

Inequality and Schooling Responses to Globalization Forces: Lessons from History

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Given the intensity of the current debate about the impact of globalization on brain drain in the Third World and inequality in the First World, it might be useful to look at these forces during the first global century, ending in 1914. This paper reviews what we know about the impact of trade and mass migration on low-wage, labor-abundant European economies and high-wage, labor-scarce overseas New World economies.¹ It reviews the distribution impact everywhere in the Atlantic economy, the extent of the European brain drain, and the schooling responses in both Europe and the United States.

The Impact of Globalization on Income Distribution in the Pre-1914 Atlantic Economy

The Heckscher–Ohlin Prediction

Shortly after the First World War, Eli Heckscher and Bertil Ohlin looked back on the nineteenth century and pondered the distributional consequences of globalization. They argued that trade and labor migration must have had important income distribution consequences in both Europe and the New World (Flam and Flanders 1991, 90–92). The high-wage New World countries must have become more unequal, while the low-wage European countries must have become more

equal, *ceteris paribus*. After all, trade would use abundant land and skills in the New World—lowering unskilled labor’s income relative to that of landlords and skilled workers—and abundant unskilled labor in Europe—raising unskilled labor’s income relative to that of landlords and skilled workers. The emigration of unskilled and poorly schooled Europeans to the New World should have reinforced the trade impact. These Heckscher–Ohlin predictions were formalized by Wolfgang Stolper and Paul Samuelson (1941) to become central pillars of modern trade theory.

The insights of Heckscher and Ohlin still inform public debate today, as evidenced by the ongoing controversy about the causes of the late twentieth century rise in inequality in Organization for Economic Cooperation and Development (OECD) nations. Has globalization led to an increase in wage inequality in the rich, skill-abundant First World, while reducing it in the poor, unskilled-labor-abundant Third World? Does immigration to the First World displace native unskilled workers, leading to wage inequality? And does Third World emigration raise wages and reduce inequality?

Given the intensity of the current debate over these questions, it might be useful to review what we know about nineteenth century globalization experience—the first global century. Since Heckscher and Ohlin thought that trade and mass migration worked together to make factor prices converge, what did that imply for changes in income distribution more generally? Labor’s wage should have fallen relative to land rents in the New World. Since landlords were at the top of the distribution pyramid, skilled labor in the middle, and unskilled workers at the bottom, globalization (trade and migration) should have contributed to rising inequality in the resource- and skill-abundant New World. Similarly, globalization should have contributed to rising wages relative to land rents and skill premia in Europe, and thus to falling inequality there. Were Heckscher and Ohlin right?

The Historical Inequality Facts

The evolution of relative factor prices has been documented for the late nineteenth century Atlantic economy, so we can explore whether the big globalization winners were New World land and European labor and whether the big losers were European land and New World labor. Were nineteenth century globalization forces strong enough to leave their inequality mark? After all, the Heckscher–Ohlin predictions are based on a static trade theory that assumes trade and mass migration were the only shocks affecting the world economy. Nothing could be further from the truth. This was a period of dramatic industrialization, technological change, and demographic revolution—forces that also must have had an impact on real wages, farm rents, and income distribution more generally. In particular, economic growth meant that wages in the New World were rising rapidly, so

American and Australian unskilled labor certainly did not lose in absolute terms. In the expanding world of the late nineteenth century, trade and mass migration meant that European real wages grew more rapidly than they otherwise would have, and it meant that New World real wages grew less rapidly than they otherwise would have. Clearly, factor price trends cannot by themselves tell us whether these counterfactual predictions were fulfilled, but recent empirical analysis has shown the predictions to be accurate.

There are four questions that we can sensibly ask of the historical data. First, did real wages converge in the late nineteenth century Atlantic economy? Second, did land rents converge? Third, was there *relative* factor price convergence? That is, did the ratio of wages to rents rise in Europe and fall in the New World? Finally, if there was relative factor price convergence, did it translate into rising inequality in the New World and falling inequality in Europe?

Elsewhere, the first question has been examined using real wages adjusted for purchasing power parity, and the answer was an unambiguous yes (Hatton and Williamson 2005, Chapter 6). There *was* real wage convergence within the Atlantic economy during the late nineteenth century, and the bulk of this convergence was accounted for by convergence between Europe and the New World.

To answer the second and third questions, we need rent data for land of comparable quality across countries and over time. Alas, such data are unavailable. Nevertheless, if we make the plausible assumptions that European quality-adjusted land was initially more expensive than New World quality-adjusted land and that land rents moved like land prices, land rent convergence during this period is a certainty. Between 1870 and 1910, real land prices increased in Australia by 400 percent and in the U.S. by 250 percent, far greater than the biggest real land price increases we can document for Europe (Denmark, where land prices increased by only 45 percent: O'Rourke and Williamson 1999, Figures 4.1–4.3). Moreover, in three important European countries—Britain, France, and Sweden—land prices actually fell, in Britain by over 50 percent. Land rents and values rose in the American Midwest, the Australian outback, and the Argentine pampas relative to those in Europe, as predicted.

It is the third question that is really central to any test of any globalization theory, especially in the context of a growing economy and especially because the theory relies so heavily on *relative* factor endowments and *relative* factor prices. The second column of Table 1 documents the evolution of the ratio of wages to land rent for three New World immigration countries—Argentina, Australia, and the United States; for four European free trading and high-emigrating countries—Denmark, Britain, Ireland, and Sweden; and for three European protectionist and low-emigrating countries—France, Germany, and Spain.² Relative factor price convergence certainly characterized the period from 1870 to 1913. In the New World, the wage-rental ratio plunged. By 1913, the Australian ratio had

Table 1

Relative Economic Performance of the European Periphery
in the Late 19th Century: Growth Per Annum (Percent)

