COMMENTS WELCOME

The Impact of Immigration on Natives in the Antebellum U.S. Labor Market, 1850-60

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Abstract

A negative effect of immigration on natives' wages or incomes has been difficult to detect over the last twenty five years. Such an impact has been observed at the turn of the century, however. This difference could result either from a genuine change in the impact of immigration or from differences across studies in the impact and treatment of the location decisions of immigrants and the internal migration of natives. This study is prompted by these differences. It measures the impact of immigration in the years before the Civil War, in a setting in which it should be possible to detect an impact if ever there was one: the analysis covers a period when the immigration rate was more than twice as great as in the modern period, controls for immigrants' location decisions, and examines both out-migrants and non-migrants among the native born. It finds that the impact of immigration on the income of natives was limited to skilled workers in the urban northeast. The largest impact on this group came from unskilled Irish immigrants. Though the results are not encouraging to those who seek a large impact from immigration today, they help explain both the reluctance of the U.S. to impose restrictions on immigrant entry in this period and some important political developments leading up to the Civil War.

Introduction

The negative effect of immigration on the wages and incomes of native born workers feared by many has been difficult to find in recent data. Only two studies for the contemporary period, one examining 120 urban labor markets (Altonji and Card 1991) and one examining the aggregate U.S. labor market using national-level time series data (Borjas, Freeman, and Katz 1992), have found a negative association between an increase in the fraction foreign born and the change in the wages of natives. The negative impact of immigration early in the twentieth century has been better documented. Using historical data on urban labor markets at the turn of the century, Goldin (1994) has found a clear negative impact from immigration, while Hatton and Williamson (1995) have used national-level time

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series data to demonstrate a similar negative effect. These differences between the findings of contemporary and historical studies motivate the approach adopted here: examining another historical period when both the immigration rate was high—the highest in U.S. history—and the data are available to accommodate many of the criticisms of previous studies of immigration's impact.

Differences between the contemporary and historical results may be due to the much greater volume of immigration in the years around 1900. The immigration rate was more than twice as great in the early years of the twentieth century as it has been in recent years of peak immigration. Some of the difference may also reflect changes in the "absorptive capacity" of the U.S. economy—its ability to accommodate the arrival of large numbers of immigrants without suffering a large fall in wages among the native born—a capacity which Williamson (1982) suggests was particularly low at the beginning of this century. Finally, some of the difference may result from differences in the factors omitted from these studies, such as the endogeneity of the location choices made by immigrants and natives in cross-sectional studies of local labor market data and differences between the wages of immigrants and natives in time series studies of national-level data. [1]

This study examines the impact of immigration on natives in a setting where it should be possible to detect an impact if ever there was one: the antebellum period, when the immigration rate was more than twice as great as in the modern period. The scale of immigration in this period can be seen in Figure 1, which shows the absolute number of immigrants entering the U.S. each year from 1820 to 1992 (the immigration level) and the number of entering immigrants per thousand U.S. population in each year (the immigration rate). Though the level of immigration was higher in the

[1] Both Altonji and Card and Goldin attempt to account for immigrants' location choices, though Goldin accounts only for fixed city-specific effects that may attract or repel immigrants. Borjas (1994, p. 1697-1698) doubts the validity of the instrumental variables used by Altonji and Card to account for the endogeneity of the location choices made by immigrants. Neither Altonji and Card nor Goldin examines the internal migration of the native born. Internal migration would dissipate the impact of immigration if natives leave places where immigration has depressed wages. The effect could go in the opposite direction as well: internal migration could cause a negative association between the change in native wages and the change in the fraction foreign born if the native born migrate in greater numbers than immigrants to places where local labor market conditions are good. For the contemporary period, evidence on whether the association observed by Altonji and Card could be the result of natives' internal migration is mixed. Using 1980 census data, both Filer (1992) and White and Hunter (1993) found more out-migration and less in-migration of native-born workers in cities with large immigrant concentrations. Frey (1994) reaches a similar conclusion using 1990 census data. Studies by Butcher and Card (1991) and White and Liang (1993), however, reach a different conclusion based on CPS data from the 1980s: they find that the in-migration of natives was greater in cities that received large numbers of immigrants in the 1980s. For the late nineteenth century, Goldin (1994, p. 249) suggests that the internal migration of the native born at the end of the nineteenth century is unlikely to have reduced the impact of immigration on wages, though she does not address the possibility that their migration may generate a negative association between the change in the immigrant share and the change in the native wage. Friedberg and Hunt (1995, p. 34) suggest that the estimates of immigration's impact in Altonji and Card are small compared to estimates of the effect of "generational crowding," a point that applies with equal force to Goldin's study which finds the impact roughly similar in magnitude to that in Altonji and Card. Friedberg and Hunt (1995, p. 31) suggest that Goldin's results "may be affected by the 'composition' problem": the city-level wages she uses combine the wages of both immigrants and natives, so wages could fall in a location with the entry of immigrants simply because they earn lower wages themselves rather than because of their impact on the wages of natives. Goldin notes (1994, p. 252-253) that her focus on occupations that few immigrants entered reduces this problem. Both of the national-level time series studies also suffer from this "composition" problem.

1980s than in the previous half century, the level was not high by historical standards until the early 1990s.[2] Even then, the rate of immigration was no more than half the rate experienced in the previous three great waves of immigration (in the 1850s, the 1880s, and the years just before 1910).

The data available for the antebellum period (described in Section II below) make it possible to control for immigrants' location decisions and to examine both out-migrants and non-migrants. Instrumental variable techniques are used to account for the possibility that immigrant inflows into a location are related to labor market conditions there. The inability to capture the impact of the geographic mobility of native-born workers has been a problem in virtually every study of immigration's impact at the level of local labor markets. As Borjas (1994, p. 1699) notes of studies of the impact of contemporary immigrants that treat local labor markets as essentially closed economies, "As long as native workers and firms respond to the entry of immigrants by moving to areas offering better opportunities, there is no reason to expect a correlation between the wage of natives and the presence of immigrants." This will be particularly important for the antebellum period, when internal migration rates were high by contemporary standards. Native born workers were extremely mobile (only 53 percent remained in the same county between 1850 and 1860). [3] But the nature of the data—multiple observations on every individual in the sample, regardless of location—makes it possible to account for this effect, and also to assess how much of immigration's impact is missed by ignoring it.[4]

A potential objection to the comparison undertaken here between the impact of immigration in the antebellum period and its impact at the turn of the century and later is that changes in the economy's structure and in its "absorptive capacity" would make comparison of immigration's impact across these eras misleading. The frontier was moving rapidly west before the Civil War, and urban

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[2] The level and rate should be adjusted upward in the post-war years for undocumented immigrants. In recent years, the INS estimates that this would add 300,000 to the annual immigration total. The sharp increase in immigration after 1990 in Figure 1 does not represent an increase in the numbers arriving at the border. Rather, it reflects the transition to documented status under the immigration law reform of previously undocumented immigrants who had entered prior to 1991 and sought citizenship under the law's lottery provision.

[3] For estimates of inter-county migration between 1850 and 1860, see Ferrie (1996b). By contrast, the Census Bureau reports that six percent of Americans changed their county of residence between 1991 and 1992. Cumulating the implied persistence rate over 10 years as $(1-0.06)^{10}$ means that 53% would remain in the same county over a decade. A ten year migration rate calculated on the basis of a single year rate over-states the true ten year rate because most moves are accounted for by a small fraction of the population who move repeatedly, so decadal inter-county migration rates in the 1850s were probably considerably higher than those in the 1990s (Tucker and Urton 1987). To see this, suppose that 6% of the population move every year, while the other 94% remain in the same location. The implied ten year migration rate of 47% will be nearly eight times greater than the true fraction of people residing in different locations at the beginning and end of the decade. Cumulating the one year rate to obtain a ten year rate will overstate the true ten year rate as long as some people move more than once. Internal migration was also probably *effectively* greater in the past because of the size of the relevant labor market. Since modern local labor markets often include several adjacent counties, while local labor markets in the antebellum period were probably no larger than a county, the rate of migration between local labor markets was also no doubt larger in the antebellum period than these figures indicate it is today: some contemporary inter-county moves represent migration within a single local labor market.

[4] Also, since the data are individual-level observations on the native born, the analysis does not suffer from the "composition" problem of other studies.

growth was rapid in new, Midwestern cities. By 1900, the frontier had vanished, forcing immigrants and natives into closer competition without the outlet provided by free land and growing cities in the west.

Two responses can be offered to this objection. The first is that, according to Williamson's estimates, the economy's "absorptive capacity" was not much greater before the Civil War than at the turn of the century. He has calculated that the elasticity of demand for unskilled labor (a measure of "absorptive capacity") fell from -3.90 in 1850 to -3.25 by 1900, and fell again over the next three decades to -1.60 by 1929 (1982, p. 273). The decline between 1850 (the period examined here) and 1900 (a time at which both Goldin (1994) and Hatton and Williamson (1995) are able to detect a negative impact from immigration) is slight (only a sixth) compared to the changes that occurred by 1929 (a fall of nearly 50 percent). Further, the absorptive capacity recovered significantly after the 1920s, making comparisons between the 1850s and the recent period less unreasonable than they might seem initially. The second response is that if this is a problem, it can to some extent be accounted for in the analysis. If the economy's capacity to accommodate immigrants without depressing the wages of natives reflects the availability of a farming frontier and rapidly growing cities just behind it to which natives displaced by immigrants could move, the data used here will be able to capture these effects.

Apart from offering a new comparative perspective, the impact of immigration in this period is also interesting in its own right. As Section I below shows, there were loud complaints in the popular press and in the political arena about the negative consequences of immigration for natives. Though those complaints never produced the closing of the "Golden Door" that Goldin (1994) documents at the start of the twentieth century with the imposition of the quota system, they did produce an important political movement that led to the election of Lincoln and a Republican Party committed to ending slavery in the 1860 election. In this sense, the long-run impact of immigration in the 1840s and 1850s is arguably greater than the impact of the immigration at the turn of the century that resulted in the restriction of immigration.

The next section provides an overview of the impact of immigration in this period. Section II describes the data. Section III describes a simple economic model in which income changes and migration probabilities are jointly determined, and both are affected by immigration. Section IV provides estimates of the impact of immigration on the incomes of the native-born, allowing for the out-migration of those whose incomes rise or fall because of an influx of immigrants into their local labor market. Section V offers some tentative conclusions and discusses implications of the findings for: 1) our understanding of how the impact of immigration has evolved over 150 years; and 2) how immigration affects the demand for immigration restriction. An Appendix describes the construction of the income measures used.

