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# THE LABOR MARKET EFFECTS OF IMMIGRATION

GEORGE E. JOHNSON\*

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This paper is a theoretical examination of the probable effects on the U.S. labor market of a continued high rate of illegal immigration. The author constructs a model to estimate the impact each additional immigrant has on the employment of the domestic population, on GNP, and on the distribution of income. The model suggests that in non-recessionary periods the most important effect of a high rate of immigration is on the wage rates of low-skilled labor rather than on the employment of low-skilled native workers, but immigration also increases the earnings of high-skilled workers and the owners of capital. In the very long run, the author concludes, this redistribution of income will be offset to some extent by increases in the supplies of skilled labor and capital.

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THE question of what to do about immigration policy in the United States—especially policies dealing with the entry of so-called illegal aliens—is likely to become very prominent during the remainder of this century. Although it is (almost by definition) difficult to establish how many immigrants are in the country without permission, that figure is probably in the 4 to 7 million range, with 2 to 5 million of these individuals engaged in labor market activity.<sup>1</sup> Most of these additional workers are employed in jobs that are near the low end of the skill distribution at what are very low wages by U.S. standards. These wages, however, are much higher than those in their

home countries, which are primarily Mexico and Central American and Caribbean countries. Given the tremendous rate of population growth in these countries, the gap between their wage levels and those for low-skilled labor in the United States is not likely to diminish in the foreseeable future. Moreover, as citizens of particular countries establish communities in more cities in the United States, emigration will become more attractive, for the initial immigrants will be able to provide job information and both financial and psychological support to newcomers. Thus, to the extent that illegal immigration is considered a problem now, it will be much more so five and ten years hence.

The principal reason why the large-scale immigration of persons at the low end of the skill distribution (by U.S. standards) is a problem is that the immigrants compete directly with the domestic population in the labor market. Whether this results in increased unemployment, lower wages, or a

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<sup>1</sup>See Walter Fogel, "Illegal Alien Workers in the United States," *Industrial Relations*, Vol. 16, No. 3 (October 1977), pp. 243–63.

reduction in the labor-force participation rate of the domestic low-skilled population, the latter will in the short run be worse off due to additional immigration.<sup>2</sup> But the income and employment of the poorest fifth of the domestic population have been a matter of serious public concern since the early 1960s. Since then we have spent hundreds of billions of dollars on a series of governmental programs to maintain the income levels and increase the earnings potential of the disadvantaged population. To a large extent the disadvantaged domestic population is also black and Hispanic, and there is a national commitment to improve the relative economic status of these groups. Thus, a *de facto* policy of permitting additional millions of low-skilled immigrants into the country would undo (and, perhaps, then some) whatever might be accomplished with our antipoverty, employment, and educational programs.

At the same time, to the extent that our concern for poverty transcends national borders, a policy of shutting off immigration altogether would be harmful to individuals in the source countries, both to those who would have emigrated and those who would have remained, to work at slightly higher wage rates. There is no "liberal" or "conservative" position on this issue. By restricting immigration, we would help poor people at home at the expense of poor people in immigrant countries; by allowing it to continue we would do the opposite. The moral superiority of one of these policies over the other is, needless to say, not obvious.

In addition, it is not clear that the flow of illegal immigration *could* be shut off.<sup>3</sup> Complete border patrol does not seem feasible. Attempts to ban the employment of illegal immigrants directly might have perverse consequences. Piore has argued persuasively that such a policy might drive the immigrant population and the employers who hire them underground.<sup>4</sup> The lower

degree of governmental control over the conditions of immigrant employment (such as their wage and safety standards) that this implies might produce a more adverse impact of illegal immigration on low-skilled domestic markets than would occur in the absence of an employment prohibition.

Thus, it is important to examine the probable consequences of immigration in connection with the development of both immigration policy itself and policies for dealing with the consequences of illegal immigration, should it prove to be uncontrollable. This article focuses on the labor market consequences of immigration, without distinction between lawful and illegal immigrants. The possibly greater impact that could result from illegal immigration—through its impact on collective bargaining, for example—are beyond the scope of the theoretical analysis presented here.

