohorts in the same manner. Further, if one of the two cohorts has been in the receiving country for many years, it may be safe to assume that they are no longer acquiring country-specific human capital (i.e., $a_{it} = a_{it'}$). Then regression-adjusted relative wage growth of immigrant cohort i measures the rate of assimilation between years.

This procedure for identifying assimilation rates amounts to using cross-sections from at least two different years to construct a panel of immigrant cohorts. An alternative way to represent this estimator is in a diagram. As shown by Fig. 2, the two solid lines depict the regression-adjusted earnings growth of the 1960 and 1970 immigrant cohorts. The way the lines are drawn, both cohorts' wages grow at similar rates with time in the host

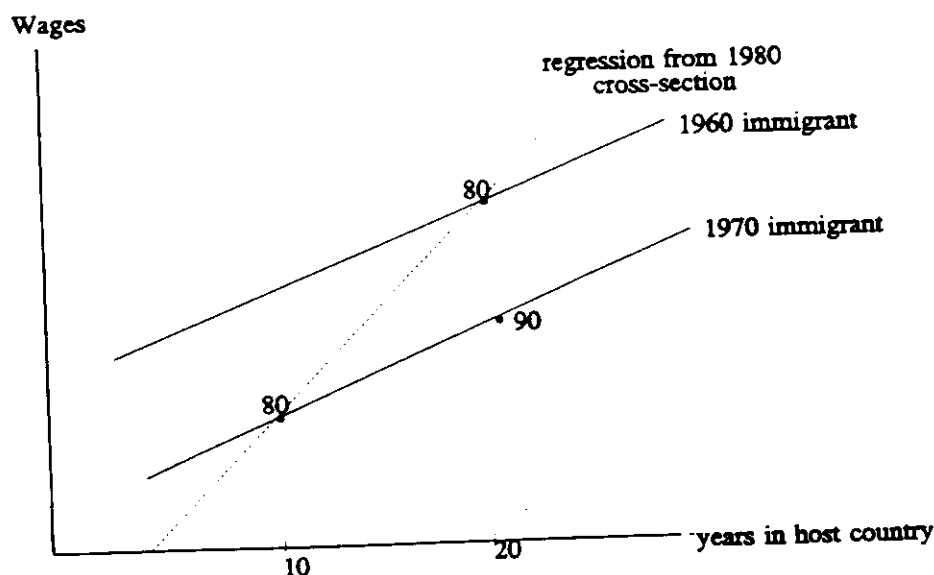


Fig. 2. Cross-sectional and synthetic panel estimates of immigrant assimilation.

country, but the 1970 cohort are less skilled than their 1960 counterparts. Ideally we would like to measure directly the rate of assimilation for immigrants during the second decade in the host country. This estimate corresponds to the rate associated with the points labeled 80 and 90 on the line depicting the 1970 immigrants' wage growth. However, when we have only a single cross-section, say from the 1980 Census, our best estimate of immigrants' assimilation rates corresponds to the greater slope of the dashed line in Fig. 2. The bias associated with this estimate arises because the 1970 immigrant cohort is less skilled than the 1960 immigrant cohort.

Although the procedure represented by Eq. (18) is an improvement over using a single cross-section, two interpretive problems remain. First, implicit in expression (18) is the assumption that unobserved immigrant skills, u_i , do not change. However, as discussed in Section 2, indirect evidence suggests that many US immigrants return to their source countries. This would not be a problem if return migrants were a random sample of each cohort. But theory suggests otherwise. For example, emigrés may have been less successful than their counterparts who remained in the host country, so the distribution of u_i is left-truncated. Then average skill levels rise with time in the host country, which the model will attribute to assimilation. The empirical importance of this problem depends on whether many members of the original cohort emigrate and on the skill composition of those who leave. As observed above, this problem may be important among Latin American immigrants to the US, but probably less so among Asian immigrants.

It is worth observing that true panel data on immigrants will still not resolve the interpretive problems associated with synthetic panel estimates of assimilation. With true panel data such as the Panel Study of Income Dynamics (PSID) in the US or the Socio Economic Panel in Germany differencing an individual's earnings between different years eliminates the cohort effect defined in Eq. (14). However, if immigrants emigrate when their assimilation rates are low (high), then these fixed effects estimates of immigrant assimilation will be too high (low). Nevertheless, one advantage of true panel data is that we can observe which immigrants remain in the host country and which emigrate. This advantage enables us to obtain unbiased estimates of assimilation rates for immigrants who remain in the host country (Pischke, 1992).