I. Antebellum Immigration

The two decades before the Civil War witnessed the first great wave of European immigration to the U.S. From 1820 (the first year for which reliable data are available) through the mid-1840s, the annual volume of immigration remained well below 100,000 which translates into an immigration rate that remained between four and five per thousand (U.S. Census Bureau 1975, Series C 89). The volume of immigration rose dramatically in 1847, in the wake of the failure of the potato crop in Ireland in 1846 and on the European continent in the following two years. In 1850 alone, nearly 370,000 immigrants arrived in the U.S., pushing the immigration rate above 15 per thousand for the first and

only time in the nation's history. Three countries (Great Britain, Ireland, and Germany) accounted for 93 percent of all arriving immigrants in 1849.

The U.S. that antebellum immigrants entered was still primarily rural. Of the free male native-born population age 20 to 65 in 1850, 83 percent lived in places of fewer than 2,500 persons, while only 9 percent lived in cities of more than 10,000 persons.[5] Immigrants were far more concentrated in cities than the native-born: more than 36 percent were living in places of more than 10,000 persons in 1850, while only 54 percent lived in rural locations (with populations below 2,500). In their choice of regions, immigrants were more concentrated in the Middle Atlantic states (43 percent) than natives (27 percent), and were only half as likely as natives to reside in the South. Half of the nation's immigrant population in 1850 resided in just three states: New York (27 percent), Pennsylvania (14 percent), and Ohio (9 percent). These differences suggest that if immigrants' arrival had an impact of natives' incomes, that impact was probably concentrated in a few places: urban places in the Northeast.

In terms of its occupational structure, the U.S. that antebellum immigrants entered was one in which economic activity was still largely oriented toward small-scale production on farms or in artisan's workshops: fifty-one percent of native-born males age 20 to 65 were farmers in 1850, and 17 percent were craftsmen. Only 22 percent were common laborers or servants, and 11 percent were in professional or commercial occupation. By contrast, in 1849, 28 percent of immigrants who reported occupations at arrival reported they were farmers, 23 percent reported they were craftsmen, 46 percent reported they were common laborers or servants, and 3 percent reported they were in professional or commercial occupations. These differences suggest that immigrants should have had the greatest impact on craftsmen and common laborers.

The arrival of so many immigrants in so short a time, and their concentration in a few locations and occupations, no doubt placed enormous stress on local labor markets. Until now, we have not had quantitative evidence of that stress for more than a few locations or industries. Nonetheless, several pieces of circumstantial evidence—on the change in the ethnic composition of the work force, on the degradation of skilled work, on the attitude toward immigration in the popular press, on the rise of nativist political organizations, and on the response of organized labor—suggest that immigration's impact was substantial in some circumstances.

The first evidence of immigration's impact is the rapid change in the ethnic make-up of the labor force where it has been possible to measure workers' nativity. In the textile mills of Lowell, where 90 percent of workers were native-born in 1849, only 35 percent were native born in 1855 (Lazonick and Brush 1985). The same rapid transformation of the labor force can be seen in a variety of other craft industries: carpentry, iron casting, shoemaking, tailoring, and cabinetmaking (Hoagland 1913; Ernst 1949; Ross 1985).

The labor history literature on "de-skilling" provides further evidence that immigration's impact was substantial. Fogel (1989, p. 358) suggests that this was a period characterized by "the general degradation of skill premiums by the downgrading of once highly skilled operations." He goes on to describe the "Berkshire system" under which skilled iron workers were gradually replaced by unskilled workers:

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[5] These figures, and the figures in the following paragraph, were calculated from the Integrated Public Use Micro Sample (IPUMS) of the 1850 federal census of population (Ruggles, *et al*. 1995).

> Prior to the introduction of the system, iron casting was performed by highly skilled journeymen. Afterward, journeymen were required to hire unskilled helpers (called bucks), each journeyman working in teams with from one to five bucks. Although the bucks were supposed to be purely helpers, the high-priced journeymen were often replaced by low-priced bucks who, if given the opportunity, soon learned enough of the trade to be given a rammer (the tool used to pack sand around a mold pattern) (Fogel 1989, p. 358).

This process was accelerated where changes in the manufacturing process made it easier for employers to replace skilled workers with semiskilled and unskilled workers:

> A very direct form of this competition seems to have occurred between native-born and immigrant skilled workers over jobs in the manufacturing sector. But this seemed less threatening than the conflict arising from technological innovation, which led to the displacement of skilled workers by semiskilled machine operators, many of them of foreign origin (Lane 1987, p. 22).

This development will figure prominently in the attempt to measure immigration's impact below, as the income measure developed here will be able to detect the demotion of skilled workers to unskilled positions.

The pressures immigration placed on labor markets, particularly in the urban northeast, produced a remarkable backlash in the 1850s. The first response of native workers was increased labor militancy: dozens of new labor organizations sprang to life between 1850 and 1854, and a wave of more than 400 strikes swept the country in 1853 and 1854 (Commons *et al.* 1918, pp. 601-614; Fogel 1989, p. 363). The second response was political: increasing support for those who preached the nativist creed. Though nativism had been present on the fringes of American politics since the nation's inception, it now moved to center stage. Capitalizing on anti-immigrant, pro-temperance, and anti-slavery sentiment ignored by the two major political parties, the Order of the Star-Spangled Banner (popularly known as the "Know Nothings") grew from a secret band of 43 adherents in 1852 to a national political organization boasting one million followers in 1854. The party "elected eight governors, more than one hundred congressmen, the mayors of Boston, Philadelphia, and Chicago, and thousands of other local officials" (Abinder 1992, p. ix). The party asserted that immigration was driving native-born laborers into pauperism:

> The effect of this immense influx of the laboring. . . immigrants, will inevitably depreciate the value of American labor. The price of labor depends upon the demand and supply, and it is indisputably true that for the last few years the supply has increased in a greater ratio than the demand, and consequently the value has been diminished, and. . . many, even among the native, who earn their livelihood by "the sweat of their brow," have been compelled to toil for barely sufficient to supply the actual necessaries of life (Busey 1856, pp. 78-79).

Surprisingly, the Know Nothings did not advocate the restriction of immigration. They merely suggested extending the period before which immigrants could become naturalized (and therefore eligible to vote). Though this suggests a greater fear of immigrant's political power than of their economic impact, the party's rhetoric clearly appealed to northern workers, particularly in northern cities, who felt they had been injured by competition with immigrants.

Nativist prescriptions were not just the musings of political extremists. The popular press took up the anti-immigrant cry with equal fervor:[6]

> [T]he enormous influx of foreigners will in the end prove ruinous to American workingmen, by *reducing the wages of labor* to a standard that will drive them from the farms and workshops altogether, or reduce them to a condition worse than that of Negro slavery (Philadelphia *Sun*, Nov. 3, 1854; emphasis in original).

The balance of this essay seeks evidence of the quantitative impact of immigration on native-born workers. In the process, it assesses the reasonableness of the circumstantial evidence presented above. It asks: Were native-born workers suffering from the influx of immigrants? If so, was the suffering general or localized? What does the impact of immigration in this period tell us about the impact observed at the turn of the century and in the contemporary period? Finally, why was the solution proposed by the Know Nothings less extreme than the outright restriction that occurred sixty years later? The next section describes data that will help us measure the economic impact of immigration in this period.

II. The Data

The data are individual-level observations on 2,897 native-born American males between the ages of 15 and 60 in 1850 located in 726 counties drawn from a new sample of 4,790 males linked from the Integrated Public Use Micro Sample (IPUMS) of the 1850 federal census of population (Ruggles *et al.* 1995) to the 1860 federal census manuscript schedules (Ferrie 1996b). The sample contains each individual's location (state, county, city, ward) and self-reported occupation in both 1850 and 1860. For each location, the county's distance from the frontier and the fraction of the population foreign born were obtained from the 1850 and 1860 published census volumes (U.S. Census Office 1853; U.S. Census Office 1863). Finally, the data set contains incomes imputed for 157 occupational titles (see the Appendix).

As Fogel (1992, pp. 482-484) notes, there are several problems in using wages to measure the economic welfare of native-born workers in this period, many of which obtain in the use of imputed incomes. These problems result from differences across locations and over time in prices, in unemployment, seasonality, and the length of the workweek, and in the distribution of workers across occupations (what he terms "de-skilling"). The measure of income change used here suffers from many of these shortcomings. The income measures used here have been adjusted for differences across regions and over time in prices, using the regional price index of Coelho and Shepherd (1974). The imputed nominal incomes are assumed to be constant within occupations between 1850 and 1860, which abstracts from changes in unemployment, seasonality, or the length of the workweek. The income measure used here introduces an additional problem by ignoring changes in incomes resulting from positive age-income or tenure-income relationships.

Since one of the issues we are interested in is whether immigration's impact is felt by natives across occupations, the regression for the change in income will include both dummies for occupation

[6] For other examples of the nativism that became increasingly apparent among native-born craft workers, see Commons *et al.* (1910, pp. 88-90).

and interactions between occupation and the share foreign-born at the 1850 location. Three occupational groups will be used: white collar (professional, technical, and kindred; managers, officials, and proprietors; clerical; and sales), craftsmen (craft and kindred workers; operatives in factory jobs), and farmers (farmers; farm managers; and farm foremen). The omitted category is laborers (operatives and kindred workers not in factory jobs; service workers; and laborers). Since the census did not provide a breakdown of age by nativity, it is not possible to use the most appropriate measure of the competition that native born males faced from immigrants: the fraction of the male labor force age 15 to 60 that was foreign born. The measure of immigration's impact used here will instead be simply the fraction of the county's population that was foreign born.

The data are summarized in Table 1, which shows the characteristics of individuals and the communities in which they lived in 1850 and 1860, disaggregated by the fraction foreign born at the 1850 location. Though average age does not vary much across the different foreign born concentrations, many of the other variables do. In particular, the fraction of natives who had made a previous interstate move rises with the fraction immigrant, while the average family size falls. Places with the highest immigrant shares had fewer farmers and more white collar, skilled, and semi-skilled workers among natives than places with fewer immigrants. Finally, the places with the highest immigrant concentrations were cities in the New England and Middle Atlantic states.