	(1) Real wage per urban worker 1870–1913	(2) Wage–land rental ratio 1870–1910	(3) Real GDP per capita 1870–1913	(4) Real GDP per worker-hour 1870–1913
Denmark	2.63	2.85	1.57	1.90
Finland	n.a.	n.a.	1.44	1.80
Norway	2.43	n.a.	1.31	1.65
Sweden	2.73	2.45	1.46	1.74
Italy	1.74	n.a.	1.28	1.33
Portugal	.37	n.a.	.69	1.10
Spain	.44	−.43	1.11	1.52
Austria	n.a.	n.a.	1.46	1.76
Ireland	1.79	4.39	n.a.	n.a.
The European Periphery	1.73	2.32	1.29	1.60
Belgium	.92	n.a.	1.05	1.24
France	.91	1.80	1.30	1.58
Germany	1.02	.87	1.63	1.88
Great Britain	1.03	2.54	1.01	1.23
The Netherlands	.64	n.a.	1.01	1.34
Switzerland	n.a.	n.a.	1.20	1.46
The European Industrial Core	.90	1.74	1.20	1.46
Europe	1.39	2.10	1.25	1.54
Argentina	1.74	−4.06	n.a.	n.a.
Australia	.14	−3.30	.87	1.08
Canada	1.65	n.a.	2.29	2.31
U.S.	1.04	−1.72	1.81	1.93
New World	1.14	−3.03	1.66	1.77

SOURCE: O'Rourke and Williamson (1999, Table 2.2).

fallen to one quarter of its 1870 level, the Argentine ratio had fallen to one-fifth of its mid-1880 level, and the U.S. ratio had fallen to less than half its 1870 level. In Europe, the ratio boomed. The British ratio in 1910 had increased by a factor of 2.7 over its 1870 level, while the Irish ratio had increased even more, by a factor of 5.5. The Swedish and Danish ratios had both increased by a factor of 2.3. This increase was less pronounced in protectionist and low emigrating economies. The ratio increased by a factor of 1.8 in France and 1.4 in Germany and not at all in Spain.

Of course, correlation is not causation. Just as rising inequality in the OECD

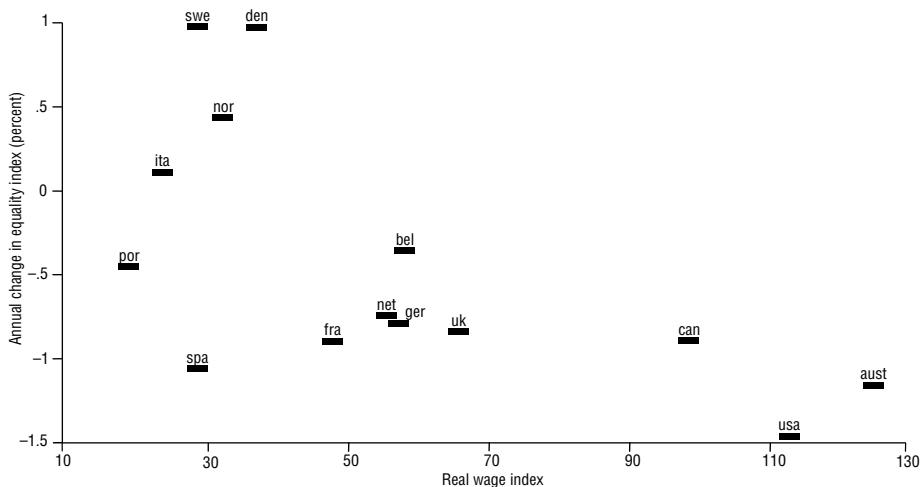
after the 1970s may have plausibly been due to technical change rather than globalization, so, too, other forces may have affected nineteenth century income distribution independent of any globalization-induced shocks. But what factor price evidence we have seems to offer support for the predicted impact of mass migration and the trade boom on late nineteenth century income distribution. While real wages grew everywhere before 1913, they grew faster in labor-abundant Europe than in the labor-scarce New World. Rents surged in overseas land-abundant countries and plunged in land-scarce European countries. And the wage-rental ratio increased dramatically in Europe, especially in free-trading and high-emigrating countries, while it declined equally dramatically in the frontier economies overseas. All in all, globalization had exactly its predicted impact on relative factor prices around the Atlantic economy from the mid-nineteenth century to World War I (O'Rourke, Taylor, and Williamson 1996).

What about trends in inequality more generally? Complete income distributions are unavailable before World War I, except for a few countries and a few benchmark dates. But even if they were available, it is not obvious that we would want to rely on them when considering the impact of mass migration. Like economists involved in debates about more recent distributional experience, our interest is in the structure of factor prices and factor rewards—the size of the average income gap between the upper and lower classes. Indeed, if rising inequality was explained by more unskilled workers who were all new immigrants, the rising inequality would be far less interesting and certainly less dangerous politically. But suppose the immigrants also lowered the relative incomes of the poor native-born with whom new immigrants competed? Inequality trends of this sort are far more interesting *and* have more dangerous political implications.

How, then, did the typical unskilled worker do relative to the average income recipient—that is, how did the ratio of the unskilled wage (w) to GDP per worker hour (y) trend over time? Changes in the ratio w/y measure changes in the economic distance between the working poor near the bottom of the distribution and the average-income recipient in the middle of the distribution. When the index is normalized by setting w/y equal to 100 in 1870, we get the following: Powerful Danish and Swedish equality trends establish the upper bound (the index rises from 100 to as high as 154), and powerful Australian and U.S. inequality trends establish the lower bound (the index falls from 100 to as low as 58). An alternative way to standardize these distributional trends is to compute the annual percentage change in the index relative to its 1870 base. The per annum rates of change range from 0.98 for Sweden to -1.45 for the United States.

This measure of the annual rate of change in inequality is plotted against the 1870 real wage in Figure 1, and it offers a stunning confirmation of the globalization-inequality hypothesis. Between 1870 and 1913, inequality rose dramatically in rich, land-abundant, labor-scarce New World countries like the United

Figure 1
Initial Real Wage Versus Equality Trends, 1870–1913



SOURCE: Williamson (1997, Figure 6).

States; inequality fell dramatically in poor, land-scarce, labor-abundant, newly industrializing countries like Norway, Sweden, Denmark, and Italy. Inequality was more stable in European industrial economies like Belgium, France, Germany, the Netherlands, and the United Kingdom. And inequality was also more stable in the poor European economies that failed to play the globalization game, like Portugal and Spain.

