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LEAVING THE FARM TO GO TO THE CITY:
HOW WELL HAVE LABOR MARKETS WORKED
OVER THE PAST TWO CENTURIES?*

by

Jeffrey G. Williamson*

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"There was [between 1820 and 1850] a continually increasing demand for industrial labour, a demand that caused a differential between agricultural and industrial wages ... Agricultural wages lagged behind ..." (Max Hartwell, 1975, pp. 99 and 102).

I. OVERVIEW

Max Hartwell's famous debate with E. J. Hobsbawm was a milestone in one of the most contentious debates in all of economic history. While he struggled over British standard of living issues in that 1961 article, Max also included a statement about labor markets which I have quoted above. That statement has helped fuel another debate: Were labor markets well enough integrated over the past two centuries to perform their function of allocating labor efficiently? Did laborers respond quickly to economic opportunities, or did their lack of mobility lead to segmented labor markets and the misallocation of labor? Did labor markets work more efficiently in the New World than in the Old, and in the 20th compared with the 19th century? Since Max Hartwell wrote that comment, economic historians have shown a growing interest in such questions. Over the past two decades or so, studies of migration have documented spatial mobility in response to economic incentives. Even more recently, economic historians have focused on wage gaps to measure the degree to which labor markets have (or have not) been arbitrated through migration (Williamson, 1987, 1990; Hunt, 1986; Rothenberg, 1988; Rosenbloom, 1990; Hatton and Williamson, 1990b). In this survey, I focus on one of the most persistent of wage gaps -- that between farm and

city, the gap which attracted Max's attention in 1961.

On the face of it, wage gaps between farm and city appear to have been very large, suggesting that urban and rural labor markets were never well linked at any time over the past two centuries. Thus, thirty years ago contemporary observers thought these wage gaps were large enough and labor market integration weak enough to provide a rationale for policy intervention (Hagen, 1958). Moreover, these wage gaps often varied sharply from year to year corresponding to sectoral shocks in labor demand.

Economic historians, labor historians, and development economists have all come to use the nominal wage between farm and city as evidence of labor market disintegration, and they have used its size to infer the magnitude of the distortion or "failure". As we shall see, such comparisons require careful attention to cost-of-living differences, to non-wage advantages (e.g., perquisites and amenities), and job tenure (e.g., anticipated seasonal unemployment and unanticipated unemployment associated with industrial crisis). Even if the wage gaps persist when they are measured properly, is it clear what we should conclude?

There are two reasons which suggest caution in making judgments about the efficiency of labor markets linking city and countryside. First, we are never offered any useful standard whereby labor markets can be judged as being integrated or segmented. Should we accept markets as being integrated only if the wage gap is zero? Surely this simple textbook application of conventional microtheory is a harsh test requiring, as it does, that labor markets are instantly arbitrated. Perhaps a better test is to assess an economy in the past by reference to late 20th century industrialized countries where we think labor markets function relatively well. Second, since even well integrated

labor markets are likely to reveal short run variance in wage gaps, we can not rely on observations for a single year but rather need fairly long time series to isolate any tendency towards integration. After all, big wage gaps at any point in time may be due to big shocks in labor demand or to lack of labor market integration on the migrant supply side. We need to sort out these influences, and we need long histories to allow these two influences to be revealed.

The survey starts with the First Industrial Revolution in Section II. Yes, nominal wage gaps rose sharply in England from the end of the French Wars to the mid 19th century. Even though farm emigration responded to excess demands in the city associated with the dramatic industrial revolutionary events, the wage gaps increased and they persist well into the mid 19th century. Section III asks whether these nominal wage gaps are simply the result of poor measurement. Cities were environmentally ugly and they were expensive, both requiring nominal wage compensation. Furthermore, they became increasingly so as the industrial revolution wore on. Nevertheless, the "true" wage gap, though smaller, persists even when it is properly measured. Were these wage gaps between farm and city large enough to matter? Development economists have always thought so, and Section IV shows that they were right at least for England in the 1830s. What about unemployment in the city? Development economists writing in the 1960s began to stress high and rising city unemployment just as Mayhew did when observing London's poor in the mid 19th century. What role does this fact play in the farm emigrant's decision? In Section V we review the Todaro model, a framework which was designed for exactly that purpose. In Section VI we move in time beyond the industrial revolution in the Old World to look at a NIC (newly industrialized country) in the New World. What role did

industrial crisis, city unemployment, foreign immigration, and farm price shocks play in accounting for America's spectacular variance in the wage gap in the half century after 1890? While these decades are well beyond America's 19th century experience with the industrial revolution, were there other forces at work driving the wage gap which were equally powerful? Here we begin to sort out explicitly the importance of shocks to labor demand from the forces of labor market integration coming from the migrant supply side. Finally, in Section VII we expand the sample to include many more currently industrialized countries from the late 19th century to the present. Section VIII concludes.