### Effect on the Employment of Low-Skilled Labor

The labor force will be disaggregated throughout this paper into two groups: low- and high-skilled workers. The former group includes all potential members of the labor force who, because of low education and experience, are qualified only for relatively menial, low-paying jobs. The immigration with which this paper is concerned can be represented by an increase in the potential labor force of this group. The total employment of low-skilled labor ( $E_1$ ) is thus equal to the employment of the domestic low skilled plus that of immigrants, that is

$$(1) \quad E_1 = E_{1d} + E_{1m}.$$

The crucial behavioral question in the labor market analysis of immigration concerns the effect of an increase in  $E_{1m}$  on  $E_{1d}$ : To what extent do domestic low-skilled workers "lose jobs" to immigrants? This question can be formalized by defining the rate of labor market displacement as the reduction in  $E_{1d}$  caused by an increase in  $E_{1m}$ , or

<sup>2</sup>See Melvin Reder, "The Economic Consequences of Increased Immigration," *Review of Economics and Statistics*, Vol. 45, No. 3 (August 1963), pp. 221–30.

<sup>3</sup>See Fogel, "Illegal Alien Workers in the United States."

<sup>4</sup>See Michael Piore, "The 'New Immigration' and the Presumptions of Social Policy," in Industrial

Relations Research Association, *Proceedings of the Twenty-Seventh Annual Winter Meeting, December 28–29, 1974, San Francisco* (Madison, Wis.: IRRA, 1975), pp. 350–58.

$$(2) \quad \beta = - \frac{dE_{1d}}{dE_{1m}}$$

If  $\beta = 1$ , there is complete displacement of domestic low-skilled workers by new immigrants, and the effect of immigration on total low-skilled employment,  $dE_1/dE_{1m} = 1 - \beta$ , is obviously zero. At the other extreme,  $\beta = 0$  implies that new immigrants will not reduce domestic low-skilled employment at all:  $dE_1/dE_{1m} = 1$ .

The value of the rate of labor market displacement depends on several factors, and in analyzing it I find it is most convenient to distinguish between the short run and the longer run.

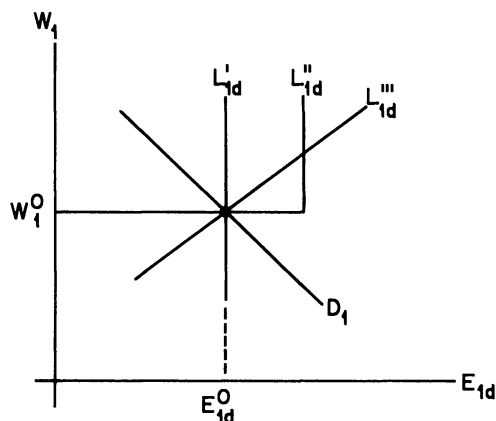
*Short run.* In the short run the money wage of low-skilled labor is fixed and is not affected by an unanticipated spurt of immigration. The effect of the immigration on  $E_1$  then depends on whether or not there is an excess supply or excess demand for low-skilled labor. In the latter case (for example, the U.S. labor market during World War II), the immigrants simply reduce the number of vacancies and add to total employment on a one-for-one basis. The labor market displacement rate,  $\beta$ , is therefore zero. If, on the other hand, there is a high rate of excess supply for low-skilled labor (as was the case in 1975), those immigrants that find jobs do so primarily at the expense of the employment of the domestic low-skilled population, i.e.,  $\beta = 1$ . When the labor market for low-skilled labor is approximately in balance (as was probably true in 1977–78), the short-run value of  $\beta$  is between zero and one.

To some extent, of course, the rate of immigration over time may depend negatively on the overall unemployment rate.<sup>5</sup> Many potential emigrants from Mexico, for example, may decide to postpone their departure until the U.S. economy picks up. If this is so, the question of the differential employment impact of immigration over the course of the business cycle would be less

important. On the other hand, a recession in the United States, which is Mexico's primary export market, may have a similar impact on the Mexican labor market.

*The longer run.* Since immigration is primarily a long-term phenomenon rather than a once-and-for-all spurt (like the immigration of Vietnamese refugees), the most interesting time span of analysis is the period over which money wages and aggregate demand policy can adjust so that actual and potential GNP are more or less equated. This is also true of the short run if the immigration is anticipated by economic policy makers (such as the Federal Reserve), employers, and incumbent workers.

There are three possible specifications of the way the labor market for domestic low-skilled workers operates, and they have very different implications concerning the labor market effects of increased immigration. These three possibilities are represented geometrically in the figure below. First, if the real wage of low-skilled labor ( $W_1$ ) is free to adjust so that employment demand and effective supply are equated, the equilibrium wage ( $W_1^0$ ) is determined by the intersection of the demand curve ( $D_1$ ) and the effective supply curve ( $L'_{1d}$ ). The introduction of the employment of immigrants would by this specification, which I call the *frictional unemployment model*, lower the low-skilled wage below  $W_1^0$  but leave domestic low-skilled employment at  $E_{1d}^0$ . This means, of course, that  $\beta = 0$ .