The two outcome measures that will be the focus of the empirical analysis, the change in the log of imputed income for natives and their out-migration rate, vary with the foreign-born concentration, though not always in the expected direction. Though the native-born out-migration rate was clearly highest in places with large immigrant concentrations, incomes in places with high immigrant concentrations grew more than twice as fast as in places with low immigrant concentrations, and grew as fast as in places with medium concentrations. Part of this difference may reflect the occupational mix in these places. Locations with low immigrant concentrations were mainly rural and southern, places in which the predominant occupation was farmer. Though natives in these places may have seen their incomes rise over the 1850s, the measure of income change used here captures only income changes resulting from changes in occupation. Places that had high immigrant concentrations were urban centers in the northeast and Midwest in which the occupational distribution was wider. In these places, there was scope for considerable movement between occupations. If immigrants chose locations where economic growth was rapid, and if rapid growth in the 1850s was positively correlated with rapid growth in the late 1840s when most immigrants arrived, we would expect to see the same positive association between immigrant concentration and income growth. The higher share of negative income changes in places with high immigrant concentrations is consistent with the first interpretation but not the second.

III. Measuring the Impact of Immigration on Natives

Critics of contemporary studies of immigration's impact on natives (Borjas 1994; Friedberg and Hunt 1995) contend that to see how immigration affects native-born workers, we must examine not only the impact of immigration (such as a fall in natives' wages) but also natives' response (such as out-migration). In order to make this connection explicit, this study adopts a simple "mover/ stayer"

framework for the empirical analysis.[7] The model is constructed to exploit the fact that individuals in the sample are observed at two points in time.

Suppose first that the log of the income of individual i at the origin (o), location j, at time t can be written as a function of observed and unobserved individual and location characteristics:

$$y_{ijt}^{o} = \beta_{o}^{\prime} X_{ijt} + \epsilon_{i} + \eta_{j} + \nu_{it}^{o} \qquad \textbf{(1)}$$

where X is a vector of observed individual and location characteristics (age, literacy, fraction foreign born in the county, and interactions between occupation in 1850 and the fraction foreign born), ϵ is an unobserved individual specific fixed effect, η is an unobserved location specific fixed effect, and ν is an error term orthogonal to X, ϵ, and η with $E(\nu_{it}^{o})=0$ and finite variance.

The log of the income of individual i at time t' depends on whether he has moved since time t. For movers (m), who go to location k

$$y_{ikt'}^{m} = \beta_{m}^{\prime} X_{ikt'} + \epsilon_{i} + \eta_{k} + \nu_{it'}^{m} \qquad \textbf{(2)}$$

For stayers (s), who remain in location j

$$y_{ijt'}^{s} = \beta_{o}^{\prime} X_{ijt'} + \epsilon_{i} + \eta_{j} + \nu_{it'}^{o} \qquad \textbf{(3)}$$

where X, ϵ, η, and ν are as defined above, though the interaction between occupation and fraction foreign born in the county in X now uses 1850 occupation and 1860 fraction foreign born. This specification assumes that the parameter vector β_o does not change between time t and time t'.

Assume that the individual chooses whether or not to migrate in order to maximize Δy. This will eliminate the individual specific effect ϵ_i for both movers and stayers, and will eliminate the location specific effect η_j for stayers. For movers (m), the change in the log of income is

$$\begin{aligned} \Delta y_{i}^{m} &= y_{ikt'}^{m} - y_{ijt}^{o} \\ &= \beta_{m}^{\prime} X_{ikt'} - \beta_{o}^{\prime} X_{ijt} + (\epsilon_{i} - \epsilon_{i}) + (\eta_{k} - \eta_{j}) + (\nu_{it'}^{m} - \nu_{it}^{o}) \qquad \textbf{(4)} \\ &= \beta_{m}^{\prime} X_{ikt'} - \beta_{o}^{\prime} X_{ijt} + \nu_{i}^{m} \end{aligned}$$

where $\nu_{i}^{m}=\eta_{k}-\eta_{j}+\nu_{it'}^{m}-\nu_{it}^{o}$ is an error term with $E(\nu_{i}^{m})=0$, $Var(\nu_{i}^{m})=\sigma_{m}$. For stayers ($s$), the change in the log of income is

[7] This framework has been used by Lee (1978) to study union/non-union wage differentials, by Willis and Rosen (1979) to examine the returns to schooling, and by Nakosteen and Zimmer (1980) and Robinson and Tomes (1982) to analyze migration and income.

$$\begin{aligned} \Delta y_i^s &= y_{ijt'}^s - y_{ijt}^o \\ &= \beta_o'(X_{ijt'} - X_{ijt}) + (\epsilon_i - \epsilon_i) + (\eta_j - \eta_j) + (\nu_{it'}^o - \nu_{it}^o) \\ &= \beta_o'(X_{ijt'} - X_{ijt}) + \nu_i^s \end{aligned} \qquad \textbf{(5)}$$

where $\nu_i^s = \nu_{it'}^o - \nu_{it}^o$ is an error term with $E(\nu_i^s)=0$, $Var(\nu_i^s)=\sigma_s$.

The individual migrates if an index of the net benefit of migration, I^*, is positive:

$$\begin{aligned} I_i^* &= \delta_1 C_i + \delta_2(\Delta y_i^m - \Delta y_i^s) - \nu_i \\ I_i^* &= \delta Z_{ijt} - \nu_i \\ I_i &= 1 \quad iff \quad I_i^* > 0 \Rightarrow \delta Z_{ijt} > \nu_i \\ I_i &= 0 \qquad otherwise \end{aligned} \qquad \textbf{(6)}$$

where C includes individual and location characteristics associated with the net benefits of migration, I_i is a dummy variable indicating whether the individual migrated, Z includes all the regressors in C and X, and ν_i is an error term with $E(\nu_i)=0$, $Var(\nu_i)=\sigma_\nu$. The vector C includes age, literacy, family size, whether a previous interstate move was made by the individual, distance from the 1850 location to the frontier, and the change between 1850 and 1860 in the fraction at the 1850 location who were foreign born. Family size should raise the cost of moving (both the direct cost of transportation and the set-up cost at the new location), though it should be uncorrelated with the change in income. [8] Similarly, whether a previous interstate move was made before 1850 (determined by comparing the reported state of birth and the 1850 state of residence) should capture the impact of any unobserved characteristics associated with a high propensity to migrate, but should be uncorrelated with the change in income between 1850 and 1860. The propensity to migrate will also be influenced by proximity to better locations. To capture this effect, the regressions include a measure of the distance from location j to the frontier for those located in rural places in 1850. [9] The change in the fraction foreign born is included to allow for the possibility that even if immigrants have no direct effect on the incomes earned by natives, natives are averse to living in places that receive a large influx of immigrants.

[8] Robinson and Tomes (1982, p. 480) suggest that the presence of school age children will increase the cost of migration if changing schools is costly. The presence of a spouse will inhibit migration "since a member of a family unit has to take into account the change in earnings of other family members."

[9] Distance to the frontier was defined as the straight-line distance from location j to 90° longitude. Locations west of this longitude (Minnesota, the Dakota Territory, western Wisconsin, western Illinois, Iowa, Kansas, Nebraska, Colorado, the western two thirds of Missouri, Arkansas, Louisiana, Texas, Arizona, New Mexico, California, Oregon, and Washington) were assigned a value of zero.

This is a "Type 5 Tobit model." Estimation proceeds in five steps (Maddala 1983, pp. 234-240; Amemiya 1985, pp. 395-400). First, assume that ν_i^m, ν_i^s, ν_i follow a trivariate normal distribution. Equations (4) and (5) can now be re-written as

$$\begin{aligned} \Delta y_i^m &= \beta_m' X_{ikt'} - \beta_o' X_{ijt} + \nu_i^m \quad iff \quad \delta Z_{ijt} > \nu_i \\ &= \beta_m' X_{ikt'} - \beta_o' X_{ijt} + \rho_m \sigma_m \left[\frac{\phi(\delta Z_{ijt})}{\Phi(\delta Z_{ijt})} \right] + \mu_i^m \end{aligned} \tag{7}$$

$$\begin{aligned} \Delta y_i^s &= \beta_o' (X_{ijt'} - X_{ijt}) + \nu_i^s \quad iff \quad \delta Z_{ijt} \leq \nu_i \\ &= \beta_o' (X_{ijt'} - X_{ijt}) + \rho_s \sigma_s \left[\frac{-\phi(\delta Z_{ijt})}{1-\Phi(\delta Z_{ijt})} \right] + \mu_i^s \end{aligned} \tag{8}$$

where $\rho_m = Corr(\nu_i, \nu_i^m)$, $\rho_s = Corr(\nu_i, \nu_i^s)$, $E(\mu_i^m) = E(\mu_i^s) = 0$, $Var(\nu_i)$ has been normalized to 1, ϕ is the standard normal density function, Φ is the cumulative normal distribution function, and the error terms μ_i^m, μ_i^s are heteroskedastistic (since they depend on δZ_{ijt}).

Second, estimate Equation (6) by Probit ML to obtain the parameters $\hat{\delta}$. Use this vector, together with Z_{ijt} to calculate the inverse Mills ratio:

$$\frac{\phi(\hat{\delta} Z_{ijt})}{\Phi(\hat{\delta} Z_{ijt})} \tag{9}$$

Third, estimate Equations (7) and (8) by weighted LS (to account for the heteroskedasticity), including the inverse Mills ratio as a regressor, as in the Heckman two-step estimator for selection, to obtain $\hat{\beta}_o$, $\hat{\beta}_m$, $\hat{\rho}_m \hat{\sigma}_m$, $\hat{\rho}_s \hat{\sigma}_s$.

Fourth, use these parameters as starting values in the joint ML estimation of Equations (6), (7), and (8), providing more efficient estimates (Amemiya 1985, p. 400) than the separate estimates used by Lee (1978).

Finally, estimate $\Delta \hat{y}_i^m$ and $\Delta \hat{y}_i^s$ for each observation using $\hat{\beta}_o'(X_{ijt'} - X_{ijt})$, $\hat{\beta}_o' X_{ijt}$, $\hat{\beta}_m' X_{ikt'}$, insert these into Equation (6), and re-estimate Equation (6) by Probit ML to obtain the structural parameters $\hat{\delta}_1$, $\hat{\delta}_2$, and correct the standard errors for the fact that some of the regressors are estimated values (Maddala 1983, pp. 252-256).

