International Migration

Giovanni Facchini

Università degli Studi di Milano,

University of Essex, CEPR, CES-Ifo and Ld‘A

Outline of the course

- A simple framework to understand the labor market implications of immigration
  - In the Host country
- Some evidence
- Explaining policies towards migration
- Individual opinions and migration policy

Labor market effects of immigration: A model with one output good

(Factor proportions analysis)

- Consider a simple economy, characterized by a linearly homogeneous production function $Q=f(K, L)$.
- The labor force $L=N+M$, where N are the natives, M are the immigrants. Natives and immigrants are thus perfect substitutes.
- The supply of natives and migrants is inelastic, and the same holds true for the supply of capital, that is owned by natives.

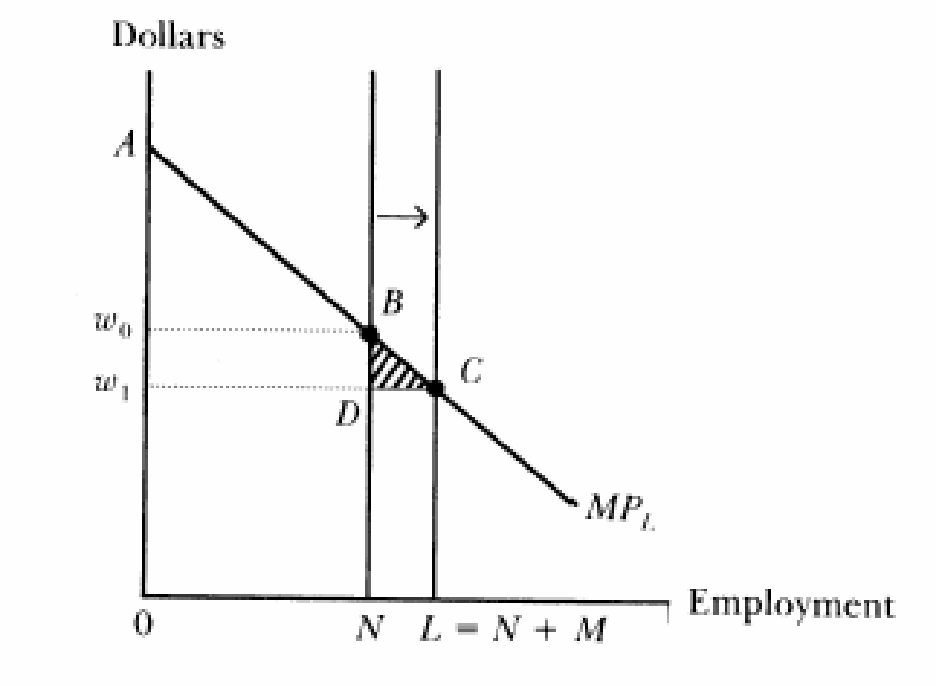
Labor market effects of immigration

- In equilibrium, r=MPK, w=MPL. National income accruing to the natives in the pre-migration equilibrium is thus

$$Q_0 = r_0 K + w_0 L$$

- The equilibria with and without migration are given by

The gains from immigration



The gains from immigration

- The area BCD represents the immigration surplus. As a share of national income, the immigration surplus is given by

$$\frac{\Delta Q_N}{Q} = -\frac{1}{2}\alpha_L \varepsilon_{LL} m^2$$

- where α_L is the labor's share of national income; ε_{LL} is the elasticity of factor price for labor and *m* is the fraction of the labor force that is foreign born.
- Notice that the immigration gains are directly proportional to the elasticity of factor price for labor: the greater the (adverse) impact of immigration on domestic wages, the larger is the immigration surplus.

