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A Specific Factor Analysis of
the Illegal Immigrant Issue

by

Michael B. Dompierre

A SPECIFIC FACTOR ANALYSIS
OF THE ILLEGAL IMMIGRANT ISSUE

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A Specific Factor Analysis of the Illegal Immigrant Issue

After considerable debate the United States has just enacted a new immigration law aimed at restricting the inflow of illegal immigrants. Referred to as the Simpson-Rodino law, it represents the first major overhaul of U.S. immigration law in twenty years. The law has two major components. Under the first, illegal immigrants will be granted temporary resident status if they can prove that either they started living in the U.S. before 1982 or that they worked in farm labor for at least 90 days in the past year. Of the four to six million illegal immigrants estimated to be currently living in the U.S., the Immigration and Naturalization service estimates only one million to 1.25 million will qualify. Under the second component, fines will be levied against employers who knowingly hired illegal immigrants after the bill became law on November 6, 1986.²

A review of the debate surrounding the bill reveals that the arguments advanced, both pro and con, were based on the believed income redistributive effects of such labor inflows rather than their general welfare effects. This is surprising to the economist familiar with the traditional theoretical model used to analyze such inflows (two factors of production, two products, small open economy producing under constant returns to scale), since in this model immigration will not affect the income distribution of the non-immigrants, Mundell (1957). The reason for this is that factor

prices are determined solely by traded goods prices and are independent of factor endowments. As noted, these theoretical results are, however, in conflict with the observed behavior of lobbying groups, capitalists, professional organizations, and labor unions who behave as though such distributional effects did in fact exist.

The purpose of this paper is to modify and extend the traditional theoretical model to gain some insights into the possible determinants of this observed behavior and the forces that shaped U.S. immigration policy. We begin by noting the following stylized facts. The owners of capital opposed the additional restrictions on the inflows of illegal immigrants. The owners of labor supported the additional restrictions, despite the fact that the illegal immigrants are on average of a lower skill level than the native population. And, the agricultural sector was singled out for special treatment. In order to generate income distributional effects and reflect these stylized facts, in this paper we will consider a three factor, two sector model that allows for some sector specificity of factors in the short run, but not in some longer run time period.

THE SHORT RUN

Consider two countries, the United States and Mexico, each of which is incompletely specialized in two productive sectors, agriculture (AGRI) and manufactures (MAN). AGRI is assumed to employ unskilled labor and capital. MAN is assumed to employ skilled labor and capital. While unskilled labor is intersectorally immobile, it is assumed that it is potentially internationally

mobile within the AGRI sector. Capital although perfectly mobile intersectorally, is internationally immobile. And, skilled labor is both intersectorally and internationally immobile. Perfect competition exists in all markets. Prices are given exogenously and, since in our barter economies only relative prices matter, the MAN sector is chosen as our numeraire. The industry production functions are assumed to be linear homogeneous, twice differentiable, and strictly quasi-concave with positive marginal products.

In light of the above assumptions the equilibrium conditions within each of the two countries are:³

$$\begin{aligned}
 r &= Y_K(K_1, S) = pY_K(K-K_1, U) \\
 (1) \quad s &= Y_S(K_1, S) \\
 w &= pY_U(K-K_1, U)
 \end{aligned}$$

where:

1 = MAN

2 = AGRI

r = uniform rental rate paid to the mobile factor,
capital (K)

s = wage rate paid to unskilled labor (U) in AGRI

w = wage rate paid to skilled labor (S) in MAN

Y_i = marginal product of factor i in sector j, $i = U, S, K, j = 1, 2$

The system of equations contained in (1) has as endogenous variables the factor returns r, s, and w, and the sectoral employment of capital, K_1 .

With the above set of equations in mind for each of the two countries it is possible to derive the responses of the endogenous

variables in each country in response to an increase in U in the U.S. and a decrease in U in Mexico. These changes in the U's are used to represent the increased unskilled labor in the U.S. agricultural sector and the accompanying decrease in the Mexican agricultural sector as a result of the flows of illegal immigrants.

SHORT RUN QUALITATIVE CHANGES IN INCOME

After totally differentiating the equilibrium conditions expressed in (1) holding total capital and skilled labor endowments, and relative commodity price constant, the following expressions for the effects of a change in the endowment of unskilled labor are found:

$$(2) \quad dK_1/dU = -pY_K^2 u / \Delta$$

$$(3) \quad dr/dU = -Y_{KK}^1 pY_{KU}^2 / \Delta$$

$$(4) \quad ds/dU = -Y_{SK}^1 pY_{KU}^2 / \Delta$$

$$(5) \quad dw/dU = [(pY_{KU}^2)^2 - pY_{UU}^2 pY_{KK}^2 - pY_{UU}^2 Y_{KK}^1] / \Delta$$

where $\Delta = -(Y_{KK}^1 + pY_{KK}^2) > 0$.

