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THEN AND NOW: THE LATE 19TH
AND LATE 20TH CENTURIES COMPARED

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ABSTRACT

The late 19th and the late 20th century shared more than simply globalization and convergence. Globalization also seems to have had the same impact on income distribution: in the late 19th century, inequality rose in rich countries and fell in poor countries; according to Adrian Wood, the same has been true of the late 20th century. Furthermore, while George Borjas and Wood think that globalization accounted for something like a third to a half of the rise in inequality in America and other OECD countries since the 1970s, the late 19th century evidence suggests at least the same, perhaps more. However, those modern economists who favor a rising inequality explanation coming from (unskilled)-labor-saving technological change will be pleased to hear that it probably accounted for more than a third of the rising inequality in the New World and for more than a half of the falling inequality in Europe. It also appears that the inequality trends which globalization produced prior to World War I were at least partly responsible for the interwar retreat from globalization. Will the world economy of the next century also retreat from its commitment to globalization because of its inequality side effects?

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I. Setting the Stage

There were three epochs of growth experience after the mid 19th century for what is now called the OECD "club": the late 19th century, the middle years between 1914 and 1950, and the late 20th century. The first and last epochs were ones of overall fast growth, globalization and convergence. The middle years were ones of overall slow growth, de-globalization and divergence. Thus history offers an unambiguous positive correlation between globalization and convergence. When the pre-World War I years are examined in detail, the correlation turns out to be causal: globalization served to play the critical role in contributing to convergence; it took the form of mass migration and trade (Williamson 1995b).

Since contemporary economists are now hotly debating the impact of these globalization forces on wage inequality in OECD countries, it seems timely to ask whether the same distributional forces were at work during the late 19th century. There is a literature almost a century old which argues that immigration hurt American labor and accounted for much of the rise in inequality from the 1890s to World War I, so much so that a labor-sympathetic Congress passed immigration quotas. There is a literature even older which argues that a New World grain invasion eroded land rents in Europe, so much so that landowner-dominated Continental Parliaments raised tariffs to help protect them from the impact of globalization. But nowhere in this historical literature has anyone constructed a panel data set across countries and over time -- like Adrian Wood (1994) has done recently for the late 20th century -- which could be used to test two fundamental and contentious hypotheses:

Hypothesis #1: Inequality rose in rich, labor scarce New World countries like Argentina, Australia, Canada and, most importantly, the United States. Inequality fell in poor, labor abundant, agrarian countries around the Old World periphery like Italy, the Iberian Peninsula,

Ireland and Scandinavia. Inequality was more stable for the European industrial leaders like Britain, France, Germany and the Lowlands all of whom fell somewhere in the middle between the rich New World and poor agrarian Old World.

Hypothesis #2: If the first hypothesis survives test, then a second follows: much of these inequality patterns can be explained by globalization. If so, how much by trade and how much by mass migration? Was trade policy very effective in muting these distributional forces?

The next two sections review the theory and tie historical debate about the first globalization boom in the late 19th century to current debate about the second globalization boom in the late 20th century. There is a striking similarity between the two debates. There is also a shared short-coming to the empirical analysis: nobody has yet explored this issue with late 19th century panel data across poor and rich countries, and, with the important exception of Adrian Wood (1994), nobody has done so for the late 20th century debate either (Burtless 1995, p. 813). Indeed, most economists focus solely on American experience. The central contribution of this paper is to offer a late 19th century panel database which includes rich and poor countries, or, in the modern vernacular, North and South. Section IV uses this new database to establish the late 19th century facts: **Hypothesis #1** survives. Section V explores **Hypothesis #2**: it too survives, although the tests are admittedly crude.

It appears that globalization did drive inequality before the interwar age of autarky. Indeed, that fact must have contributed to the implosion, de-globalization and autarkic policies between 1913 and 1950.

II. Globalization and Inequality: The Late 20th Century Debate

After 1973 and especially in the 1980's, the US experienced a dismal real wage performance for the less skilled, mostly due to declining

productivity growth coupled with increasing wage inequality between skills. The ratio of weekly wages of the top decile to the lowest decile increased from 2.9 in 1963 to 4.4 in 1989 (Kosters 1994). This inequality was manifested primarily by increasing wage premia for workers with advanced schooling and age-related skills. While the same inequality trends were apparent elsewhere in the OECD in the 1980s, the increase was typically far smaller (Kosters 1994). Most of the current debate has focused on explaining these inequality facts. Since these developments coincided with convergence, globalization,¹ and a shift in US spending patterns which resulted in large trade deficits, economists have quite naturally explored the linkages between trade and immigration, on the one hand, and wage inequality, on the other. They have also explored the role of technological change on labor demand by skill. Economists remain divided between globalization and technology explanations, with no resolution in sight.

Robert Lawrence and Matthew Slaughter (1993) looked at wage inequality using the standard Heckscher-Ohlin model and concluded that there is little evidence that Stolper-Samuelson effects can explain increasing wage inequality because a lower relative wage for unskilled labor must be coupled with a lower skilled to unskilled worker ratio in all industries for such an effect to be present. That is, a trade shock that serves to diminish the relative demand for unskilled labor (following a boom in skill-intensive export industries and a slump in unskilled-labor-intensive import competing industries) should lower the unskilled wage thus augmenting unskilled employment in all sectors. However, they find that only 10% of the US manufacturing industry in the 1980s moved in this manner. The rest saw an increase in the ratio of skilled to unskilled workers. Lawrence and Slaughter then go on to examine the effect of Hicks-neutral technological change occurring more rapidly in goods that are

¹ Trade shares in the United States increased from 12% of GNP in 1970 to 25% in 1990 (Lawrence and Slaughter 1993), while the labor force accommodated increasing proportions of unskilled immigrant workers (Borjas 1994). Meanwhile, World Bank figures document that the share of output exported from low-income countries rose from 8% in 1965 to 18% in 1990. The figures for middle-income countries are 17 and 25%. See Richardson (1995, p. 34).

relatively intensive in skilled labor. While such technological events would also generate a decrease in the skilled to unskilled worker ratio in all industries, the authors explain this otherwise perverse result by claiming that technological change actually had a skill-using bias. They also criticize the use of trade figures in analyzing wage inequality and look instead at shifts in the prices of tradables. They conclude that technological change has been an important source of wage inequality trends because they find a positive association between total factor productivity growth and skilled labor intensification while they find no evidence of a relative price decline of goods that use unskilled labor intensively.²

Lawrence and Slaughter stress the evolution of labor demand by skill, ignoring the potential influence of supply. George Borjas (1994) and his collaborators (Borjas, Freeman and Katz 1992) take a different approach, emphasizing the contribution of trade and immigration to the US labor force. In order to do this, they first estimate the implicit labor supply embodied in trade flows. Imports embody labor thus serving to augment effective domestic labor supply. Likewise, exports imply a decrease in the effective domestic labor supply. In this way, Borjas calculates that the huge US trade deficit of the 1980s implied a 1.5% increase in the US labor supply and, since most of the imports were in goods which used unskilled labor relatively intensively, it also implied an increasing ratio of unskilled to skilled effective labor supplies. In addition, there was a shift in national origin of immigrants from the 1960s to the 1980s so that an increasing proportion of immigrants were from the less developed nations (e.g., Mexico and Asia) and thus more unskilled, which in turn meant a far higher fraction of immigrants were relatively unskilled just when there were more of them. It follows that both trade and immigration increased the supply of unskilled relative skilled workers in the 1980s.

² Lawrence and Slaughter use a crude definition of skill, classifying production workers as unskilled and non-production as skilled. Using a more traditional skill classification, Sachs and Schatz (1994) find evidence of a slight decline in the relative price of commodities that use unskilled labor intensively.

These relative supply shifts give us the desired qualitative result -- wage inequality between skill types. The quantitative result, at least in Borjas' hands, also seems big. Borjas estimates that 15 to 25% of the relative wage decline of high school to college graduates is due to trade and immigration. He also estimates that 30 to 50% of the decline in relative wage of high school dropouts to all other workers is due these same globalization forces, one-third of which was due to trade and two-thirds to immigration. Migration was the more important globalization force producing US inequality trends in the 1980s according to Borjas. We shall see that it was far more dominant in the late 19th century, and, furthermore, that it was ubiquitous across practically all countries involved in the globalization experience.

Borjas' figures are among the largest estimates of the globalization impact on earnings inequality, although they are clearly consistent with recent late 19th century views (e.g., Hatton and Williamson 1995). Most contemporary economists dealing with the impact of late 20th century immigration on US labor markets have found the effects to have been tiny.³ However, these studies tend to look across local labor markets for their evidence. As such, they almost certainly understate (or miss entirely) the economy-wide impact of immigration on wages. After all, foreign in-migration will only lower wages in a local labor market if it increases the total labor supply. If instead there is completely offsetting native out-migration, then a rise in the immigrant share is consistent with no change in the size of the local labor force, and no immigrant-induced wage effect compared with other local labor markets in which natives relocate. But wages should fall (perhaps equally, perhaps not) in all locations. These macro effects are not measured by the local labor market studies.⁴

Thus far, we have been talking about only one country, the United

³ See, for example, the surveys in Greenwood and McDowell (1986, 1994).

⁴ They are also completely at odds with three decades of applied econometric work which has estimated the elasticity of derived labor demand at around -0.60 (Hammermesh 1993).

States, perhaps because this is where rising inequality and immigration have been greatest. Richard Freeman (1995, p. 19) illustrates how narrowly economists have defined the debate:

"The question ... is not simply why the United States and Europe experienced different labor market problems in the 1980s and 1990s, but what factors depressed the relative demand for low-skill labor in both economies."

We are more likely to find an answer if in addition we ask whether the same factors were stimulating the relative demand for low-skill labor in the poor Third World. I certainly don't take the narrow approach when viewing the late 19th century, and Adrian Wood (1994, Chp. 6; 1995b) doesn't either for the late 20th century. Wood is one of the few economists -- if not the only economist -- to examine systematically inequality trends across countries, including the poor South.

Wood distinguishes three skill types: uneducated, labor with basic education and the highly educated. The poor South is richly endowed with uneducated labor but the supply of labor with basic skills is growing fast. The rich North is, of course, abundant in highly educated labor with a slow growing supply of labor with basic skills. Wood assumes capital is fairly mobile and that technology is freely available. As the South improves its skills through the expansion of basic education and trade barriers fall, it produces more manufactures that require only basic skills whereas the North produces more of the high-skill goods. It follows that the ratio of the unskilled to the skilled wage should rise in the South and fall in the North. The tendency towards relative factor price convergence raises the relative wage of workers with a basic education in the South and lowers it in the North, producing, ceteris paribus, rising inequality in the North and falling inequality in the South. Complete factor price equalization is, of course, not necessary to get such relative factor price convergence. Eli Heckscher and Bertil Ohlin understood that fact: it was the late 19th century relative factor price convergence which attracted Heckscher and Ohlin's attention when

they were writing in 1919 and 1924, immediately following the pre-World War I globalization experience (Flam and Flanders 1991).

Basing his results on insights derived from classical Heckscher-Ohlin theory, Wood concludes that the decline in the relative wage of less-skilled northern workers is due to the elimination of trade barriers and increasing relative abundance of southern workers with a basic education.⁵ He also dismisses biased technological change as a potential explanation since labor and total factor productivity growth both slowed down during the period when inequality was rising. Wood also argues that the pattern of increasing wage inequality in the North favors a trade explanation since there is no cross-country association between inequality trends and technological progress rates.