Distributional effects of immigration (in the host country)

- Native workers lose. As a share of GDP the net change in the income of native workers is given by

$$\frac{\Delta NativeWork}{Q} = \alpha_L \varepsilon_{LL} m(1-m)$$

- Native capitalists are instead better off. As a share of GDP they gain

$$\frac{\Delta NativeCap}{Q} = -\alpha_L \varepsilon_{LL} m\left(1-\frac{m}{2}\right)$$

Perfect capital mobility

- If capital is perfectly mobile across countries, any extra return will be arbitraged out… and as a result the gains from immigration for the host country will be equal to zero.

A model with two outputs

- Small open economy
- 2 goods, produced under constant returns to scale
- 2 factors: skilled labor, unskilled labor
- Native labor force *N* has fraction *b* of skilled workers and *(1-b)* unskilled workers, i.e.

$$N=b*N+(1-b)*N$$

The 2x2 Hecksher Ohlin model

- Immigrant workforce *M* has *β* skilled workers and *(1- β)* unskilled workers, i.e.

  $M = \beta * M + (1 - \beta) * M$

- Total Labor force is

  $L = N + M$

The 2x2 Hecksher Ohlin model

- Equilibrium

$$p_i = c_i\left(w_U, w_S\right)\ i = 1,2$$

$$S = \sum_{i=1}^{2} y_i c_{iS}\left(w_U, w_S\right)$$

$$U = \sum_{i=1}^{2} y_i c_{iU}\left(w_U, w_S\right)$$

where p_i and y_i are prices and quantities, while $c_i\left(w_U, w_S\right)$ are unit costs and $c_{ik}(w_U, w_S) = \frac{\partial c_i}{\partial w_k}$ are unit factor demands.

2x2 HO Model

- Assume that the country produces both goods, and no factor intensity reversals.
- Factor returns can then be determined by solving

$$p_1 = c_1\left(w_{S,} w_U\right)$$
$$p_2 = c_2\left(w_{S,} w_U\right)$$

2x2 HO Model

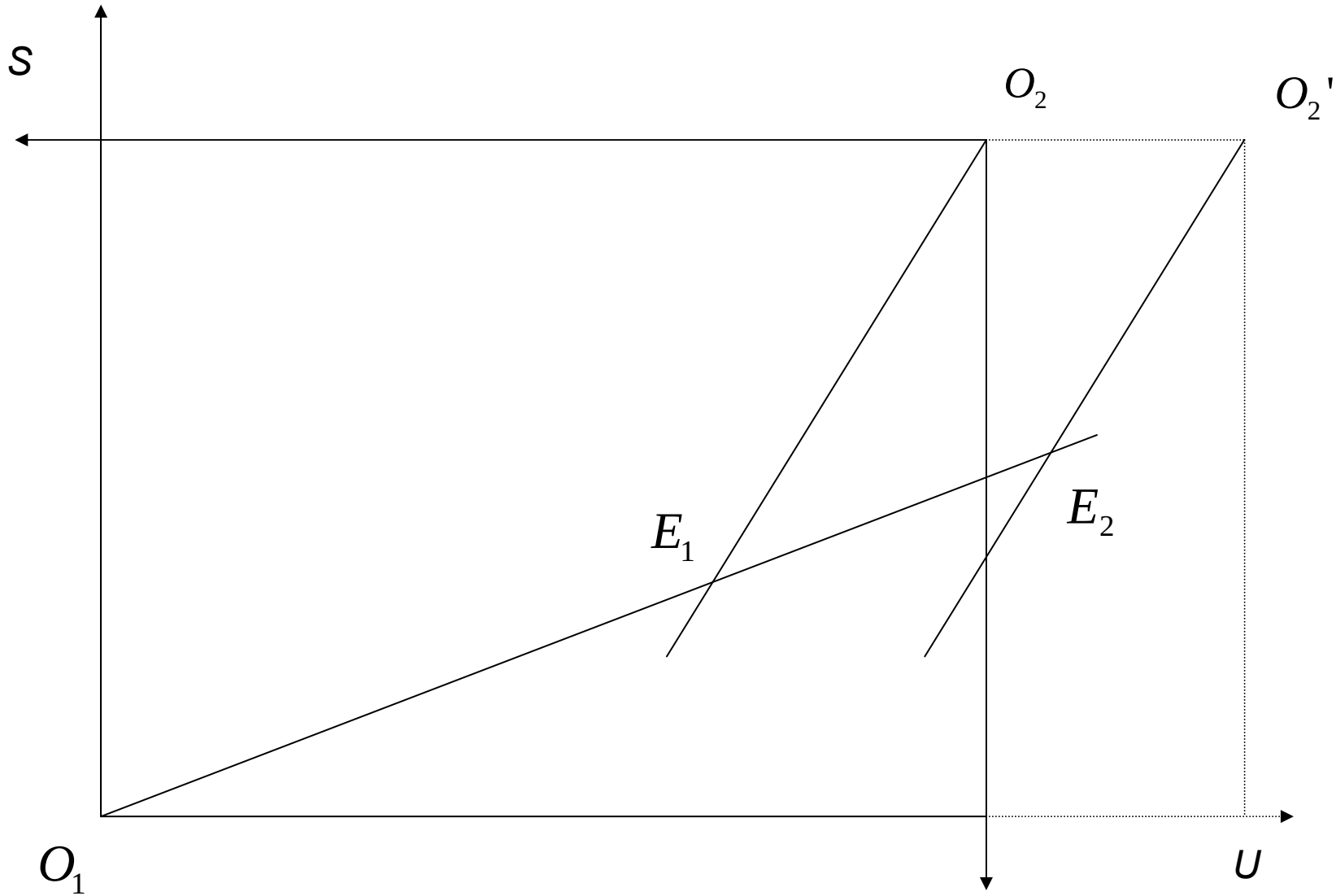
- The no FIR assumption guarantees that the system has a unique solution, i.e. for given output prices there is only one pair of returns to skilled and unskilled labor that satisfies the zero profit condition.

