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By STANLEY L. ENGERMAN AND RONALD W. JONES *

When income levels of some group in the economy fall behind those of others, the blame frequently is cast on the nature of international trading relationships. Such has been the case recently in the United States with the struggle to maintain real wages for relatively less-skilled workers. Much of the debate has asked how changes in world prices or in technology at home or abroad have altered wage rates (see e.g., Susan Collins, 1996; Jones and Engerman, 1996). In this note we focus on another potential culprit, immigration, and probe more widely into past historical experience in the United States and other countries when inflows of labor from abroad disturb wage rates for nationals. Such international labor flows could serve to enhance rather than to depress the earnings of the country's own laborers. If the question addressed concerns the effects of immigration on the welfare of the original inhabitants of a country, a disarmingly simple answer was provided some years ago by Harry Johnson (1967): as long as immigrants bring an accumulated bundle of labor and physical or human capital that is *different* from that possessed by local residents, the latter must gain from immigration. This is the basic gains-from-trade argument, appropriate only if the country originally did not engage in any other form of trade and if all residents held balanced portfolios of capital and labor. As well, it ignores the social costs incurred and extra taxes collected when migrants flow into a country.

In this note we focus not on aggregate welfare effects, but on the effect of immigration on the return to some homogeneous national group of laborers. This question is the one that most sharply divides the views of labor economists from those of trade economists. On the one hand, increases in the supply of labor would seem naturally to depress the return to labor, but in the basic Heckscher-Ohlin trade model with two factors and two produced commodities, an inflow of labor can be absorbed with absolutely no change in wage rates as long as the terms of trade remain undisturbed. We begin by asking what some basic theoretical models tell us about this issue, before turning to the historical record. Simple theory reveals that there are two basic attributes of immigration that affect income distribution: relatively how substitutable immigrant labor is for the national labor force, and the occupations in which immigrants are allowed to work.

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I. Immigration in Some Simple Models

The most simple setting in which to view this issue has a country producing only a single commodity, relying on the rest of the world for its consumption of all others. If labor and capital are the only two factors used, and if labor of the same quality flows into the country, the law of diminishing returns provides the standard answer that such immigration lowers the wage rate. If the two factors are unskilled labor and skilled labor (instead of capital), inflows of unskilled labor will depress unskilled wages and raise the wage rate of skilled workers.

A richer set of possibilities emerges in a setting with three productive factors, say, physical capital, a homogeneous local labor force, and foreign labor that possesses a different range of skills. Assuming there are already some immigrants at work, ask what the effect of further immigration would be on the national wage rate. Must this be driven down? Not necessarily. It all depends upon the relative extent to which the three productive factors substitute for each other in producing the national product. As a benchmark case, suppose that immigrant labor were as good a substitute for local capital as it is for local labor. Further immigration would then result in an increase in the national wage (of the same

percentage amount as in the return to capital) as immigrant wages are driven down. If immigrant labor is a better substitute for local labor than for capital, the resulting benefit in national wages would be reduced, and if the two types of labor are sufficiently substitutable, the national wage would be dragged down by immigration. Nonetheless, a range of possibilities exists for the more favorable local outcome.

A different set of outcomes is possible if the country is not specialized in producing a single commodity, even if commodity prices are assumed to remain constant. If only two productive factors are employed, the standard Heckscher-Ohlin model with two commodities produced with two factors yields the classic result that an inflow of labor from abroad would not affect the local wage rate if the terms of trade are held constant. Such a labor flow would be completely absorbed by increases in the output of the labor-intensive commodity, with reductions in the quantity of the other commodity produced. In order for immigrant labor to have an effect on local income distribution, it is necessary to posit a model with more factors employed than commodities produced. The specific-factors model (see Jones, 1971) provides the most simple case. Suppose that foreign labor is restricted in its employment locally in only one of the two industries, while national labor is mobile between sectors. Let capital be specific in the other sector. If the country's terms of trade remain constant but the supply of immigrant labor is increased, the return to the mobile factor (national labor) is unambiguously improved, while the return to the other specific factor, capital, would be depressed.