A second interpretive problem with panel estimates of assimilation arises because immigrant cohorts who have been in the host country longer include a larger fraction of persons who migrated as children (Friedberg, 1992). Unless immigrants who have been in the host country for a long time migrated as children, they now would be retired and have no labor market earnings. This source of selection causes the cohort effects, u_j , to change over time in a way that is similar to how it changes when less-skilled members of an immigrant cohort emigrate from the host country. Because the cohort effects change, in principle, we cannot be certain that the panel estimates have "differenced" them away. If t and t' are not too many years apart, this source of bias is not likely to be significant. However, if immigrants who arrive as children experience a different assimilation process compared with those who arrive as adults, estimated

assimilation rates generated from Eq. (18) may be misleading. We suspect that policy makers and analysts are more interested in knowing assimilation rates for immigrants who arrived as adults than the rates for those who arrived as children and were educated in the host country's school system.

A third interpretive problem with panel estimates of assimilation turns on the identification of the time effects, $[(b_{it} - b_{it'}) - (b_{it'} - b_{it'})]$. LaLonde and Topel (1992) argue that because the wage distribution in industrialized countries has been widening, identification of this effect is crucial (Juhn et al., 1993; Davis, 1992). Because relative wages of less-skilled workers have fallen *in general*, the wages of immigrant also will decline because they typically are less skilled than a representative native. If this effect is ignored, longitudinal estimates of immigrant assimilation will be biased downward.

To deal with this last problem, LaLonde and Topel argue that recent immigrants' wage growth should be compared to the wage growth either of immigrants of the same ethnicity who have been in the US for more than 30 years, or ethnically similar natives. For example, LaLonde and Topel estimate that because of the rise in US wage inequality, the average 1979 wage of recent Mexican immigrants relative to natives was 8% lower than the average 1969 relative wages of their newly arrived counterparts. Therefore using growth in natives' wages to measure changes in demand conditions would cause estimates of the rate that Mexican immigrants acquired US-specific human capital to be too low.

4.1. Estimates of assimilation

Both definitions of assimilation motivated Chiswick's (1978a) influential study of immigrant assimilation in the US. Using a single cross-section from the 1970 US Census, and controlling for workers' years of schooling, potential labor market experience, marital status, and region, Chiswick found that immigrants' relative wages rose with time spent in the US. Despite arriving with lower earnings and having lower estimated returns to schooling, Chiswick estimated that immigrant earnings surpassed those of a comparable white native after 13 years in the US. Moreover, after examining the separate assimilation paths of immigrants from a number of different English speaking and non English speaking countries, Chiswick concluded that "an earnings cross-over at 10–15 years appears to be quite robust" (Chiswick, 1978a: p. 919).

Chiswick's results suggest that immigrants acquire a significant amount of country-specific human capital during their first decade in the United States. When compared to earlier immigrant cohorts, his results indicate that new immigrants' (those in the US for less than five years) earnings rose by 11% relative to immigrants with the same observed characteristics who had been in the US for 30 or more years. However, because these results are derived from cross-sectional data, this estimate of the rate of

assimilation may be too large, resulting from lower unobserved skills among recent immigrant arrivals.

This concern about the reliability of cross-sectional estimates of assimilation is particularly relevant when studying immigration to Australia and North America. As shown by Table 6, during the postwar period immigrants' countries of origin changed. During the 1950s, approximately 60% of immigrants to the US were from Europe, compared with only 6.2% from Asian countries. Twenty years later these percentages had changed so that less than 20% of immigrants to the US were from Europe and 36% were from Asia. Similar changes in the contributions of different source countries also occurred in Australia and Canada. The implication of these figures is that cross-sectional estimates of assimilation compare immigrant cohorts with substantially different labor market skills upon arrival in the receiving country (Borjas, 1991a). For example, European immigrants include many persons from the northwestern part of the continent, who arrive in the US with high levels of education and English language proficiency. By comparison, immigrants from Latin America and Asia arrive with substantially poorer skills. Thus, cross-sectional comparisons among immigrant cohorts from different years leads to comparisons between relatively skilled European immigrants and less-skilled immigrants from Latin America and Asia.

Although it is clear that the skills of recent immigrants to the US have declined over time, it is not so clear that this has led to biased estimates of the rate of assimilation. Some of Chiswick's specifications include crude controls for immigrants' source country, years of schooling, and experience, so the changing observable characteristics of immigrant cohorts will not bias his estimate of assimilation. Still, declines in unobserved skills may occur "within" an educational-experience-source country category. For example, Mexican immigrants who arrived in the US between 1975 and 1979 with six years of schooling and ten years of potential experience may be less skilled than observably similar Mexicans who arrived a decade earlier.

Both Borjas (1985) and LaLonde and Topel (1992) examined the importance of this possibility using two cross-sections derived from the 1970 and 1980 US Censuses.

Table 6
Region/country of origin of immigrants to the US

Region/country of origin	1951-1960 (%)	1961-1970 (%)	1971-1980 (%)
Europe	59	37	18
United Kingdom/Germany	22	13	4
Asia	6	13	36
Americas	33	48	43
Canada	11	9	3
Mexico	13	13	14

Source: Chiswick (1986: p. 170, Table 1).