Figure

<sup>5</sup>This was true of the rate of migration of Puerto Ricans to the mainland U.S. See Belton Fleisher, "Some Economic Aspects of Puerto Rican Migration to the United States," *Review of Economics and Statistics*, Vol. 45, No. 3 (August 1963), pp. 245–53.

A second specification, the *structural unemployment model*, is based on the assumption that the initial real wage ( $W_1^0$ ) is institutionally fixed by government fiat or some other mechanism (like unions or non-maximizing employer behavior). There are  $L''_{1d}$  members of the domestic low-skilled population who want to work, but only  $E^0_{1d}/L''_{1d}$  can find jobs at a given point in time. The introduction of immigrants into this situation does not increase total employment demand, so there is a one-for-one reduction in  $E_{1d}$  per employed immigrant, i.e.,  $\beta = 1$ .

The third possible specification, which I call the *induced unemployment model*, is the most interesting and, in fact, includes the other two models as special cases. In it, the effective labor supply of domestic low-skilled workers is assumed to be an upward-sloping function of the real wage, the  $L'''_{1d}$  curve in the figure. This may be justified on the grounds that the domestic low-skilled population has nonmarket alternatives to employment (such as receiving government income transfers, housework, or petty crime) in addition to leisure. Thus, if  $W_1$  falls, the fraction of a year spent in employment declines.<sup>6</sup> The introduction of the employment of immigrants causes  $W_1$  to fall below  $W_1^0$  which, in turn, causes  $E_{1d}$  to decline from  $E^0_{1d}$ . But the reduction in the employment of domestic low-skilled workers is less than is the case for the structural unemployment model.

The algebra of the displacement rate for the induced unemployment model is as follows: The total demand for low-skilled workers is

$$(3) \quad E_1 = E_{1d} + E_{1m} = D_1(W_1),$$

where  $-d(\log E_1)/d(\log W_1) = \eta_1$  is the absolute elasticity of demand. The effective supply of domestic low-skilled workers is

$$(4) \quad E_{1d} = h(W_1),$$

where  $d(\log E_{1d})/d(\log W_1) = \epsilon_1$  is the wage elasticity of labor supply. These two equations determine the values of  $W_1$  and  $E_{1d}$  as functions of the employment of immigrants,  $E_{1m}$ , which is taken as given, and they can be readily manipulated to obtain

$$(5) \quad dE_{1d} = -\frac{\epsilon_1(1-\mu)}{\eta_1 + \epsilon_1(1-\mu)} dE_{1m} = -\beta dE_{1m}$$

and

$$(6) \quad d(\log W_1) = -\frac{1}{\eta_1 + \epsilon_1(1-\mu)} \frac{dE_{1m}}{E_1} = -\frac{1-\beta}{\eta_1} \frac{dE_{1m}}{E_1},$$

where  $\mu = E_{1m}/E_1$  is the fraction of total low-skilled employment accounted for by immigrants. The coefficient on  $dE_{1m}$  in Equation 5 is  $\beta$ , the rate of labor market displacement, and its value is zero when  $\epsilon = 0$  (the frictional unemployment model) and one when  $\epsilon = \infty$  (the structural unemployment model). For positive but finite values of the supply elasticity,  $\beta$  is between zero and one.

The increase in potential GNP per additional employed immigrant is approximately equal to  $W_1$  times  $1 - \beta$ .<sup>7</sup> The extent which new immigrants receive their share of an appropriately expanded pie as opposed to a share of the same size pie depends on how flexibly the low-skilled labor market operates. This is an empirical question, of course, but it is very subtle and not subject to a wide consensus among economists. There is strong evidence that for most identifiable labor-force groups in the U.S. there is a great deal of labor market flexibility in the sense that their employment and labor-force participation rates are not much in-

<sup>6</sup>Another justification of this specification is provided by Martin Baily and James Tobin, "Macroeconomic Effects of Selective Employment and Wage Subsidies," *Brookings Papers on Economic Activity*, No. 2 (Washington, D.C.: The Brookings Institution, 1977), pp. 511–41. One can also build a model of partial structural unemployment in which one sector has an institutionally fixed high wage and the other sector has a freely determined wage. This will yield results similar to those of the induced unemployment model (i.e.,  $0 < \beta < 1$ ). For a model of this sort, see Jacob Mincer, "Unemployment Effects of Minimum Wages," *Journal of Political Economy*, Vol. 84, No. 4, Part 2 (August 1976), pp. S87–S104.

<sup>7</sup>This is not strictly true when  $\beta$  is not close to one and the additional immigration is large relative to the total employment of low-skilled workers, for, by Equation 5, the immigration will lower  $W_1$ .