While Wood's evidence is persuasive, one can, with Gary Burtless (1995) and others, remain skeptical as to whether the recent trade boom can explain more than half the decline in unskilled labor demand in the USA as Wood argues. Wood's answer is that

"trade can hurt unskilled labor even where it does not raise import penetration ... by depressing the prices of labor-intensive goods [and] by forcing firms to find ways of using less unskilled labor to stay competitive. [In any case], these imports from developing countries are highly labor intensive goods, and thus displace more domestic workers than might be supposed by simply comparing their dollar value to that of the U.S. GDP (1995a, p. 64)."

Yet, the data indicate that this apparent unskilled worker demand shrinkage is found across a whole range of industries including ones that produce no tradables. This does not seem consistent with Wood's story and the fact that these non-trading firms are not taking advantage of the cheaper unskilled

⁵ Wood also asserts that an important shortcoming in previous factor-content-of-trade literature is the assumption that goods in the North and South are identical. In essence, Wood argues that textiles produced in Mexico are different from textiles produced in the US since in the latter case they are produced with a relatively intensive use of skilled labor. When evaluating the factor content of US textile imports from Mexico, one should use the factor proportions implied by Mexican rather than US production.

workers, using instead more skilled workers, suggests a greater role for biased technological change.

The debate on the late 20th century globalization and inequality connection is far from resolved.⁶ Alan Deardorff and Dalia Hakura (1994) offer a critique of most of the current arguments. As they point out, causality is a crucial issue in the debate since it is equally valid in standard trade models to say that trade occurs as a result of wage differences rather than claiming that trade affects wage patterns. It follows that an especially meaningful test would be to look at the distribution of income before and after the removal of trade barriers, and this is exactly the social experiment performed for us in the late 19th century -- or almost exactly.

III. Globalization and Inequality: The Late 19th Century Debate

There was real wage (Figure 1) and GDP per worker hour (Figure 2) convergence in the late 19th century, and it appears that most of it was the combined result of a trade boom and the pre-quota mass migrations (Hatton and Williamson 1995; O'Rourke and Williamson 1994, 1995, 1996a and 1996b; Taylor and Williamson 1994; Williamson 1995a and 1995b).

Consider the trade boom first. The late 19th century was a period of dramatic commodity market integration: railways and steamships lowered transport costs, and Europe moved towards free trade in the wake of the 1860 Cobden-Chevalier treaty. These developments implied large trade-creating price shocks which affected every European participant, the canonical case being the drop in European grain prices: for example, while Liverpool wheat prices were 60% higher than Chicago prices in 1870, they were less than 15% higher in 1912, a decline of 45 percentage points, a far bigger change than that embeded

⁶ The literature is exploding. See, for example, Baldwin and Cain (1994), Bergstrand et al. (1994), Bhagwati and Dehejia (1994), Bhagwati and Koster (1994), Borjas and Ramey (1994), Freeman (1995), Freeman and Katz (1994), Krugman and Venables (1995), Leamer (1994, 1995), Richardson (1995) and Wood (1995a, 1995b). In addition, the 1995 World Development Report is devoted to the issue.

in the infamous Smoot-Hawley 1930 tariff or any other US tariff introduced over the past century, and bigger than the GATT-induced decline in OECD tariff barriers in the three decades following the 1940s.⁷ The commodity price convergence is even bigger if the price gradient is pushed into the wheat-growing interior west of Chicago. Furthermore, it applied to all tradables, not just grain. Table 1 offers one summary measure of the trade boom, exports plus imports as a share of gross domestic product.

Eli Heckscher and Bertil Ohlin argued that such commodity market integration should have led to international factor price convergence, as countries everywhere expanded the production and export of commodities which used their abundant (and cheap) factors relatively intensively. Thus, the late 19th century trade boom implied convergence in GDP per worker hour and in the real wage.⁸ It also had distributional implications. For poor labor abundant

⁷ The Smoot-Hawley tariff of 1930 is infamous for its height and for its alleged contribution to the Great Depression. Yet, the ad valorem tariff equivalent levels were 42.5% under Smoot-Hawley, a "big" increase of 8 percentage points over the levels implied by the 1922 Tariff Act (Irwin 1995, Table 1, p. 19). A tariff-induced 8 percentage point increase seems tiny compared with a transport-cost-decline-induced 45 percentage point decrease prior to World War I -- one-sixth the magnitude in fact! Another example advertising just how revolutionary world commodity market integration was in the late 19th century is offered by Wood (1994, p. 173). The World Bank reports that tariffs on manufactures entering developed countries fell from 40% in the late 1940s to 7% in the late 1970s, for a thirty year fall of 33 percentage points. While closer in magnitude, this spectacular postwar reclamation of "free trade" from interwar autarky is still smaller than the 45 percentage point fall in trade barriers between 1870 and 1913 due to transport improvements.

⁸ It turns out that estimates of the impact of trade on convergence are significant but modest. Commodity price convergence accounts for about three-tenths of real wage convergence between the United States and Britain during the twenty-five years after 1870, and about a tenth of the convergence between the United States and Sweden over the four decades after 1870; however, Anglo-American commodity price convergence effects were swamped by other forces after 1895, and they made only a modest contribution to Anglo-Swedish real wage convergence over the four decades as a whole (O'Rourke and Williamson 1994, 1995). All of these results used computable general equilibrium models. Kevin O'Rourke, Alan Taylor and I (1996) turned to econometric analysis of wage-rental trends in seven countries (including Britain and Sweden) to search for the modal case. The study found that commodity price convergence could explain about a quarter of wage-rental convergence between the New World and the Old World.

These late 19th century estimates are not unlike those reported for the contribution of trade to rising US inequality from the 1970s, about 10-15% (Richardson 1995, p. 36).

and land scarce countries, it meant rising unskilled wages relative to rents and skilled wages. For rich labor scarce and land abundant countries, it meant falling unskilled wages relative to rents and skilled wages.

What about mass migration? J. David Richardson's comment on the late 20th century debate applies with even greater force to the late 19th century:

"[T]he focus on trade alone is too narrow. A proper conception of globalization would also involve the international migration of physical, human, and technological capital, as well as pure (unskilled) workers (1995, p. 44)."

As Appendix Table 1 shows, the correlation between real wages or GDP per worker hour and migration rates (measured in Appendix Table 1 as the impact on the labor force) is positive and highly significant (0.905 between the real wage (w/c) and the migration-induced labor force impact). The poorest Old World countries tended to have the highest emigration rates while the richest New World countries tended to have the highest immigration rates. The correlation isn't perfect since potential emigrants from poor countries often found the cost of the move binding, and some New World countries restricted the inflow of those from the poor European periphery. But the correlation is still very strong. Furthermore, the average labor force impact is very big (36.7% among the three New World immigrant countries in Appendix Table 1 and -18% among the six Old World emigrant countries around the European periphery), much bigger than US experience in the 1980s. In any case, one estimate has it that the mass migrations explain about 70% of the real wage convergence in the late 19th century (Williamson 1995b, p. 18). Note that this estimate, in contrast with contemporary debate about the US in the 1980s, includes the total impact on both rich receiving countries and poor sending countries.

Since the migrants tended to be unskilled and increasingly so as the late 19th century unfolded (much like the late 20th century), they served to flood the immigrant country labor markets at the bottom, thus lowering the unskilled wage relative to skilled wages, white collar incomes and rents.

Immigration implied rising inequality in rich countries. Emigration implied falling inequality in poor countries.

So much for plausible 19th century assertions. What were the facts?

IV. Establishing the Stylized Facts

Full size distributions at various benchmarks between the mid 19th century and World War I are unavailable except for a few countries and dates,⁹ but even if they were it is not obvious that we'd want them to test the globalization impact. Like economists involved in the late 20th century debate, our interest here is on factor prices, rents and the structure of pay. In particular, how did the typical unskilled worker near the bottom of the distribution do relative to the typical landowner or capitalist near the top, or even relative to the typical skilled blue collar worker and educated white collar employee in the middle of the distribution? Late 20th century debate has a fixation on wage inequality, but since land and landed interests were far more important to late 19th century inequality events,¹⁰ we need to add them to our distribution inquiry. I have two kinds of evidence available to document inequality trends so defined: the ratio of the unskilled wage to farm rents per acre, and the ratio of the unskilled wage to GDP per worker hour. Consider each in turn.¹¹

⁹ Some evidence on late 19th and early 20th century inequality trends has been collected by economic historians since Simon Kuznets published his presidential address to the American Economic Association in 1955. For surveys, see Brenner et al. (1991) and Williamson (1991, Chp. 1). They seem to offer some support for the view that inequality was on the rise in the United States before World War I while it had been falling in Britain since the 1860s. But the coverage is not sufficiently comprehensive to be used in the analysis which follows.

¹⁰ The share of primary sector value added in GDP around 1890-1910 was: Great Britain 13.4%, Sweden 27.2%, Norway 27.2%, Denmark 29.9%, Finland 47%, Italy 38.2%, France 27.6%, Germany 32.2% and the USA 23.5% (Crafts 1985, Tables 3.4 and 3.6, pp. 58, 59 and 62; US Department of Commerce 1976, Series 126 and 127, 1897-1901).

¹¹ The following five paragraphs draw on O'Rourke, Taylor and Williamson (1996).

Recently, a panel database was constructed documenting wage-rental convergence among eleven late 19th century countries (O'Rourke, Taylor and Williamson 1996): four New World countries plotted in Figure 3 -- Argentina (1883-1913), Australia (1872-1913), Canada (1901-1911) and the United States (1870-1915); four free trade Old World countries plotted in Figure 4 -- Denmark (1870-1913), Great Britain (1870-1915), Ireland (1870-1913) and Sweden (1870-1914); and three protectionist Old World countries plotted in Figure 5 -- France (1870-1915), Germany (1870-1915) and Spain (1870-1910).

We all know that farm land was abundant and cheap in the New World while scarce and expensive in the Old World. And we all know that labor was scarce and expensive in the New World while abundant and cheap in the Old World. Thus, we know that the wage-rental ratio was high in the New World and low in the Old. What we really want to know, however, is how the gap evolved over time: Are the trends consistent with the predictions of the globalization and inequality literature? Was there, in Adrian Wood's language, relative factor price convergence in the late 19th century, implying rising inequality in rich countries and declining inequality in poor countries? Figures 3-5 supply some affirmative answers.¹² But first, a word about the Old World labels on Figures 4 and 5 -- "free trade" and "protectionist".

The impact of the New World grain invasion on Old World wage-rental ratios must have been muted where tariffs were raised in defense. As Charles Kindleberger (1951) pointed out long ago, and as the new theories of endogenous tariffs predict, the response was especially strong on the Continent. Comparative measures of late 19th century protection are hard to construct, and I will offer some new measures of openness in Section V. For

¹² Land values were used as proxies for land rents for the late 19th century. The underlying assumptions linking the two should be made explicit. If land is an economic asset with infinite life, and if the land markets of that time simply projected current rents into the future, and if global financial markets were well enough integrated so that interest rates were pretty much the same everywhere across our eleven countries, then land values should serve as an effective proxy for land rents. The last two assumptions are clearly violated and in a way which tends to exaggerate wage-rental trends, but my guess is that the exaggeration isn't very big. See O'Rourke, Taylor and Williamson (1996).

the moment, I rely on the crude measures of protection offered by Paul Bairoch (1989). Based on his evidence for 1913, the "protectionist" label applied to France, Germany and Spain, and the "free trade" label applied to Britain, Denmark and Ireland. Sweden lay somewhere in between, but since protectionist policy was implemented there relatively late in the period, Sweden is thrown into the free trade group. While these categories could be, and have been, debated, they serve well enough to motivate what follows.