This strategy suffers from a few difficulties when applied empirically. The first is the identification of the parameters in the migration decision equation, Equation (6). In order to identify δ_1, there must be at least one variable contained in X that does not appear in C. Since X includes interactions between an individual's occupation at time t and the fraction foreign born in the county at

time *t* and time *t′*, but these interactions are excluded from *C*, this condition is satisfied. In order to identify δ_2, there must be at least one variable contained in *C* that does not appear in *X*. Since *C* includes an indicator for previous interstate migration and measures of family size, and distance to the frontier, but these are excluded from *X*, this condition is satisfied.

Another problem, as Robinson and Tomes (1982, pp. 477-478) note, is that the "mover/ stayer" framework imposes some strong restrictions when used to analyze migration. The most important is the need to limit the number of origins and destinations, even though the logic of the model suggests at least the possibility of a different wage equation for each origin and each alternative location. The origins have been defined broadly to keep the sample sizes reasonable large. The two origins examined here will be "urban places (population > 2,500) in the northeast (New England and Middle Atlantic)" and "rural places in the northeast."[10] All alternative locations have been aggregated into a single alternative location for each origin. For those originating in the urban northeast, the "other" location is rural places in the northeast or any location outside the northeast; for those originating in the rural northeast, the "other" location is urban places in the northeast and any location outside the northeast. This framework also imposes some restrictive assumptions on the error structure of Equations (7) and (8).[11]

The estimation procedure itself imposes further restrictions. Ideally, we would like a model that produces coefficients that directly measure $\partial\Delta y/\partial\Delta X_F$ (the difference in the change in income associated with a given change in the foreign born concentration) for both movers and stayers. This would require that the vector *X* include a term F_{1860}-F_{1850} for both movers and stayers. But in order to allow for the possibility that the parameter vector β differs between the origin and the destination, the *level* of all variables in 1860 and the negative of the *level* of all variables in 1850 must be included in the regression for movers (rather than the *differences* as is the case for stayers). Our measure of $\partial\Delta y/\partial\Delta X_F$ for movers, then, must be calculated using the coefficients on F_{1860} and $-F_{1850}$. The advantage of this procedure is that it allows us to test whether the impact of immigrants on natives' wages at the origin differs according to whether an individual later migrated out of that location. To derive $\partial\Delta y/\partial\Delta X$ for an element of the vector *X*, re-write Equation (7) as

$$\Delta y_i^m = \frac{1}{2}(\beta_m-\beta_o)'(X_{ikt'}+X_{ijt}) + \frac{1}{2}(\beta_m+\beta_o)'(X_{ikt'}-X_{ijt}) + \rho_m\sigma_m\lambda_i^m + \mu_i^m \qquad \textbf{(10)}$$

where $\lambda_i^m=\phi(\delta Z_{ijt})/\Phi(\delta Z_{ijt})$. Since $\Delta X_i=X_{ikt'}-X_{ijt}$, the desired partial derivative is

$$\frac{\partial\Delta y^m}{\partial\Delta X} = \frac{1}{2}(\beta_m+\beta_o) \qquad \textbf{(11)}$$

[10] Separate analyses (not presented here) were also performed for those originating in the rural Midwest and the rural Southeast. The findings were similar to those described below for the rural Northeast.

[11] See Robinson and Tomes (1982, pp. 479-480) for a discussion of these issues.

For movers, if the regression includes the 1860 values of the vector X and the negative of the 1850 values of the vector X, the impact of ΔX_F is then the simple average of the coefficients on the 1860 value of X_F and the coefficient on the negative of the 1850 value of X_F. For stayers, the impact of ΔX_F can be read directly as the coefficient on ΔX_F.

A final problem is endogeneity. The vector X contains the fraction foreign born in the county in 1850 and 1860. This will be correlated with the error terms in Equations (7) or (8) if immigrants choose where to settle on the basis of an unobserved location specific effect associated with the level of income earned by native born males. To eliminate this correlation, the fraction foreign born at time t or time t' is replaced with an instrument created using the ratio of white females age 20-29 to white females age 30-39 in the county, as well as polynomials up to fifth order in this ratio. The resulting instrument should be correlated with the fraction foreign born (as immigrants are disproportionately prime-age), but not with the error term in income equations for *male natives*.[12]

IV. Regression Results

[12] Note that for stayers, first differencing has eliminated any permanent location specific effect. The instrument needs only to be correlated with the fraction foreign born and uncorrelated with transitory location specific effects. Separate instruments are created for the fraction foreign born in 1850 and 1860. This is different from the procedure used by Altonji and Card (1991) who created a single instrument for the *difference* in the immigrant share between two dates in each location using the immigrant share at the initial date. Here, because some fraction of the sample moves between 1850 and 1860, the *levels* are each instrumented separately and the instrument for the difference is taken as the difference in the instruments. For movers, there is no reason to expect that the immigrant share in the initial year should be correlated with the change in the immigrant share movers face as a result of changing locations. The following table shows the regressions used to create the instruments for 1850 and 1860. The regressors are linear and higher order terms in the ratio of females in the county age 20-29 to females in the county age 30-39. The dependent variable in each case is the fraction of the county's population foreign born:

	1850		1860	
	β	standard error	β	standard error
intercept	0.8209***	0.1125	0.4079***	0.0465
[(20-29)/(30-39)]	-1.0479***	0.1835	-0.2548***	0.0811
$[(20-29)/(30-39)]^2$	0.4773***	0.1052	0.0106	0.0517
$[(20-29)/(30-39)]^3$	-0.0876***	0.0255	0.0181	0.0135
$[(20-29)/(30-39)]^4$	0.0069***	0.0026	-0.0027*	0.0014
$[(20-29)/(30-39)]^5$	0.0002**	0.0001	0.0001**	0.0001
Adjusted R^2	0.0584		0.0731	
Observations	1,593		2,015	

Significant at *** 99% level ** 95% level * 90% level.

For movers, the instrumented values for 1850 and 1860 are entered directly into the regressions. For stayers, the difference between the instruments for 1860 and 1850 are entered. The following analysis was also performed using an instrument created using the method of Altonji and Card (1991) and the arbitrary assumption that the instrumented value for the change in the foreign born concentration faced by movers was the simple average of the instrumented changes at the origin and destination. All of the substantive results that follow were replicated.

Taken together, the parameters of Equations (6), (7), and (8) allow us to assess the total impact of immigrants, after accounting for the effect of out-migration. To see this, differentiate Equation (8) with respect to the change in the foreign-born share ΔX_F, which yields:

$$\frac{\partial(\Delta y^s)}{\partial \Delta X_F} = \beta_{oF} - \delta_F \rho_s \sigma_s \frac{-\phi(\delta Z)}{1-\Phi(\delta Z)}\left(\delta Z + \frac{-\phi(\delta Z)}{1-\Phi(\delta Z)}\right) \quad \textbf{(12)}$$

where β_{oF} is the coefficient on the change in the immigrant share between 1850 and 1860 for stayers and δ_F is the coefficient on the change in the immigrant share between 1850 and 1860 from the structural probit equation. This includes the direct effect of immigrants' arrival on the income change experienced by stayers and the effect induced by immigration on the probability that an individual will be a stayer (the second term). Since the change in the fraction foreign born *at the origin* enters the vector *Z* rather than the change between the 1850 share at the origin and the 1860 share at the destination, the full effect of a change in the 1850 share at the origin and the 1860 share at the destination for movers is simply the quantity in Equation (11). The total effect of immigration is a weighted sum of Equation (12) and β_{mF}. If the difference between Equation (12) and β_{mF} is small, little of immigration's impact would be missed in this period by concentrating only on those who remained in the same location.

For stayers, the effect in Equation (12) is similar to that estimated in most studies of the impact of contemporary migrants which ignore the impact of out-migration. In these studies, since individual migration decisions are not observed for the native born, immigration's impact on the change in income might indeed be negative ($\beta_{oF}<0$), but the observed impact could be zero or positive if the second term is sufficiently large and negative. One important difference between Equation (12) and the measure of immigration's impact in contemporary studies is that the latter measure allows for native-born in-migrants. The measure used here holds the composition of the native-born population fixed between 1850 and 1860, so it measures immigration's impact only on non-migrants who remained in a particular location between 1850 and 1860. The difference between this measure and contemporary measures turns on the impact of immigration on native-born in-migration rates. [13]

The results from estimating Equations (7) and (8) for the observations located in the urban northeast are presented in Table 2.[14] The first two columns use instrumental variables in place of the foreign born share in 1850 and 1860 to eliminate the correlation between the foreign born share and the transitory component of the error term in the income equations. The third and fourth columns use the actual levels of the foreign born instead. The excluded occupations are semi-skilled, unskilled, and farmer. Craftsmen saw their incomes grow significantly less rapidly than the omitted group, but much of this difference probably reflects regression to the mean due to the nature of the income measure: laborers had nowhere to go but up, while both white collar and skilled workers could move down.

[13] See note 1 above for studies exploring these patterns.

[14] Note that although age and literacy were hypothesized to effect the level of income, the values of these variables change by the same amount between 1850 and 1860 for every individual in the sample (10 years for age and zero for literacy, since no observations became literate between 1850 and 1860). The intercept term in the first difference regressions will capture all such effects. Age was included separately in the first difference regressions to allow for a non-linear impact of age on the level of income.

Of greater interest are the coefficients on the fraction foreign-born in 1850 and 1860 for movers and the coefficient on the change in the fraction foreign born for stayers. For both movers and stayers in the omitted group, incomes grew more rapidly when the fraction foreign born grew. The implied value of $\partial\Delta y/\partial\Delta X_F$ calculated using Equation (11) is 6.781 for movers; the value of $\partial\Delta y/\partial\Delta X_F$ for stayers is 5.564. It is not possible to reject the null hypothesis that these effects are identical (t=0.260, p=0.795). For skilled workers, though, increases in immigration were associated with slower income growth. This was true for both movers and stayers. The implied value of $\partial\Delta y/\partial\Delta X_F$ for skilled workers was -3.972 for movers; for stayers, the impact was -3.025. Again, the difference in these effects is not statistically significant (t=-0.124, p=0.902). The similarity of the effects for movers and stayers suggests that immigration's impact could be accurately measured by examining only those who remained in the same location over the 1850s. The magnitudes of the coefficients for the omitted group suggest that an increase of one percentage point in the foreign born share was followed by a six to seven percent increase in income; for skilled workers, the same increase in the fraction foreign born led to a three to four percent drop in income. Though large in magnitude, the impact for white collar workers was not statistically significant.