*Table 1.* Employment Reduction of Domestic Low-Skilled Workers  
Caused by Additional 100 Employed Immigrants for Selected Values of  $\epsilon$ ,  $\eta$ , and  $\mu$ .<sup>a</sup>

	$\mu = 0$			$\mu = .5$		
	$\epsilon_1 = .2$	$\epsilon_1 = .5$	$\epsilon_1 = 1$	$\epsilon_1 = .2$	$\epsilon_1 = .5$	$\epsilon_1 = 1$
$\eta_1 = .5$	29	50	67	17	33	50
$\eta_1 = 1$	17	33	50	9	20	33
$\eta_1 = 1.5$	12	25	40	6	14	25

<sup>a</sup>  $\epsilon$  = supply elasticity,  $\eta$  = demand elasticity, and  $\mu$  = proportion of low-skilled labor force composed of immigrants.

fluenced by changes in their relative wages and relative population shares. This, as I have argued elsewhere,<sup>8</sup> leads to the conclusion that the frictional unemployment model is the most accurate analytical description of most labor markets in the United States. There are two groups, however, for which the data are not consistent with this interpretation: minority youth and persons eligible for income-transfer programs. There may well be significant amounts of structural unemployment among minority youth and induced unemployment among certain components of the adult low-skilled population.

To see how quantitatively important the labor market displacement effect might be, I calculated values of  $\beta$  for a range of alternative values of  $\epsilon$ ,  $\eta$ , and  $\mu$ . These are reported in Table 1. Estimates of particular demand elasticities range from about 1 up to very high values, with a midpoint of about 1.5.<sup>9</sup> Most recent estimates of the uncompensated labor supply elasticity of the poor adult population range from zero to .2,<sup>10</sup> but

I include larger values in the range to reflect more pessimistic assumptions. The calculated values of  $\beta$  around the range that I believe is most plausible ( $\epsilon_1 = .2$  and  $\eta_1 = 1.5$ ) imply a labor market displacement effect that is only around 10 percent. One has to make very extreme assumptions about the demand and supply elasticities (that the former is very small and the latter very large) in order to obtain displacement rates as large as 50 percent.

### Distributional Implications of Immigration

The immigration of additional low-skilled labor into any country has several effects on the distribution of income, knowledge of which is necessary to understand the politics of immigration. I will analyze these for the longer-run situation, the period in which wages and aggregate demand policy have adjusted so that the aggregate and potential output are equal. Subsequently I will discuss the very long run in which immigration causes adjustments in the capital stock and the skill distribution of the domestic population.

*Impact on gross earnings.* The prior analysis of the employment effects of increased immigration was based on the implicit assumption that the other factors of production—high-skilled labor ( $E_2$ ) and capital ( $K$ )—are both fully employed and inelastically supplied. Here I will assume further

<sup>8</sup>See George E. Johnson and Arthur Blakemore, "The Potential Impact of Employment Policy for Reducing the Unemployment Rate Consistent with Non-Accelerating Inflation," *American Economic Review*, Vol. 69, No. 2 (May 1979), pp. 119–23.

<sup>9</sup>For an excellent survey of recent approaches to this problem, see Daniel S. Hamermesh and James Grant, "Econometric Studies of Labor-Labor Substitution and Their Implications for Policy," *Journal of Human Resources*, forthcoming.

<sup>10</sup>There is still considerable uncertainty about the value of these parameters for the groups that would be most affected by immigration. For an excellent critical survey of the labor supply behavior of prime-age males, see George Borjas and James Heckman, "Labor Supply Estimation for Public Policy Evalua-

tion," Industrial Relations Research Association, *Proceedings of the Thirty-First Annual Meeting, August 29–31, 1978, Chicago* (Madison, Wis.: IRRA, 1979), pp. 320–31.

that the underlying production function of the economy is linear homogeneous and that there is a constant elasticity of substitution between the three factors of production.<sup>11</sup> Total output per unit of time ( $y$ ) is distributed between low-skilled workers (both native and immigrant), high-skilled workers, and the owners of the capital stock. Thus

$$(7) \quad y = W_1 E_{ld} + W_1 E_{lm} + W_2 E_2 + vK,$$

where  $v$  is the real rental price of capital.

