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Immigration And Poverty In The United States

By Steven Raphael and Eugene Smolensky*

Between 1970 and 2003, the proportion of US residents born in another country increased from 4.8 to 12.4 percent, with net migration accounting for one-quarter of net population growth. Recent migrants are concentrated among groups with either extremely low or relatively high levels of formal educational attainment, with the group at the low end being particularly large.

The potential contribution of international migration to the official US poverty rate likely operates through two avenues. First, with higher poverty rates among the foreign born, an increase in the proportion foreign born increases the national poverty rate. Second, international immigration alters the relative supplies of workers with different skill levels, which may influence the wages and employment of both migrants and natives. The impact of this change on poverty depends on the sensitivity of native employment and earnings to labor supply shifts.

We assess the impact of immigration on native poverty rates operating through the latter channel. We calibrate a model of the US wage structure using census data for the period 1970 to 2005, and use this model to simulate what native wages would have been in 2005 if immigrant penetration in the labor market were at 1970 levels. Next, we use this hypothetical set of wage effects in conjunction with household survey data for 2005 to estimate what the consequences for native poverty rates would have been.

I. The Wage Determination and Simulating the Wage Effects of Immigration on Natives

Following David Card and Thomas Lemieux (2001), George Borjas (2003), and Gianmarco Ottaviano and Giovanni Peri (2007), we assume that overall production in the economy is described by the multilayer constant elasticity of substitution (CES) production function

$$(1)\qquad Q_t = [a_{0t} K_t^{\nu} + a_{1t} L_t^{\nu}]^{1/\nu},$$

$$\text{where}\quad \nu = 1 - \frac{1}{\sigma_{KL}},$$

$$(2)\qquad L_t = \left(\sum_{k=1}^{4} e_{tk} L_{tk}^{\eta}\right)^{1/\eta},\quad \text{where}\quad \eta = 1 - \frac{1}{\sigma_{\text{educ}}},$$

$$(3)\qquad L_{tk} = \left(\sum_{j=1}^{8} x_{tkj} L_{tkj}^{\delta}\right)^{1/\delta},$$

$$\text{where}\quad \delta = 1 - \frac{1}{\sigma_{\text{exp}}},$$

$$(4)\qquad L_{tkj} = \left(\sum_{i=1}^{2} m_{tkji} L_{tkji}^{\varepsilon}\right)^{1/\varepsilon},$$

$$\text{where}\quad \varepsilon = 1 - \frac{1}{\sigma_{\text{immig}}},$$

where t indexes times, k indexes four labor groups defined by educational attainment (less than high school, high school, some college, college graduates), j indexes eight potential years of experience groups (0 to 4, 5 to 9, 10 to 14, 15 to 19, 20 to 24, 25 to 29, 30 to 34, 35 to 40), and i indexes nativity (1 = native, 2 = immigrant). Equation (1) combines capital and total labor in year t to produce national output Q_t, where a_{ot} and a_{1t} are productivity coefficients for capital and labor, respectively, and σ_{KL} is the elasticity of substitution between capital and labor. In turn, the total labor supply aggregate, L_t, is a CES aggregation of subcategories of labor defined by the four educational groups, L_{tk}, given by equation (2), where the e_{tk} provide the corresponding productivity coefficients and σ_{educ} is the elasticity of substitution between education groups. The labor supply of each educational group, L_{tk}, is further assumed in equation (3) to be a CES aggregation of labor supply for each of the eight experience groups, L_{tkj}, with corresponding

*Raphael: Goldman School of Public Policy, University of California, Berkeley, 2607 Hearst Avenue, Berkeley, CA 94720–7320 (e-mail: stevenraphael@berkeley.edu); Smolensky: Goldman School of Public Policy, University of California, Berkeley, 2607 Hearst Avenue, Berkeley, CA 94720–7320 (e-mail: geno@berkeley.edu).

productivity coefficients x_{tkj} and an elasticity of substitution between experience groups within an education branch given by σ_{exp}. Finally, labor supplied within a given education-experience cell is assumed to be a CES aggregation of native labor, L_{tkj1}, and immigrant labor, L_{tkj2}, with a corresponding elasticity of substitution between immigrants and natives given by σ_{immig}, and productivity coefficients given by m_{tkji}.

The wages of workers in group *tkji* are determined by their marginal product, which in turn will depend on the supply of capital, the overall supply of labor, the supply of labor in education group *tk*, the supply of labor in education-experience group *tkj*, and their own supply of labor L_{tkji}. Immigration over a given time period affects the wages of natives through an impact on the first four of these factor supplies. Since we are estimating the effects of immigration over a 35-year period, we assume that the economy is on its long-run balanced growth path (following Ottaviano and Peri 2007 and Borjas 2005), implying that capital accumulates at the rate needed to ensure a constant return to capital.