II. DO WAGE GAPS RISE WITH INDUSTRIALIZATION?

They certainly did in Britain. Table 1 shows that an index of the gap between the average nominal earnings of unskilled nonfarm and farm laborers (1797 = 100) rose sharply across the first half of the 19th century. That is, the rise in farm wages lagged far behind the rise in city wages. The table suggests that the nominal wage gap did not begin to rise until well after the French Wars when British industrialization quickened (Williamson, 1984; 1990, Chp. 7). Indeed, the index implies that wartime conditions served to erode the gap. Because the conflict caused a contraction in foreign trade (cutting back the import supply of grains and choking off the foreign export demand for manufacturers), the relative price of grains rose, and domestic agriculture was favored. Under such conditions, it is hardly surprising that the wage gap would tend to collapse as wartime labor demands were unusually strong in the countryside. With the end of the wars, however, the pace of British

industrialization accelerated and agriculture resumed its long-run relative demise. Labor demand in the city far outstripped local labor supplies. Thus, if we are looking for evidence of labor-market disequilibrium in Britain between farm and city, the 1830s, 1840s, and 1850s are clearly the place to start. Trends in the wage gap would appear to reflect a labor-market disequilibrium because it rose sharply to a peak in 1851. It appears that farm emigration to the city was simply not fast enough to satisfy bouyant urban labor demands, and the relative cost of labor rose in the cities as a consequence.

Do subsequent industrial revolutions repeat the British experience? The absence of comparable data makes it impossible to say for sure, but one thing is certain: wage gaps of this magnitude have been commonly observed in the middle of industrial revolutions ever since Britain experienced the first. Unskilled full-time nominal city wages were about 73 percent higher than farm wages in England by the 1830s (Table 3). They are about 41 percent higher in the contemporary Third World (Squire, 1981, p. 102), and they were about 51 percent higher among late 19th century industrializers (Clark, 1957, pp. 526-531). Nor were things much different in the New World: wage gaps were about 50 percent in America in the mid 1890s at the end of three decades of dramatic post Civil War industrialization (Hatton and Williamson, 1990a, forthcoming/a). Such evidence is certainly consistent with the view that the followers repeated the experience of the leader.

Rising wage gaps and apparent labor market disequilibrium between farm and city need not imply, of course, the rural emigration was small. Rather, it implies only that it was not big enough. Table 2 shows that the rates of emigration from the English countryside responded to the labor market disequilibrium, rising dramatically after the French Wars,

reaching what appear to be very high levels by the 1840s. These rates are high by almost any standard (except in terms of what would have been necessary to eliminate the disequilibrium). While they ranged between 1.2 and 2.1 percent per annum after 1821, they ranged between 1.0 and 1.2 percent per annum in the Third World in the 1960s and 1970s (Kelley and Williamson, 1984, Table 3-13, p. 93). More important to the issues at hand, however, rural emigration and the wage gap move in tandem. After 1816, the emigration rates surged upwards, as did wage gaps. By the 1840s, the emigration rate was about two and a half times the pre-1816 rate. By the 1860s, the rate was more than three times the pre-1816 rate.

But to repeat the bottom line: while farm labor took advantage of the higher wages in the cities, it appears that their migration response was nowhere near elastic enough to satisfy the excess labor demands associated with the First Industrial Revolution. Their inelastic response must have served to raise the cost of labor to off-farm employers, making industrialization less dramatic than it would have been otherwise.

III. ARE THESE WAGE GAPS JUST AN ILLUSION?

Given such intense mobility, why were English farm laborers in the 1830s, or farm laborers in the Third World in the 1970s, or American farm laborers in the 1890s willing to accept much lower wages than those available in city and town? Are we sure that village labor failed to fully exploit employment opportunities off the farm? Perhaps these nominal wage gaps simply fail to measure the quality of life associated with village and city employment. Perhaps when wages are properly

measured, what looks like labor market disequilibrium is really equilibrium. What might be called "equilibrium" explanations for the nominal wage gap fall under four headings: higher cost of living in the city, urban disamenities, greater urban unemployment, and greater farm payments in kind. These adjustments never appear in comparisons of nominal wages between farm and city, and it is likely that at least some portion of the wage gap would disappear if such adjustments were made. To the extent that wage gaps, though smaller, persist when measured properly, then we must conclude that there was market failure, that there was disequilibrium, and that farm and city labor markets were disintegrated by the dramatic shocks associated with early industrial revolutions. Although mobility may have been intense, we would have to conclude that it was not intense enough to erase wage gaps between farm and city, even to reduce them.

While these four items are likely to help account for the existence of large nominal wage gaps, the more interesting question is whether they are likely to help account for the rise in the wage gap after the French Wars. There are reasons to think so, especially those related to the rising cost and falling quality of city life, events which employers must have been forced to offset with higher nominal wages if they were to attract rural workers to city employment.