The first question concerns how an increase in  $E_{lm}$  influences the gross (before taxes and income transfers) incomes of each of these four groups. An increase in the employment of immigrants by one will increase potential GNP by  $(1 - \beta)W_1$ , and the gross earnings of that employee are, of course,  $W_1$ . If the rate of labor market displacement is not zero, the employment level of the domestic low-skilled population falls by the amount implied by Equation 5, and the wage of those low-skilled workers who are still employed falls according to Equation 6. Assuming  $\beta < 1$ , the increase in the total employment of low-skilled labor increases both the wage of high-skilled workers and the price of capital. The proportionate change in each of these in response to a proportionate change in  $E_1$  is

$$(8) \quad d(\log W_2) = d(\log v) = \frac{1}{(1 - \alpha_1)\eta_1} d(\log E_1),$$

where  $\alpha_1$  is the ratio of the wage bill of low-skilled workers to GNP. It then follows that the change in total output due to one additional employed immigrant is

$$(9) \quad \frac{dy}{dE_{lm}} = (1 - \beta)W_1 \text{ (increase in GNP)} \\ = W_1 \text{ (immigrant's earnings)} \\ - W_1 [\beta + (1 - \beta) \frac{(1 - \mu)}{\eta_1}] \text{ (domestic low skilled)} \\ - \frac{\mu}{\eta_1} (1 - \beta)W_1 \text{ (previous immigrants)}$$

<sup>11</sup>The assumption that low-skilled labor is equally substitutable with high-skilled labor and capital is fairly specialized. For a generalization of the analysis, see my "The Theory of Labour Market Intervention," *Economica*, forthcoming.

$$+ \frac{\alpha_2}{(1 - \alpha_1)\eta_1} (1 - \beta)W_1 \text{ (high skilled)} \\ + \frac{1 - \alpha_1 - \alpha_2}{(1 - \alpha_1)\eta_1} (1 - \beta)W_1 \text{ (capitalists)},$$

where  $\alpha_2$  is skilled workers' share and  $1 - \alpha_1 - \alpha_2$  capital's share. This decomposition shows the change in the gross earnings of each of the relevant groups, and these changes do indeed sum to the increase in GNP.<sup>12</sup>

The importation of low-skilled workers has very significant redistributive implications. For the case of a perfectly adjusting labor market for low-skilled labor ( $\beta = 0$ ) the increase in GNP due to one additional employed immigrant increases output by  $W_1$ , which is also the earnings of the new immigrant. The additional low-skilled worker also causes a minute decrease in  $W_1$  and minute increases in  $W_2$  and  $v$ . Summing across all incumbent low-skilled workers, high-skilled workers, and capitalists, this amounts to a transfer of  $W_1 / \eta_1$  from the first group to the other two. The size of this transfer is greater or less than the value of the increase in GNP as the demand elasticity is less or greater than unity. For an hourly wage of \$3.00 ( $W_1 = \$6000$  on an annual basis), this implies an income transfer, as shown in the numerical example in Table 2, of \$12,000, \$6,000, and \$4,000 for demand elasticities of, respectively, .5, 1, and 1.5.

When the rate of labor market displacement is greater than zero, there are two forms of earnings transfers due to additional immigration. First, the earnings of the newly employed immigrant exceeds the increase in GNP by  $\beta W_1$ , and this comes from the wage bill of the domestic low-skilled population. (Note: this implicitly assumes that domestic low-skilled workers are subject to induced unemployment but previous immigrants are not; this assumption, which I believe is correct, could easily be modified without substantially changing the results.)

<sup>12</sup>Such a result holds for any homogeneous production function. The only difference between (9) and the general case is the assumption that the gross earnings of high-skilled workers and capitalists increase in the same proportion. The sum of the changes in their earnings, however, equals  $(1 - \beta)W_1 / \eta_1$  in the general case.

The second source of a transfer is the  $W_1(1 - \beta)/\eta_1$  per employed immigrant that goes from incumbent low-skilled workers to high-skilled workers and capitalists through the adjustment of wages. This transfer obviously increases as the values of both  $\beta$  and  $\eta_1$  decrease.

The loss on the part of incumbent low-skilled workers due to additional immigration is the smaller (greater) the larger the value of  $\beta$ , provided that  $\eta_1$  is less (greater) than one. My own prior expectations for these parameters ( $\eta_1$  equal to 1.5 and  $\beta$  between 0 and .1) imply that most of the loss to incumbent low-skilled workers is of the second variety, an effective transfer to the other factors of production through the adjustment of relative factor prices. Table 2 suggests that the size of this transfer would be approximately 60 to 65 percent of the wage bill of new immigrants.