2x2 HO Model

- If the immigration shock is not too big (i.e. the economy remains within the cone of diversification), factor price insensitivity holds: Factor prices are *insensitive* to changes in factor endowments induced by immigration
- Increase in factor endowment absorbed by a Rybczynski effect, with reallocation of factors across sectors.

2x2 Heckscher Ohlin Model

- The Rybczynski theorem – one of the four important theorems of the Heckscher-Ohlin model of international trade - says that as long as both outputs continue to be produced, and output prices are given, an increase in the number of unskilled workers (in our context an inflow of unskilled migrants) leads to an increase in the output of the good that uses intensively unskilled labor.
- Graphically, the Rybczynski theorem can be illustrated as follows

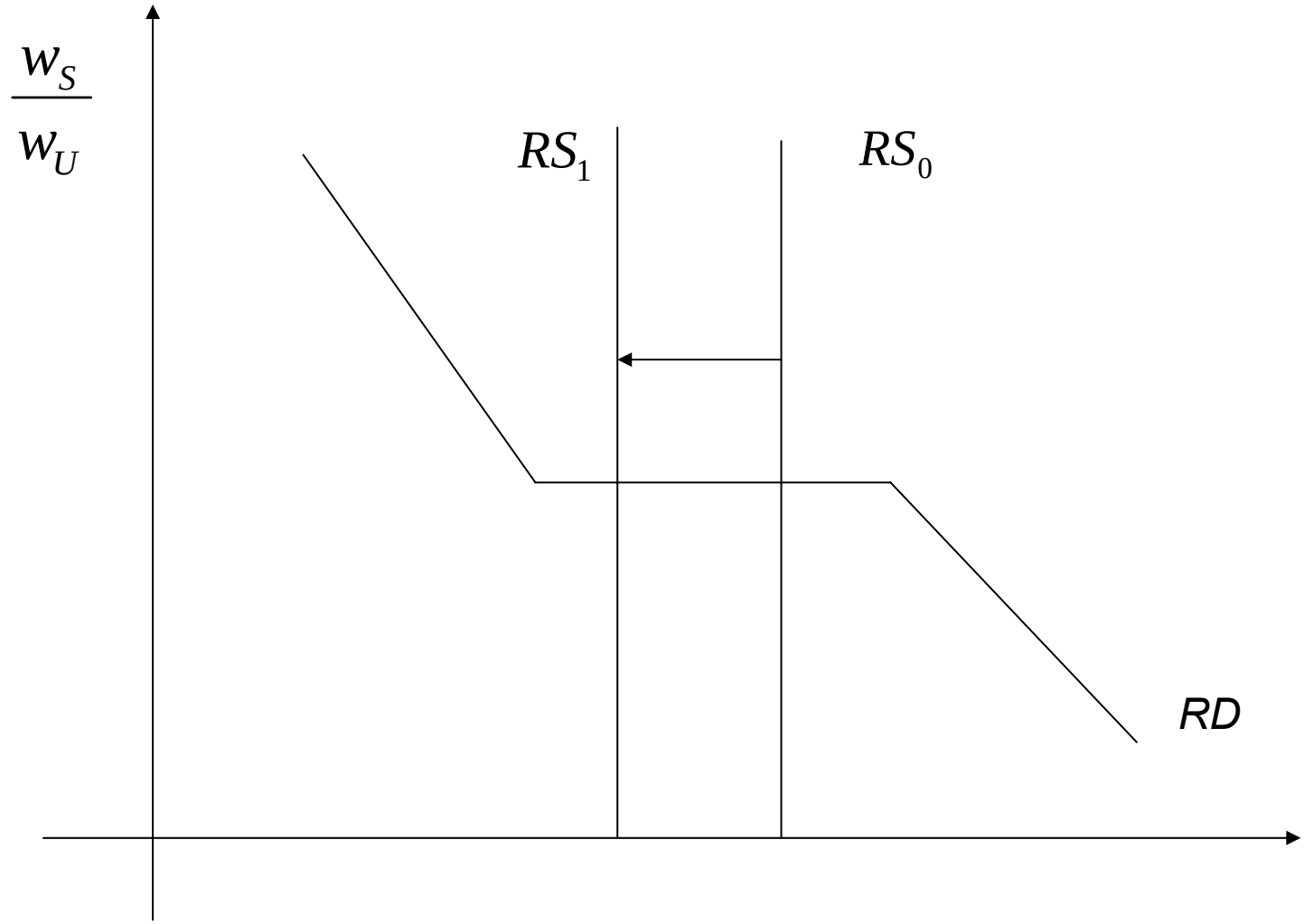

S
O_2
O_2'
E_1
E_2
O_1
U

Rybczynski Effect

- Good 1 is unskilled labor intensive, while good 2 is skilled labor intensive.
- If both goods continue to be produced and output prices are fixed, the conditions

$$p_1 = c_1\left(w_{S,} w_U\right)$$
$$p_2 = c_2\left(w_{S,} w_U\right)$$

continue to determine the domestic returns to unskilled and skilled labor. Thus, there are no distributional effects of immigration.


$\frac{w_S}{w_U}$
RS_1
RS_0
RD

2x2 HO Model

- What if the country produces only one good?
- Zero profit conditions are not enough to pin down factor prices, we need factor market equilibrium conditions as well
- Changes in endowments now have an impact on factor prices!

2x2 HO model

$$\frac{dw_S}{dM} = k_1(b-\beta)\frac{w_S}{N} \quad k_1 > 0$$

$$\frac{dw_U}{dM} = k_2(b-\beta)\frac{w_U}{N} \quad k_2 < 0$$

- Remember: b is the share of skilled in the native population, β in the immigrant population
- If the immigrants are less skilled than the natives i.e. if $\beta < b$ the skilled wage increases.
- If the immigrants are more skilled than the natives, i.e. if $\beta > b$ the skilled wage decreases.