To derive the full effects of a specific immigration-induced supply shock on the wages of a given native skill group, we must derive the elasticity of native wages to changes in immigrant supply (1) within the same education-experience cell, (2) within one's education group but outside one's education-experience cell, and (3) with respect to immigrant supply outside one's education group. Raphael and Smolensky (2008) show that these three wage elasticities are given by the expressions

$$(5)\qquad \varepsilon_{\text{own}} = \frac{\partial \ln w_{tkj1}}{\partial \ln L_{tkj2}} = \frac{1}{\sigma_{\text{educ}}}\frac{s_{tkj2}}{s_t} + \left[\frac{1}{\sigma_{\text{exp}}} - \frac{1}{\sigma_{\text{educ}}}\right]\frac{s_{tkj2}}{s_{tk}} + \left[\frac{1}{\sigma_{\text{immig}}} - \frac{1}{\sigma_{\text{exp}}}\right]\frac{s_{tkj2}}{s_{tkj}},$$

$$(6)\qquad \varepsilon_{\text{cross-exp}} = \frac{\partial \ln w_{tkj1}}{\partial \ln L_{tkj'2}} = \frac{1}{\sigma_{\text{educ}}}\frac{s_{tkj'2}}{s_t} + \left[\frac{1}{\sigma_{\text{exp}}} - \frac{1}{\sigma_{\text{educ}}}\right]\frac{s_{tkj'2}}{s_{tk}}, \quad \text{where} \quad j \neq j',$$

$$(7)\qquad \varepsilon_{\text{cross-educ}} = \frac{\partial \ln w_{tkj1}}{\partial \ln L_{tk'j2}} = \frac{1}{\sigma_{\text{educ}}}\frac{s_{tkj'2}}{s_t}, \quad \text{where} \quad k \neq k',$$

where s_t is labor's share of income in year t, s_{tk} is the share of income accruing to labor in education group k in year t, s_{tkj} is the share of income accruing to labor in group *tkj*, and s_{tkj2} is the share of income accruing to immigrant labor in group *tkj*.

Define the variable M_{kj} as the percentage increase in immigrant supply between 1970 and 2005, and the column vector m as the complete set of shocks for the 32 education-experience groups. Using the elasticites in equations (5) through (7), we can construct a square elasticity matrix $\mathbf{\Pi}$ where the rows are defined by the education experience group of natives for whom we wish to analyze wage effects, and the columns are defined by the education-experience group experiencing an immigrant labor supply shock. Elements of the matrix where $i_{\text{row}} = i_{\text{column}}$ and $j_{\text{row}} = j_{\text{column}}$ are given by the own-elasticity in equation (5), and elements of the matrix where $i_{\text{row}} = i_{\text{column}}$ and $j_{\text{row}} \neq j_{\text{column}}$ are given by the cross experience group elasticity in equation (6), while elements of the matrix where $i_{\text{row}} \neq i_{\text{column}}$ and $j_{\text{row}} \neq j_{\text{column}}$ are given by the cross-education group elasticity in equation (7). The vector of simulated wage effects of immigration on natives between 1970 and 2005 is given by the equation

$$(8)\qquad \textit{Wage Effect} = \mathbf{\Pi} m.$$

In our simulations, we assume that labor's share of national income is 0.7, and estimate the additional shares using data from the 2005 American Community Survey. We define the immigrant shocks M_{kj} as the difference between the immigrant supply level in 2005, less the immigrant supply level in 1970, all divided by the immigrant supply level in 2005. Our preferred estimates of the three elasticities of substitution implied a high degree of substitutability between immigrants and natives ($\sigma_{\text{immig}} = 33$), a lower level of substitutability between workers in different education groups ($\sigma_{\text{educ}} = 8$), and a somewhat greater degree of substitutability between workers of similar education but different experience levels ($\sigma_{\text{exp}} = 9.14$).[1] These parameter choices, coupled with endogenous capital accumulation, result

[1] See Raphael and Smolensky (2008) for estimation details.

TABLE 1—SIMULATED PROPORTIONAL EFFECTS OF IMMIGRATION BETWEEN 1970 AND 2005 ON THE WEEKLY WAGES OF NATIVE HIGH SCHOOL DROPOUTS BY POTENTIAL YEARS OF WORK EXPERIENCE

Years of experience	$\sigma_{immig} = 33$ $\sigma_{exp} = 9.14$ $\sigma_{educ} = 8$	$\sigma_{immig} = 33$ $\sigma_{exp} = 9.14$ $\sigma_{educ} = 2.5$	$\sigma_{immig} = \infty$ $\sigma_{exp} = 9.14$ $\sigma_{educ} = 2.5$
0–4	−0.00	−0.05	−0.07
5–9	−0.02	−0.07	−0.09
10–14	−0.02	−0.07	−0.09
15–19	−0.02	−0.07	−0.09
20–24	−0.02	−0.07	−0.09
25–29	−0.01	−0.06	−0.08
30–34	−0.01	−0.06	−0.08
35–40	−0.00	−0.06	−0.07

Note: See text for description of the wage simulations.

in relatively small impacts of immigration on native wages, which are concentrated among high school dropouts only. To explore the sensitivity of our poverty simulations to changes in these parameter choices, we tabulate wage changes and poverty effects using two other sets of parameter values. The first alternative assumes a cross-education group elasticity of 2.5. The second alternative set of parameter values employs our estimate of σ_{exp}, sets σ_{educ} to 2.5, but assumes perfect substitutability between immigrants and natives.