Relative factor price convergence certainly characterized these four decades, and it implied rising inequality in rich New World countries and declining inequality in poor Old World countries. In the New World, the wage-rental ratio plunged. By 1913, the Australian ratio had fallen to one-quarter of its 1870 level, the Argentine ratio had fallen to one-fifth of its mid-1880 level, and the USA ratio had fallen to less than half of its 1870 level. In the Old World, the wage-rental ratio surged. According to the trend values in Table 2, 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. The surge was less pronounced in the protectionist than in the free trade group. The ratio had increased by a factor of 1.8 in France, 1.4 in Germany, and not at all in Spain. The last two lines of Table 2 summarize wage-rental trends in the New World relative to the Old 1870-1910:¹³ one index drops by a factor of ten, from about 6 to about 0.6; and the other drops by a factor of four, from about 2.5 to about 0.6.

Since landowners tended to be near the top of the distribution,¹⁴ this evidence seems to confirm Hypothesis #1: inequality rose in the rich, labor scarce New World; inequality fell in the poor, labor abundant Old World. There

¹³ The figures in Table 2 must be treated with caution: they are based on indices 1901=100, but we are not sure that the underlying wage-rental ratios refer to quality-comparable units of land in the denominator.

¹⁴ This was certainly true of Europe, Argentina and the American South, but less true for the American Midwest and Canada where the family farm dominated.

is also some evidence that globalization mattered: Old World countries staying open absorbed the biggest distributional hit; Old World countries retreating behind tariff walls absorbed the smallest distributional hit.

So much for wage-rental ratios. What about the ratio of the unskilled worker's wage to the returns on all factors per laborer (including farm rents)? An Appendix supplies the details for this second inequality index, w/y , where w is the unskilled daily or weekly wage rate (Williamson 1995a) and y is GDP per worker hour (Maddison 1994).¹⁵ Ideally, and to be most consistent with the evidence used in the late 20th century debate, I would have preferred an inequality index w/z , where $z = y - w$ is the income (per laborer) accruing to all factors other than unskilled labor, including the premium on skills. It turns out that z is hard to construct for our late 19th century panel, so I stick with w/y .

Figure 6 summarizes the wide variance across the fourteen countries in the sample. The inequality index is normalized by setting w/y 1870 = 100: Norwegian inequality trends establish the upper bound, 1913 = 244; Spanish and United States inequality trends establish the lower bound, 1913 = 53.

An alternative way to standardize these inequality trends is simply to compute the percentage change in the index, $e = d(w/y)/(w/y)$. I will use e in everything that follows, and it ranges from +144% for Norway to -47% for Spain and the United States. It is plotted against 1870 real GDP per worker-hour in Figure 7 and against the 1870 real wage in Figure 8. What follows will focus on the evidence underlying Figure 8 which measures rich and poor by the initial level of labor scarcity rather than by aggregate GDP per worker-hour.

Figure 8 offers a stunning confirmation of Hypothesis #1: between 1870 and 1913, inequality rose dramatically ($-50\% < e < -25\%$) in rich, land abundant, labor scarce New World countries like Australia, Canada and the United States; inequality fell dramatically ($0 < e < 150\%$) in poor, land scarce, labor abundant,

¹⁵ The Williamson (1995a) w is in fact a real wage rate, w/c , where the deflator is a cost of living index. The Maddison (1994) y is in fact real GDP per worker hour, y/p , where the deflator is the implicit GDP price index. Both w/c and y/p have been reflatd to nominal levels in computing w/y since I want to isolate the behavior of nominal returns, as opposed to relative prices.

pre-industrial countries like Norway, Sweden, Denmark and Italy; inequality fell only modestly in middle-income, land scarce, labor abundant, industrial economies like Belgium, France, Germany, the Netherlands and the United Kingdom. A fairly tight nonlinear correlation can, perhaps, be seen even more clearly in Figure 9, and the simple bivariate regression plotted there is:¹⁶

$$(1) \quad \ln(100+e) = 6.951 - 0.634 \ln(1870 w/c), \quad R^2 = 0.537. \\ (10.275) \quad (3.734)$$

A key stylized fact has emerged from the late 19th century: labor scarce countries underwent rising inequality and labor abundant countries underwent falling inequality.

V. The Impact of Late 19th Century Globalization on Inequality Trends

"The best we can do is probe and poke at the evidence and arguments ... with appropriate humility (Freeman 1995, p. 31)."

Theory suggests that globalization can account for this key stylized fact: in an age of unrestricted international migration, poor countries should have had the highest emigration rates and rich countries should have had the highest immigration rates; in an age of trade liberalism, poor countries should have exported labor-intensive products and rich countries should have imported labor-intensive products. Theory is one thing; fact is another. What's the evidence that supports the (apparently plausible) globalization hypothesis?

First, we know that there was a retreat from trade liberalism from the 1880s onwards, and we know that the retreat included, in our sample, Italy, Portugal, Spain, France and Germany (Estevadeordal 1993; O'Rourke and Williamson 1996b). In the absence of globalization forces, poor labor abundant countries who protect should raise the returns to their scarce factors, like

¹⁶ Throughout this paper, t-statistics are reported in parentheses.

land, relative to their abundant factors, like unskilled labor; in the face of globalization forces, the same countries should at least mute the rise in unskilled labor's relative scarcity and thus the fall in inequality. Figures 10 and 11 appear to be consistent with these Stolper-Samuelson predictions, supporting the inequality-trade connection. That is, the correlation between inequality and initial labor scarcity is better for 1870-1890 (Figure 10) than for 1890-1913 (Figure 11). In addition, the slope on the inequality-real-wage regression line is far steeper without the protected five (ITA, POR, SPA, FRA and GER) than with them. We saw the same contrast when comparing wage-rental ratio trends in Figures 4 versus 5.

Second, since we know that migration's impact on the labor force is highly correlated with initial labor scarcity, the former is therefore a prime candidate in accounting for the inequality trends. Figure 12 plots the result: where immigration had a large positive impact on the labor force, inequality undertook a steep rise; where emigration had a large negative impact on the labor force, inequality undertook a steep fall. The regression result (migration's impact = mig) is:

$$(2) \quad \ln(100+e) = 4.439 - 0.011 \text{ mig}, R^2 = 0.356.$$

$$(43.942) \quad (2.578)$$

Unfortunately, it is impossible to decompose globalization effects into trade and migration using this time series information since the correlation between migration's impact and initial labor scarcity is so high. Yet, an effort is made by constructing a trade-globalization-impact variable as the interaction of initial labor scarcity and "openness". The former is proxied by dummies for the labor scarce New World (d1 = 1: Australia, Canada, the United States), the labor abundant Old World periphery (d2 = 1: Denmark, Italy, Norway, Sweden, Spain, Portugal) and the core Old World industrial leaders (Belgium, France, Germany, the Netherlands, United Kingdom). The latter is proxied by the trade shares given in Table 1 ("trade"), and the inequality variable is now taken simply as e ($R^2 = 0.722$):

$$(3) \quad e = -52.072 - 0.313\text{mig} + 0.253\text{trade} + 0.545(\text{d1}*\text{trade}) + 2.416(\text{d2}*\text{trade})$$

$$(2.563) \quad (0.995) \quad (0.359) \quad (3.382)$$

The impact of migration is still powerful, significant and of the right sign: when immigration rates were small, α was big and thus egalitarian trends were strong; when emigration rates were big ($-mig$ was big), α was also big and thus egalitarian trends were strong; the opposite was true of countries accomodating heavy immigration or light emigration rates. In the Old World core, the more open economies had more egalitarian trends ($+0.253$), as Heckscher and Ohlin would have predicted. However, the coefficient does not pass any significance test. In the Old World periphery, where labor was even scarcer, this effect was even more powerful ($0.253+2.416 = +2.669$), just as Heckscher and Ohlin would have predicted. Furthermore, the coefficient passes most significance tests. In the labor scarce New World, the more open economies also had more egalitarian trends ($0.253+0.545 = +0.798$), which is certainly not what Heckscher and Ohlin would have predicted. The result is not significant however.¹⁷

Overall, I read this evidence as strong support for the impact of mass migration on trends in distribution, and weak support for the role of trade. There is, however, at least one important qualification that must be placed on that conclusion.

Perhaps I have overstated the impact of mass migration. After all, I have ignored the possibility that capital might chase after labor so that the stayer back in Europe would have no more capital per worker than prior to the mass emigration while the mover in the New World would have no less capital per worker than prior to the mass immigration. We know these capital chasing forces had an important influence on real wage convergence (Taylor and Williamson 1994; O'Rourke, Williamson and Hatton 1994), but what about inequality trends? One would have to show that capital and labor were closer complements than capital and skills or capital and land; and that capital didn't chase after labor into sectors where land and skills were used intensively. While such general equilibrium thinking about late 19th century

¹⁷ This regression was also run where "trade" was measured as changes in the trade share 1870-1910. The results were exactly the same.

globalization issues is to be applauded, the evidence does not appear to support this view of factor complementarity (e.g., Wright 1990). My prior, therefore, is that the overstatement of mass migration's impact on inequality trends is not very great. It is, however, worth worrying about.

It should be evident that I have been able so far to explain two-thirds of the variance in inequality trends across the late 19th century: while globalization appears to have been the dominant force, there were other forces at work raising inequality in rich countries and lowering it in poor. Like what? What could possibly account for the remaining third that was also highly correlated with initial labor scarcity (w/c)? Critics of the late 20th century globalization thesis have argued that the answer lies with factor-demand generated by technological change. For example, Lawrence and Slaughter argue that it's a skill-using bias in America that has been driving rising inequality. Wood counters that it cannot be so since US (and OECD) inequality was on the rise just when productivity slowdown was in full swing. Whichever view the reader believes, she must remember that we are searching for an explanation that can account simultaneously for falling inequality in the South and rising inequality in the North. So, is there any reason to believe that technological change should be unskilled-labor-saving in rich countries and unskilled-labor-using in poor countries?

Kevin O'Rourke, Alan Taylor and I (1996) explored this issue at length using the wage-rental data presented in Figures 3-5.¹⁸ Along with Heckscher-Ohlin, capital deepening and land-labor ratio forces, we estimated the impact of factor-saving. Industrial revolutions typically embody productivity growth which favors industry, even when one takes account of the fact that such unbalanced productivity advance tends to lower the relative price of industrial goods. Since industrial output makes little use of farmland, industrialization tends to be land-saving, raising instead the relative

¹⁸ Or, to be more accurate, for seven of the countries for which the explanatory variables were available: AUS, USA, UK, FRA, GER, DEN and SWE. Thus, the sample excludes the relevant cases of Argentina, Canada, Ireland and Spain.

demands for labor and capital. Such industrial revolutionary events should, therefore, tend to raise the wage-rental ratio. According to this prediction, more rapid industrialization in Europe compared to the New World should also have served to raise the wage-rental ratio by more in Europe. Such events should have contributed to factor-price convergence, including the rise of real wages in the labor abundant Old World relative to the labor scarce New World. This prediction would be reinforced if productivity advance in the late 19th century New World was labor-saving and land-using, as an induced-innovation hypothesis would suggest (Hayami and Ruttan 1971) and as economic historians generally believe (Habakkuk 1962; David 1974; Williamson and Lindert 1980; di Tella 1982). The prediction would be further reinforced if productivity advance in the Old World was land-saving and labor-using, as we also generally believe.¹⁹

The results were striking (O'Rourke, Taylor and Williamson 1996, Table 4, Panel C). Changing land-labor ratios and capital-deepening in combination accounted for about 26% of the fall in the wage-rental ratio in the New World, but for none of its rise in the Old World. Commodity price convergence and Heckscher-Ohlin effects accounted for about 30% of the fall in the New World wage-rental ratio, and for about 23% of its rise in the Old World. Productivity advance, as predicted, was labor-saving in the labor scarce New World and labor-using in the labor abundant Old World. Labor-saving technological change appears to have accounted for about 39% of the fall in the New World wage-rental ratio while labor-using accounted for about 51% of its rise in the Old World, powerful technological forces indeed.²⁰

Globalization, according to these results, accounted for more than half of the rising inequality in rich, labor scarce countries and for a little more than a quarter of the falling inequality in poor, labor abundant countries.