This kind of result is more robust than the assumptions of the specific-factors model would suggest. In any competitive model in which three productive factors produce a pair of commodities whose prices are kept fixed, changes in factor supplies affect the local array of factor prices. The assumption of constant terms of trade might suggest that the concept of a Hicksian composite commodity could usefully be invoked so that the same results as obtained in our three-factor, single-commodity model would emerge. That is, immigration would affect the national wage rate positively or negatively, depending on relative degrees of substitutability among the three productive factors. That is not the case. Instead, as is proved in Roy Ruffin (1981) and Jones and Stephen Easton (1983), the sign of the effect of immigration on the wage rate of nationals depends only upon a ranking of factor intensities; the relative degree of factor substitutability affects only the extent of such factor-price changes, not the direction. Suppose that immigrant labor is used most intensively in one sector, and capital most intensively in the other, with the national labor force representing a "middle" factor in the sense that the ratio of the distributive shares of national labor in the two industries lies between the ratios of each of the other two inputs into the two sectors. Then an increase in immigration at constant commodity prices lowers the immigrant wage rate, raises the wage rate of local nationals, and depresses the return to capital. The logic of the argument is essentially the same as in the specific-factors model. An increase in the supply of foreign labor cannot be fully absorbed by an adjustment in the composition of outputs at the given and fixed terms of trade. At initial factor prices an increase in the output of the commodity in which immigrants are the most intensive factor and a reduction in the other output could clear markets for the two extreme factors. But such output changes leave a positive excess demand for the "middle" factor. If this is national labor, its wage rate must be raised, the returns to immigrant labor and capital would be pushed down, and a further output adjustment required.

Higher-dimensional cases are, of course, more complicated. But these simple scenarios suggest that in general both the array of factor substitution possibilities and the factor-intensity rankings are involved in ascertaining whether immigration raises or lowers the national wage rate. The three-factor, one-commodity and two-commodity cases suggest that the greater the excess of the number of productive factors over the number of traded commodities, the more important is the influence of factor substitutabilities. At the other extreme, if the number of factors is only one greater than the number of commodities, it is only the factor-intensity rankings which

indicate the direction of changes in factor prices (see Jones, 1985).

The analysis of the way in which changes in the terms of trade affect the national wage rate has been undertaken elsewhere. But immigration may have an important effect on the prices of nontradables. In particular, if the demand for nontradables is raised, and if these intensively make use of national labor, the wage rate for local labor could be pushed upward. Immigration would also affect the prices of real assets (e.g., housing). If housing prices rise, local labor would gain or lose, depending upon whether the workers own or rent.

II. Immigration in Historical Perspective

The experience with immigration in the United States in the past several decades has provided the focus for much recent empirical work, as described in a survey piece by George J. Borjas (1994). He concludes that no strong results emerge bearing on the effects of immigration on the national wage rate.[1] We turn our attention to earlier episodes of immigration, both in the United States and in other regions of the world. Whereas it is difficult to obtain explicit data bearing on the effects of migrant labor on national wage rates, or on the relative sizes of factor substitutabilities, these historical episodes do serve to reveal the potential importance of factor-intensity criteria since immigrant labor was often brought in to work in specific occupations and sectors, with legal barriers preventing mobility to other activities.[2]

Involuntary slave labor from Africa represented the first of the large-scale transatlantic migrations (outnumbering white migration by about 3:1 in the period up to the early decades of the 19th century). There is an obvious sector-specific bias in this migration, with the receiving countries in the Caribbean, Brazil, and elsewhere in Latin America making use of this labor primarily for agricultural purposes, especially sugar, but also in mining. White workers typically did not compete directly, being used instead as skilled and managerial labor. The international slave trade to the United States was closed in 1808, and from the debates it was obvious that some slave-owners in the early-settled states, especially Virginia and South Carolina, actually supported ending the trade, since it would increase the value of their current stock. (In the next century the opposite position was taken by sugar planters in Queensland, who made use of indentured labor from the Pacific islands, in regard to the introduction of the "white-Australia policy." In a system where such labor had to return after a specified period, costs would rise if new labor could not be hired.)