When the actual level of the foreign born is used instead, the negative effects of immigration on skilled workers are reduced to statistical insignificance. In the case of stayers, the effect is actually reversed: in column 4, a rise in the immigrant concentration is associated with a higher rate of income growth for skilled workers who did not move. For the omitted occupational group, the sign also changes between equations 2 and 4 on the change in the foreign born share: the change in the foreign born share is now associated with slower income growth than it was when using instrumental variables for the foreign born shares in 1850 and 1860. These sign changes in going from the instrumented to the actual levels are consistent with immigrants choosing locations that are good for native skilled workers and bad for native unskilled workers.[15]

Results for the rural northeast are shown in Table 3. The results are strikingly different from those in Table 2: there is no strong negative impact from the change in the immigrant concentration. In fact, the implied $\partial\Delta y/\partial\Delta X_F$ is actually positive for movers in the omitted occupational group when the actual levels are used and for stayers when the instruments are used. Older movers saw slower income growth, while skilled natives saw faster growth when the actual foreign born shares were used whether they were movers or stayers.[16] The absence of an impact from immigration in the rural Northeast (and in an identical analysis of the rural Midwest) suggests that there is no need to take into account the arrival in the rural Northeast and Midwest of natives from the urban Northeast displaced by immigrants in analyzing immigration's impact.

[15] The coefficients on σ and ρ in column 1 of Table 2 indicate that movers are negatively selected: their income change is smaller than the change that stayers would have earned had they migrated. Since the coefficients on ρ are essentially zero in columns 2, 3, and 4, it is not possible to say anything definitive about the nature of the selection among stayers when instruments for the foreign born are used and among movers and stayers when the actual foreign born concentrations are used.

[16] The coefficients on σ and ρ in Table 3 suggest the positive selection of movers using both predicted and actual foreign born concentrations (they earn more than stayers would have earned if they had migrated), but once again leave the sign of the selection effect for stayers indeterminate.

Using the coefficients from Tables 2 and 3, it is possible to estimate the coefficient vector δ in Equation (6) to determine the impact of potential differences in income growth and other factors as determinants of migration patterns. The results of this exercise are shown in Table 4. [17] For the urban northeast, the most important determinant of migration is having made a previous interstate move: previous interstate migrants were nine percentage points more likely to move than others, and this difference was statistically significant. The change in the foreign-born share at the origin was associated with a lower probability of migration, though this effect was statistically distinguishable from zero only at the 85% level when instruments were used and at the 89% level when actual levels were used. The point estimate suggests that a one percentage point increase in the fraction foreign born would decrease the out-migration propensity by between one and two percentage points. The partial derivative of the migration probability with respect to the difference in the income change for movers and stayers, though negative, is statistically insignificant. For the rural northeast, age and literacy were both associated with a lower propensity to migrate whether using instruments or actual levels for the foreign born. Previous interstate migration and an increase in the foreign-born share were also associated with more migration whether using instruments or levels, while proximity to the frontier increased migration using instruments for the foreign born. The sign on the difference in income growth between movers and stayers is of the anticipated (positive) sign in both columns 2 and 4, though it is statistically significant only when the predicted foreign born share is used. [18]

The apparently negative relationship in the urban northeast between the change in immigrant concentration and the change in skilled workers' incomes and the positive relationship for the unskilled deserve further exploration. We now seek the mechanism by which that impact came about. Were skilled workers displaced by competition from skilled immigrants, or was it competition from unskilled workers eager to take their jobs (if not their occupational titles) as in the "de-skilling" story emphasized by labor historians? We can exploit the substantial differences across ethnic groups in the proportion possessing craft skills to provide a tentative answer. Only 6 percent of Irish immigrants arriving between 1840 and 1850 reported a skilled occupation at arrival, while 20 percent of British immigrants and 24 percent of German immigrants did so over the same period (Ferrie 1996a). If we see a greater impact on native-born skilled workers from British and German immigration than from Irish immigration, this suggests that the impact of immigration came through competition within the skilled class of workers, with immigrants replacing natives in skilled jobs, and natives having to assume lower-income jobs as a result. If the impact is greatest from the Irish, the "de-skilling" explanation is more likely.

Table 5 shows the coefficients on interactions between an individual's occupation and the share of the population that was (1) Irish and (2) British and German at the 1850 and 1860 locations for

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[17] This calculation requires predicted values of both Δy^m and Δy^s for all observations. while both depend on the foreign born concentration in 1850 and 1860 at the origin and the destination. For both movers and stayers, the 1860 foreign born concentration at the origin (necessary to obtain Δy^s) can be easily obtained, as can the 1860 foreign born concentration at the destination for movers (necessary to obtain Δy^m for movers). For stayers, it is not clear what to use for the 1860 foreign born concentration in calculating their income in the event of migration. For this exercise, it was arbitrarily assumed that they would move to a place with an 1860 foreign born concentration equal to the average 1860 foreign born concentration in the places to which movers relocated.

[18] The standard errors in Table 4 have not been corrected for the fact that one of the regressors (the estimated Δy^m-Δy^s) is an estimated value (Maddala 1983, pp. 252-256). In general, this correction has a substantial impact only on the standard error for Δy^m-Δy^s (Maddala 1983, p. 238).

movers and the changes in (1) and (2) for stayers. [19] This specification is identical to that in Table 2, but for the inclusion of two categories of immigrants (Irish and all others) and the inclusion of the corresponding interactions with occupation. Among those in the omitted occupational group, the arrival of non-Irish immigrants raised incomes for both movers and stayers, while the arrival of the Irish raised movers' incomes but reduced stayers' incomes. The results reveal that the largest negative impact of immigration was among skilled movers, and that this impact came mostly through the Irish. The implied $\partial\Delta y/\partial\Delta X_F$ for the increase in the Irish share is -9.102 for skilled movers. For skilled stayers, the effect of an increase in the Irish fraction is a faster rate of income growth. This group shows a negative impact of -4.003 from the non-Irish instead.

The threat to native-born craftsmen who left the cities of the northeast, then, came not from similarly skilled British or German immigrants, but from largely unskilled Irish immigrants. Among those who remained in northeastern cities, by contrast, the British and Germans were a greater problem. Though the results for movers are consistent with the de-skilling story, the results for stayers are not. In fact, the arrival of Irish immigrants was associated with faster income growth for stayers. Further attention must be devoted to the characteristics of the places left by movers to learn why the Irish had an impact on some skilled workers but not on others. [20] The individual-level data in the present sample are inadequate to answer this question.

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[19] The census did not report the distribution of countries of origin for the foreign born at the county level in 1850 or 1860. It provided such a breakdown only for about 30 cities in both years. It was thus necessary to estimate the Irish share of the population for each county, based on the Irish share in each state and the accommodations reported by Roman Catholic churches in each state and county. For 1850 and 1860, separate weighted linear least squares regressions of the state's Roman Catholic church space on the state's Irish population were estimated using $1/\sqrt{P}$ as the weight, where P is the state's total population in 1850 or 1860 (standard errors in parentheses):

1850: Irish population =	-4320.82	+	1.76 (Roman Catholic Church space)	Adj. R^2=	0.71	N=32
	(4391.73)		(0.20)			
1860: Irish population =	-9125.61	+	1.43 (Roman Catholic Church space)	Adj. R^2=	0.72	N=36
	(7337.68)		(0.16)			

The reported Roman Catholic church accommodations for each county were then used together with these regression coefficients to estimate the Irish population of each county. The resulting number was divided by the county's foreign born population to estimate the ratio of Irish born residents to total foreign born residents in the county. The logistic transformation $e^X/(1+e^X)$ was then used so this ratio would lie in the unit interval. The transformed ratio was then multiplied by the instrumented foreign born population and the actual foreign born population to divide those figures into (1) Irish and (2) all other (British and German) components. In using this instrument, I am assuming that the foreign born population of a county is endogenously determined by factors affecting the error term in the wage equations for natives, but that the division of the foreign born population into Irish and all other immigrants is not.

[20] Goldin (1994, p. 251) finds that the arrival of mostly unskilled immigrants reduced the wages of nonunion artisans between 1890 and 1903, and reduced the wages of union artisans between 1907 and 1923. This is not comparable to the negative effect of unskilled immigrants on artisans described here. Goldin's results pertain to changes in wages within the artisan class, while the results presented here are for individuals who were artisans in the base year (1850) whether or not they remained in this group over the 1850s.

The labor history literature on "de-skilling" suggests where we might turn for an answer, though. Where unskilled workers were used to squeeze out skilled workers, the Irish were generally recognized as the unskilled workers most likely to be used in this manner. They were the most likely group to be used in employers' attempts to transform industries dominated by small scale hand production by artisans to large scale machine production by operatives:

> [T]he urban artisans, as serious casualties of change and economic depression, were able to identify a particular group, the Irish, as being largely responsible for their decline in occupational, political, and social status. . . . [T]he Irish were identified as agents in the process of economic modernization. The adoption of task differentiation and mechanization was facilitated by this increasing supply of cheap, unskilled labor, notably in industries like sewing, shoemaking, cabinetmaking, and carpentry. . . . [T]he Irish were perceived less as fellow laborers than as the minions of capital (Lane 1987, pp. 26-28).

This suggests that the growth of large scale, low-skill manufacturing, made possible by the appearance of cheap, unskilled Irish laborers, was the mechanism through which immigration depressed the incomes of skilled native born craftsmen in the urban Northeast. If this is true, then we should observe an association at the county level between the scale of manufacturing and the share of the population born in Ireland. Though the published census volumes of 1850 and 1860 (U.S. Census Office 1853; U.S. Census Office 1863) do not make such an analysis possible (since the number of manufacturing establishments was not tabulated at the county level in 1850), they do allow an examination of the relationship between the share of the population employed in manufacturing and the share of the population born in Ireland, born in other countries, and born in the U.S.