¹⁹ It should be noted that this intertemporal application of the induced-innovation hypothesis has reappeared in cross-sectional accounts of trade patterns in the 1980s (Trefler 1993).

²⁰ The residual was 5.1% for the New World and 27.5% for the Old.

VI. Some Things Never Change

It appears that the late 19th and the late 20th century shared more than simply globalization and convergence. Globalization also seems to have had the same impact on income distribution: in the late 19th century, inequality rose in rich countries and fell in poor countries; according to Adrian Wood, the same seems to have been true of the late 20th century. Furthermore, while Borjas and Wood seem to think that globalization accounted for something like a third to a half of the rise in inequality in America and other OECD countries since the 1970s, the late 19th century evidence suggests at least same, perhaps more. However, those modern economists who favor an explanation of rising inequality coming from (unskilled)-labor-saving technological change will be pleased to hear that it probably accounted for more than a third of the rising inequality in the rich New World between 1870 and 1910. And factor-saving accounted for even more of falling inequality in the Old World, more than half.

Some things never change, and that fact implies a warning. Globalization and convergence ceased between 1913 and 1950. It appears that the inequality trends which globalization produced are at least partly responsible for the interwar retreat from globalization introduced first in the rich industrial trading partners. That fact should make us look to the next century with some anxiety: will the world economy retreat once again from its commitment to globalization?

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Table 1
The Late 19th Century Trade Boom
 ((X+M)/GDP, in %)

Country	1870	1890	1913
New World			
Australia	44.3	31.3	42.0
Canada	33.0	25.6	34.0
United States	11.8	13.0	11.1
Old World: Free Trade			
United Kingdom	50.7	54.6	59.6
The Netherlands	87.4	149.9	249.4
Sweden	32.0	47.2	42.3
Norway	34.0	43.6	50.9
Denmark	35.7	48.0	61.4
Belgium	57.8	81.9	134.9
Old World: Protected			
Germany	na	31.7	39.8
Spain	11.7	25.0	23.9
Portugal	11.3	11.1	16.1
France	23.7	28.3	30.9
Italy	18.3	19.3	28.7

Source: See Appendix.

Table 2

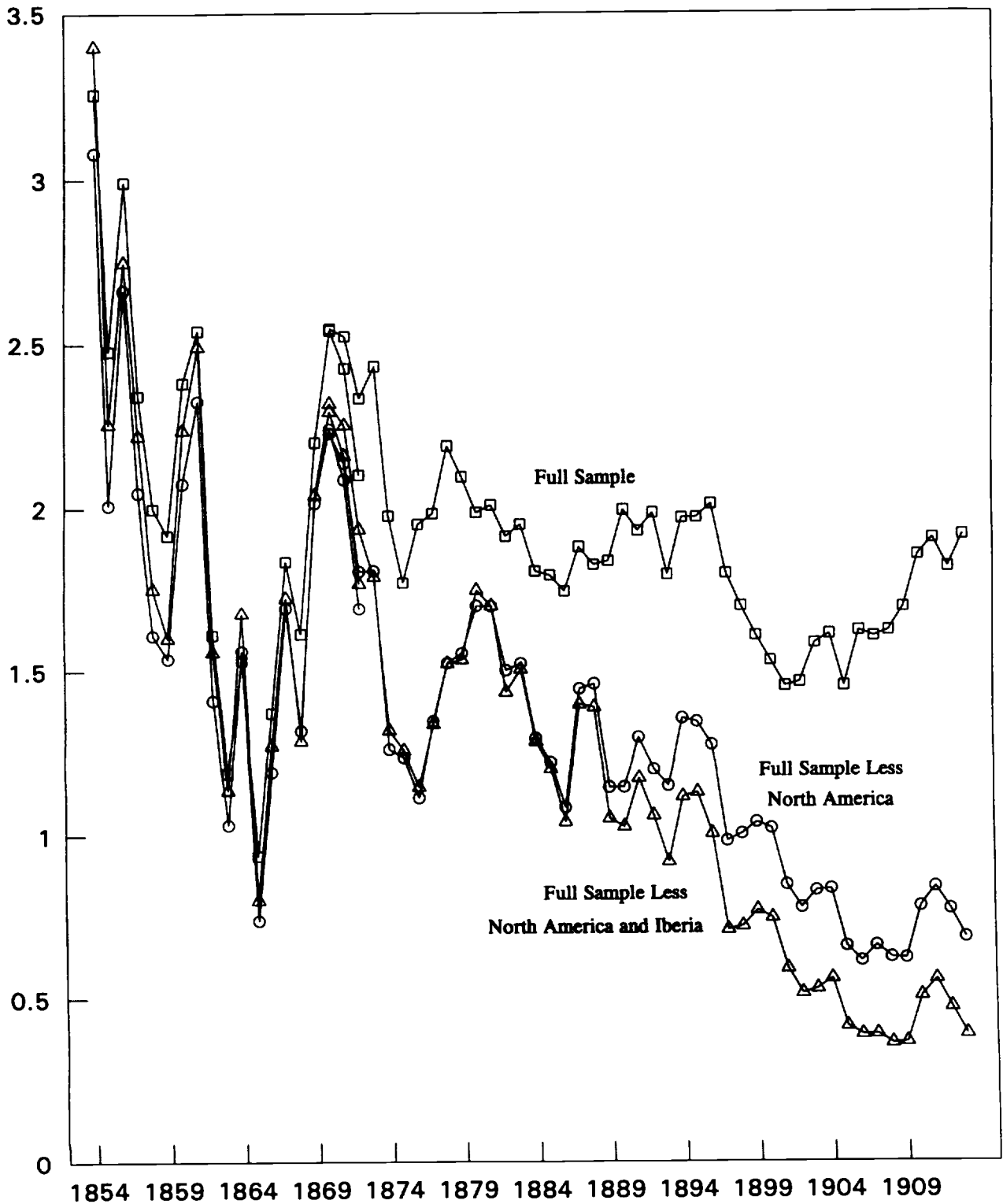
Trends in the Ratio of Wages to Land Values 1870-1910 (1901=100)

<u>Country</u>	<u>1870</u>	<u>1890</u>	<u>1910</u>
<u>Old World, Free Trade</u>			
Britain	42.28	84.99	115.42
Denmark	32.89	62.06	101.09
Ireland	12.61	66.86	70.31
Sweden	41.41	70.02	108.88
Average	32.30	70.98	98.93
<u>Old World, Protected</u>			
France	59.97	112.97	122.36
Germany	67.51	86.47	95.57
Spain	102.55	123.21	67.52
Average	76.68	107.55	95.15
<u>New World</u>			
Argentina	167.58	106.45	31.95
Australia	289.74	118.54	75.64
United States	127.99	103.23	64.07
Average	195.10	109.41	57.22
<u>Ratio of New World to:</u>			
Old World, Free Trade	6.04	1.54	0.58
Old World, Protected	2.54	1.02	0.60

Note: Index numbers are not comparable across countries. New World excludes Canada since the latter has data only for 1901-1911.

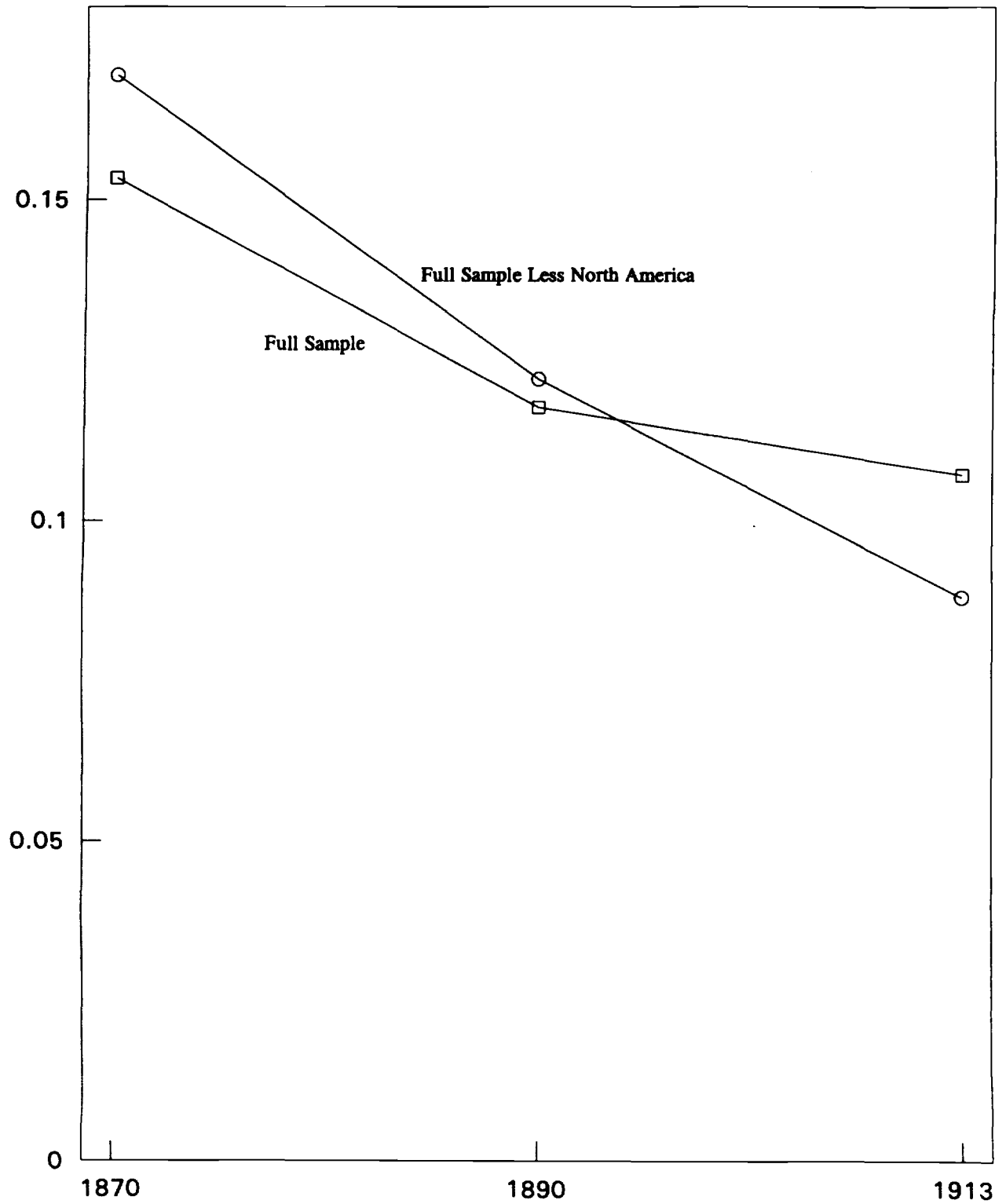
Source: O'Rourke, Taylor and Williamson (1996), Table 2.