But they reached different conclusions. Although Borjas found some evidence of immigrant assimilation, he concluded that “the strong assimilation rates measured in the cross-section may be partly due to a precipitous decline in the ‘quality’ of immigrants admitted to [the US] since 1950”. As a result, cross-sectional estimates overstate the rate of assimilation “by as much as 20 percentage points in some immigrant cohorts” (p. 484). Further, the rate of immigrant wage growth relative to natives was “greatly overestimated by cross-section analysis”.

By contrast, LaLonde and Topel acknowledged that the average skill of immigrants had declined substantially, but argued that there was “no important evidence of declining immigrant ‘quality’ within the groups that we studied”. They point to evidence in both their own and in Borjas’s study, showing that there was no decline in the educational attainment of successive immigrant cohorts within ethnic groups. Lack of change in *observable* skills makes it less plausible that there were important declines in *unobservable* skills within an ethnic category. More to the point, they found that both cross-sectional and “panel” estimates of assimilation were similar. Provided researchers control for immigrants’ education, experience, and ethnicity, LaLonde and Topel conclude that estimates of immigrant assimilation from a cross-sectional data set may be reliable estimates of the amount of assimilation likely to be observed in a panel.

LaLonde and Topel’s results indicate that immigrants acquire significant amounts of county-specific human capital during the first ten years in the US. They also find that the rate of assimilation is positively correlated with the gap between a newly ar-

Table 7
Rates of US immigrant assimilation^a

Ethnic groups	(1)	(2)	(3)	(4)	(5)
Europeans and Canadians	0.09 (0.02)	0.08 (0.03)	0.08 (0.03)	-0.05 (0.02)	- -
East Asians	0.24 (0.03)	0.25 (0.03)	0.24 (0.09)	-0.33 (0.02)	-0.07 (0.03)
Mexicans	0.17 (0.03)	0.22 (0.03)	0.21 (0.09)	-0.22 (0.02)	-0.11 (0.02)
Other Latin American and Caribbean	0.23 (0.03)	0.24 (0.03)	0.19 (0.09)	-0.22 (0.03)	-0.20 (0.03)

^aColumn (1), log wage differences for ethnic natives; column (2), initial gap with ethnic natives. The rates of assimilation in columns (3), (4) and (5) are relative to: column (3), ethnic natives 1980 cross-section; column (4), old immigrants 1980 cross-section; column (5), old immigrants 1970–80 panel. Estimates control for years of completed schooling, a quartic in experience, and interactions between schooling and experience. Additional controls do not affect the results. Assimilation rates estimate the effect of the first ten years’ US experience on wages, measured relative to observationally identical ethnic natives and ethnic immigrants who have been in the US for more than 30 years. Standard errors are in parentheses.
Source: LaLonde and Topel (1991b: Table 2).

rived cohorts' wages and those of ethnically similar natives. As shown by Table 7, skills associated with their first ten years in the US raises European and Canadian immigrants' wages by 8%, compared with a 20% rise in Mexican and East Asian immigrants' wages. These results hold both when using only the cross-section (columns (1) and (2)) and when using the panel (column (3)). However, as shown by column (4), Mexican and East Asian immigrants begin work in the US with a larger wage gap between themselves and natives of the same ethnicity.

The foregoing rates of assimilation indicate that immigrants will "catch up" with *ethnically similar* natives who have similar levels of education within 10–20 years. But immigrant earnings will *not* approach those of the median native. For example, earnings of Mexican immigrants will approach those of Hispanic natives. But, as shown by column (5) of Table 7, Hispanic natives earn less than an otherwise observationally equivalent native of European ancestry. In the US, the melting pot analogy is incomplete, as is indicated by persistent earnings differentials among members of ethnic groups who are natives (Glazer and Moynihan, 1963).

There are fewer studies that examine immigrant assimilation in other developed countries. Those that exist for Australia, Canada, Germany, and the United Kingdom suggest that years spent in these countries yield substantially smaller returns than estimates for US immigrants. Chiswick and Miller (1993) find that a year of experience in Australia raises immigrant earnings by approximately three-tenths of a percent. Baker and Benjamin (1994) report low, if not negative rates of assimilation for several early immigrant cohorts in Canada. Pischke (1992) and Chiswick (1980) find no evidence of immigrant assimilation in Germany and the United Kingdom.

One potential explanation for these findings is that new immigrants to these countries have skills that are more similar to natives' than is the case for immigrants in the US. US studies suggest a negative relationship between estimated assimilation rates of a given immigrant cohort and that cohort's skills relative to natives (Duleep and Regets, 1992). One interpretation of this finding is that immigrants who arrive in the receiving country at a significant earnings disadvantage to natives are more likely than other immigrants to lack the country-specific skills of the native population. For these disadvantaged migrants, time in the receiving country provides them with an opportunity to acquire these skills. By contrast, new immigrants who can earn as much as natives likely arrive with these country-specific skills, and therefore do not earn any returns by gradually acquiring them during their stay in the receiving country.