To formalize this notion, suppose that Mfg_{it}, the share of the population in county i employed in manufacturing at time t, is a function of the share of the population from Ireland at time t, the share from Other countries at time t, and a location specific effect α_i that reflects endowments of resources, proximity to markets, and other factors that are fixed in the short run:

$$Mfg_{it} = \alpha_i + \beta_I Irish_{it} + \beta_O Others_{it} + \epsilon_{it} \qquad \textbf{(13)}$$

where ϵ_{it} is a transitory error term with the usual properties. There are two difficulties with estimating the parameters β_I and β_O: the presence of the unobserved fixed effect α_i and the possibility that immigrants choose where to live on the basis of the presence of manufacturing jobs. The unobserved location specific effect can be eliminated by first differencing:

$$\Delta Mfg_i = \beta_I \Delta Irish_i + \beta_O \Delta Others_i + (\epsilon_{it'} - \epsilon_{it}) \qquad \textbf{(14)}$$

The correlation between the regressors and the transitory location specific effects can be eliminated by using instrumental variables in place of the actual changes in the *Irish* and *Other* populations.[21]

[21] In this context, the instrumenting procedure used by Altonji and Card (1991) is appropriate. They created a single instrument for the *difference* in the immigrant share between two dates in each location using the *level* of the immigrant share at the initial date. Bartel (1989) found that the best predictor of where an immigrant would settle in the 1970s was the fraction foreign born in a location. Goldin (1994, p. 243) also observed a statistically significant relationship between immigrant flows into cities between two dates and the share at the initial date around the turn of the century, but the direction of the relationship changed between 1890 and 1920:

Estimation of Equation (14) for 192 urban counties (1850 population > 10,000) in the Northeast using instruments for *Irish* and *Other* produced an estimated β_I of 0.206 (t=1.671, p=0.096) and an estimated β_O of 0.109 (t=0.752, p=0.453). This suggests that an increase of one percentage point in the fraction of a county's population born in Ireland resulted in an increase of 0.2 percentage points in the fraction of the county's population employed in manufacturing. The increase caused by the same size increase in the non-Irish immigrant population was only half as great.

These findings are consistent with the arrival of unskilled Irish immigrants making it easier for employers to transform their methods of production in some industries in order to eliminate skilled workers, and skilled workers seeing a fall in their incomes as their jobs were eliminated and choosing to migrate out of those places as a result. Places that received more non-Irish immigrants saw less growth in manufacturing. In these places, the competition between natives and immigrants was within the class of skilled workers. Native born skilled workers chose to remain in such places, perhaps because employment in small scale production remained an option, even though they now faced competition from British and German craftsmen. More detailed data on the changing distribution of workers across industries are necessary to provide a more definitive explanation for the different impacts on native craftsmen from Irish and non-Irish immigration.

Finally, since the regressions in Tables 2 and 3 control for the selectivity of out-migration, it is possible to assess the importance of the geographic mobility among native-born workers in diminishing the negative impact of immigration. A large historical literature has debated the value of the farming frontier as a "safety valve" for dissatisfied urban laborers in the nineteenth century (Turner 1920). More recent research has uncovered extraordinary economic opportunity in urban places in the Midwest (Galenson 1991). Did the presence of the farming frontier or rapidly growing cities like Chicago, Milwaukee, and Cincinnati provide relief to native-born craftsmen squeezed by the arrival of unskilled Irish laborers in northeastern cities?

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from 1890 to 1900 it was negative, from 1900 to 1910 it was positive, and from 1910 to 1920 it was again negative. For the Irish, the regressors used to create the instruments are linear and higher order terms in the share of the county's 1850 population born in Ireland (see note 19 above) and the dependent variable is the change from 1850 to 1860 in the fraction of the county's population born in Ireland. The regression for Other foreign born is defined similarly. The regression results are shown below:

	Irish		Other	
	β	standard error	β	standard error
intercept	0.001*	0.001	0.002	0.001
[1850 share]	0.404***	0.138	1.175***	0.116
[1850 share]^2	-20.109***	3.801	-9.589***	1.745
[1850 share]^3	193.809***	35.362	29.918***	9.100
[1850 share]^4	-721.207***	128.801	-44.531**	18.959
[1850 share]^5	882.970***	158.441	24.295*	13.180
Adjusted R^2	0.271		0.197	
Observations	1,593		1,593	

Significant at *** 99% level ** 95% level * 90% level.

The importance of mobility can be seen by comparing the direct effect of immigration on income growth for movers and stayers.[22] When instruments are used for the foreign born share, a comparison of the coefficients in columns 1 and 2 in Table 2 suggests that movers were considerably more sensitive to the arrival of immigrants at their 1850 location: for skilled workers, the coefficient on the immigrant share in 1850 (the sum of the coefficient for the omitted group and the coefficient on the interaction between skilled occupation and the immigrant share in 1850) is more than five times greater for movers than for stayers.[23] If moving had not been an option so movers would have had to remain at their 1850 location, their income growth would have been even more negative than it actually was. [24] This suggests that internal migration may indeed have been an important mechanism dissipating the impact of immigration, though in this case it is the internal migration of skilled workers rather than the unskilled workers whose movement Turner emphasized. Though movers and stayers saw the same impact on their incomes from immigration, it was the outlet provided by migration out of the urban Northeast that made that equalization possible.

V. Conclusions and Implications

The tremendous volume of immigration in the late 1840s produced an immigration rate that was more than twice as great as it has been in the 1990s. As a result, we might expect that if immigration ever had an impact, it would have been manifested in the years between 1850 and 1860. The results do show great distress among skilled native-born workers in northeastern cities, but little apparent negative impact elsewhere. In fact, immigration was actually associated with faster income growth among unskilled workers. Since the income measure used here captures only the large changes in income associated with changes in occupation and not the within-occupation income changes that immigration might also cause, the effect of immigration is probably an underestimate of its true effect in this period. Though the negative effect for skilled workers could be increased somewhat by taking account of changes in income within occupations, it is difficult to imagine how such an adjustment could reverse the large, positive, and statistically significant effect for unskilled workers.

These findings are in contrast to the conclusions of Goldin (1994) and Hatton and Williamson (1995) who both found a clear, generalized negative impact from immigration on wages in the U.S. labor market at the turn of the century. That such a wide-spread impact cannot be detected in the antebellum period when the immigration rate was slightly higher than at the turn of the century indicates that some structural change occurred between 1850 and 1900. One candidate is the reduction in the economy's "absorptive capacity" suggested by Williamson (1982). As noted above, though, the elasticity of demand for unskilled labor fell only modestly over these 50 years. An alternative

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[22] Note that this is different from the econometric question posed at the start of this section: how much of immigration's impact would be missed if we were unable to observe the behavior of out-migrants? Here, a counterfactual is posed: how different would things look if migration had not been possible?

[23] For skilled workers, the difference between the 1850 effect of immigrant arrivals for movers and the 1850 effect for stayers is 13.856; this difference is statistically significant at the 78% level (t=1.239, p=0.216).

[24] The difference between the impact of immigration for stayers and the 1850 impact for movers is probably an overstatement of how much worse movers would have fared if migration had not been an option, though. It is likely that skilled workers facing a deterioration in their positions as a result of the arrival of immigrants and unable to move to a more favorable environment would take steps to ameliorate that impact.

explanation is that the process of industrial transformation that the arrival of immigrants facilitated and that produced a negative effect for skilled workers in the 1850s was largely complete by the turn of the century. By that time, immigrants and natives were more likely to be in competition for jobs within a particular occupational class. The lack of an unambiguously negative effect from immigration today may reflect the increase in the economy's "absorptive capacity" since them calculated by Williamson (1982).

The results also reveal that little of the impact of immigration is missed by examining stayers and treating local labor markets as essentially closed economies. Hatton and Williamson (1995, p. 32) suggest that the inability to detect immigration's impact in studies of local labor markets today results from the failure to account for the impact of geographic mobility (of both capital and labor). The results presented here indicate that, at least for skilled workers, mobility attenuate the negative effects of immigration—movers would have had worse outcomes if migration had not been an option—but the overall impact of immigration is the same for movers and stayers. Taking account of the endogeneity of immigrants' location decisions, however, does make a considerable difference: the sign of the relationship between the arrival of immigrants and the income change experienced by natives is generally reversed when instruments are used for the arrival of immigrants.

Finally, the findings presented here also illuminate two aspects of antebellum political economy: the reluctance to restrict immigration, and the coming of the Civil War. As was noted above, the staunchest of nativists in the years between 1850 and 1860, the Know Nothings, never advocated a solution to the "immigration problem" more radical than lengthening the time until immigrants could become naturalized. Nothing like the outright restriction of immigration imposed after 1921 was even considered. The isolated impact of immigration found here may explain why: with immigration's negative effects limited to one occupation group (skilled workers) in urban places in one region, it was difficult to make the case for restriction to a nation that otherwise derived significant benefits from immigration.

The rise of the Know Nothings did have a lasting impact, however, even though they shunned anti-immigrant legislation after their electoral victories in 1854, and passed from the political scene by 1856. Their effect was to drive voters into the Republican Party in the election of 1860, a party by then dedicated to anti-slavery positions initially advanced by the Know Nothings. Fogel (1989) attributes much of the rise of the Know Nothings to the conditions faced by native-born craftsmen in northern cities in the 1850s. The distress they responded to was an important force shaping the Know Nothing agenda and the Republican Party's attempt to win over disaffected native workers. The Republican's success in that conversion paved the way for the Civil War.

Appendix: Imputing Income By Occupation

Neither the 1850 census nor the 1860 census collected information on income for individuals. Other documentary sources provide information on earnings, but only for individuals in particular occupations, places, or industries. In order to assess the impact of immigration in the 1850s, then, we need a measure of income by occupation that we can use to infer the income earned by an individual on the basis of a reported occupational title. Fortunately, the 1850 census reported real estate wealth which can be used to derive such a measure.

The 1850 census asked each respondent to report the value of his or her real estate holdings. The Integrated Public Use Micro Sample (IPUMS) of the 1850 census (Ruggles *et al.* 1995) provides individual-level observations on roughly 32,000 males between the ages of 20 and 65 who reported occupations. A regression was estimated using these data with the natural log of real estate wealth as the dependent variable and age, age squared, and age cubed, controls for region of residence and size of location, along with dummy variables for 157 occupation titles, as regressors.