Figure 1
Real Wage Dispersion 1854-1913



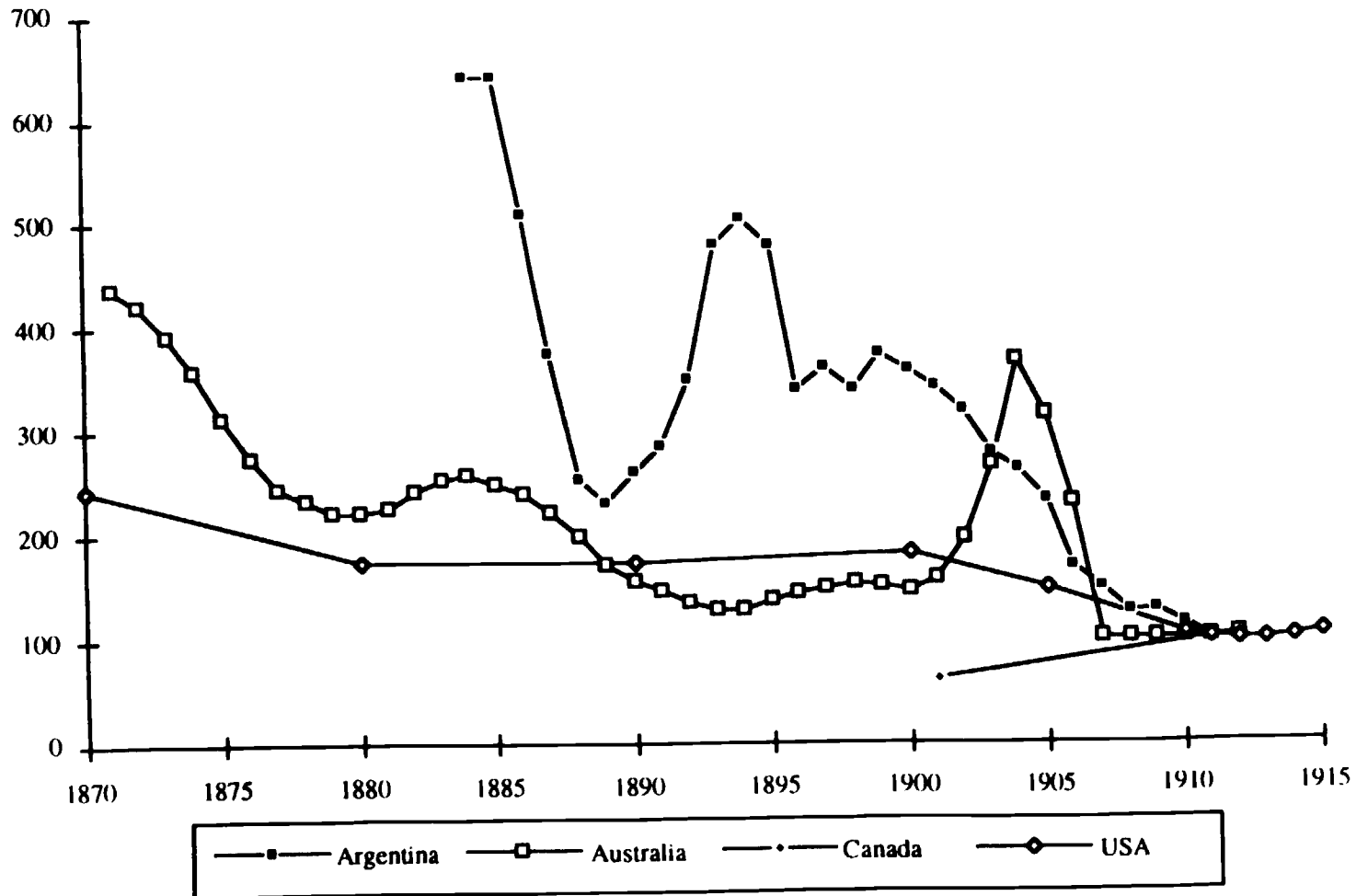
Source: Williamson (1995b), Figure 1.

Figure 2
GDP per Worker-Hour Dispersion 1870-1913



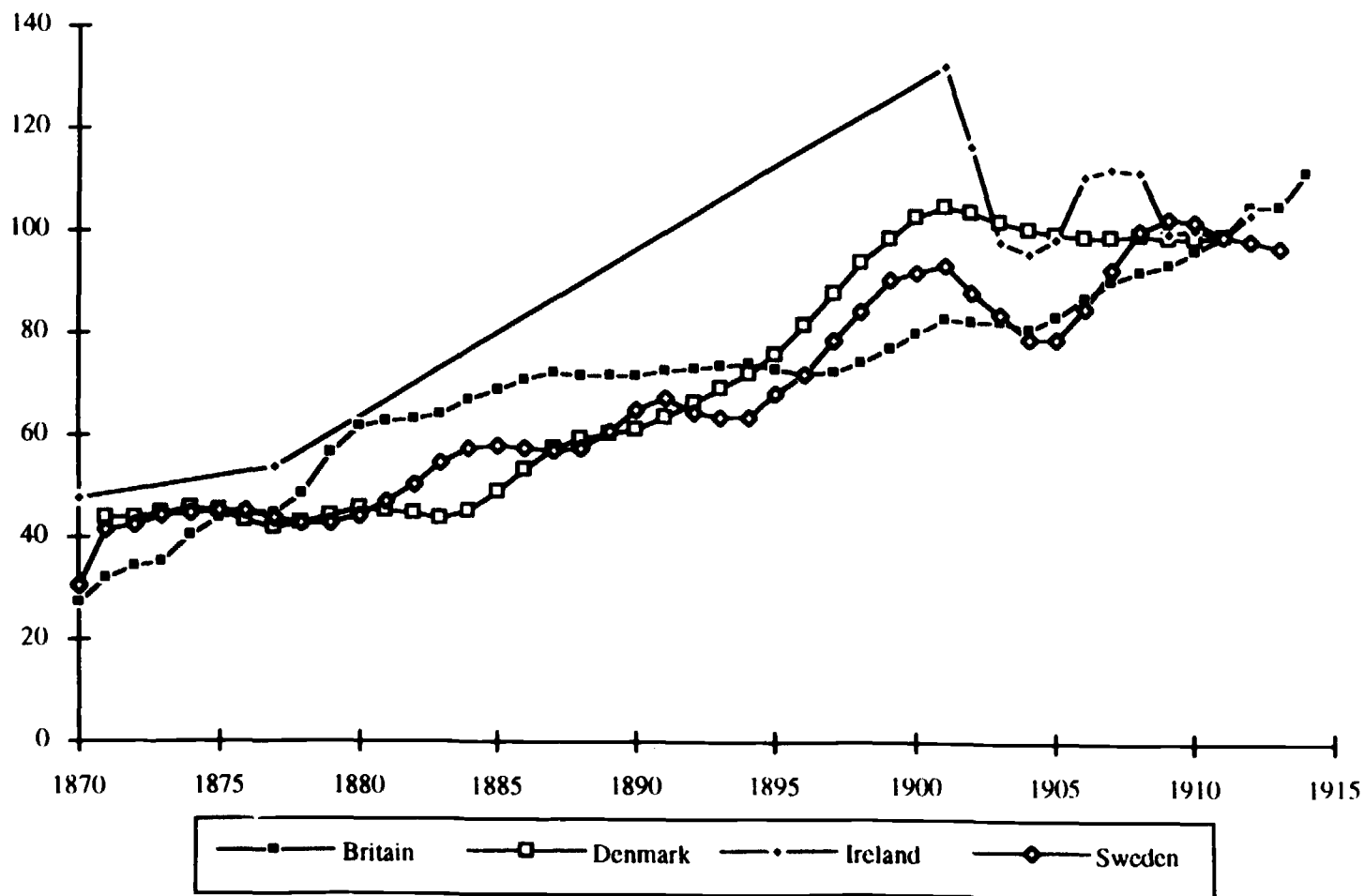
Source: Williamson (1995b), Figure 3.

Figure 3
Ratio of unskilled wages to land values 1870-1910, New World
(1911=100)



Source: O'Rourke, Taylor and Williamson (1996), Figure 1.

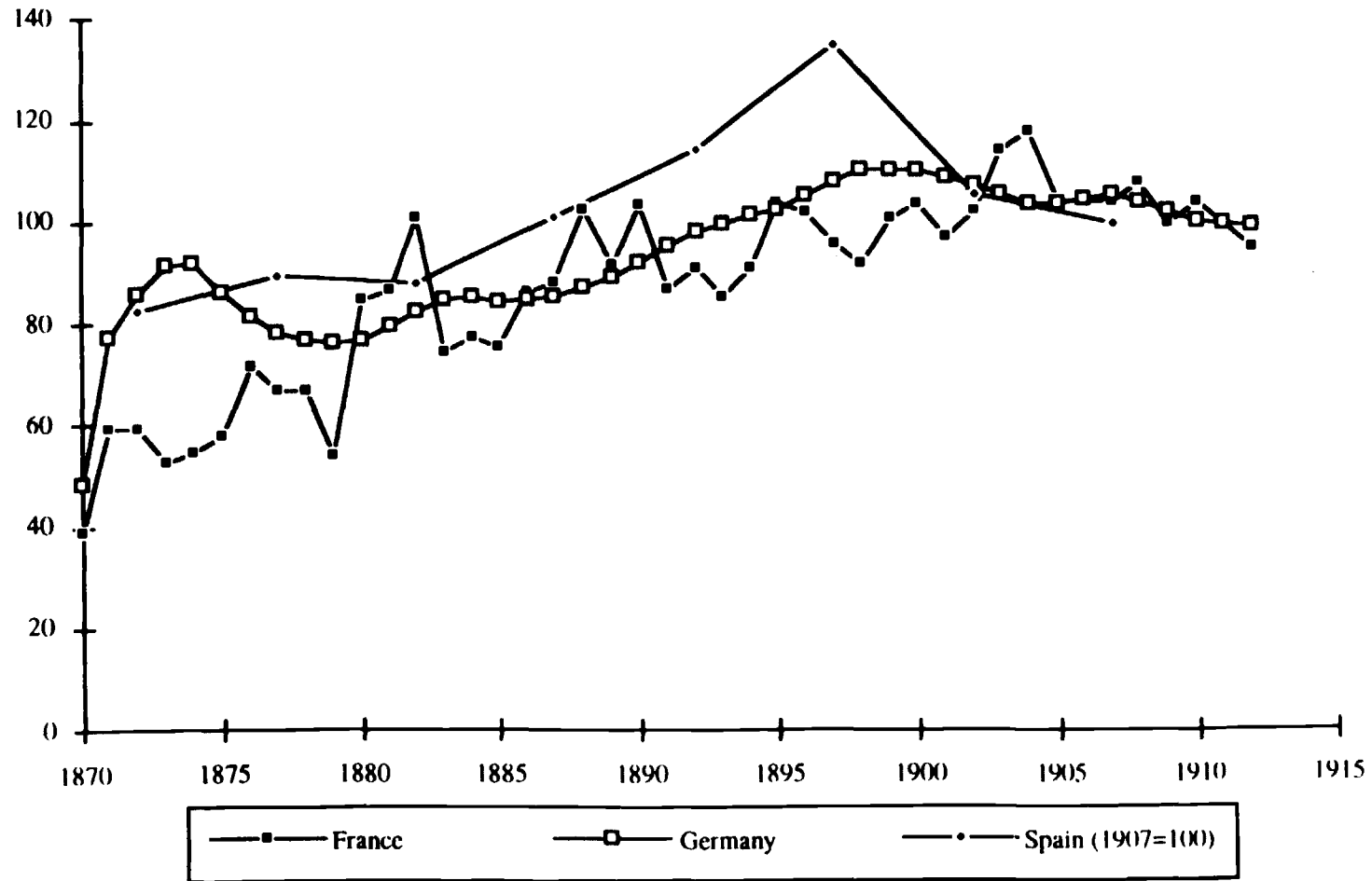
Figure 4
Ratio of unskilled wages to land values 1870-1910, Old World "free trade"
(1911=100)



Source: O'Rourke, Taylor and Williamson (1996), Figure 2.