Several studies of immigrant assimilation outside the US find some support for this explanation. For example, after accounting for Canadian immigrants' changing ethnic composition and for their age at migration, Baker and Benjamin report that five years of experience in Canada raised the earnings of immigrants arriving between 1971 and 1975 by 5%, and between 1976 and 1980 by 6%. Similarly, Schmidt (1992), using the same data used by Pischke in the study cited above, reports that a year of experience in Germany for Turkish, Greek, and Italian immigrants raised their earnings by nearly

1%.¹⁹ One characteristic of the more recent immigrants to Canada and the Turkish, Greek, and Italian immigrants to Germany is that, when compared to other immigrant groups, their initial earnings were lower relative to natives. In Canada this decline in the relative earnings of new immigrants tracks the shift in immigrant composition away from Northwestern European countries and toward Asian countries.

4.2. *The impact of language proficiency*

New immigrants acquire a variety of social and cultural “skills” that facilitate their assimilation into the receiving country’s labor force. Among these skills, the one that has received the most attention in the literature is language proficiency. If a person’s language skills are an important component of his or her work-related human capital, immigrants’ earnings should depend on their language skills upon arrival in the receiving country and on the rate that these skills improve over time. This conjecture suggests immigrants’ proficiency in the dominant language of the receiving country should account for a portion of their earnings and of its rise with time since migration.

The extent that greater language proficiency leads to increased earnings depends on how production is organized, on the nature of the product, and on the share of consumers that speak the dominant language. If all output consisted of standardized products produced in one-person firms using only labor, communication skills would be less important and measures of language proficiency would not be strongly related to earnings. However, when production requires communication among workers and capital, or when consumers demand customized products, those lacking proficiency in the receiving country’s language are likely to have lower earnings (McManus, 1985). As a result, theory not only predicts that language-deficient immigrants have lower earnings, but that these earnings differentials would vary among workers according to their occupation and industry. Further, the presence of large numbers of language deficient immigrants may affect equilibrium occupation and industry wage differentials (Kossoudji, 1988).

Most available data sources for studying language proficiency and earnings only contain individuals’ self-reported assessments of their ability to speak the receiving country’s language (Bloom and Grenier, 1991). For example, the US, Canadian, and Australian censuses inquire about the “mother tongue”, the “language spoken at home”, and, if the respondent speaks a language other than English (or in Canada, French) at home, whether they speak English “very well”, “well”, “not well”, or “not

¹⁹ Although Pischke (1992) finds little evidence among several econometric specifications that German immigrants assimilate, he does report that when he used native blue-collar workers as this “base” group, he generated nearly the same assimilation rates that Schmidt found for Greek, Italian, and Turkish immigrants. Because immigrants from these groups are nearly always blue-collar or low-skilled workers, this choice of a base group makes some sense.

at all". For these countries, there also are some special surveys, such as the 1976 US Survey of Income and Education (SIE), that contain more detailed information on immigrants' language skills (McManus et al., 1983: Appendix). However, even when using these sources, researchers usually must evaluate an immigrant's language proficiency by relying on respondents' (or interviewers') assessments of their spoken English. Most available data sources not only lack objective measures of language skills, but even lack self-assessments of respondents' ability to write or read the receiving country's language.

Although the available measures of immigrants' language skills have obvious shortcomings, these measures have the expected correlations with other determinants of individuals' human capital. In their studies of immigrants' language skills and earnings in Australia, Canada, Israel, and the US, Chiswick and Miller (1992, 1993) report that after controlling for differences among observed characteristics, immigrants' language proficiency increased with years of schooling and years in the receiving country and was lower when immigrants had migrated at older ages, married abroad, or lived in an area with a high concentration of persons of similar ethnicity. In a separate paper, Chiswick (1991) reports these same patterns hold even among a sample of apprehended illegal immigrants awaiting deportation from the US.

Studies that use these measures of language proficiency usually find that they are significant determinants of immigrants' earnings. As shown by Table 8, US immigrants' earnings are strongly correlated with their ability to speak English. Chiswick and Miller (1992: pp. 264, 275) report that in 1980 there was a 46% earnings differential between US immigrants who were fluent and those reporting themselves as "English language deficient". This difference falls to approximately 17% after they accounted for the standard variables in an earnings equation. These authors' studies of language acquisition by Australian, Canadian, and Israeli immigrants yielded similar, but somewhat smaller, effects of language proficiency on earnings (Chiswick, 1993; Chiswick and Miller, 1993).