The coefficients on the occupational dummies, evaluated at age 30, were taken to represent differences in income within three broad occupational classes: white collar, skilled, and unskilled. These dummies were inflated to reflect the white collar/skilled and skilled/unskilled premia found by Goldin and Margo (1992) for clerks, artisans, and laborers. To make their wage figures comparable to the coefficients from the wealth regression, the Goldin and Margo estimates for average nominal daily wages for clerks, artisans, and laborers were weighted by the population shares from the 1850 IPUMS in each of the regions they defined (Northeast, Midwest, South Atlantic, and South Central) to create a national average for each occupation using their 1850 figure. For each occupation, daily wages were multiplied by 312 to obtain annual wages. Finally, the occupational dummy for common laborers was inflated to equal the resulting Goldin and Margo national average annual wage for laborers, and the dummies for all unskilled occupations were adjusted by the same factor. The same was done for skilled workers, with the income of carpenters pegged to the Goldin and Margo skilled wage, and for white collar workers, with the income of clerks pegged to the Goldin and Margo clerks wage. The results of these imputations for 157 occupational titles are shown in Table A1. These incomes were then adjusted using the 1851 and 1861 price levels by region from Coelho and Shepherd (1974) to reflect differences across locations and over time in prices.

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TABLE 1
Characteristics of Native Born Males
Observed in 1850 and 1860

		By 1850 Foreign Born Share in County		
	All	under 5%	5 to 10%	over 10%
Personal Characteristics				
Age (1850)	31.507	31.105	31.934	31.772
Previous Migrant	0.263	0.248	0.262	0.288
Family Size (1850)	3.429	3.671	3.292	3.175
Literate	0.956	0.924	0.984	0.983
Occupation (1850)				
White Collar	0.072	0.039	0.065	0.127
Skilled	0.182	0.123	0.193	0.262
Semi-Skilled	0.072	0.054	0.071	0.098
Farmer	0.524	0.630	0.515	0.372
Unskilled	0.153	0.153	0.163	0.147
y_{1850}	6.612	6.695	6.587	6.507
y_{1860}	6.687	6.743	6.685	6.605
Δy 1850-60	0.075	0.048	0.098	0.098
Mover 1850-60	0.397	0.384	0.401	0.412
Location Characteristics				
Size (1850)	7074.27	527.042	994.128	21615.07
Size (1850)	18084.43	5762.16	10627.90	42308.65
Miles to Frontier	602.037	510.591	654.385	697.017
% Foreign (1850)	0.088	0.019	0.071	0.204
% Foreign (1860)	0.118	0.053	0.123	0.211
Region (1850)				
New England	20.6	13.6	22.2	29.9
Middle Atlantic	36.9	23.6	50.4	46.2
Mid-West	20.8	19.5	25.5	19.0
Southeast	13.3	26.5	1.1	3.2
Southwest	8.0	16.8	0.7	0.7
Mountain	0.0	0.0	0.0	0.0
Pacific	0.3	0.0	0.0	1.1
Observations	2,896	1,314	698	884

Notes: "Previous Migrant" is an individual living outside his state of birth in 1850. "y_{1850}" and "y_{1860}" are the natural log of the income imputed on the basis of the individual's occupational title in 1850 and 1860. "Mover" is an individual who changed county of residence between 1850 and 1860. "Size" is the population of the census division (city, town, or township) in which the individual was enumerated. "Miles to Frontier" is the straight-line distance from the individual's 1850 county to 90° longitude.

TABLE 2
Maximum Likelihood Estimates of the
Parameters of the Structural Earnings Equations
For Movers and Stayers in the Urban Northeast

	Using Instruments for % Foreign Born		Using Actual Level of % Foreign Born	
	Δy^m	Δy^s	Δy^m	Δy^s
Intercept	-1.828**	0.348**	0.222	-0.276**
	(0.932)	(0.184)	(0.497)	(0.124)
Age	-0.001	0.002	-0.001	0.001
	(0.007)	(0.003)	(0.007)	(0.002)
White Collar	-0.551	-0.514	0.092	0.064
	(4.204)	(0.333)	(1.163)	(0.146)
Skilled	-2.834**	-0.434	0.618***	0.411***
	(1.272)	(0.305)	(0.236)	(0.107)
$-F_{1850}$	14.174***		0.051	
	(4.973)		(2.299)	
$-F_{1850}$ x Wh. Collar	-22.176		-1.247	
	(46.122)		(7.211)	
$-F_{1850}$ x Skilled	-31.055***		-0.057	
	(11.398)		(2.976)	
F_{1860}	-0.613		3.299	
	(5.873)		(2.820)	
F_{1860} x Wh. Collar	-10.420		-5.096	
	(39.759)		(7.056)	
F_{1860} x Skilled	9.550		-3.895	
	(9.777)		(3.149)	
ΔF		5.564**		-1.491***
		(2.640)		(0.373)
ΔF x Wh. Collar		-4.716		1.710***
		(5.639)		(0.668)
ΔF x Skilled		-8.589*		2.173***
		(4.916)		(0.552)
σ	0.711***	0.467***	0.645***	0.456***
	(0.267)	(0.026)	(0.204)	(0.023)
ρ	-0.741**	-0.291	-0.574	0.253
	(0.356)	(0.410)	(0.539)	(0.341)
Log-Likelihood		-449.902		-440.321
Observations		386		386

Notes: Significant at *** 99% level ** 95% level * 90% level.
Heteroskedasticity-corrected standard errors (White 1980) in parentheses.
"Skilled" and "White Collar" are 1850 occupation. F_t is the fraction foreign born in the county in year t; ΔF is the change in the fraction foreign born in the county between year t and year t'.

TABLE 3
Maximum Likelihood Estimates of the
Parameters of the Structural Earnings Equations
For Movers and Stayers in the Rural Northeast

	Using Instruments for % Foreign Born		Using Actual Level of % Foreign Born	
	Δy^m	Δy^s	Δy^m	Δy^s
Intercept	-0.052	0.201	-0.488***	-0.052
	(0.241)	(0.169)	(0.178)	(0.100)
Age	-0.004*	-0.002	-0.005**	-0.002
	(0.003)	(0.002)	(0.003)	(0.002)
Skilled	1.009	0.200	0.284*	0.362***
	(0.688)	(0.299)	(0.164)	(0.109)
$-F_{1850}$	0.583		-0.058	
	(2.324)		(0.485)	
$-F_{1850}$ x Skilled	7.401		-0.438	
	(8.427)		(0.997)	
$-F_{1860}$	-0.740		1.095***	
	(1.569)		(0.432)	
F_{1860} x Skilled	-2.452		-0.263	
	(4.017)		(0.621)	
ΔF		2.837**		-0.463
		(1.458)		(0.435)
ΔF x Skilled		-1.626		0.707
		(4.609)		(0.994)
σ	0.592***	0.561***	0.654***	0.561***
	(0.037)	(0.013)	(0.055)	(0.012)
ρ	0.394**	-0.073	0.653***	-0.001
	(0.205)	(0.209)	(0.141)	(0.055)
Log-Likelihood		-1,907.089		-1,864.595
Observations		1,281		1,281

Notes: Significant at *** 99% level ** 95% level * 90% level.
Heteroskedasticity-corrected standard errors (White 1980) in parentheses.
"Skilled" is 1850 occupation. F_t is the fraction foreign born in the county in year t; ΔF is the change in the fraction foreign born in the county between year t and year t'.

TABLE 4
Maximum Likelihood Probit Estimates of the
Parameters of the Structural Migration Equation
(Partial Derivatives Evaluated at Sample Means)

	Using Instruments for Foreign Born		Using Actual Level of Foreign Born	
	Urban Northeast	Rural Northeast	Urban Northeast	Rural Northeast
Intercept	-1.087	-1.778***	-1.168	-1.253
	(9.681)	(0.583)	(9.672)	(1.048)
Age	0.001	-0.005***	0.001	-0.005***
	(0.002)	(0.002)	(0.002)	(0.002)
Literate	0.934	-0.198*	0.945	-0.194*
	(9.703)	(0.116)	(9.704)	(0.116)
Family Size	-0.004	0.002	-0.003	0.003
	(0.011)	(0.007)	(0.011)	(0.007)
Previous Migrant	0.093*	0.101**	0.088*	0.099**
	(0.054)	(0.050)	(0.054)	(0.050)
log(Miles to Frontier)		0.281***		0.776
		(0.086)		(0.553)
ΔF	-2.007	7.482***	-1.251*	2.495***
	(1.410)	(0.922)	(0.777)	(0.488)
$\Delta\hat{y}^m - \Delta\hat{y}^s$	-0.029	0.295*	-0.015	0.012
	(0.045)	(0.184)	(0.085)	(0.158)
Log-Likelihood	-198.884	-832.261	-198.897	-854.447
χ^2	6.664	93.003***	6.637	48.632***
Observations	386	1,281	386	1,281

Notes: Significant at *** 99% level ** 95% level * 90% level.
Uncorrected standard errors in parentheses. ΔF is the change in the fraction foreign born in the origin county between year t and year t'.

TABLE 5
Maximum Likelihood Estimates of the
Parameters of the Structural Earnings Equations
For Movers and Stayers in the Urban Northeast
(Using Instruments for % Foreign Born)

	Δy^m	Δy^s
-Irish$_{1850}$	11.448*	
	(6.285)	
-Irish$_{1850}$ x White Collar	-11.346	
	(141.420)	
-Irish$_{1850}$ x Skilled	-31.863***	
	(12.688)	
Irish$_{1860}$	0.201	
	(6.063)	
Irish$_{1860}$ x White Collar	-19.605	
	(72.812)	
Irish$_{1860}$ x Skilled	2.010	
	(13.724)	
ΔIrish		-2.755
		(1.811)
ΔIrish x White Collar		5.722
		(4.027)
ΔIrish x Skilled		4.882*
		(2.605)
-Other$_{1850}$	13.311**	
	(6.500)	
-Other$_{1850}$ x White Collar	2.712	
	(119.130)	
-Other$_{1850}$ x Skilled	-22.643	
	(15.743)	
Other$_{1860}$	-2.770	
	(6.361)	
Other$_{1860}$ x White Collar	-5.631	
	(62.396)	
Other$_{1860}$ x Skilled	9.601	
	(12.251)	
ΔOther		3.819
		(2.553)
ΔOther x White Collar		-5.082
		(6.496)
ΔOther x Skilled		-7.823
		(4.989)

Notes: Significant at *** 99% level ** 95% level * 90% level.
See Table 2. "Other" is British and German. The intercept term and coefficients on age, occupation, σ, and ρ are not shown.