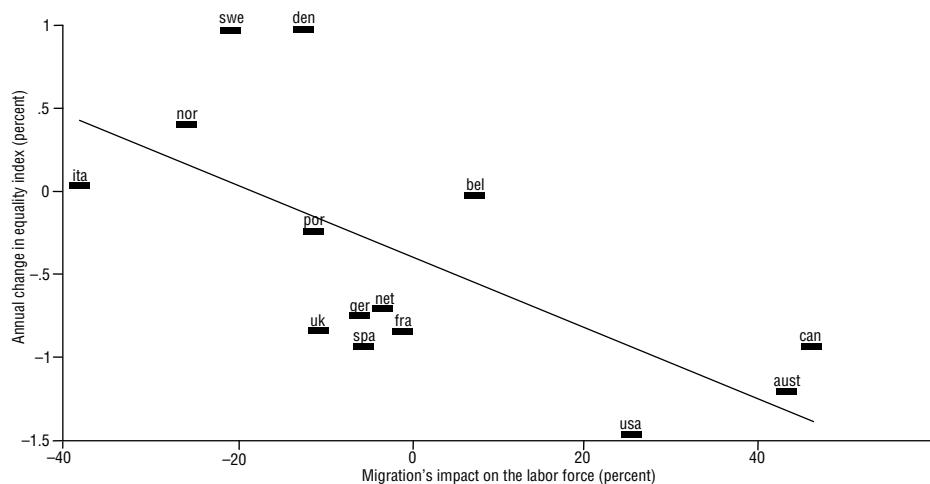
When Simon Kuznets gave his presidential address to the American Economic Association in 1955, he hypothesized that inequality should rise in early stages of modern development, reach a peak during what we have come to call the newly industrialized-country stage, and fall thereafter. Since then, the thesis has taken a beating, most recently by a newly constructed late twentieth century database (Deininger and Squire 1996). What is surprising about this Kuznets curve literature, however, is that it treats a very complex problem so simply. A number of forces can drive inequality in the long run: mass migration, trade, demography, schooling, and technology. The technological forces Kuznets thought were pushing his curve cannot by themselves explain the trends in Figure 1, because while inequality should have been on the rise in newly industrializing but poor European countries, it was not. And while it should have been on the decline in richer, more mature industrial economies, it was not.

It appears likely that globalization was producing those late nineteenth century Atlantic economy distribution trends. Furthermore, I think that mass migra-

tion was the most important part of that globalization-distribution connection. As I already noted, the mass migration significantly influenced labor supplies in sending and receiving countries. I also noted that migration's impact on the labor force was highly correlated with initial labor scarcity, causing the biggest reductions in low-wage emigrating countries and the biggest increases in high-wage immigration countries. Figure 2 plots the migration-inequality connection. Where immigration had a large positive impact on the labor force, inequality underwent a steep rise. Where emigration had a large negative impact on the labor force, inequality underwent a steep fall.

Mass migration appears, therefore, to be the leading candidate in accounting for the distribution trends we observe in the Atlantic economy. I stress the word *appears* since it is impossible to decompose globalization effects into trade and migration, given that the correlation between migration's impact, trade's impact, and initial labor scarcity is so high. Yet, an effort has been made to finesse this problem by constructing a trade-globalization-impact variable as the interaction of initial labor scarcity and openness (Williamson 1997). The former is proxied by dummies for the labor-scarce New World (d_1), the labor-abundant European periphery (d_2), and the core European industrial leaders making up the remainder of countries. Openness is proxied by trade shares (*trade*). The per annum rate of

Figure 2
Migration's Impact on Inequality Trends, 1870–1913



SOURCE: Williamson (1997, Figure 7).

change in the equality index, here called e , is explained by ($R^2 = 0.72$, t statistics in parentheses):

$$(1) \quad e = -52.07 - .31mig + .25trade + .55(d_1 * trade) + 2.42(d_2 * trade), \\ (2.56) \quad (1.00) \quad (0.36) \quad (3.38)$$

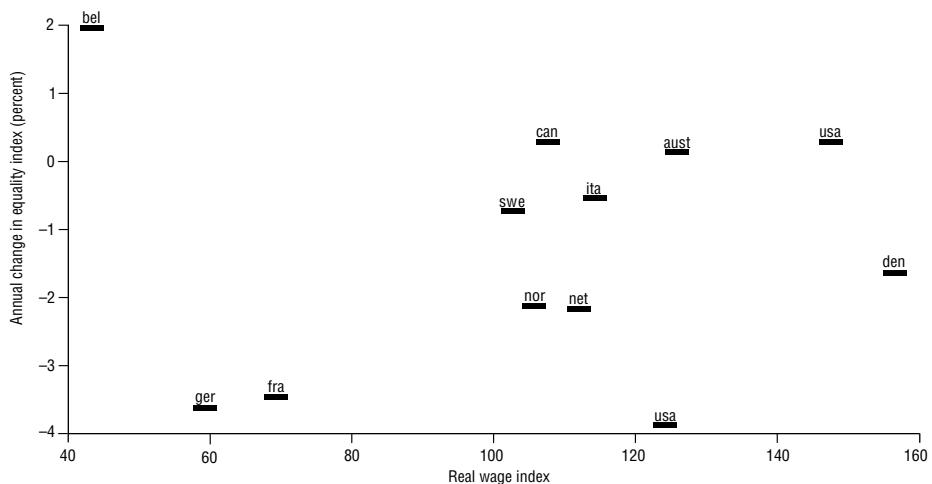
where *mig* stands for the impact of net migration on labor supplies. The impact of mass migration is powerful, significant, and of the right sign. When immigration rates were big, e was small and inegalitarian trends were strong. When immigration rates were small, e was bigger, and thus inegalitarian trends were weaker. And when emigration rates were big, e was even bigger, and thus egalitarian trends were strong.

Around the European periphery, the more-open economies had more egalitarian trends (bigger *trade* implying bigger e , $[.25 + 2.42] * trade$). It appears that the open, industrializing “tigers” of that time enjoyed benign egalitarian trends, while those opting for autarky did not. Furthermore, the coefficient 2.42 on $(d_2 * trade)$ passes conventional significance tests. In the European industrial core, the effect was far less powerful since the smaller coefficient 0.25 on *trade* does not pass any significance test. It appears that open-economy effects on income distribution were ambiguous among the European industrial leaders with moderate initial income levels. In the labor-scarce New World, however, the more open economies also had more egalitarian trends ($[.25 + .55] * trade$), which is certainly *not* what Heckscher and Ohlin would have predicted. The result is not statistically significant, however.