Figure 5

Ratio of unskilled wages to land values 1870-1910, Old World "protected"
(1911=100)



Source: O'Rourke, Taylor and Williamson (1996), Figure 3.

Figure 6. Normalized inequality levels (1870 = 100) 1870-1913

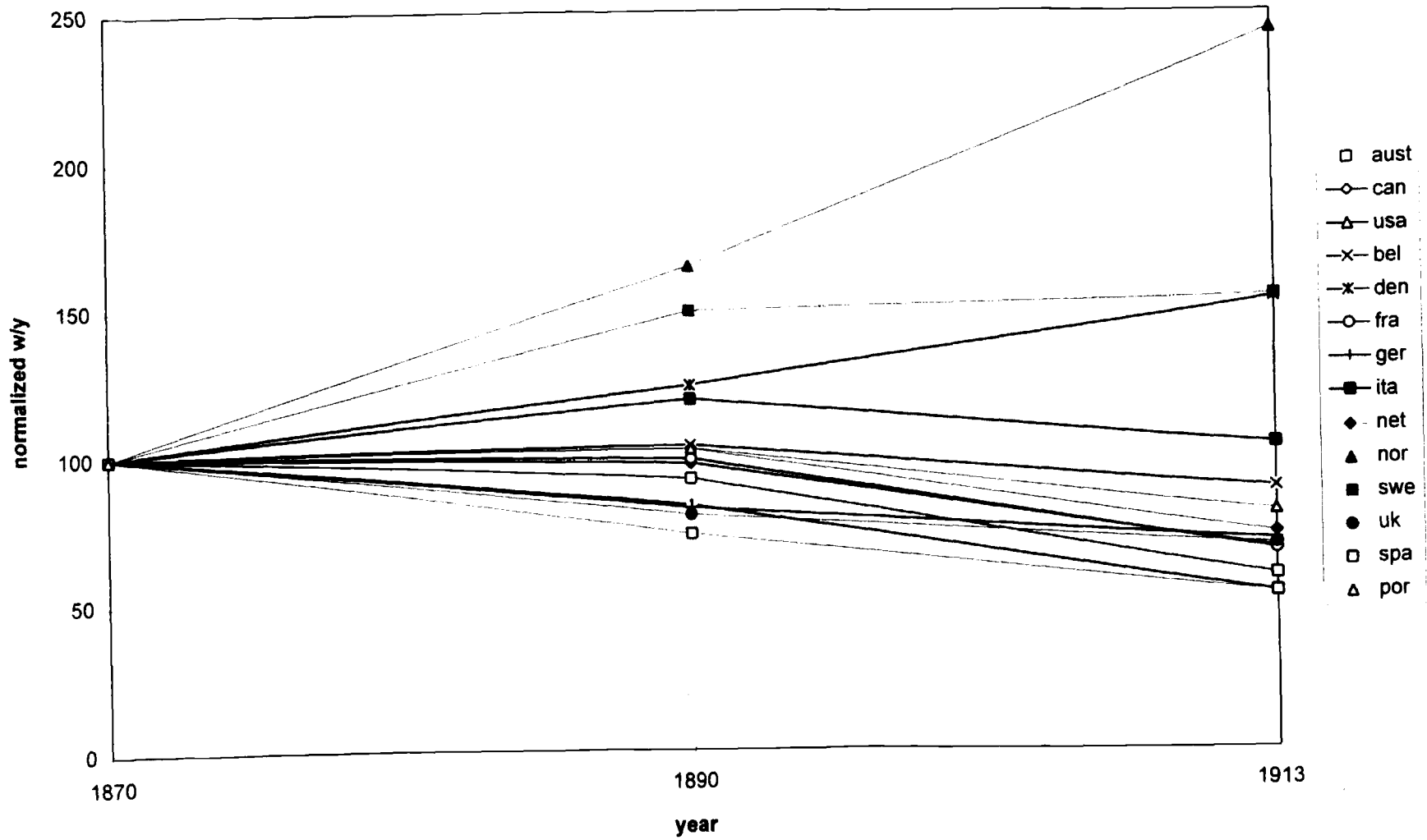


Figure 7. Initial GDP per worker-hour vs inequality trends 1870-1913

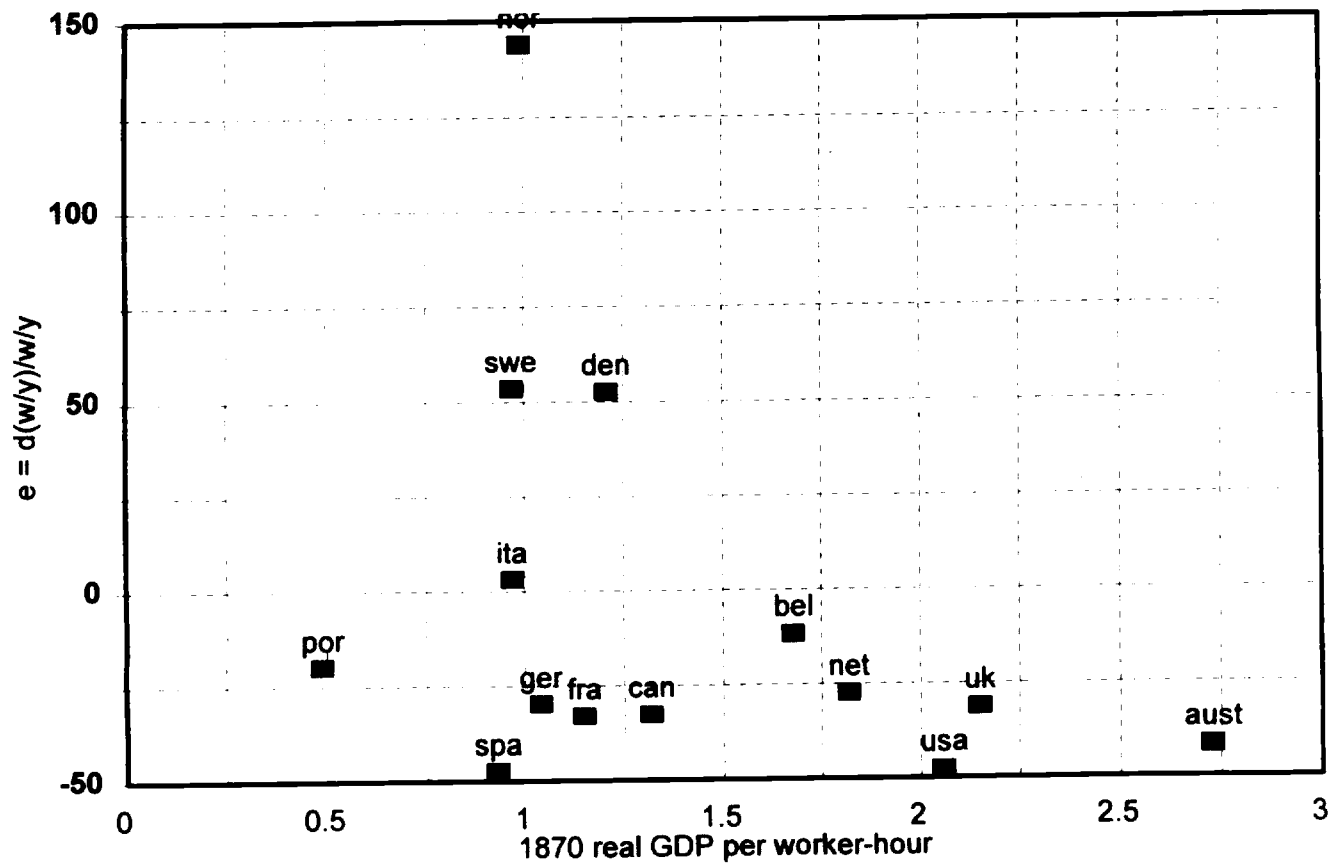


Figure 8. Initial real wage vs inequality trends 1870-1913

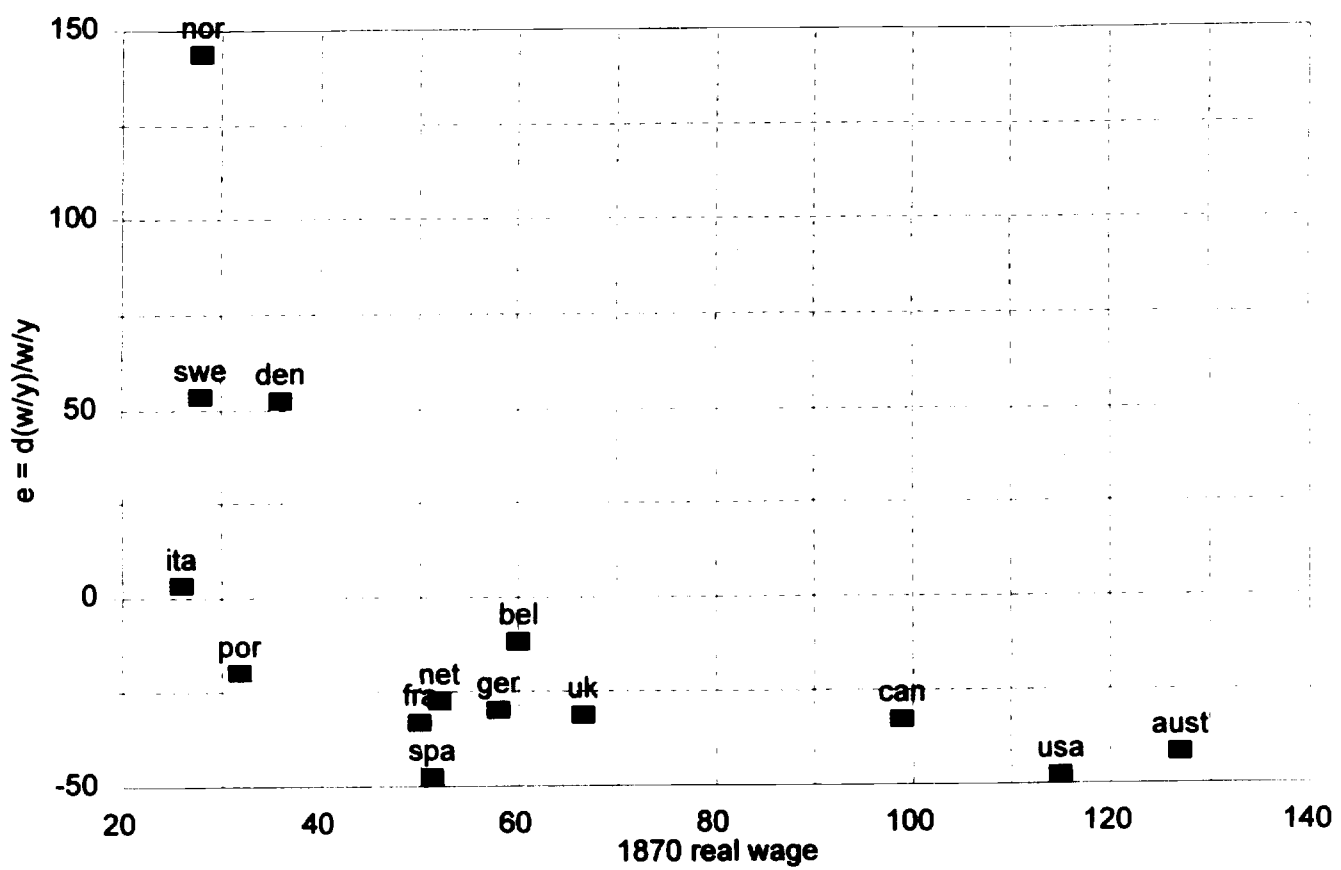


Figure 9. Initial real wage vs inequality trends, double-log, 1870-1913

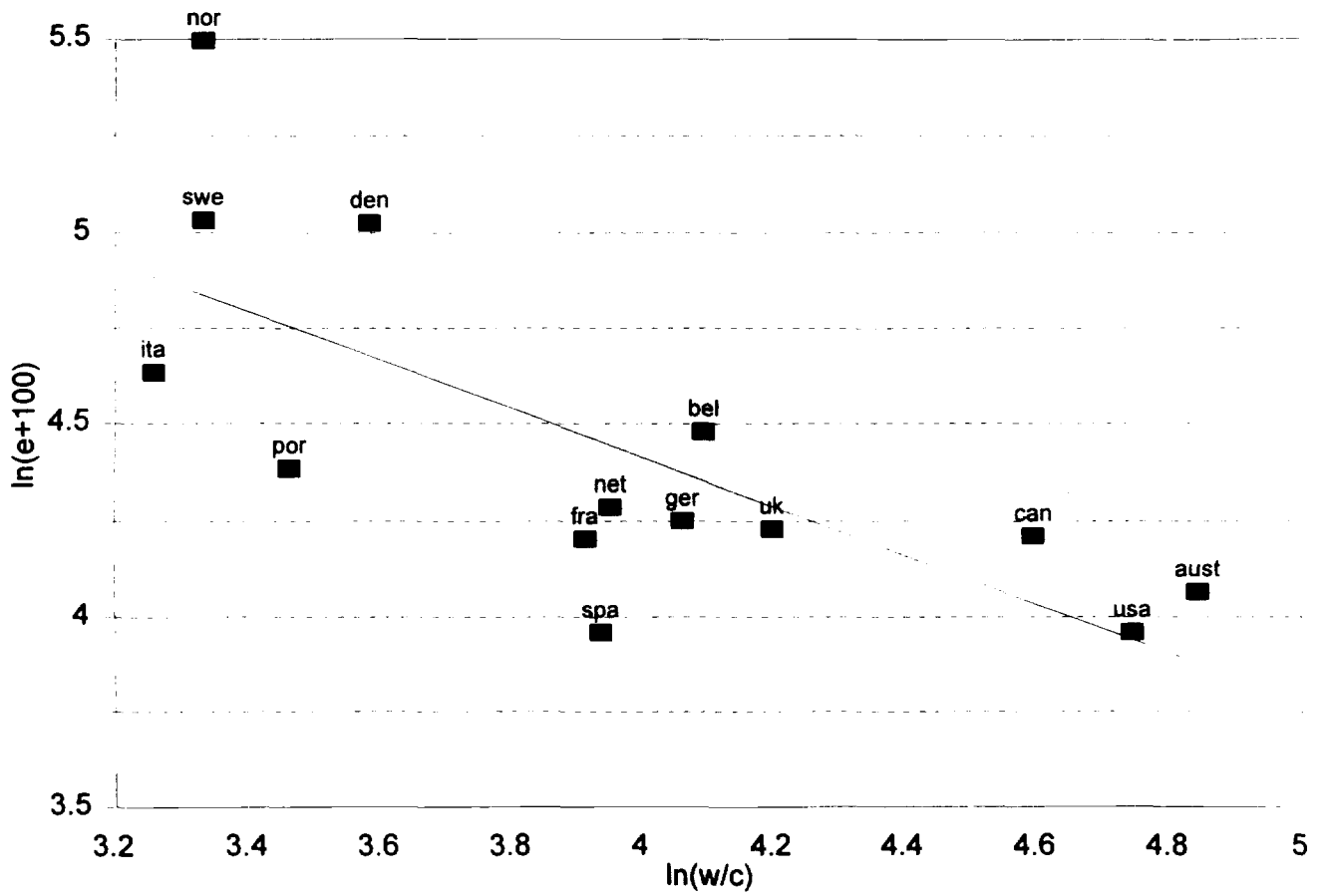


Figure 10. Initial real wage vs inequality trends, double log, 1870-1890

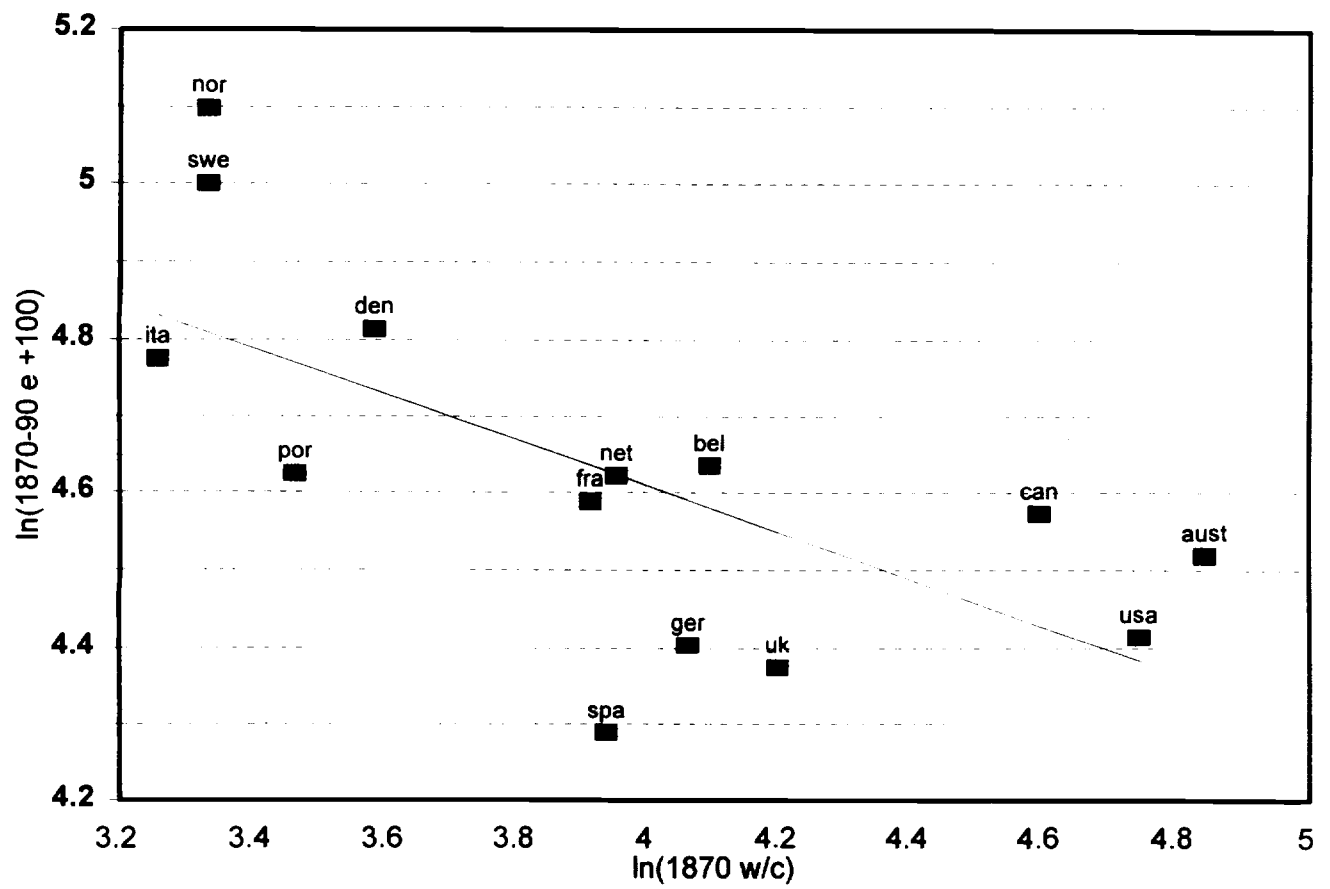


Figure 11. Initial real wage vs inequality trends, double log, 1890-1913

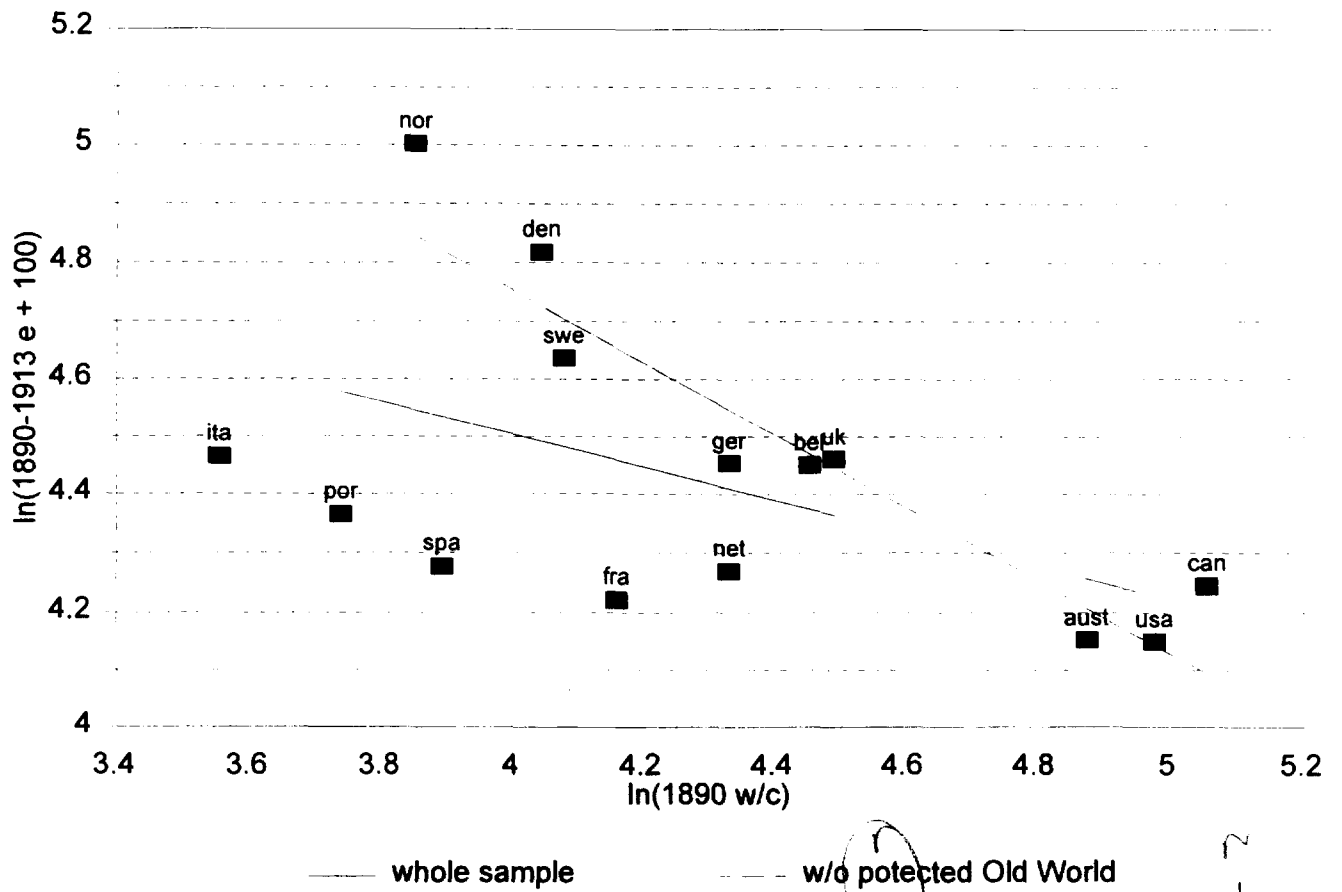
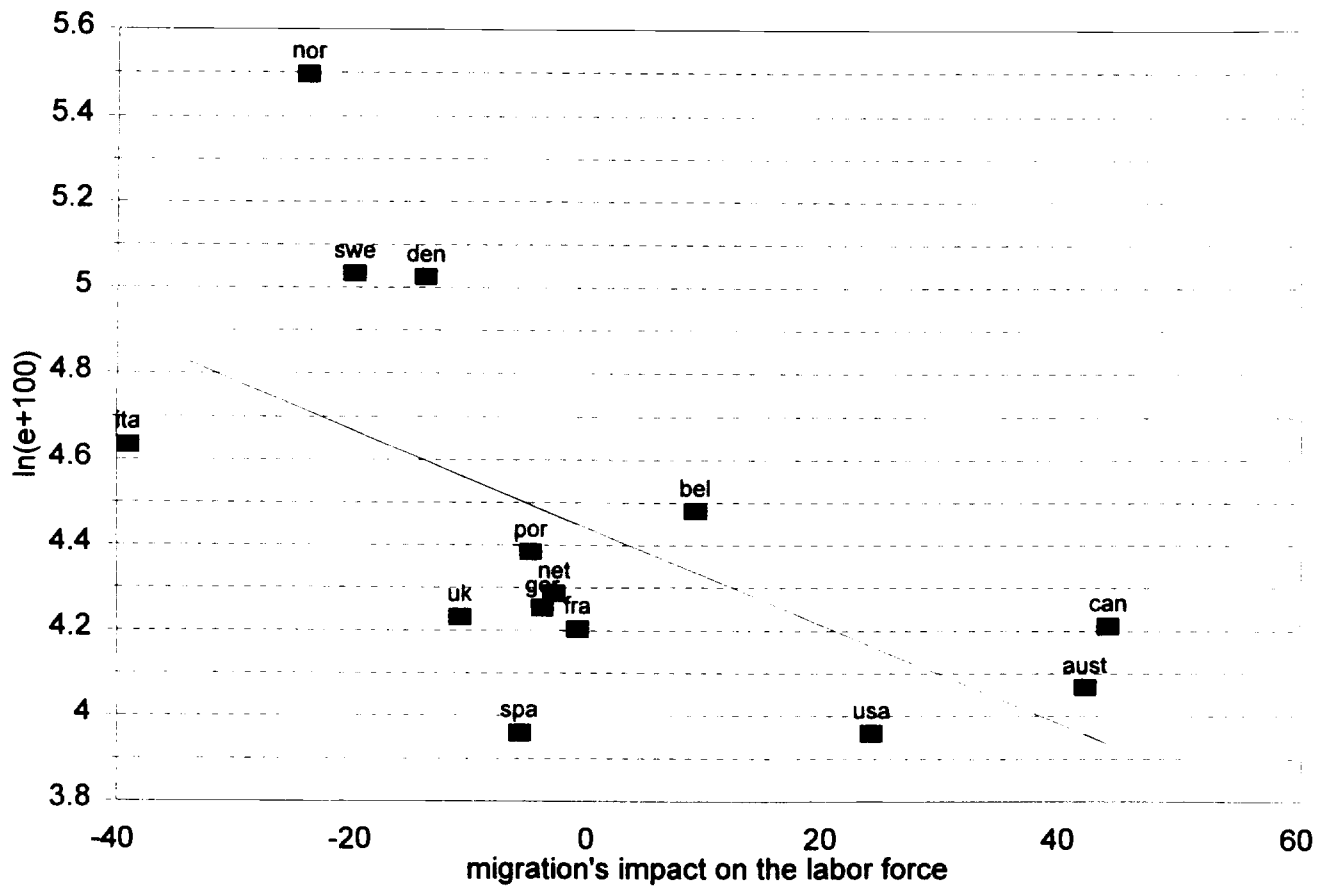


Figure 12. Inequality trends vs migration's impact on labor force, 1870-1913



Appendix: Late 19th Century Globalization and Inequality Database

Main Data Sources

- Bardini, C., A. Carreras, and P. Lains (1995), "The National Accounts for Italy, Spain and Portugal," Scandinavian Economic History Review XLIII: 115-46.
- Bry, G. (1960), Wages in Germany, 1871-1945 (Princeton: Princeton University Press).
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- Williamson, J. G. (1995), "The Evolution of Global Labor Markets Since 1830: Background Evidence and Hypotheses," Explorations in Economic History 32: 141-96.

Countries Included in the Database (N=14)

Australia (AUST), Canada (CAN), United States (USA), Belgium (BEL), Denmark (DEN), France (FRA), Germany (GER), Italy (ITA), Netherlands (NET), Norway (NOR), Sweden (SWE), United Kingdom (UK), Spain (SPA) and Portugal (POR).

With two exceptions, this list is the intersection of countries contained in the two primary data sources --- Maddison (1994) and Williamson (1995). Maddison does not list data for SPA and POR but we have derived the real GDP per worker-hour data from other sources. Maddison supplies observations for 1870, 1890 and 1913, which are paired with Williamson's real wage observations.

Database Description

Maddison reports real GDP per worker hour (y/p , where p = implicit GDP price deflator) and Williamson reports real (unskilled) wages per day or week (w/c , where c = cost of living). To construct the inequality index w/y , y must be

reinflated by some GDP price index and w must be reinflated by some cost of living index.

Real wages and cost of living deflators