One relative price which increases sharply during the industrial revolutions is city rents. There are three reasons for this. First, housing construction is labor intensive and the relative price of labor rises during industrialization. Second, urban housing is space intensive, and rising urban land scarcity is a fact of life during all industrial revolutions. Third, the rate of productivity advance in the building trades is slower than that of commodity production even today

(Baumol, et al., 1989, Chp. 4). All of these factors should serve to raise the relative cost of housing as industrialization unfolds. It is manifested by a rise in rents, and it is manifested by families saving on rising dwelling costs by moving into smaller dwellings and by the dwellings themselves packing in closer together, events which served to raise mortality and morbidity, while lowering the quality of life.

So much for theory. What about fact? Such evidence is available for Britain during her industrial revolution (Williamson, 1990, pp. 188, 235-238). From the 1790s to the 1840s, real rents (nominal rents relative to the cost of living) in Leeds, Black Country towns and a village in Staffordshire rose by 2.5 percent per annum, for a whopping 30 percent per decade. Since rents accounted for about 20 percent of the urban laborer's budget, this explosion in urban dwelling expense served to raise the rate of city cost of living growth perhaps as much as 0.5 percent per year. A good share of the increase in the nominal wage gap between British cities and farms may simply reflect those forces, and thus may not reflect labor market disequilibrium after all. Nor is Britain's experience unique. The same was true of America in the late 19th century (Williamson and Lindert, 1980, Chp. 5) and in the Third World today (Kelley and Williamson, 1984).

Furthermore, what about the poor quality of urban life? Didn't urban employers have to pay a premium to attract potential rural emigrants to locations of poorer environmental quality, manifested most vividly by much higher mortality and morbidity in 19th century cities, so much so that Frederick Engels called it "social murder"? Recent work of mine (Williamson, 1982, 1987) assessed the value of these ghastly urban disamenities by estimating hedonic earnings equations on data taken from the 1834 Poor Law Inquiry. The exercise made it possible to.

place a value on disamenities incurred when migrating from a relatively pleasant village environment to a very unpleasant big city environment. It turns out that the premium may have been as high as 24 percent in England as a whole, Although it was higher in the North than in the South. Furthermore, most participants in the standard of living debate believe that these disamenities had risen up to the 1830s.

Table 3 offers a final accounting of the English wage gap in the 1830s. After adjusting for the fact that cities were expensive, that cities were environmentally unattractive and required some compensation for the "bads" prevailing there, and that poor relief was used to augment workers' incomes in the countryside during slack season (better known as the Spenhamland System: Boyer, 1990), the nominal wage gap of 73.2 percent drops to a "true" wage gap of 33.2 percent. Much of the wage gap between farm and city was illusory, but it certainly fails to disappear entirely. Labor market disequilibrium was an attribute of the British industrial revolution after all.

In short, while nominal wages do exaggerate the wage gap, when properly adjusted they are still large enough to suggest fundamental disequilibrium.

IV. DO WAGE GAPS BETWEEN FARM AND CITY MATTER?

They certainly have had a significant impact on policy, at least in recent times. By 1958, the early pioneers in development economics had a full appreciation of wage gaps, and they were central to debates over development strategy. Everett Hagen (1958) published an influential paper in that year on "An Economic Justification of Protectionism". Based on evidence like that surveyed earlier in this paper, he

concluded:

"The agricultural-urban wage differential exists in underdeveloped and economically advanced countries alike; the available evidence suggests that it does not disappear, or even diminish, in the course of development. It is a persistent long-run phenomenon (Hagen, 1958, p. 503)."

Hagen's priors were very strong. Just as we have argued based on British experience in the first half of the 19th century, Hagen felt that post-World War II wage differentials in the Third World were the result of unbalanced growth in the derived demand for labor. Rapid industrialization creates an excess demand for labor in urban sectors while a lagging agriculture creates an excess supply in rural sectors. Since migration is never adequate to fully clear these two markets in any one year, and since the unbalanced growth persists year in and year out (indeed, it may even accelerate), a disequilibrium distortion will emerge. The more rapid the rate of unbalanced growth, the bigger the distortion. Only in NICs where the industrial revolution is well along or in advanced economies where it is more or less complete do rural-urban labor markets have an opportunity to erase those gaps, but even then, as we shall see below, large terms of trade shocks and industrial crises (like the 1930s) may create them once again.

Establishing the argument that wage gaps reflected true wage distortions was central to Hagen's agenda since they helped support a policy of active intervention to foster industrialization. By appealing to sluggish migration and resulting distortions which made wages "too high" in the city, Hagen could offer support for the infant industry

argument for protection, leaning heavily on the theoretical contributions of Haberler and Viner. Since those wage distortions tended to price domestic manufacturers out of their own markets (artificially raising labor costs), government intervention to offset the distortion was warranted.

Hagen's argument hinges, of course, on the assertion that these wage gaps imply "big" distortions. That is, his argument implies that British wage gaps in the 1830s must have lowered British rates of industrialization well below what they should have been, especially in the absence of an interventionist policy of subsidizing industry to offset the distorted wages. He had no evidence to support his view when he was writing in 1958, but we do now. What does British experience in the midst of the First Industrial Revolution tell us?