Overall, I read this evidence as strong support for the impact of mass migration on distribution trends. The effects were big everywhere in the Atlantic economy where the migrations were big. The evidence offers weak support, however, for the impact of trade on distribution trends, except around the European periphery where trade lowered inequality. This econometric exercise explains about two-thirds of the variance in distributional trends across the late nineteenth century.

The globalization–inequality connection in high-wage countries was broken after 1913. Figure 3 shows the correlation between distributional trends as measured by changes in *w/y* and a 1921 real wage measure of labor scarcity. The late nineteenth century inverse correlation has completely disappeared, replaced by a positive correlation. In the interwar period of deglobalization, the poorer countries experienced sharply increasing inequality while the richer countries experienced more moderate increases or, in four cases, egalitarian trends. This finding is consistent with both the cessation of the mass migrations and with the Stolper–Samuelson theorem: Protection should raise demand for the scarce factor, thus improving the position of the unskilled in rich countries and contributing to egalitarian trends while eroding the position of the unskilled

Figure 3
Initial Real Wage Versus Equality Trends, 1921–38



SOURCE: Williamson (1997, Figure 9).

in poor countries and contributing to inegalitarian trends. Whether it really was deglobalization that precipitated this dramatic switch in distribution trends has yet to be established with firmer evidence, but there seems to be no doubt about the switch itself. The pre-1913 egalitarian trends in Scandinavia and Italy disappeared and were replaced by post-1921 inequality trends. The pre-1913 inequality trends in the New World disappeared and were replaced by post-1921 egalitarian trends. This change, seen as a revolutionary leveling at the time, has been confirmed by better data since (Goldin and Margo 1992; Goldin and Katz 2001). And the relatively stable pre-1913 distribution trends in industrial France and Germany were replaced by dramatic post-1921 inequality trends (Piketty and Saez 2003).

A Closer Look at the Impact of Immigrants on High-Wage Labor Markets

The impact of immigrants on labor markets obsessed contemporary American observers. Here we confront two questions as relevant today as when they were posed almost a century ago, when the Immigration Commission published its 1911 report: Did immigrants crowd out natives and reduce their wages? It appears they did.

Claudia Goldin (1994) estimates the correlation between immigration and wage changes across cities between 1890 and 1915, finding that a 1 percentage point increase in the foreign-born share reduced unskilled wage rates by 1 to 1.5 percent. Another study estimates the impact of immigration on the real (unskilled)

wage by looking at the wage adjustment mechanism from time-series data. By altering labor supply and unemployment in the short run, immigration should have driven down the wage along some long-run Phillips curve. The long-run solution to one such model estimated for 1890–1913 suggests that holding output constant, an increase in the labor force of 1 percent lowered the real wage in the long run by 0.4 or 0.5 percent (Hatton and Williamson 1998, Table 8.6). Based on the stock of foreign-born and their children enumerated in the 1910 census, immigration after 1890 accounted for about 12 percent of the 1910 labor force and immigration after 1870 accounted for about 27 percent of the 1910 labor force. These magnitudes suggest that the real (unskilled) wage would have been 5 to 6 percent higher in the absence of immigration after 1890 and 11 to 14 percent higher in the absence of immigration after 1870.

Both the cross-section and time-series results are consistent with those based on computable general-equilibrium models. The first effort to apply a computable general-equilibrium model to the late nineteenth century United States estimates that immigration after 1870 lowered real wages in 1910 by 11 percent (Williamson 1974, 387), almost identical to the time-series estimate. A more recent computable general-equilibrium experiment gets pretty much the same result: Immigration reduced urban real wages in 1910 by 9.2 percent (O'Rourke, Williamson, and Hatton 1994, 209).

In short, it appears that there were powerful crowding-out forces at work in immigrant countries before World War I and that they contributed to the rising inequality observed there.

The Impact of Anti-Immigration Policy on the American Labor Force

The United States was the biggest immigrant labor market, so our focus is there. Whether due to a switch to restrictive immigration policy, war, the Great Depression, or all three in concert, did the labor force and population growth rate slow down in the three decades after 1913? If so, how much of the decline can be attributed to declining immigration? Only if we can show that a decline in immigration contributed to a labor force slowdown can we ask whether it had an impact on developments within the U.S. economy.

Three studies have explored the impact of immigration on U.S. population and labor supply in the interwar years, but I believe that all three ask the wrong question. Kuznets and Ernest Rubin (1954) adopt a foreign-born measure and count net migrants of labor force age but also immigrant children born abroad as they reach employment age. Richard Easterlin's (1968) measure is narrower and excludes the impact of immigrant children. More recently, Henry Gemery (1994) extends the analysis using the Easterlin measure, the narrow definition that I also use in what follows. However, all of these scholars only measure the share of the *actual* labor force or population increase accounted for by immigrants. While

such accounting decompositions are useful, they do not assess the impact of the demise of mass migration on labor force or population growth. What we want instead are estimates of a *counterfactual* world where the mass migrations continued. Only then can we identify the role of the demise of mass migration.

Consider first the extent of the labor force slowdown. Table 2 documents a dramatic fall in the U.S. labor force growth rate from 2.29 percent per annum over the three decades 1880–1910 to 1.14 percent per annum over the three decades 1910–40. This slowing in the rate of labor supply growth amounted to 1.15 percentage points—a massive regime switch in which the growth rate was cut in half. Whether we would find similar large numbers for other, less-adequately documented immigrant countries would depend on two factors.

First, which economies were most dependent on immigration prior to the Great War? The answer to that question has been reported elsewhere for both sending and receiving countries (Hatton and Williamson 2005, Table 6.2). Immigration between 1870 and 1910 served to raise the 1910 labor force of Argentina by 86 percent, Canada by 44 percent, Australia by 42 percent, and the U.S. by 24 percent. Emigration between 1870 and 1910 served to lower the 1910 labor force in Ireland by 45 percent, Italy by 39 percent, Norway by 24 percent, and Sweden by 20 percent.