An examination of expression (2) reveals it to be negative.⁴ Thus, the inflow of unskilled labor into the AGRI sector in the U.S. causes capital employment in the MAN sector to decline, and given the fixed total endowment of capital, its employment in the AGRI sector would increase.

Expression (3) is positive, indicating that the unskilled labor inflow would lead to an increase in the rental rate paid to capital.

From expressions (4) and (5) it is clear that the wage rates paid to skilled labor and unskilled labor, respectively, would both decline. Intuitively, since skilled labor and capital must be complements, the outflow of capital from the MAN sector causes

skilled labor's marginal productivity schedule and hence its demand to decline and since the supply is necessarily unchanged the wage rate must fall. In the AGRI sector, the inflow of capital does cause unskilled labor's marginal productivity schedule and hence its demand to increase; however, the supply of unskilled labor increases proportionately more, so that the wage rate to unskilled labor must fall.

Assuming, as we have, a fixed world endowment of each factor, the flow of unskilled labor from Mexico to the U.S. will have a similar but qualitatively opposite effect on the factor incomes in Mexico. On the basis of the above results, U.S. capital owners would in general be in favor the continuation of such inflows, while U.S. labor, both unskilled and skilled, should oppose these inflows. In Mexico, capital owners should be hurt by the outflows, while both types of labor should gain.

ADJUSTMENT TO LONG-RUN EQUILIBRIUM

Although the assumption of factor sector-specificity is quite realistic for relatively short run periods of time it is not likely to be a long run phenomena. As such, our model will likely resolve itself into the three-mobile-factors two goods case in which factor competition will act to equalize sectoral returns to each factor.

Ruffin (1981) has established a fairly general theorem for the distributional effects of a change in factor endowments in this model. These effects are determined completely by factor intensities independent of complementarity/substitutability. The short-run results determined here are determined completely by the assumption of factor specificity and factor

complementarity/substitutability independent of factor intensity. Due to the differences in what determines the direction of the change in a factor's return in the short and long run one might expect to find a conflict. However, in this case, they may be likely to agree. Suppose that unskilled labor and skilled labor differ most in factor usage across sectors so that they may be labeled extreme factors. And capital is the middle factor. According to Ruffin an increase in the supply of an extreme factor will benefit the middle factor and hurt the other extreme factor. Thus, an inflow of unskilled labor would lower the return to skilled labor (and itself) and raise the return to capital; Thus even in the long run, capital owners would be expected to uniformly oppose additional restrictions and labor to uniformly favor them. Of course, if either capital is an extreme factor or unskilled labor the middle factor, capital and/or skilled labor will experience a conflict between its best interests in the short and long runs, the resolution of which will depend upon their respective time rate of discount.

CONCLUSION

In this paper we have attempted to model the distributional effects of the inflows of illegal immigrants in to the U.S. in terms of an inflow of sector-specific unskilled labor in a three factor, two good model. The short-run results found are consistent with the observed behavior of factor owners with regards to the recent change in immigration policy. The long-run results when the specificity assumption is relaxed may also prove to be consistent.

NOTES

¹Assistant Professor of Economics and Fellow, Center for International Studies. This research was supported, in part, by the Center.

²Wall Street Journal, November 26, 1986, pp. 1 and 15.

³Except for the different labelling of the factors, the short run model presented here is essentially what has come to be referred to as the specific-factors model of foreign investment. The first brief treatment of this model appears in Caves (1971). More detailed analysis may be found in Ikemoto (1975), Amano (1977), and Falvey (1979). Dompierre (1984) provides an application of the model to a current trade policy issue.

⁴Continuing our notation Y_{KK}^j , $j=1,2$, Y_{UU}^2 , Y_{KU}^2 , Y_{SK}^2 , denote the own second derivative of capital (unskilled labor) respectively, and the cross-partial of capital and unskilled labor, (skilled labor and capital) respectively. From the second-order conditions for profit maximization we get $Y_{KK}(Y_{UU}) < 0$, $j=1,2$, i.e., diminishing marginal productivity. And, from the assumptions of only two factors employed in a sector and linear homogeneity we get Y_{KU} , $Y_{SK} > 0$, i.e. the two factors are complements.

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