Lurking behind that question are some implicit counterfactuals: If farm labor had responded with sufficient elasticity to city employment opportunities to achieve an optimal allocation of labor in England in the 1830s, by how much would national income have been raised? Would industrialization have taken place much more rapidly (as Hagen implies)? Back in the 1950s and 1960s, economists would have thought the answer could be easily found by calculating the deadweight loss denoted by the shaded area in Figure 1. This familiar diagram shows the employment distribution between agriculture and industry in the presence of wage gaps. If the wage gaps were eliminated, even more migrants would have left agriculture for industry, and employment would have been optimally distributed at . National income would have been increased by the shaded area, or by the elimination of the deadweight loss. When I made this calculation a few years ago (Williamson, 1987, p. 661), I found the number to be trivial, something like 0.5 percent of 1831 national

income.

Why, then, all the fuss over disequilibrium in labor markets between farm and city? First, it ignores the fact that capital may chase after labor. Second, and perhaps even more important, it ignores the fact that farm rents are too high because of cheap labor there while industrial profits are too low because of dear labor there. Low profits imply low rates of industrial accumulation and thus slower rates of industrialization. If we can show that labor market failure significantly augmented agricultural rents at the expense of industrial profits, then we will have come a long way in confirming Hagen's hypothesis. After all, most of us now agree that England achieved only modest rates of accumulation during the First Industrial Revolution (Williamson, 1984), even when compared with the rest of Europe (Crafts, 1985, p. 64). One of the explanations for this has been that English capital markets failed to innovate those changes which would have made external finance more accessible to industrial firms (Mokyr, 1985, pp. 33-38). Now we may have another explanation, namely that labor market failure served to choke off industrial profits and thus accumulation.

When a general equilibrium model was applied to this problem (Williamson, 1987, pp. 73-77), the results appeared to support Hagen: the wage distortions were very important to England in the 1830s. First, they suggested that industrial employment in general, and manufacturing in particular, must have been seriously choked off by labor market failure up to the 1840s. While England's industrialization performance was certainly impressive after the French Wars, it would have been far more impressive in the absence of these wage gaps between farm and city. Indeed, industrial employment would have been 15.5 percent higher. If that increase is stretched over the two decades 1821-1841, it implies

that industrial employment growth would have been about 2.7 percent per annum, not the 2 percent per annum actually achieved. Manufacturing output would have been 24.1 percent higher. And if that increase is stretched over the period 1815 to 1841, it implies that manufacturing output growth would have been about 3.9 percent per annum, not the 3.1 percent per annum actually achieved. Second, these wage gaps had important distributional implications. In their absence, profits in industry would have been 11.2 percent higher, and they would have been 23.6 percent higher in manufacturing. If the reinvestment rate out of profits was relatively high, as most of us think, then the elimination of the wage gaps would have resulted in a significant rise in saving and accumulation, especially so in manufacturing.

Based on the First Industrial Revolution, Hagen was right: the wage gaps between farm and city choked off industrialization in important ways. We can infer the same for any other 19th century economy which exhibits wage gaps similar in size.

V. UNEMPLOYMENT AND OFF-FARM MIGRATION: ADDING ANOTHER DIMENSION

Economists in the 1950s and 1960s had a very optimistic view of the development process from low income levels. Given elastic labor supplies from the countryside, industrialization could proceed where the only constraint that really mattered was the rate of accumulation. Labor was transferred from low marginal productivity in the countryside to high marginal productivity in the city, and the rate of labor absorption into city employment was expected to be fast. As the 1960s unfolded, a more gloomy view began to emerge. The rate of labor absorption in Third World cities was far slower than the rapid rate of accumulation would

have predicted and, even more alarming, urban unemployment became more and more pronounced. The appearance of overt urban unemployment created two camps who tried to explain it: there were those who argued that rural labor was being pushed by Malthusian forces into the cities at a rate too fast for their absorption in good industrial jobs, a view which implied that urban unemployment should have increased; and there were those who argued that urban labor market distortions could account for both the rising unemployment and the increased wage gaps.

Lewis was the first development economist to bring attention to urban unemployment in the Third World. It appears prominently in his 1965 Richard T. Ely lecture to the American Economic Association where he sketched out the following argument (Lewis, 1965, pp. 12-13): Attracted by an apparently irrational optimism that they will be selected for those scarce high-wage city jobs, the rural emigrants keep coming, and the glut spills over into urban unemployment. By focusing on expected rather than current wage gaps, Michael Todaro (1969) developed a framework which formalized Lewis's argument. The Todaro framework and its extensions (Harris and Todaro, 1970; Stiglitz, 1974; Corden and Findlay, 1975) enjoyed considerable popularity over the two decades which followed.