This regression-adjusted language earnings premium suggests that a US immigrant who was fluent in English earned approximately \$4500 (1992\$) more annually than

Table 8
Earnings of US natives and immigrants by English fluency
(median weekly earnings in dollars, males 25–54 years old in November 1989)

Age	Native-born	Immigrants who speak English		
		At home	Well, but not at home	Not well
25–34	455	482	409	221
35–44	575	622	506	239
45–54	582	739	506	286

Source: Meisenheimer (1992: pp. 16–17, Tables 10 and 12).

an observationally equivalent immigrant who spoke English either "not well" or "not at all". Likewise, despite using different econometric approaches and a different data set, McManus (1985) and Kossoudji (1988) each arrived at a similar conclusion for Hispanic immigrants. They found that earnings of the typical non-English speaking Hispanic (male) immigrant would rise by approximately \$5000 (1992\$) if he became fluent in English. Kossoudji reports that about one-third of this gain results because fluent immigrants are more likely to be employed in higher-paid managerial and professional occupations, while the remaining two-thirds of this gain occurs as a result of increased earnings within occupations.

Although many studies find that immigrants with greater language proficiency have greater earnings, they agree less on how much their acquisition of these skills accounts for the rates of assimilation observed above. Chiswick and Miller (1992) using US Census data and Tainer (1988) using the SIE report that including measures of language proficiency in an earnings equation reduces estimated assimilation rates by less than 25%. Likewise, these authors find that similar measures of immigrants' language proficiency have approximately the same effect on estimated assimilation rates of Australian, Canadian, and Israeli immigrants. Further, these measures of language proficiency only explain a fraction of the earnings differences between immigrants and natives. These findings suggest that immigrant assimilation is explained largely by the acquisition of other country-specific skills. By contrast, studies such as those by McManus et al. (1983) and McManus (1985) reach the opposite conclusion. Using different econometric specifications applied to the same data, they each report that once they account for an Hispanic immigrant's language deficiency, neither ethnicity nor time in the US are statistically significant determinants of earnings.

Understanding the connection between language proficiency and earnings growth is important because there may be considerable gains associated with improving immigrants' language skills. For example, McManus' and Kossoudji's studies suggest that the lifetime earnings losses to non-English speaking Hispanic immigrants may amount to as much as \$90 000. Therefore, if it costs less than that amount to make such an immigrant fluent, paying for such training may be privately beneficial. Further, if an immigrant cannot borrow from family members, or does not have sufficient access to capital markets or to existing public-sector sponsored educational loan programs, it also may be socially beneficial for governments to subsidize this training. However, this \$90 000 estimate has another interpretation. It may underscore the high costs incurred by adults, as compared to those incurred by children, when they learn a new language.

Chiswick and Miller (1992) offer another argument as to why these estimates may not reflect the gains associated with becoming fluent in English. But rather than disputing the foregoing interpretations of these estimates, they argue that they are biased because measures of language proficiency are endogenous in an earnings equation. Immigrants "become fluent in English if their unobserved skills are more highly rewarded when they are fluent" (p. 266). They note that the gains to fluency are greater

for more educated persons. Educated people are likely to invest more in improving their English skills. Because returns to proficiency are greater for observed skills such as education, it seems likely that these returns also would be greater for larger endowments of unobserved skills. As a result, measures of language proficiency likely are correlated with the error term in the earnings equation.

The authors attempted to address this problem by instrumenting their measures of language proficiency. Their instruments included immigrants' veteran status, number and age structure of their children, whether they were married abroad, and local concentration of "minority language" speakers. The validity of their procedure depends on whether they are uncorrelated with the unobserved characteristics in the immigrants' earnings equation. This caveat aside, the instrumental variable estimates yielded substantially larger estimated premiums for immigrants proficient in the dominant language in Canada, Israel, and the US, while yielding lower premiums for similar immigrants in Australia (Chiswick and Miller, 1993). Results such as these underscore the potential importance of endogenous language proficiency in earnings equations and of their sensitivity to the instrumental variables used in the analysis.

5. Transfers, taxes, and social welfare programs

Recent waves of immigrants to Western Europe and the US have included a large number of unskilled, and thus low income, families. Aside from their impact on the wage distribution, these immigrants raise additional concerns in countries with generous social welfare systems. One obvious problem is that generous transfer programs are most attractive to the least skilled, so the composition of immigrants is affected. For example, Sweden – with the most generous income-support programs in the world – received about 80 000 immigrants annually in the early 1990s. This flow represents 1% of the Swedish population, and many of the immigrants are relatively unskilled refugees from the Middle East. This effect can only worsen with Sweden's planned entry into the European Community, which will allow free labor mobility among member states.

The other problem is that participation of immigrants in social welfare programs places a burden on native taxpayers. As one extreme example, California taxpayers bear the medical costs of childbirth for illegal Mexican immigrants, whose US-born children are automatically citizens. The incentives for Mexican women to give birth in the US are huge. Should immigrants' use of these services exceed the taxes they pay plus their contribution to consumers' surplus, then receiving country policy makers have a strong incentive to restrict the flow of low-skilled immigrants into their country.