Second, which economies experienced the biggest fall in mass migration? With that evidence in hand, we would then predict that the biggest labor force slowdown occurred in economies where net migration had the biggest impact

Table 2
U.S. Labor Force Growth, 1910–40: Some Counterfactuals

	Labor force growth rate (percent per annum)	Percentage due to net immigration
Actuals		
1880–1910	2.29	40.1
1910–1940	1.14	11.6
Counterfactuals for 1910–1940 with immigrant participation rate of 1910–1940		
Net immigration rate for 1919–1940	1.14	11.6
Absolute net immigration of 1880–1910	1.38	30.9
Net immigration rate of 1880–1910	1.66	44.1
Counterfactuals for 1910–1940 with immigrant participation rate of 1880–1910		
Net immigration rate for 1910–1940	1.17	14.5
Absolute net immigration of 1880–1910	1.48	35.6
Net immigration rate of 1880–1910	1.82	50.4

SOURCE: Hatton and Williamson (2005, Table 9.3).

on prewar labor force totals and where across-border net migration underwent the biggest decline after 1913. Australia would be one such candidate; indeed, the rate of labor force growth in Australia fell by 1.41 percentage points between 1870–1913 and 1913–38 (Maddison 1994, 266). The other immigrant countries are harder to document, but similar magnitudes seem likely.

Next, does the demise of mass migration explain the big slowdown? Table 2 poses the following counterfactual: What would have been the labor force growth rate between 1910 and 1940 had the 1880–1910 immigration experience persisted? The counterfactuals are calculated to take account of two forces. First, immigration into the U.S. fell after 1910. So, what would have been the impact over the 1910–40 period if, on the one hand, the immigration *rate* had maintained the 1880–1910 average thereafter and if, on the other hand, the *absolute level* of immigration had maintained the 1880–1910 average thereafter? The pre-1910 *rate* sets an upper bound, while the pre-1910 *level* sets a lower bound on the counterfactual impact. These counterfactuals are reported in the second panel of Table 2. Second, the age and sex distribution of the immigrants changed dramatically—partly induced by immigration policy—thereby serving to lower the labor participation rate of the interwar immigrants. So, what would have been the impact on pre-1910 labor force growth if, in addition, the immigrant labor participation rate had maintained its pre-1910 average thereafter? These counterfactuals are reported in the third panel of Table 2.

The bottom line is this. The observed decline in the rate of labor force growth between the pre- and post-1910 periods was 1.15 percentage points, but the no-mass-migration-demise counterfactual decline would have been only 0.47 (2.29 – 1.82, panel 3) or 0.63 (2.29 – 1.66, panel 2) percentage points. The demise of mass migration accounted for 45 to 59 percent of the massive slowdown in U.S. labor force growth around World War I, or about half. Since the immigrants were more unskilled than the native-born (Hatton and Williamson 2005, Chapters 5 and 15), it seems likely that the demise of mass migration contributed even more than half to any unskilled labor force growth slowdown.

The demise of mass migration wasn't the only force at work, of course, since the crude birthrate in the U.S. also fell, from about 37 per thousand in the 1880s to about 18 per thousand in the 1930s. But the demise of immigration accounted for about half the changing demographic and labor supply growth events during the interwar years when the world went antiglobal.

Rising Schooling Supplies, Falling Immigrant Supplies, and the Great Leveling in America

When Paul Samuelson published the sixth edition of his famous *Economics* textbook in 1964, he made the following statement: "After World War I, laws were passed severely limiting immigration. Only a trickle of immigrants has been ad-

mitted since then. ... By keeping labor supply down, immigration policy tends to keep wages high" (Samuelson 1964, cited in Borjas 2003, 2).

Writing in the same year, Stanley Lebergott, in *Manpower in Economic Growth*, joined Samuelson with this statement about the impact of the immigration quotas: "It [is] most unlikely that the rate of productivity advance or the nature of productivity advance changed so [much in the 1920s] as to explain [the spurt in real wage growth]. Instead we find that halting the flow of millions of migrants ... offers a much more reasonable explanation" (Lebergott 1964, 27).

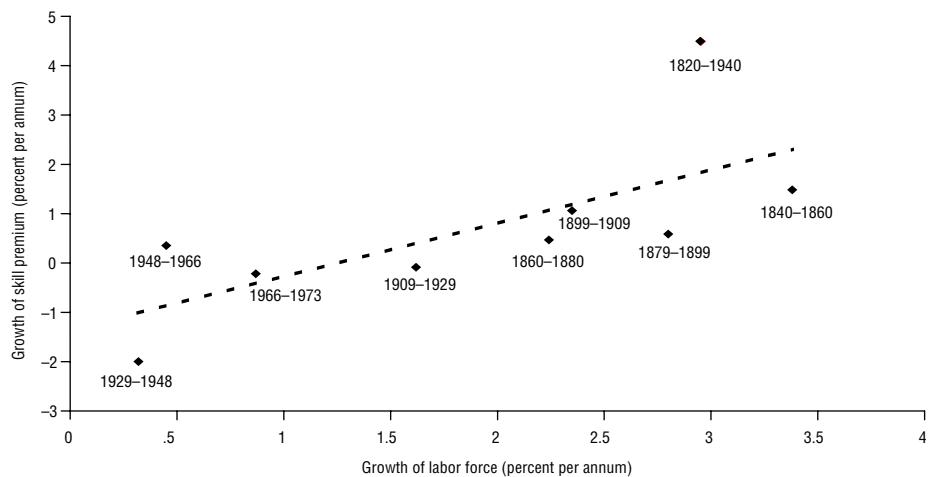
The economics underlying both statements is straightforward, and it goes back to the Dillingham Commission reports in 1911 and before. A glut in the labor supply lowers the wage relative to the returns to capital and rents on land. Since capital and land are held by those at the top of the distribution pyramid, immigration-induced labor supply growth should create more inequality and the demise of immigration should create less, *ceteris paribus*. Since immigrants were more unskilled than the native-born, immigration should also have raised the premium on skills as they got scarce relative to unskilled labor, and the demise of immigration should have reduced the premium on skills as they got relatively abundant, *ceteris paribus*.³

Not everyone has agreed with this traditional argument, mostly because of the *ceteris paribus*: Many other forces were driving the American economy, thus offering potential offsets to any measured immigrant glut or scarcity. Potential offsets invite debate. For example, Vernon Briggs (1984, 50) thought that the premise of the traditional argument was false, since he believed that immigration was still substantial in the 1920s and that productivity advance was very different in rate and factor-saving bias. Others have argued that immigration generates accumulation responses, forces that would mute the immigration impact. I will not try to resolve this debate here but only pose the arguments and present an impressive and suggestive correlation in the historical time series.