For example, assume that there are 4 million illegal immigrants in low-skilled positions working in competition with 20 million domestic low-skilled workers. For  $\beta = 0$  and  $\eta_1 = 1.5$ , this would imply that the current low-skilled wage would be  $(4/24) \times (1/1.5) = 11.1$  percent higher if the immigrants were not in the United States, which implies that the \$6000 value of  $W_1$  would be \$6667. This would represent a loss of  $\$667 \times 20 \text{ million} = \$13.3 \text{ billion}$  per year. This is not, of course, a loss in output, but a zero-sum transfer from the lowest end of the income distribution. If the value of  $\beta$  were .1 with  $\eta_1 = 1.5$  (which by Equation 5 implies a supply elasticity of approximately .17), the distributional implications of immigration would be slightly different. If the immigrants were not present, first, average total employment of domestic low-skilled workers would be 400,000 greater, and, second, the low-skilled rate would be  $(3.6/24) \times (1/1.5) = 10$  percent higher, or \$6600. The first effect implies a \$2.4 billion transfer from domestic low-skilled workers to immigrants, the second effect a \$12 billion transfer from the domestic low-skilled to other factors of production.

*Effects on the distribution of net income.*

The results in Table 2 suggest that, on self-interest grounds alone, high-skilled workers and capitalists would be strongly in favor

of the importation of more low-skilled labor. There is a possibility, however, that the lowering of  $W_1$  would drive large numbers of the domestic low-skilled population out of the labor force and onto the rolls of income transfer programs. With a progressive tax system, this would offset the gains in gross income incurred by the upper classes. It is therefore interesting to see under what conditions increased immigration would actually hurt the upper as well as the lower classes.

I will purposely make the extreme assumption that the tax system is as progressive as it can get, i.e., low-skilled workers pay no taxes at all. Real government spending equals spending for other than social programs ( $G_0$ ) plus a payment of  $\pi$  to each nonemployed member of the domestic low-skilled population. Assuming a balanced government budget, the after-tax income of the upper classes—high-skilled workers and capitalists—is then

$$(10) \quad y_u = y - W_1 E_1 - G_0 - \pi (L_{ld} - E_{ld}),$$

where  $L_{ld}$  is the total domestic population of low-skilled persons. (Note: Immigrants are assumed to be ineligible for the income transfer program and are, in any event, fully employed.) From Equations 5 and 6 it follows that one additional employed immigrant changes the total income of the upper classes by

$$(11) \quad \frac{\partial y_u}{\partial E_{lm}} = W_1 \left[ \frac{1 - \beta}{\eta_1} - \rho \beta \right],$$

where  $\rho = \pi/W_1$  is the replacement ratio of the income transfer system. The first term within the brackets represents the transfer due to the change in factor prices (the last two rows of Table 2), and the second term is the increase in expenditure on the income transfer program due to the additional employed immigrant.

The change in the net income of the upper classes due to an additional employed immigrant is positive so long as

$$(12) \quad \rho < \frac{1 - \beta}{\beta \eta_1} = \frac{1}{\varepsilon_1(1 - \mu)}.$$

This implies that immigration benefits the upper classes unless there is a considerable degree of labor market inflexibility in the



Table 2. Hypothetical Impact of One Additional Employed Immigrant on Potential GNP and the Distribution of Gross Earnings for Alternative Values of  $\beta$  and  $\eta_1^a$ .

Change in:	$\beta = 0$			$\beta = .1$			$\beta = .5$			$\beta = 1$		
GNP			6000			5400			3000			0
New Immigrant			6000			6000			6000			6000
	$\eta_1 = .5$	$\eta_1 = 1$	$\eta_1 = 1.5$	$\eta_1 = .5$	$\eta_1 = 1$	$\eta_1 = 1.5$	$\eta_1 = .5$	$\eta_1 = 1$	$\eta_1 = 1.5$	$\eta_1 = .5$	$\eta_1 = 1$	$\eta_1 = 1.5$
Low Skilled	- 12000	- 6000	- 4000	- 11400	- 6000	- 4200	- 9000	- 6000	- 5000	- 6000	- 5000	- 6000
High Skilled	8000	4000	2667	7200	3600	2400	4000	2000	1333	4000	2000	1333
Capitalists	4000	2000	1333	3600	1800	1200	2000	1000	667	2000	1000	667

<sup>a</sup> $\beta$  = rate of labor market displacement;  $\eta_1$  = demand elasticity;  $W_1$  = \$6000,  $\alpha_1 = .1$ ,  $\alpha_2 = .6$ .

low-skilled labor market.<sup>13</sup> For a replacement ratio less than one, the supply elasticity must be greater than one for the inequality in Equation 12 to be satisfied.

The quantitative importance of the existence of a transfer system can be seen by comparing the impact of immigration on the distribution of net incomes in Table 3 with the  $\eta_1 = 1.5$  column for each  $\beta$  in Table 2. This assumes that three-quarters of the earnings transfer from domestic low-skilled workers to the newly employed immigrant is paid for by taxpayers, and for large values of  $\beta$  the change in the net income of high-skilled workers and capitalists turns negative.