The Todaro hypothesis is simple and elegant. Its most effective illustration can be found in Max Corden and Ronald Findlay (1975), reproduced in Figure 2. Under the extreme assumption of wage equalization through migration, and in the absence of wage rigidities, equilibrium is achieved at E (the point of intersection of the two labor demand curves for agriculture, AA', and industry, MM'). Here wages are equated. But since wages are not equated in the contemporary Third World (or in England in the 1830s and America in the 1890s), the Todaro model

incorporates the widely-held belief that the wage rate in manufacturing is pegged at artificially high levels by unions, by minimum wage legislation, or by private sector emulation of inflated public sector wages, say at w_M . If, for the moment, we ignore urban unemployment, then all those who fail to secure the favored jobs at high wages in industry would accept low-wage employment in agriculture at w_A^{**} . Now let's add the reality of urban unemployment. Todaro introduces an expectations hypothesis which, in its simplest form, states that the favored jobs are allocated by lottery, the potential rural emigrant calculates the expected value of that lottery ticket, and compares it with the certain employment in the rural sector. Migration between farm and city then takes place until the urban expected wage is equated to the farm wage. This structural equation of migration behavior is in fact the qq' curve in Figure 2. The equilibrium agricultural wage is now given by w_A . Todaro thus offers an explanation for wage gaps observed between city and countryside which is consistent with the historical reality of urban unemployment.

The Todaro model has its strengths and weaknesses. It stresses an asymmetry in wage adjustment and wage flexibility in the two sectors. Recent research has confirmed that, at least since the 1870s, nominal wages have been very flexible in agriculture while very sticky in industry. Indeed, the asymmetry has increased over the past century. The industrial sticky wage view has, of course, a long tradition in macroeconomics. Jeff Sachs (1980) and Robert Gordon (1983) have both shown that industrial wage stickiness has risen in 20th century America. Chris Hanes (1990) has shown that the rise in industrial wage stickiness can be dated even earlier with the late 1880s and the rise of Chandlerian big business. Thus, any dramatic event which shifts the

MM' in Figure 2 downwards to the right, like an industrial crisis, will create urban unemployment. But it will also shift workers back to the farm, lowering wage rates there and increasing the wage gap. And world price shocks which lower the terms of trade facing agriculture will shift the AA' curve downwards to the left, lowering farm wages, increasing the wage gap and raising city unemployment. On the other hand, while Todaro's stress on unemployment is important, his long-run equilibrium view is unlikely to be very useful in understanding historical experience punctuated by price shocks and industrial crises, and where farm emigrants are cautious and slow to respond to short-run unemployment-adjusted earnings differentials between city and countryside. What we need is to merge the strengths of the Todaro model with Hagen's emphasis on dynamic disequilibrium.

VI. INDUSTRIAL CRISES, WORLD PRICE SHOCKS, FARM EMIGRATION AND WAGE

GAPS: AMERICA FROM 1890 TO WORLD WAR II

Oddly enough, while the Todaro model was constructed to explain a contemporary Third World problem, the proposition has its intellectual roots with agricultural economists who were writing about the American interwar wage gap more than forty years ago (Schultz, 1945). To begin with, these economists focused almost exclusively on interwar wage gaps. Their interest was in farm income parity, and thus compared the 1920s and 1930s with World War I benchmarks where farm income matched up fairly well with industrial income. This interwar fixation is somewhat surprising given that in his 1930 book on Real Wages in the United States 1890-1926 Paul Douglas devoted a whole chapter to the partial collapse in the wage gap from the early 1890s to World War I.

The United States experience with wage gaps since the 1890s certainly needs an explanation. The ratio of farm to unskilled urban weekly wages from 1890 to 1941 is plotted at the bottom of Figure 3, while the dotted line in the middle adds on the influence of urban employment and the top solid line adds in addition the influence of cost-of-living differentials. In the 1890s, farm wages were about 50 percent of unskilled city wages, rising to almost 65 percent on the eve of World War I. By the late 1920s they had fallen below 50 percent of unskilled city wages, while in 1940 the figure was, incredibly, less than 35 percent. Real farm/nonfarm wage ratios were closer to parity in the 1890s and 1920s (Alston and Hatton, 1988; Hatton and Williamson, forthcoming/a, forthcoming/b), but they too undergo the same dramatic decline after World War I (Figure 3).

Timothy Hatton and I (forthcoming/a) have had considerable success in explaining American experience with the wage gap by developing and estimating a model of interacting labor markets between farm and city. It captures elements of the Todaro model, but it also introduces Hagen's notions of dynamic disequilibrium by allowing farm emigration to be slow and cautious. It tracks both the wage gaps and farm emigration very closely. What we'd really like to know, however, is which labor market shocks were doing most of the work driving farm emigration and the wage gap. Was it terms of trade shocks emanating from conditions in world markets -- the farm price boom up to World War I, followed by the slump in the 1920s, and then the disaster of the early 1930s? Was it labor supply shocks generated by foreign immigration -- favored by Brinley Thomas (1972), and stressed by Sir Arthur Lewis and other "pessimistic" development economists? Was it institutional forces manipulating the industrial wage -- a premise which motivated the Todaro model in the

first place, and one with which many macroeconomists might be comfortable? Was it always the same labor market shocks doing all the work, or did the driving forces vary across the epochs 1891-1896 (a rise in the wage gap), 1896-1915 (a fall), and 1915-1940 (a massive rise)?