5.1. Social welfare transfers

In addition to reducing the benefits that natives receive from a given flow of immigrants, the presence of a social welfare system also increases the numbers of low-

skilled persons and may reduce the numbers of high-skilled persons migrating to the receiving country. Because the social welfare system creates a minimum living standard, low-skilled persons' expected income in the receiving country may rise above their expected labor market earnings. As a result, because the benefits from migration are more likely to exceed their costs, these persons have a greater incentive to migrate to the receiving country (Borjas and Trejo, 1992). By contrast, these incentives do not affect the migration rates of high-skilled persons because their high receiving country earnings would likely make them ineligible for transfer payments. Instead, their migration rates might decline if the receiving country supported a generous social welfare system with high tax rates. Again, Sweden is a good example.

Studies of 1970 and 1980 US Census data support the contention that immigrants make substantial use of the receiving country's social welfare system. As shown by Table 9, in 1970 approximately the same percentages of immigrant and native households received either Aid to Families with Dependent Children (AFDC), Supplemental Security Income, or general assistance. In 1980, the percentage of immigrants receiving transfers exceeded the native percentage by nearly one point. Moreover, the table suggests that immigrant households' use of the social welfare system increases with time in the US. In both 1970 and 1980, immigrant households whose head reported being in the US for no more than five years were usually less likely to receive welfare payments than other immigrant households.

However, as the discussion of assimilation rates indicated in the previous section, cross-sectional comparisons of participation in transfer programs will understate the growth in the proportion of families receiving assistance. Recent arrivals are less skilled, so they have higher participation rates in these programs than earlier cohorts. The importance of this point is clear from Table 9, which shows that in 1970 approximately 6.0% of immigrant households whose head had been in the US no more than ten years received welfare payments. But by 1980, 9.7% of a comparable sample households whose head now had been in the US for 11–20 years received welfare payments. These figures suggest that the percentage of immigrant households receiving

Table 9
Welfare participation of US immigrants
(percentage of households receiving payments)^a

Census year	Natives	Immigrants	Years in the US			
			0–5	6–10	1–20	20+
1970	6.1	5.9	5.5	6.5	5.0	6.2
1980	7.9	8.8	8.3	8.4	9.7	8.5

^aPercentages of immigrant and native households with head 18 years and over that received Aid to Families with Dependent Children, Supplemental Security Income, or general assistance in the year prior to the Census.

Source: Borjas and Trejo (1991: p. 198, Table 1).

ing welfare jumped by more than 60% during the decade. This is more than twice the growth rate for native households.

The figures in Table 9 highlight two points about the costs of immigration to native taxpayers. First, new US immigrant households are more likely to receive welfare payments than their earlier counterparts. Second, the longer immigrants remain in the US, the more likely they are to use the social welfare system. Borjas and Trejo (1991) find that the first result is due to the changing ethnic composition of immigrants to the US. As observed in Section 2, recent immigrants to the US are less likely to come from European countries, and more likely to come from Asia and Latin America. Immigrants from these regions are much more likely to reside in households receiving welfare. For example, in 1980, 29% of Vietnamese-headed households, 18% of Cuban-headed households and 12% of Mexican-headed households received welfare. By contrast, the percentages of German-headed and British-headed households that received welfare were 4.7 and 5.4% respectively.

Borjas and Trejo estimated the probability that immigrant households received welfare while holding constant years in the US, ethnicity, and other demographic characteristics. Using a logit framework, they found that after including controls for ethnicity (white, black, Hispanic, or Asian) immigrant households were *less* likely to receive welfare than ethnically similar native households (see also Blau, 1984; Tienda and Jensen, 1986). However, the probability that a household would receive welfare rose by approximately 0.15 percentage points for each year that they spent in the United States. These results indicate that not only do changes in the ethnic composition of immigrants account for the higher percentages of immigrant households receiving welfare, but that these percentages are likely to grow as they spend time in the United States. Combining these results, Borjas and Trejo predict that immigrant welfare reciprocity will eventually exceed that of natives.

Rising welfare reciprocity appears inconsistent with earnings assimilation among immigrants, since participation in social welfare programs usually requires low income. One explanation for this paradox is that legal barriers initially exclude new immigrants from receiving welfare payments. For example, immigrants in principle may be deported from the US if they become public charges during the five-year period before they become eligible to apply for US citizenship, though this policy is rarely enforced.

5.2. *Transfers and fertility*

Another possible explanation for the rising percentages of immigrants receiving welfare turns on the close connection between eligibility for these programs and the presence of dependent children. For example, low-income persons obviously receive AFDC only if they have dependent children. Likewise, families' eligibility for Medicaid, the US program that provides health care services to low-income persons, is

significantly more likely if there are unborn or infant children in the household. Finally, families with children are considerably more likely to use the public school system. So higher fertility among less-skilled immigrants could explain rising participation rates in welfare programs.