Even prior to the use of slave labor, contract labor was a device by which Britain sent migrants to North America and the Caribbean, primarily for tobacco production (later to be replaced by slave labor). Many of these laborers remained as settlers after the contracts expired and thus entered a pool of mobile labor, freed from the constraints of work in any one sector. With the ending of slavery in the 19th century, plantations in the Caribbean maintaining sugar production and in need of labor relied mainly on contract labor, primarily from India and other low-income countries. Areas such as Mauritius and the Caribbean colonies of Britain, France, and the Netherlands used such labor to continue sugar production, whereas the high demand for sugar led indentured labor to be newly employed in Fiji, Malaya, Natal, and Queensland, with such labor often sent home after the contract period had expired. In some areas of the Caribbean, such as Trinidad and British Guiana, the existence of an open frontier led ex-slaves to move out of sugar production (a disagreeable occupation) and into more general agricultural pursuits, necessitating the use of contract labor in sugar production, whereas in more heavily settled areas such as Barbados reliance on extra contract migrant labor was not required. In

[1] Ira Gang and Francisco Rivera-Batiz (1994) and John De New and Klaus Zimmermann (1994) have asked about the effects of immigration on wage rates of locals in recent American and European experience in a three-factor setting in which immigrants possess various combinations of the three factors (education, unskilled labor, and experience in the former article; labor quantity, labor quality [i.e., human capital], and physical capital in the latter). The effects of immigration then entail weighting the characteristics by the relative endowments of migrants.

[2] For a discussion of the different migration streams discussed in this section, and some estimates of their magnitudes, see Engerman (1986).

addition, there were nominally free migrations (often under private contract) to Malaya for rubber production, Ceylon for tea, and Burma for rice.

It was only at the end of the first quarter of the 19th century that the extensive outpouring from Europe to the Americas became the major stream of labor migration. Although some of this movement was subsidized in order to obtain labor for specific occupations (generally agriculture), in most cases the financial burden was borne by the immigrants. This labor was more free to move into sectors of choice, but in the United States and elsewhere immigrants were often bunched into low-skilled industrial occupations.[3] The pressure on wages of native-born workers was in large part relieved by increases in capital and land endowments; in the late 19th century the United States experienced twin inflows from Britain (and other European areas) of labor and capital, while cheap land was made available by the opening of frontier regions.[4]

Much of the labor flow into the United States in the 19th century and early 20th century was permanent. In contrast were seasonal migrant streams (e.g., farm workers from Mexico) or, primarily in postwar Europe, "guest workers," whose initial residential permits were limited (generally to one year). These transient workers were confined to certain occupations and sectors: "Until 1969 the jobs filled by foreign workers were concentrated in a few branches of manufacturing and construction ... . These were unskilled workers and were not close substitutes for German workers" (Wendy Carlin, 1996 p. 469). Such workers accounted for almost 10 percent of the labor force in West Germany in 1973 and over 20 percent in Switzerland in 1983. Real wages for the national labor forces were rising in this period, and increased demands for supervisory labor and management positions were usually filled by native-born labor. In more recent years, with high unemployment rates characterizing European labor markets, reliance on the guest-worker program has greatly diminished. Indeed, in the late 1970's France granted subsidies for foreign workers to depart.

The migration patterns in the United States for most of the 20th century have not displayed sector-specific characteristics. It has received free labor, able to pay its own costs of transportation, highly mobile legally and economically, with a rather broad distribution of skills and occupations. Furthermore, as the Borjas (1994) survey indicates, there is little firm evidence of a negative impact of such migration on native-born labor in the post-World War II era. Illegal immigration into the United States has reached significant levels in the past couple of decades, and attempts to control this lead to sector-specific results (Arye Hillman and Avi Weiss, 1996). In particular, internal controls can be less stringent for workers in particular occupations (gardeners, maids, etc. in southern California; textile workers; agricultural workers) than for illegal immigrants attempting to enter the general labor force. According to our arguments, such sector-specific immigration poses little threat to native-born wage levels and improves real wages for locals by reducing costs of certain nontradables such as household services.[5] There is little doubt that some locals are adversely affected by immigration. But the overall evidence, both in the United States recently and in various important cases of labor migration in other places and other times, does not support the view that native-born workers have much to fear from such international labor flows.[6]

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[3] In 1870, for example, 34.3 percent of the foreign-born had "manufacturing, mechanical, and mining" occupations, in comparison with their 14.0-percent share of population and 21.6-percent share of the labor force (E. P. Hutchinson, 1956 pp. 2, 79, 84).

[4] Ronald Findlay (1995) discusses the effects of the "moving frontier" in a general-equilibrium model.

[5] In southern Africa it was customary for African male labor to be engaged in household activity, freeing up European female labor for more market-oriented pursuits.

[6] This conclusion seems consistent with recent findings of David Card (1996).

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