The answers are the following. First, labor force growth always served to raise the wage gap, ceteris paribus. Indeed, had not the immigrant-induced labor force expansion from 1896 to World War I not been so rapid, the collapse in the wage gap would have been far more impressive. This result may appear to be counterintuitive. Didn't the influx of foreign immigrants into American cities serve to lower the urban wage and thus to diminish the wage gap? Not in the Todaro model or in our augmented version of it: The story here is that the nonfarm wage was sticky, so a glut of foreign immigrants tended to increase urban unemployment, to discourage potential farm emigrants, to lower the flexible farm wage, and thus to increase the wage gap. Second, the terms of trade had exactly the impact which the traditional literature assigns to it, and it is large. The collapse in the farm terms of trade in the early 1890s and the interwar decades raised the wage gap. Furthermore, it accounted for about a third of the 1891-1896 and a quarter of the interwar rise in the wage gap. The farm price boom between 1896 and World War I accounted for about half of the collapse in the wage gap. Third, the major force at work driving the wage gap over the period as a whole appears to have been real industrial wages. Todaro would have predicted as much.

What are the macroeconomic implications of these results? Some contemporaries saw the rural sector as an "industrial labor reserve", such that the urban sector drew on rural labor supplies when times were good and sent them back in a slump, the flexible wage in agriculture

helping to absorb labor in depressions. Suppose we use the model reported above to ask the question: What would have happened to unemployment had the farm wage been inflexible downwards and had it not collapsed relative to city wages during the 1930s? The answer is that the employment recovery from the Great Depression in America was aided by the fall in the farm wage, and the effect was very large. This conclusion has relevance to recent efforts to answer the question: Has the American economy become more stable over the past century? It suggests that such comparisons had best be made with a macroeconomic model which pays attention to two sectors, not just one.

It's time to summarize. Why did the American wage gap vary so much over time, and why was it so large in the 1930s? When Todaro's structural equation is embedded in a general disequilibrium model, can fundamental forces like the intersectoral terms of trade, the urban wage, and foreign immigration be shown to play an important role? They can, provided we take account of the sluggish response of migration to those shocks. This finding sits well with our account of the British industrial revolution almost a century earlier, although there it was the spectacular effects of industrialization pushing the demand for urban labor which was doing most of the work.

VII. INDUSTRIAL CRISES, UNEMPLOYMENT, FARM EMIGRATION, AND WAGE GAPS: EXPANDING THE SAMPLE

Timothy Hatton and I (1990b) have added seven more economic histories to the US experience with wage gaps. Thus, we can now say something about three Old World countries in the late 19th century (Germany 1871-1913, Sweden 1861-1913, United Kingdom 1860-1913), about

an Old World country in the 20th century (Denmark 1923-1953), and about four New World countries in the 20th century (Australia 1906-1958, Canada 1923-1960, New Zealand 1929-1969, United States 1890-1941). This sample of eight certainly covers a wide range of experience: fast and slow industrializers, late 19th century countries which suffered unfavorable shocks to their farm sector and those which didn't, countries which underwent deep industrial crisis during the Great Depression and some which didn't, and countries which sent emigrants abroad and some which received them. What we would like to know is how their labor markets dealt with these shocks and whether some exhibited greater evidence of labor market integration than others.

The wage gap is displayed in Figure 4 for late 19th century Germany, Sweden, and the United Kingdom (1900 = 1.00). All three series exhibit sharp cyclical fluctuations, particularly striking in the case of Sweden, while the wage gap follows a similar long run path, especially after the 1870s. All three countries offer evidence of a rising wage gap over the period. Figures 5 and 6 show a variety of experience across the 20th century (1929 = 1.00). Some, like Denmark, show a downward trend in the wage gap, while others, like New Zealand, show the opposite. Except for the period 1929-1945, these five 20th century histories have little in common. But during the earlier part of the Great Depression, all of these countries underwent a surge in the wage gap. The late 1930s and early 1940s saw farm wages catching up, at least in Australia, Denmark, New Zealand and Canada. These years of Great Depression and War show the most striking movements in the wage ratio.