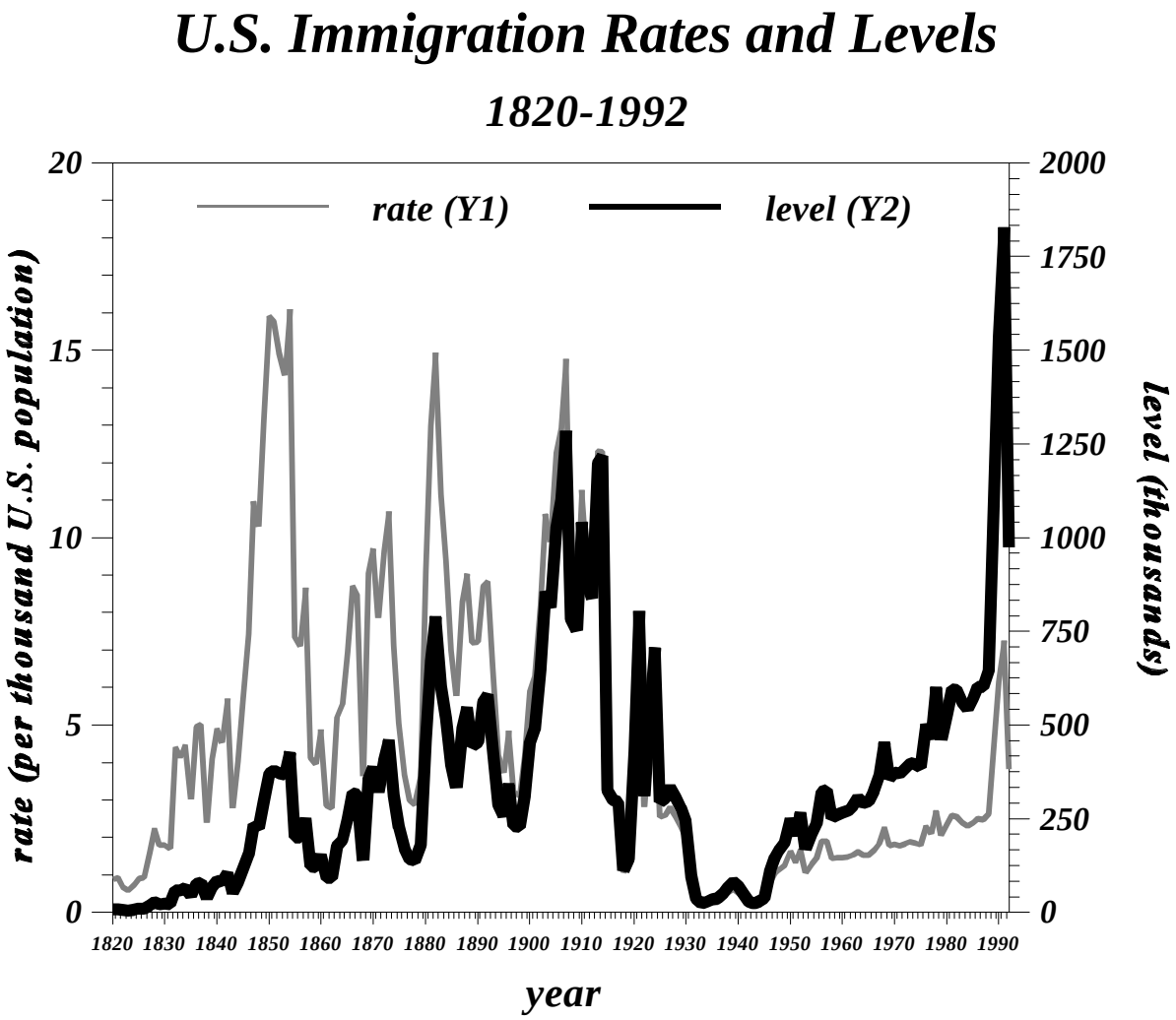

FIGURE 1

SOURCE: U.S. BUREAU OF THE CENSUS (1975); U.S. BUREAU OF THE CENSUS (1995).

TABLE A1
Imputed Income Scores By Three-Digit 1950 Occupation Code and Title

Professional, Technical, and Kindred		
000	Accountants & auditors	$ 488.95
001	Actors & actresses	488.95
003	Architects	488.95
004	Artists & art teachers	502.60
005	Athletes	488.95
006	Authors	488.95
007	Chemists	488.95
009	Clergymen	775.22
010	College pres. & deans	488.95
018	Professors/mathematics	488.95
028	Professors/nonscientific	488.95
029	Professors/., n.s.	488.95
031	Dancers teachers	488.95
032	Dentists	298.03
033	Designers	488.95
035	Draftsmen	488.95
036	Editors & reporters	484.85
043	Engineers, civil	488.95
046	Engineers, mechanical	488.95
051	Entertainers, n.e.c.	488.95
054	Funeral dir. & embalmers	488.95
055	Lawyers & judges	1281.49
057	Musicians & teachers	502.60
073	Pharmacists	759.35
074	Photographers	488.95
075	Physicians & surgeons	1191.52
092	Surveyors	931.15
093	Teachers, n.e.c.	502.60
099	Prof., tech. workers, n.e.c.	484.85
Farmers & Farm Managers		
100	Farmers	1175.86
123	Farm managers	576.18
Managers, Officials, & Proprietors		
201	Buyers & shippers,	1073.70
203	Conductors, railroad	716.49
210	Inspectors	748.00
230	Managers, building	748.00
240	Officers, pilots, etc., ship	716.49
250	Officials n.e.c., public	748.00
270	Postmasters	1111.78
290	Mgr/officials/prop n.e.c.	1073.70
Clerical & Kindred		
300	Agents, n.e.c.	749.71
304	Baggagemen, transp	711.74
305	Bank tellers	711.74
310	Bookkeepers	352.20
320	Cashiers	711.74
321	Collectors, bill & account	711.74
335	Mail carriers	711.74
340	Messengers & office boys	711.74
342	Shipping & receiving clerks	711.74
360	Telegraph messengers	711.74
365	Telegraph operators	711.74
380	Ticket agents	749.71
390	Clerical & kindred, n.e.c	748.00
Sales & Kindred		
410	Auctioneers	$1027.11
430	Hucksters & peddlers	557.59
450	Insurance agents	1027.11
460	Newsboys	557.59
470	Real estate agents	1027.11
490	Salesmen & clerks, n.e.c.	714.48
Craftsmen & Kindred		
500	Bakers	352.79
501	Blacksmiths	502.32
502	Bookbinders	396.67
503	Boilermakers	589.90
504	Brick masons, tile setters	492.75
505	Cabinetmakers	501.15
510	Carpenters	489.84
511	Cement finishers	299.16
512	Compositors & typesetters	478.77
521	Engravers	309.10
522	Excavating ops.	492.15
523	Foremen, n.e.c.	233.88
524	Forgemen & hammermen	299.16
525	Furriers	299.16
532	Inspect., log & lumber	299.16
533	Inspectors, n.e.c.	299.16
534	Jewelers, watchmakers, etc.	453.40
541	Locomotive engineers	299.16
544	Machinists	352.45
553	Mechanics, RR/car shop	299.16
554	Mechanics, n.e.c.	469.37
555	Millers	546.99
560	Millwrights	491.71
561	Molders, metal	405.61
563	Opticians, lens grinders	299.16
564	Painters, const.	418.74
565	Paperhangers	299.16
570	Pattern makers, ex. paper	309.44
571	Photoengravers	299.16
573	Plasterers	497.12
574	Plumbers & pipe fitters	465.89
575	Pressmen & plate printers	299.16
580	Rollers & roll hands, metal	356.45
581	Roofers & slaters	299.16
582	Shoemakers, ex. fact.	413.22
583	Stationary engineers	363.63
584	Stone cutters/carvers	279.16
590	Tailors & tailoresses	362.06
591	Tinsmiths/coppersmiths	417.13
592	Tool & die makers	299.16
593	Upholsterers	513.71
594	Craftsmen, n.e.c.	410.45
595	Armed forces	270.01
Operatives & Kindred		
602	Apprentice carpenters	$ 389.36
611	Apprentices, building	389.36
614	Apprentices, other	389.36
615	Apprentices, not specified	470.85
623	Boatmen & lock keepers	360.91
624	Brakemen, railroad	389.36
625	Bus drivers	260.75
632	Deliverymen & routemen	517.11
633	Dressmakers, ex. fac.	389.36
634	Dyers	317.14
635	Filers, grinders, polishers	389.36
641	Furnacemen, & pourers	469.09
642	Heaters, metal	389.36
643	Laundry operatives	389.36
644	Meat cutters	430.00
645	Milliners	389.36
650	Mine operatives & laborers	253.70
661	Motormen	389.36
670	Painters	362.68
673	Sailors & deck hands	387.46
674	Sawyers	431.63
675	Spinners, textile	145.52
680	Stationary firemen	300.55
681	Switchmen, railroad	389.36
682	Taxicab drivers	434.52
683	Truck & tractor drivers	329.21
684	Weavers, textile	220.02
685	Welders & flame-cutters	389.36
690	Operatives/kindred, n.e.c.	431.17
Service Workers		
710	Laundresses,	270.90
720	Private household workers	457.43
730	Attendants	270.90
732	Attendants, recreation	270.90
740	Barbers, beauticians, etc.	640.41
750	Bartenders	662.26
752	Boarding house keepers	287.09
763	Guards & watchmen	258.79
764	Housekeepers	424.91
770	Janitors & sextons	270.90
771	Marshals & constables	335.91
773	Policemen & detectives	335.91
780	Porters	485.81
781	Practical nurses	270.90
782	Sheriffs & bailiffs	335.91
784	Waiters & waitresses	485.81
785	Watchmen, bridge tenders	258.79
790	Service wkrs, n.e.c.	457.43
Farm Laborers		
810	Farm foremen	404.61
820	Farm laborers	490.86
Laborers		
910	Fishermen & oystermen	598.43
930	Gardeners	468.96
940	Longshoremen	511.84
950	Lumbermen	598.43
970	Laborers, n.e.c.	327.60