We have already seen that during the mass migrations between 1870 and 1913, rich labor-scarce countries with big immigration rates underwent rising inequality and poor labor-abundant countries with big emigration rates underwent falling inequality. During the antiglobal and immigrant-restricted interwar years 1921–38, the correlation disappeared. Indeed, some previously emigrating countries like Italy underwent rising inequality, while some previously immigrating countries like Australia, Canada, and the United States underwent falling inequality. This is only a correlation, of course. Immigration policy may have been correlated with some omitted variables, and the omitted variables may have been driving this change. Still, the correlation keeps the immigration-breeds-inequality hypothesis on the table.

Now consider Figure 4, where I plot the correlation for the U.S. only, but over 150 years. The figure is taken from a book that was published some time ago

Figure 4
Labor Supply and the Skill Premium in the U.S., 1820–1973



SOURCE: Williamson and Lindert (1980, 205).

(Williamson and Lindert 1980), and the underlying data have been revised many times since. Still, those revisions have not overturned the correlation—namely, rapid rates of labor force growth in the United States took place during episodes when earnings inequality was on the rise and the skill premium was increasing, while slow labor force growth rates took place during episodes when earnings inequality was decreasing and the skill premium was falling. And note the observations that are the focus of this section: 1909–29 and 1929–48 in the lower left quadrant, where the skill premium was falling and the growth rates of the labor force were slow; and 1899–1909 in the upper right quadrant, where the skill premium was rising and the labor force growth rates were fast. Correlation is not causation, but Figure 4 is certainly consistent with the immigration-breeds-inequality hypothesis.

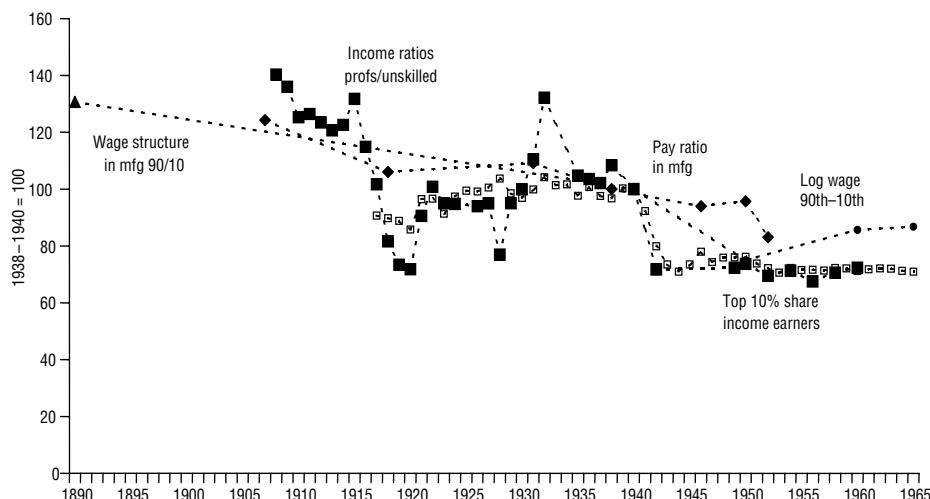
The twentieth century evidence on the evolution of U.S. inequality has improved over the past decade or so, and it confirms a great egalitarian leveling in American incomes between the first and second thirds of the century (*Figure 5*). The ratio of wages in the top to the bottom 10 percent in manufacturing fell by almost a third between 1890 and 1940, a period of labor force slowdown, half of which can be attributed to the demise of mass migration. Pay ratios of skilled to unskilled labor fell by two-thirds between 1907 and 1952. The ratio of college professors' incomes to those of unskilled workers was cut in half between 1908 and 1960. Weekly-wage dispersion measures among white men fell by more

than a quarter between 1940 and 1965, as did the share of the top 10 percent of income earners.

Among the authors contributing to the evidence in Figure 5, Goldin and Lawrence Katz have made the greatest effort to explain the great leveling (Goldin and Margo 1992; Goldin and Katz 1998, 1999a, 1999b, 2001), and the relative demand and supply of skills is central to their story: “[The] long-run change in the distribution of earnings is shaped by a race between the demand for skill, driven largely by industrial shifts and technological advances, and the supply of skill, altered by changes in educational investments, demographics and immigration” (Goldin and Katz 2001, 68).

While they are cautious, Goldin and Katz appear to favor the view that an exogenous and revolutionary change in the supply of secondary and tertiary schooling must have overwhelmed the skill-using bias that characterized twentieth century economic progress. Such schooling forces would, of course, help erase the skill premium, compress the wage structure, and level incomes. But what about exogenous and revolutionary changes in unskilled labor supplies as-

Figure 5
American Inequality Trends, 1890–1965



NOTES AND SOURCES: Wage structure in mfg 90/10 = wage ratios, male production workers, top 10% relative to bottom 10% (Goldin and Katz 2001, Table 2.1); income ratios profs/unskilled = ratio of earnings of college full professors to low-skilled (Goldin and Katz 2001, Table 2.3); log wage 90th–10th = wage dispersion of white men, log weekly wages 90th–10th percentiles (Goldin and Margo 1992, Table 1); pay ratio in mfg = pay ratios, skilled to unskilled in urban manufacturing (Goldin and Margo 1992, Table VII); top 10% share income earners = income share of the top 10% of earners (Piketty and Saez 2003, Table II). Hatton and Williamson (2005, Figure 9.4).

sociated in large part with the demise of mass migration? These policy-induced immigration forces would reinforce the policy-induced schooling forces. As the growth of the unskilled labor force slowed down, unskilled labor would have become scarcer relative to skilled labor.

If mass migration before the Great War contributed to high and rising inequality and skill scarcity in New World host countries, while its absence there after the quotas contributed to less equality and the decline in skill scarcity, we should see opposite trends in the European sending countries. While both sides of the Atlantic may have shared the same technological events and perhaps even the same schooling events (see below), the boom and bust in mass migration must have left different inequality marks on labor markets on either side of the Atlantic. Much more work remains to be done on this issue, but what evidence we have at hand seems to be consistent with the hypothesis. Two recent papers have documented skilled versus unskilled wage-gap trends for Europe and North America between 1870 and 1960, and they show the following.