Further insight into the time series of the wage gap can be gained from Table 4. The first row of the table reports the correlation

coefficient for rates of change in the two nominal series underlying the wage gap. In each case there is a positive correlation demonstrating that city and farm wages do move together, but in most cases the correlation is far from perfect. The second and third rows provide some evidence which may be relevant to macroeconomic debates about sticky industrial and flexible farm wages already raised in the previous two sections. With the exception of late 19th century Germany, every country exhibits higher standard deviations for farm wages than for industrial wages. What this data cannot tell us, however, is the extent to which the result can be explained by asymmetric labor demand shocks or by asymmetric labor market adjustment (although the previously cited literature by Sachs, Gordon, and Hanes would certainly suggest it was the latter). The fourth and fifth rows of Table 4 report the correlation coefficients between changes in the industrial/farm wage ratio and in each of its two components. As would be expected, the fourth row shows that a change in the farm wage is always correlated negatively with a change in the wage ratio: when farm wages rose, the city-to-farm wage ratio fell. However, the same is not true of the industrial wage. As the fifth row shows, in four out of eight cases the wage ratio is negatively correlated with the industrial wage -- when the industrial wage rises the wage gap falls, and in three of the remaining cases (the exception being Germany) the correlation coefficient is lower than for farm wages. In the case of Australia, Canada, Denmark, New Zealand, Sweden, and the United States, the farm wage is clearly doing most of the work driving the wage gap. Hence, for these five cases at least, we can conclude that the greater flexibility of farm wages drives the wage gap, a finding which suggests that our first order of business should be to model farm wage determination.

As in the previous section, the central issue is whether farm wages were driven by urban labor market conditions, and thus whether the two labor markets were well integrated. We start with our version of Todaro's migration equation, add to it an expression for farm labor demand and supply, and solve for the rate of change in the farm wage, yielding the simple estimation equation in Table 5 for changes in the log of farm wages. This equation tells us that farm wages are influenced by two forces, conditions in industry and conditions in agriculture. The latter are captured by agricultural prices (DLPA), making it possible to see just how sensitive farm wages were to farm price shocks in the past. More important to the issue at hand, was agriculture so segmented that the lagged industry/farm wage ratio (LWMA1) and the lagged industrial employment rate (LIU1) had only a modest impact on farm wages? The estimated coefficients on LWMA1 and LIU1 tell us just how strong links between the two sectors were, that is, just how strong migration responses were.

Overall, the results reported in Table 5 are quite good. First, and most important, current farm wages were intimately tied to labor market conditions in the city. They certainly appear to have responded strongly to the previous year's wage gap in every country but New Zealand. When the wage gap was large in the previous year, farm wages rose to catch up with industrial wages, presumably in response to farm emigration and the increased labor scarcity thus created in the wake of that emigration. Furthermore, the coefficient on LWMA1 is quite similar across these countries which varied so in the size of their farm sectors, in their experience with foreign migration, in the policies they adopted, and in the magnitude of the disequilibrating shocks to which they had to adjust. The same seems to be true of the current farm wage response to

last year's employment rate in the city: with the exception of Sweden, low unemployment rates last year encouraged farm emigration, and the resulting farm labor scarcity caused farm wages to rise. Typically, those countries which exhibit low coefficients on LIU1, like the United States and the United Kingdom, also exhibit low coefficients on LWMA1, while the same is true of countries which exhibit high coefficients, like Australia, Denmark and Canada. And it is not true that New World countries systematically exhibit more mobile populations and better integrated labor markets. New Zealand and the United States exhibit lower coefficients on LWMA1 than do Germany, Sweden and Denmark. Nor is it true that late 19th century economies had consistently more poorly integrated labor markets than did 20th century economies. In short, farm wages were typically very responsive to labor market conditions in the city, suggesting strong integrative forces at work.

Nonetheless, the farm sector was not perfectly integrated. When farm prices boomed, so did farm wages, and the response was especially pronounced for Sweden, the United States, Canada and New Zealand. In all cases but one, Denmark, farm prices had a significant positive impact on farm wages. The speed of adjustment of the wage ratio once disturbed by these price shocks (or by industrial crisis) can be calculated from these results. They imply a range in the lag from over six years for the UK to six months for Australia, with an average lag of a little more than two years.

These findings help us understand why farm wages and wage gaps behaved as they did over the century following 1860. Since the industrial employment rate (LIU1) had such a consistent positive impact on farm wages, thus serving to erode the wage gap, we should look for a collapse in wage gaps during industrial booms and their opening up

during serious depressions. And that is exactly what we find in Figures 5 and 6: Australia, Canada, Denmark, the United States and New Zealand all underwent a rise in their wage gaps during the Great Depression, and they all show an erosion or even collapse during the full employment WWII and post-WWII boom. To repeat the language of the previous section, macroeconomic historians might take note of this result: to the extent that sticky industrial wages helped contribute to high urban unemployment during the Great Depression, the incidence of that unemployment was shifted back on to the farm sector where its more flexible wage collapsed (causing the wage gap to rise) in the face of a glutted labor market induced by city-farm migration. And since DLPA has a consistent positive impact on farm wages, it is hardly surprising to find a persistent erosion in wage gaps during the great farm price boom between the 1890s and WWI in Australia, the United States, and even Germany.

VIII. AN AGENDA

Measuring nominal wage gaps at one point in time certainly will not tell us if labor markets between farm and city are well integrated. First, such measures fail to adjust for cost-of-living differences, perquisites and unemployment incidence. Second, well integrated labor markets do not require that wage gaps are zero. After all, there may be non-pecuniary disadvantages of the high wage location (like urban disamenities). Third, and most important, a well integrated labor market may reveal large wage gaps only because of big asymmetric labor demand shocks.