With one exception, the real wage series have all been taken from Williamson (1995). The exception is that for the UK which has since been revised. It should be noted that the 1913 real wage for POR is actually 1912 since the former was not available.

The cost of living data was also taken from Williamson (1995), with the following exceptions:

AUST no COL data for 1870-1913
GER no COL data for 1870-1913
ITA no COL data for 1870

These exceptions were dealt with in the following way:

AUST: 1870-1913 used the series labeled as "Y2" from McLean and Woodland (1991).
GER: 1870-1890 used Phelps-Brown (1968); 1890-1913 used Desai (1968).
ITA: 1870 used Mitchell (1981).

All of the real wage indices were indexed with the base 1900 = 100.

Real GDP per worker hour

Except for SPA, POR and ITA, all series are taken from Maddison (1994). Although we initially used Maddison's series for ITA, it was subsequently revised by using the same method and sources as used for POR and SPA, since the new figures for real GDP reported in Bardini, Carreras and Lains (1995) were improvements. We assume that the 1870 ITA annual hours per worker also applied to SPA and POR (for which such information is absent), and further that trends the ITA rate applied to SPA and POR. The rate was applied to SPA and POR population estimates.

GDP deflators

This is the series that posed the greatest problem. Since Maddison does not supply any GDP deflators, we had to construct them from various sources. The details for each country are given below:

AUST: The cost of living index in Maddison is actually derived from the GDP deflator series reported in Butlin (1962). We use it here.
CAN: Maddison's cost of living index is actually the GNP deflator series reported in Urquhart (1986). We use it here.
USA: Deflators have been derived from the constant and current price GNP given in the United States Department of Commerce (1976). It should be noted that the 1870 deflator was actually derived from the 1869-78 GNP decade average since no other disaggregated figures were available for 1870.
BEL: We used the cost of living series given in Mitchell (1981).
DEN: Deflators have been derived from the current and constant price GNP given in Mitchell (1981).
FRA: We used the price series reported in Toutain (1987).
GER: Deflators have been derived from the current and constant price NNP given in Mitchell (1981).
ITA: Deflators have been derived from the current and constant price GNP given in Mitchell (1981).
NET: We used the retail price index given in Nusteling (1985). Also the 1913 figure is actually the index for 1912 since our source did not go beyond 1912.