First, the U.K. skilled-wage premium started falling in 1880, thirty-five years before it did in the U.S. and Canada in 1915 (Anderson 2001, 96; Betrán and Pons 2004, 39). Second, while the skilled-wage premium declined very dramatically after 1915 in the U.S. and Canada, it declined only very modestly in the U.K. (Anderson 2001, 96; Betrán and Pons 2004, 39). And third, what is true for the Anglo-American comparison was also true for those involving Denmark, France, Germany, Italy, Spain, and Sweden (Anderson 2001, 94; Betrán and Pons 2004, 39). The mass migration boom and bust appears to be a good candidate to help explain the asymmetric inequality trends between Europe and the New World.

A good illustration of how policy-induced immigration forces created greater unskilled labor scarcity and lower inequality in the United States is not hard to find, and it involves disadvantaged black Americans. Did European immigrants crowd out southern blacks from northern jobs that offered much better earnings and living standards than did sharecropping in the South? This is an old question that until recently was illustrated only by compelling correlations. Thirty-five years ago, Brinley Thomas (1972, 130–34, Chapter 18) noted the striking inverse correlation between black migration out of the South and European migration into northern cities. The problem left unanswered by these correlations, however, was causation. William Collins (1997) recently unraveled the issues of causation and supplied the answers. While only about a half-million southern blacks left for the urban North in the four decades before 1910, seven times that—about 3.5 million—left in the four decades after 1910. By 1950, about 20 percent of all the blacks born in the South lived in the North, while the figure was only a little more than 4 percent at the turn of the century (Collins 1997, 607), or only a fifth of the 1950 figure. Not only did those who moved improve their economic lives, but those who stayed behind gained, too, since the wage gap between North

and South declined sharply as the Great Black Migration served to better integrate what had been regionally segmented labor markets (Wright 1986). Collins concludes that the mass migrations from Europe did indeed crowd out southern blacks from better jobs in the urban North, and, symmetrically, the demise of the mass migrations crowded them in. A very large share of the Great Black Migration can be explained by the disappearance of new European immigrants in northern U.S. cities after 1914. Since the Great Black Migration greatly improved the relative income position of blacks between 1910 and 1950, it helps account for the great leveling of incomes in the middle third of the twentieth century and offers one important channel through which exogenous changes in European mass migration contributed to the leveling.

Did the Presence of Immigrants Contribute to the Schooling Revolution in America?

Consistent with the evidence of the great leveling in the United States in the middle third of the twentieth century, Goldin and Katz (1999a, Tables 6 and 7) have documented a decline in the returns to schooling from World War I to the 1960s. For young men, the return to a high school degree fell from 11–12 percent in 1914 to 7 percent in 1959, while the return to a college degree fell from about 15 percent to 9 percent over the same period (Goldin and Katz 2001, Table 2.4). How much of this was due to a policy-induced scarcity of unskilled and poorly schooled immigrants who lowered the rate of return to schooling by raising the opportunity costs of staying in school and out of the labor market? How much of it was due, instead, to a schooling glut that lowered those rates? If it was a schooling glut, how much of that glut was triggered by exogenous policy changes and how much was an endogenous response to the observed skill scarcity created, at least in part, by the open immigration policy before 1914?

It is important to stress that the immigrant-scarcity and schooling-glut hypotheses are not competing. Instead, they are mutually supporting. The exogenous and endogenous schooling hypotheses also need not be competing, since both forces might have been operating. Still, we would like to know which was most important.

Goldin and Katz clearly favor the exogenous-schooling hypothesis. There is no doubt that secondary school enrollment soared in the United States from 1910 to 1940, rising from about 14 percent to 71 percent (Goldin 1998; Goldin and Katz 2001, 59–60, Figure 2.5), and an increasing number of the graduates took white-collar office and factory jobs. More and more high school students were using their diplomas in the marketplace, rather than solely as a way to gain entrance to college, and secondary schools increased the number of terminal degrees granted: “The increase in high school enrollments and graduation served to flood the market with literate and numerate workers whose skills enabled them

to move into white-collar office jobs. It also increased the supply of those capable of filling blue-collar positions that required the reading of manuals, deciphering of blue-prints, computing of formulae, and use of elementary science" (Goldin and Katz 2001, 61).

Moreover, "mass' secondary school education was unique to the United States at that time. Most European countries did not have mass non-vocational, non-industrial secondary school education that was fully publicly funded until the post-World War II era" (Goldin and Katz 1999a, 15).

But why did the U.S. high school movement begin around 1900 or 1910? Why not later, as was true of Europe? We may agree that the schooling supply response helped erase schooling scarcity and inequality in America, but surely previous schooling scarcity played a role in triggering that supply response. Goldin and Katz think not and believe instead that it was the relative cultural and wealth homogeneity of the early twentieth century that explains the timing and location of the schooling boom. For them, the key was social and economic egalitarianism in America that supported the belief in externalities—especially in New England and the West, where the high school movement led the nation. Perhaps, but some part of the schooling boom must have been an endogenous response to the large skill premium, schooling scarcity, and a high return to education in the late nineteenth century, when mass migration reached its crescendo.

The issue has not been resolved, but Rodney Ramcharan (2002) has offered some evidence supporting the schooling-endogeneity hypothesis, although his evidence also offers some support for the alternative offered by Goldin and Katz. Ramcharan's results are reassuring for those, like me, who believe that schooling endogeneity and exogeneity forces were both at work.

Needless to say, the payoff to future research on the schooling-endogeneity hypothesis will be great, since it speaks to modern brain drain debates and whether and how human capital formation responds to mass migration in host and source country.

Brain Drain and Schooling Responses in Europe

Was There a European Brain Drain?

Fearing brain drain, there were legal restrictions in the eighteenth century on the emigration of artisans and engineers from Britain to the European continent. But public concerns about losing vital skills through emigration seem to have vanished by the late nineteenth century. There may have been good reasons for this. First, where positive selection was weak, it would not have made a major dent in the per capita skill base at home. Second, much of the human capital embodied in the emigrants who disappeared across the Atlantic had not been

financed by the public purse. Third, immigrant remittances from abroad may have offset the forgone income at home.