**Table 3.** Hypothetical Impact of One Additional Immigrant on Potential GNP and the Distribution of Net Income for Alternative Values of  $\beta$ ;  $\pi = 4500$ ,  $\epsilon = .75$ ,  $\eta_1 = 1.5$ ,  $w_1 = \$6000$ , and  $\alpha_1 = .1$ .

Change in:	$\beta = 0$	$\beta = .1$	$\beta = .5$	$\beta = 1$
GNP	6000	5400	3000	0
New Immigrant	6000	6000	6000	6000
Low Skilled	-4000	-3750	-2750	-1500
Taxpayers	4000	3150	-250	-4500

### Long-Run Adjustments Caused by Immigration

The adjustments of the employment level, the domestic low-skilled population, and of factor prices occur in the medium run. There will also be adjustments in the supplies of the other factors of production, and these will to some extent mitigate the severe distributional consequences of immigration already discussed.

**Capital Stock Adjustment.** First, if the supply of capital is infinitely elastic at an internationally determined price, an in-

crease in the total employment of low-skilled labor will increase the marginal product of capital, leading in turn to an increase in its supply. This implies that the effects of one additional employed immigrant on the employment of domestic low-skilled workers and their wage rate are

$$(13) \quad dE_{ld} = - \frac{(1-\mu) \epsilon_1}{(1-\mu) \epsilon_1 + \eta_1 \frac{\alpha_2 + \alpha_1 \alpha_k}{\alpha_2}} dE_{ln}$$

$$(14) \quad d(\log W_1) = - \frac{1}{(1-\mu) \epsilon_1 + \eta_1 \frac{\alpha_2 + \alpha_1 \alpha_k}{\alpha_2}} \frac{dE_{lm}}{E_1},$$

where  $\alpha_k$  is the share of output going to the owners of capital and  $\eta_1$  is the wage elasticity of demand for low-skilled labor on the assumption that other factors are held constant as used in Equations 5 and 6. (Notice that Equations 13 and 14 reduce to Equations 5 and 6 if  $\alpha_k$  is zero, i.e., if capital is not a variable factor of production.)

The adjustment of the capital stock in response to immigration lowers the rate of labor market displacement ( $\beta$ ) as long as this parameter is strictly between 0 and 1 in the first place. However, the quantitative importance of this effect is quite small. For example, with  $\epsilon_1 = .5$ ,  $\eta_1 = .5$ , and  $\mu = 0$ , the value of  $\beta$  falls from .250 without capital adjustment (see Table 1) to .241 with capital adjustment. In other words, 100 additional employed immigrants would displace 25 domestic low-skilled workers initially and 24 after capital had adjusted to the changed conditions.

Capital adjustment does have a more significant effect on the distribution of income, however. First, an additional employed immigrant—so long as  $\beta$  is less than one—increases the productivity of capital, which causes an increase in investment (in the United States as opposed to, say, South Korea) and causes potential GNP to rise by more than the wage of the immigrant. Without reporting the algebra, which is straightforward but tedious, a numerical example of the distributional effects of an additional

<sup>13</sup>Interestingly, a subsidy paid to employers to hire domestic low-skilled workers increases the after-tax income of the upper (tax-paying) classes if the inequality in (12) is not satisfied (see Johnson, "The Theory of Labour Market Intervention"). In other words, if immigration hurts taxpayers, employment programs are a free lunch, and *vice versa*.

immigrant is given in Table 4, first with no capital adjustment (repeating data from Table 2) and then with sufficient capital adjustment to keep the marginal product of capital constant. This example assumes that there is no labor market displacement as well as that  $\eta_1 = 1.5$ ,  $\alpha_1 = .1$ ,  $\alpha_2 = .6$ , and  $\alpha_k = .6$ . The big gainers, compared to the no capital adjustment case, are high-skilled workers, whose rent increases by 43 percent due to capital adjustment. The income loss of the domestic low-skilled population (including previous immigrants) falls by only 5 percent. The gross earnings of capitalists increase, but, by assumption, their rents disappear.