The importance of assessing this possibility for the US is underscored because immigrants have increasingly arrived from source countries with substantially higher average fertility rates. These rates probably overstate the fertility rates of those women who emigrate. Women who migrate probably have lower fertility than those who remain in the source country. Further, fertility among immigrants may converge to that among natives as part of the assimilation process. The counter argument is that the act of immigration may postpone fertility, so that child-bearing increases once women are settled in the receiving country.

These hypotheses about immigrant fertility suggest that direct comparisons between the numbers of children ever born to immigrant and native women may create a misleading impression about the differences between these women's fertility levels. Large cross-sectional data sets such as the Censuses report the number of children ever born at a point in time. For younger women this date is before they have completed their child-bearing years, so the data are censored. If immigration delays child bearing, the difference between native and immigrant fertility would be understated. Comparisons of the number of children ever born to older immigrant and native women do not suffer from these shortcomings because these groups have completed their child bearing. By following older cohorts over time we may estimate whether immigrants' fertility rates converge or diverge from those of natives.

Although these comparisons are informative for predicting the likely fertility patterns of recent immigrant cohorts, care is required when extrapolating past immigrant fertility patterns to those of recent cohorts. For example, to the extent that these patterns depend on economic conditions, extrapolations should account for the differing "time" effects that influenced the fertility behavior of each arrival cohort. One way to control for these effects is to condition on the fertility patterns of native cohorts, especially natives with the same ethnicity as immigrants.

A more important problem with using the fertility patterns of past immigrants to project the pattern for recent arrivals is that immigrants' ethnic composition changes with time. In the US, the older immigrant cohorts are from source countries with low average fertility rates compared to the those of new arrivals. Therefore, the differences between their and natives' fertility levels and as well as growth may not provide a reliable basis for estimating the completed fertility differences between new arrivals and similarly aged natives. An improvement upon such estimates involves comparing the fertility patterns of past immigrants from the same source countries.

Blau (1992) accounted for these effects in her analysis of immigrant and native fertility in the United States. She found that even immigrants who arrive from source countries with high fertility rates have comparable fertility levels to natives. According to the 1980 US Census, the number of children ever born to immigrants who had

arrived in the US during the previous decade was only 0.1–0.2 children larger than the numbers born to similarly aged natives. Earlier immigrant cohorts reported fewer children compared with natives, and immigrants generally had fewer children than ethnically similar natives. To be sure, the fertility rates of immigrants groups are correlated with the average fertility rates in their countries of origin. This correlation is especially strong for immigrants who had married prior to arriving in the United States. But the fertility rates of recent immigrants are much lower than those of their source countries.

At least for the US, these findings imply that immigrant fertility rates do not portend substantially higher participation in social welfare programs. Nevertheless, Blau found that immigrants fertility rates rise relative to natives during their first decade in the United States. Following the cohort of immigrants who arrived between 1965 and 1970, the immigrant–native difference in number of children born increased by 0.5 children between 1970 and 1980. Should this trend continue, by 1990 the average immigrant will bear 0.7 more children than a comparable native.

Because the presence of more dependent children increases a household's likelihood of receiving social welfare transfers, Blau's findings are consistent with those of Borjas and Trejo showing that immigrants "assimilate" toward the social welfare practices of ethnically comparable natives. However, it is unclear whether increased immigrant fertility, both within and across cohorts, explains a significant portion of immigrants increased use of the US social welfare system. What is clear is that although US immigrants have increasingly arrived from countries with high fertility rates, their fertility behavior in the US is fairly similar to that of natives.

5.3. *Comparing transfers and tax payments*

A comprehensive estimate of the benefits of immigration should include the costs of immigrant participation in the full range of income-support programs. These include transfers from the unemployment insurance and social security systems, public health insurance, and the public schools. Simon (1984) provides such an estimate for a sample of 15 000 immigrant households from the 1976 Survey of Income and Education. As shown by column (1) of Table 10, families headed by immigrants who arrived in the US between 1965 and 1975 received less from the social welfare system than other immigrant or native households. The reason is that these families are headed by younger persons, who are less likely to be eligible for Social Security and Medicare.²⁰ However, as shown by the table, immigrants receive as much if not more than natives from the other transfer programs.

²⁰ Social Security provides retirement benefits and Medicare provides health care services to older Americans. US immigrants' parents are not eligible to receive payments under these programs.