So was there a big brain drain from Europe during the age of mass migration? While there certainly was some within-country positive selection, it probably did not translate into big brain drains. Table 3 shows literacy rates (in any language) for five European countries among adult immigrants to the United States between 1899 and 1909, as well as the literacy rates of the adult home populations in 1901 (those who stayed behind). Literacy rates among immigrants were generally higher than they were among the source populations, implying positive selection. Perhaps this was inevitable: Immigrants were younger adults than the source adult populations, and, as I discuss below, there was a schooling revolution taking place in late nineteenth century Europe, raising literacy among the young movers compared with the old stayers (Easterlin 1981). Italy may appear to be an exception to this rule, but the observed lower literacy among immigrants relative to the Italian population simply reflects the dominance of poor southern Italians in the immigrant inflow.⁴ The third row of Table 3 reports the outflow of literate emigrants (over the decade) as a proportion of literate adults in the 1901 source population. For Britain and France, the decade's loss to the United States was small in relation to the stock, less than 2 percent. It was larger for Italy because of its higher emigration rates. Spain's and Portugal's out-migration numbers would be higher if the flows to South America were included. But even then, the totals would be small.

Even if the human capital losses were small for Europe when measured in terms of education and literacy, they may have been larger in terms of unobservable "best and brightest" characteristics. One piece of evidence supporting this view comes from Swedish clergymen's evaluations of the intellectual abilities of their parishioners. Comparison of those who subsequently emigrated with those

Table 3
Literacy in Europe and the Brain Drain

	France	Britain	Italy	Spain	Portugal
Literacy rate of adult immigrants to the U.S. 1899–1909 (percent)	94.6	99.0	47.0	85.4	31.8
Literacy rate, adult stayers, 1901 (percent)	83	97	52	44	22
Literacy loss (outflow of literates as a percentage of literate stayers)	.4	1.6	8.6	.6	2.0
School enrollment as a percentage of literate adult stayers, 1901	25.9	23.4	24.2	31.3	29.5

SOURCE: Hatton and Williamson (2005, Table 5.3, 93).

who did not reveals that the former had a higher intellectual level, did better at school, and had a wider view of the world (Hvidt 1975, 109). On these grounds, one might have expected that immigrants to the New World were more likely than the native-born to become entrepreneurs and business leaders. Consistent with that prediction, it turns out that among those born between 1816 and 1850, immigrants were overrepresented among the top businessmen in the United States (Ferrie and Mokyr 1994). This evidence of positive selection and brain drain was much less apparent among those born between 1850 and 1890, reflecting the declining quality of U.S. immigrants as origin countries shifted.

Were There Schooling Responses in Europe?

If a supply glut of poorly schooled and poorly skilled immigrants helped raise the relative scarcity of skills in the United States before the quotas and thus helped create a high school revolution in America, why wouldn't the same skill scarcity encourage schooling at home in Europe, at least at the primary level?

The 1917 Literacy Act imposed a literacy test that was precisely the mode of restriction Congress had debated since 1895. The idea was that the literacy requirement would ensure a rise in the quality of immigrants, a change in their source (favoring more advanced Western Europe), and a reduction in their numbers (Hatton and Williamson 2005, Chapter 8). Congress was to be disappointed. The literacy test (in English or some other language) proved ineffective in stemming the inflow at the end of the Great War, mainly because a revolution in the provision of free and public elementary education had spread east and south to backward and illiterate Europe from the 1880s onwards (Easterlin 1981; Lindert 2003).

As one of the biggest immigrant sources by 1910, Italy illustrates the European schooling revolution well. Between 1881 and 1931, Italian regional literacy rates soared, from less than 20 percent to more than 60 percent in southern Italy, Sicily, and Sardinia; from less than 35 percent to almost 80 percent in central Italy; from about 40 percent to about 85 percent in Venice and Emilia; and from almost 60 percent to more than 95 percent in the northern industrial triangle (Kirk 1946, 183–85). The literacy rate for Italy as a whole was about 80 percent by 1931. Of course, the rate for young adults is much more relevant for any prediction regarding the effectiveness of the 1917 Literacy Act, because these were the individuals most responsive to labor market signals. The literacy rate in poor European source countries (including Italy) for those aged 15 to 29 ranged from 80 to 83 percent in 1931 (Kirk 1946, Table 12, 189). No wonder the literacy criteria failed to effectively bar immigrants from poor European countries.

Just as it might be doubted that the U.S. high school revolution was exogenous to labor market skill scarcity, it might also be doubted that the European

literacy revolution was exogenous to labor market demands, both being driven in part by mass migration.

Comparative Economic History and the Present

The first global century before 1914 had profound effects on both low-wage, labor-abundant Europe and the high-wage, labor-scarce New World. Trade and especially mass migration contributed to a reduction in unskilled labor scarcity in the New World and to a rise in unskilled labor scarcity in Europe. Thus, globalization contributed to rising inequality in the United States and falling inequality in most of Europe. Falling unskilled labor scarcity in the U.S. meant rising skill scarcity, which contributed to the high school revolution there. Rising unskilled scarcity in Europe also contributed to the primary schooling and literacy revolution there.

Under what conditions would we expect the same responses to globalization in today's world? The magnitude of the migrations matters. The skill-selectivity of the migrations matters. And the governmental response to market signals matters. It seems to me that we would gain considerable insight into the inequality and schooling responses to modern globalization forces by doing serious comparative analysis, and that analysis should include history.

Notes

This paper draws from a recent book with Timothy J. Hatton, *Global Migration and the World Economy: Two Centuries of Policy and Performance* (MIT Press, 2005). It has also been influenced by participants' comments at the Center for Global Development Workshop on Emigration's Impact on the Third World (September 11, 2006).

¹ Other surveys can be found in O'Rourke and Williamson (1999); Bordo, Taylor, and Williamson (2003); Williamson (2006); and Hatton and Williamson (2005).

² The modern economist may find it odd to discuss changing distribution without referencing the wages of skilled workers, while stressing land rents. Yet land and labor were the dominant factors of production a century ago, not skills and capital, as is true today.

³ The premium on U.S. skills relative to the unskilled was 53 percent in 1890, greater than Great Britain (33 percent) and Germany (35 percent), and much greater than the poorer parts of Europe (Hatton and Williamson 2005, Table 5.2, 90).

⁴ Among the northern Italian immigrants to the U.S. in 1899–1909, 88 percent were literate, whereas only 46 percent of southern Italian immigrants were literate (Hatton and Williamson 2005, 407).

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