Table 1 presents the simulated effects of immigration between 1970 and 2005 on the wages of native high school dropouts (the only group negatively effected in our three simulations). The simulation using our preferred parameter values yields the smallest adverse wage effects. Limiting the degree of substitutability between education groups leads to a substantial increase in these impacts. Finally, adding perfect substitutability between immigrants and natives yields the largest negative wage effects.

II. The Impact of Immigrant-Native Labor Market Competition on Native Poverty

Using the wage simulations, we calculate counterfactual family income for households with a native-born household head and corresponding counterfactual poverty rates in 2005 (presented in Table 2). For each simulation, we present two sets of hypothetical poverty rates. The first assumes that higher wages induce an increase in weeks worked, while the second assumes perfectly inelastic labor supply. A simulated poverty rate below the actual rate suggests that immigration between 1970 and 2005 has aggravated poverty for the group in question.

The results by race/ethnicity suggest that immigration over this time period has had negligible effects on poverty overall. For black households the simulation using the largest adverse wage effects for high school dropouts suggest that had immigration been held to 1970 levels, the black poverty rate in 2005 would be 25.5 percent, compared with actual poverty rates for this group of 26 percent. Among native-born Hispanics, the lowest hypothetical poverty rate is 18.4 percent, compared to an actual poverty rate of 19.3 percent. By level of educational attainment, we find the largest potential effects on the poverty rates of households headed by someone with less than a high school degree. The simulations suggest a hypothetical 2005 poverty rate between 27.2 and 28.6 percent for this group, compared to an actual poverty rate of 29.1 percent. For households headed by a native born person with a high school degree or greater, the effects of immigration on poverty are essentially equal to zero.

In results not reported in table form here, we also performed poverty simulation for households defined by both the race and educational attainment level of the household head. Again, we found very little evidence of an impact of immigration on poverty rates. The lowest simulated poverty rates imply only modest impacts of labor market competition with immigrants

TABLE 2—ACTUAL POVERTY RATES (2005) AMONG PERSONS IN HOUSEHOLDS HEADED BY NATIVES, AND SIMULATED POVERTY RATES

		$\sigma_{immig} = 33, \sigma_{exp} = 9.14, \sigma_{educ} = 8$		$\sigma_{immig} = 33, \sigma_{exp} = 9.14, \sigma_{educ} = 2.5$		$\sigma_{immig} = \infty, \sigma_{exp} = 9.14, \sigma_{educ} = 2.5$	
	Actual poverty	Elastic labor supply	Inelastic labor supply	Elastic labor supply	Inelastic labor supply	Elastic labor supply	Inelastic labor supply
Panel A: By race/ethnicity of household head							
NonHispanic							
White	7.9	7.9	7.8	7.8	7.9	7.8	7.8
Black	26.0	25.8	25.8	25.8	25.7	25.5	25.6
Asian	8.0	8.0	7.9	7.9	7.9	7.8	7.8
Other	19.6	19.5	19.5	19.5	19.5	19.2	19.3
Hispanic	19.3	19.0	19.1	18.7	18.9	18.4	18.8
Panel B: By level of educational attainment of household head							
< High school	29.1	28.4	28.6	27.6	28.2	27.2	27.9
High school	14.0	13.9	13.9	13.9	13.9	13.8	13.8
Some college	9.9	9.9	9.9	10.0	9.9	10.0	9.9
College plus	3.0	2.9	2.9	2.9	2.9	2.9	2.9

Notes: Actual and simulated poverty rates pertain to persons in households where the household head is native born. Simulations with elastic labor supply assume a weeks-worked labor supply elasticity of one. Simulations with inelastic labor supply assume a weeks-worked labor supply elasticity of zero. See the text for a complete discussion of the calculations of the simulated poverty rates.

on native poverty rates for households headed by someone with less than a high school degree, and virtually no effects for all other groups. For the lowest skilled households, the largest poverty effects occur for African Americans and Hispanics. For example, the lowest simulated poverty rate for black households headed by someone with less than a high school degree is 43 percent, 2.3 percentage points lower than the actual poverty rate for this group in 2005 (45.3 percent). The comparable figures for low-skilled Hispanic households are 33.5 and 36.6 percent.

Thus, we find little evidence of an impact of immigration on native poverty through immigrant-native labor market competition. Despite adverse wage effects on high school dropouts and small effects on the poverty rates of members of this group, the effects on native poverty rates are negligible. This latter result is largely driven by the fact that even among native-born poor households, most have at least one working adult with at least a high school education.

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