Table 10
Annual benefit to natives from immigration
(transfer payments received and taxes paid by US immigrant and native families)^a

Cohort arrival dates	Public transfers			(4) Estimated taxes paid (\$)	(5) Net taxes (4) - (1) (\$)	(6) Net benefit (5) - \$282 (\$)
	(1)	(2)	(3)			
	Total (\$)	SSA (\$)	Other (\$)			
1970-1974	1414	72	1342	3048	1634	1352
1965-1969	1941	200	1741	3552	1611	1329
1960-1964	2247	414	1833	4064	1817	1535
1950-1959	2292	500	1792	3927	1635	1353
Natives	2279	902	1377	3201	922	-

^aTotal transfers per family include unemployment and workmen's compensation, veteran's benefits, public welfare, Supplementary Security Income, Aid to Families with Dependent Children, food stamps, Social Security, and estimated costs for Medicare (at \$592 per patient year), Medicaid (at \$126 per patient year) and schooling for children aged 5-17 (at \$1302 per child year). SSA includes both Social Security and Medicare payments. The figures in the table are in \$1975 per family. To convert them to 1993 dollars, multiply by 2.7.

Source: Simon (1974: pp. 58, 65, Tables 1 and 4).

While immigrants appear to make substantial use of the US social welfare system, an equally important consideration is whether the tax payments associated with their incomes exceed these costs. Existing micro-data sets do not report individuals' tax payments. But, as shown by column (5) of Table 10, estimates based on their reported incomes indicate that, on balance, immigrants who arrived in the US prior to 1975 paid more in taxes than they collected from social welfare programs. Notice that the same also is true for natives. Natives' net taxes must be positive, because tax payments must also pay for the provision of public goods, such as national defense, international affairs, or general science, and for other government services. Simon estimates that 20% of natives' tax payments cover expenditures on public goods. By definition, the presence of immigrants does not affect the usage of these services, but the number of immigrants may affect usage of and therefore expenditures on other government services. We can estimate these government expenditures per family by subtracting the government's per-family expenditures on public goods, \$640 ($= 0.2 \times \3201), from natives' net taxes, \$922, to arrive at \$282. We then compute the net benefits (column (6)) that natives received from an immigrant family in a given arrival cohort by subtracting this figure from immigrants' net taxes.

As the final column of Table 10 shows, immigrants' net tax payments exceed the costs associated with their use of the social welfare system by approximately \$1400 per family. The main source of this surplus is due to current immigrants contributions to Social Security, which is a transfer to older natives. Overall, during the mid-1970s a

cohort of 500 000 immigrant families transferred approximately \$0.7 billion (1975\$) annually to natives.

These calculations indicate that policy concerns about the effect of immigration on social welfare costs may be unwarranted. However, two considerations suggest that they overstate the benefits associated with more recent US immigration. First, the calculations assume that average immigrant skills have not declined. We know that they have, and that recent immigrant cohorts have higher poverty rates. For example, the percentage of new immigrant arrivals with incomes below the poverty line rose from 18.4% in 1970 to 29.4% in 1980 (Borjas, 1990). This change occurred during a period when the poverty rates for both white and minority US natives declined. Therefore, the net benefits associated with immigrants who migrated after 1975 may be substantially smaller than for those who arrived in the US prior to that year.

A second reason why the figures in Table 10 overstate the net benefits to natives from recent immigration is that they do not take into account that a cohort's use of the social welfare system rises with time in the US. The growth in welfare payments received by the 1970–1974 cohort between 1975 and 1985 will be larger than indicated by the difference between payments received by the 1970–1974 and 1960–1964 cohorts in 1975. Further research is required on the forthcoming 1990 Census and other micro-data sets to assess the importance of these considerations.

6. Conclusions

Studies of the labor market impact of immigration find generally that increased immigration has only a modest impact on the distribution of income. However, most of these adverse affects fall on immigrants themselves. Recent immigrants to a locale depress the earnings of other new immigrants in the area, but they have little measurable effect on the employment and earnings prospects of natives. These effects might be small as a result of the effects that immigrants have on local labor demand or of changes in natives' migration patterns. In the former case, there is little reason to expect large effects from immigration on natives' income distribution. In the latter case, such migratory behavior would imply that any adverse impact of immigration on natives is not isolated to a locale, but is spread more widely across the economy.

The literature on assimilation has several implications for studies of the labor market impact of immigration. First, there is evidence of a significant amount of immigrant assimilation in the US data, although there is less evidence of it in Australian, Canadian, and European data. This result implies that the adverse effects that US immigrants have on wages lessen as they spend more time in the US. Second, this assimilation does not mean that immigrants' wages approach those of the median native. Instead, it implies that their earnings approach those of comparably skilled, and ethnically similar natives within a generation. Finally, one reason that there may be less evidence of immigrant assimilation outside the US is that the US receives a

more heterogeneous pool of immigrants. Indeed, within the US there is less evidence of assimilation among groups that arrive with skills that are similar to the typical native. Years of experience in the host country may be particularly valuable to the unskilled as they acquire country-specific skills that their more skilled counterparts already have. This result suggests that because in recent years immigrants to the US (and Canada) have become less skilled compared to the native population, the process of assimilation will be a more important part of the immigrant experience in the years ahead.

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