The central problem with the literature on wage gaps and labor

market integration is that we are never offered a comparative standard. Well integrated compared with what? Not perfection, surely, since no country has ever achieved it. I have argued that the assessment can only be made comparatively, across countries and over time. Does the farm-to-city wage gap get smaller as economic development unfolds? Was it smaller in the New World, where it is alleged that workers were more mobile, compared with the Old? Even these comparative questions cannot be answered in the absence of an economic model of labor market behavior. Why? Because we must have a means by which asymmetric labor demand shocks can be isolated from the migration forces which serve to integrate labor markets.

In exploring issues of national labor market integration over the past two centuries, this paper has focused on an old chestnut -- farm emigration and the wage gap between city and countryside. The same questions can, of course, be posed of international labor markets (Hatton and Williamson, 1990c). When does an integrated international labor market begin to emerge within Europe, and between Europe and the New World? Do international wage gaps begin to collapse during the age of free migrations up to World War I? When do various low-wage, Old World, agrarian countries begin to join the high-wage, industrial club? And what role do world-wide industrial crises and price shocks play in creating global labor market disintegration? I believe that future research will show that the morals which emerge from this survey of national labor markets will be repeated at the world level from the mid 19th century to the present.

*This survey paper was presented at the symposium on Capitalism and Social Progress in honor of Max Hartwell, University of Virginia, Charlottesville, October 12-14, 1990. It relies heavily on my previous research, as well as recent collaborative efforts with Timothy J. Hatton. While the paper cites this earlier work, I should emphasize that it draws freely from the following: Williamson (1987, 1988, 1990), and Hatton and Williamson (1990a, 1990b, 1990c, forthcoming/a and b). The comments of Bob Fogel, Bob Gallman, John James, Don McCloskey, Joel Mokyr, George Stigler, and other participants at the symposium are gratefully acknowledged.

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Table 1

Trends in the British Nominal-wage Gap, 1797 to 1851 (1797 = 100)

Year	Index
1797	100
1805	86.6
1810	96.7
1815	105.1
1819	99.7
1827	132.4
1835	134.7
1851	148.3

Source: Williamson (1990), Table 7.1, p. 182. The gap is calculated as the difference between the weighted average of nonfarm unskilled earnings (e.g., common laborers, porters, police, guards, watchmen, coal miners) and the farm-earnings rate, divided by the farm-earnings rate. Thus, it is the percentage differential by which nonfarm unskilled wages exceeded farm wages, the common measure used in the development literature.

Table 2

Rural Emigration Rates in England and Wales, 1776-1871

Period	Annual Rates of Rural Emigration (%)
1776-1781	0.86
1781-1786	0.50
1786-1791	0.56
1791-1796	0.79
1796-1801	0.83
1801-1806	-0.18
1806-1811	1.07
1811-1816	0.59
1816-1821	0.87
1821-1826	1.19
1826-1831	1.14
1831-1836	1.01
1836-1841	1.20
1841-1846	1.57
1846-1851	1.73
1851-1856	1.54
1856-1861	1.60
1861-1866	2.10
1866-1871	2.05

Source: Williamson (1990), Table 2, p. 50.

Table 3

Decomposing the Nominal Wage Gap for England

Item	Wage Gap (in %)
Nominal wages	73.2
Adjusted by cost of living	52.1
Also adjusted by rural poor relief of able-bodied	46.1
Also adjusted by disamenities premium for city life	33.2

Source: Williamson (1987), Table 7, p. 656.

Table 4

Descriptive Statistics for Farm and Industrial Wages: Eight Countries

	Germany (1871- 1913)	United Kingdom (1860- 1913)	Sweden (1861- 1913)	United States (1890- 1941)	Aust- ralia (1906- 1958)	Denmark (1923- 1953)	Canada (1921- 1960)	New Zealand (1929- 1969)
(1) Correlation Coefficient: DLWA, DLWM	0.669	0.539	0.574	0.879	0.913	0.518	0.544	0.723
(2) Standard Deviation: DLWA	0.296	0.016	0.061	0.107	0.066	0.105	0.136	0.077
(3) Standard Deviation: DLWM	0.325	0.015	0.039	0.095	0.054	0.045	0.059	0.050
(4) Correlation Coefficient: DLWMA, DLWA	-0.309	-0.507	-0.772	-0.463	-0.597	-0.902	-0.903	-0.772
(5) Correlation Coefficient: DLWMA, DLWM	0.500	0.452	0.078	0.015	-0.219	-0.098	-0.130	-0.119

Sources and Notes: DLWA = $\log W_A$, DLWM = $\log W_M$, DLWMA = $\log(W_M/W_A)$, LWMA = $\log(W_M/W_A)$. Hatton and Williamson (1990b), Table 1.

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