*Table 4. Hypothetical Impact of One Additional Employed Immigrant on Potential GNP and the Distribution of Gross Earnings for  $\beta=0$  and  $\eta_1=1.5$ .*

<i>Change in:</i>	<i>No Capital Adjustment</i>	<i>Complete Capital Adjustment</i>
GNP	6000	8571
New Immigrant	6000	6000
Low Skilled	- 4000	- 3810
High Skilled	2667	3810
Capitalists	1333	2571

*Adjustment of the distribution of skills.* An increase in the wage differential between low- and high-skilled workers will set in motion another set of adjustments that are potentially more important than the adjustment of the capital stock. Young persons in the domestic population who are on the margin between choosing to engage in training to become highly skilled workers and not to engage in training and thus becoming low-skilled workers are now more likely to pursue the former option. This is just as true when  $\beta$  is close to one as when it is zero. To the extent that the immigration is a steady stream and can be anticipated by young persons (as, I suspect, it *should* be at the present time in the United States), this skill adjustment can actually take place rather rapidly.

To some extent, the immigrants themselves may engage in further training and

occupational upgrading. A recent study, however, found that most *economic* immigrants (most importantly, those from Mexico) experienced a relatively small amount of upgrading.<sup>14</sup> Immigrants who are political refugees, notably the Cubans (and, one suspects, the Vietnamese in the past few years), experienced a U-shaped pattern of occupational attainment. Initially they took jobs that were worse than the ones they held in their home countries, but with the passage of time their occupational status increased as they learned how to transfer their skills to the U.S. context. Quantitatively, however, political refugees are much less important than economic immigrants.

If the skill distribution of the labor force does not change due to immigration, the losses incurred by the low-skilled population are not a problem. With a variable capital stock the real wages of both skill groups are no different from what they would have been without the immigration, and GNP rises by the proportion of the average wage in the economy divided by labor's share of output. The only problem arises when the economy begins to run out of fixed capital (land and resources).

## Conclusions

The principal conclusion of this exercise is that a high rate of immigration of low-skilled labor into the United States is likely to have a rather large impact on the distribution of income in the United States. Incumbent low-skilled workers will lose as a result of immigration—primarily through lower wages rather than increased unemployment, and this loss is probably in the range of 50 to 75 percent of the earnings of the additional immigrants. The additional low-skilled labor that results from the immigration does, however, raise the earnings of high-skilled workers and the owners of capital. In fact, the earnings gain of these other groups exactly equals the earnings

<sup>14</sup>See Barry Chiswick, "A Longitudinal Analysis of The Occupational Mobility of Immigrants," in Industrial Relations Research Association, *Proceedings of the Thirtieth Annual Winter Meeting, December 28-30, 1977, New York City* (Madison, Wis.: IRRA, 1978), pp. 20-27.

loss of the domestic skilled population if the latter's employment is not reduced. Thus, if governed solely by self-interest, persons at the low end of the skill distribution will oppose increased immigration and persons who possess high skills or own the capital stock will point out that there is still plenty of room for newcomers in this great country.

These conclusions are modified to some extent if there is a high labor supply elasticity and a generous income transfer program for the non-employed. Then it is possible that all groups of domestic workers lose through immigration, but it is not likely that the supply elasticity is sufficiently large or the income transfer scheme would be sufficiently generous for this to be the case. Also, the importation of low-skilled workers into the country will drive up the real return to capital. This would increase investment until the return to capital returns to its internationally-determined supply price (for example, U.S. companies will decide to build plants in Texas rather than in Singapore). In this longer run the adverse effects of immigration on the distribution of earnings will then be mitigated somewhat.

The major qualification to the conclusion that immigration has had (and will continue to have) perverse distributional consequences is the likelihood that a larger base of low-skilled workers permits a higher fraction of the sons and daughters of domestic low-skilled workers to train for highly skilled professions. To the extent that this

happens, the transfer of earnings from the low-skilled to the high-skilled population would be much smaller than under the assumption of a constant skill distribution. In this respect, it is interesting to note that during the 1880 to 1914 period the number of immigrants to the United States averaged about 600,000 per year.<sup>15</sup> Seventy percent of these were experienced, blue-collar workers, only 5 percent were white-collar workers, and 25 percent were without an occupation (presumably these were dependent children). Those immigrants therefore constituted a sizable increment to the total blue-collar work force of that period, averaging about 3 percent per year. During this period the fraction of the 18–24 year old population attending institutions of higher learning increased from 1.6 to 2.9 percent; the fraction of 17 year olds who graduated from high school rose from 2.5 to 11.7 percent. Similarly, the illiteracy rate of the white native-born population also decreased from 8.7 to 3.0 percent. Obviously these data do not *prove* the hypothesis, but they are certainly consistent with the notion that the massive immigration around the turn of the century drove up the rate of return to schooling and induced the native population to acquire a higher average level of skill than they would have obtained in the absence of massive immigration.

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<sup>15</sup>United States Bureau of the Census, *Historical Statistics of the United States: Colonial Times to 1970* (Washington, D.C.: G.P.O., 1975).