NOR: Deflators have been derived from the current and constant price GDP given

in Mitchell (1981).

SWE: Deflators have been derived from the current and constant price GDP given in Mitchell (1981).

UK: Deflators have been derived from the current and constant price GNP given in Mitchell (1981).

SPA: The deflator is taken from Prados (1995).

POR: The deflator is taken from Nunes, Mata and Valerio (1989).

Appendix Table 1

Country	w/c	y/p	w/y	lab force	imp duty
AUST					
1870	127	2.73	50.3407		
1890	131	2.82	46.19208		
1910/13	128	4.34	29.41518	42	18.2
CAN					
1870	99	1.32	92.25		
1890	157	1.81	89.34254		
1910/13	219	3.52	62.2902	44	18.7
USA					
1870	115	2.06	86.52913		
1890	145	2.82	71.58934		
1910/13	169	4.68	45.44241	24	21.4
BEL					
1870	60	1.68	40.71429		
1890	86	2.3	41.96135		
1910/13	94	2.85	35.97726	9	15.8
DEN					
1870	36	1.21	32.13223		
1890	57	1.69	39.59787		
1910/13	102	2.72	49.00781	-14	5.8
FRA					
1870	50	1.15	45.65217		
1890	64	1.52	44.91579		
1910/13	66	2.26	30.5928	-1	8.7
GER					
1870	58	1.04	53.03418		
1890	76	1.52	43.4126		
1910/13	92	2.32	37.29918	-4	7.9
ITA					
1870	26	0.97	25.6628		
1890	35	1.11	30.43028		
1910/13	55	1.72	26.47218	-39	9.7

Country	w/c	y/p	w/y	lab force	Imp duty
NET					
1870	52	1.82	31.14286		
1890	76	2.49	31.68383		
1910/13	72	3.23	22.66659	-3	0.4
NOR					
1870	28	0.99	34.91607		
1890	47	1.36	57.19277		
1910/13	82	2	85.20426	-24	11.4
SWE					
1870	28	0.97	30.02062		
1890	59	1.32	44.60004		
1910/13	98	2.04	46.08882	-20	9
UK					
1870	66.54979	2.15	37.4536		
1890	89.21289	2.86	29.77171		
1910/13	97.68496	3.63	25.78101	-11	5.6
SPA					
1870	51	0.93	54.57		
1890	49	1.37	39.79845		
1910/13	51	1.79	28.68784	-6	14.3
POR					
1870	32	0.49	52.52571		
1890	42	0.65	53.53855		
1910/13	40	0.78	42.18614	-5	23.7

Sources and Notes:

(1) The real wage (w/c) is a purchasing-power-parity adjusted real daily or weekly wage for unskilled urban workers, typically in the building trades; from Williamson (1995b, Table A2.1), except for Great Britain, which has been revised; see Appendix text.

(2) Real GDP per worker hour (y/p) is taken from Maddison (1994), except for SPA, POR and ITA which are all from Bardini, Carreras and Lains (1995); see Appendix text.

(3) The inequality index (w/y) is described in the Appendix text.

(4) The impact of net immigration (1870-1910) on the receiving country's labor force in 1910 and of net emigration (1870-1910) on the sending country's labor force in 1910 (lab force) is taken from Taylor and Williamson (1994).

(5) The measure of openness (imp duty) is based on average import duties in 1913; from Estevadeordal (1993).