Evaluating the labor market impact of immigration

- Traditional Approaches
  - In the US immigrants tend to cluster in a small number of geographic areas. In 1990: 32.5 % of the immigrant population lived in LA, Miami and NY. The share of natives living in these cities is much lower
  - Exploit regional clustering of immigrants and use differences across local labor markets to identify the effects of immigration
  - Basic idea: define the local labor market as a metropolitan area and analyse the impact of immigration on the labor market outcome, and compare it with what is going on in metropolitan areas that have not been affected by the phenomenon.

Empirical evidence

- If immigrants distribute themselves randomly and
- If natives do not react to the presence of immigrants in a given locality, then the correlation between labor market outcomes in a locality and the presence of immigrants identifies the effect of immigration.
- Approach pioneered by Grossman (1982) and Borjas (1983)

Empirical Evidence/Cont.

- The most influencial contribution in this strand of literature is the study by Card (1990) of the Mariel immigration inflow in Miami.
- April 1980: Fidel Castro declared that Cubans were free to migrate from the port of Mariel.
- In just a few months, 125000 Cubans decided to migrate and about half of them ended up settling in the Miami area.
- The Cuban influx added 7% to the Miami labor force, and these immigrants were mainly unskilled.

Empirical Evidence/Cont

- Difference in difference approach shows no discernible effect of the *Marielitos* on employment and wages in Miami‘s labor market.
- Even previous cohorts of Cuban immigrants in Miami appeared not to have suffered from competition with the Marielitos.
- This evidence would broadly support the idea of factor price insensitivity, and one interpretation is that Miami was a sort of small open economy, trading with the rest of the US. The Mariel boatlift can then be interpreted as a shock that, although large, did not move it outside the cone of diversification.

Empirical evidence/Cont.

Friedberg (2001): Israeli experience of the 1990‘s

- Starting in 1989 the Soviet government allows Russian jews to freely emigrate.
- Most of them end up in Israel. Between 1990-91, 610000 Russian jews settle in Israel, a number equivalent to 7% of the Israeli population at the time. By the mid nineties, this figure has increased to a million, or about 12% of the total population.
- Initial effects on the Israeli labor market are very large: the real wage fell around 5% for every 10% increase in the Israeli population.

Empirical evidence/cont.

- Other forces are at work though…
- Throughout the nineties sharp rise in the capital accumulation in Israel, mostly financed from abroad.
- This led to a substantial reduction of the labor market impact of Russian immigration in Israel in the medium term.
- No big Rybczynski effects have been registered. Russian migrants were more skilled than the domestic Israeli population, but there has not been a large change in the output composition in favor of high skill intensive goods.
- Notice that high skilled Russian initially had a hard time finding jobs that matched their skills.

Empirical evidence/cont

- Hunt (1994) → French data
  - In 1962 the Algerian war of independence came to an end, with France granting independence to the former colony.
  - As a result, in 1962 about 900,000 French born expatriates returned to France. They represented about 1.6 percent of the French labor force. On average, they were slightly more skilled and slightly younger than the domestic population, and they relocated mostly to the south of France.
  - Labor market effects are relatively modest. Estimated elasticities are in the order of -0.5-0.8.

Empirical evidence/cont.

- The literature on the subject is vast. Other studies include
  - Pischke and Velling (1997) → German data
  - Carrington and de Lima (1996) → Effect of the *Retornados* from Mozambique on the Portuguese labor market

Empirical Evidence/Cont.

Issues:

- Immigrants may not be randomly distributed across cities/local labor markets. If immigrants move towards thriving labor markets, there might be a spurious positive correlation b/w wages and immigration
- Alternatively, natives may respond to immigration by moving their capital/labor to other markets

Empirical Evidence/Cont.

- Borjas, Freeman and Katz (1997) use national labor market as the unit of analysis, but have only two skill groups in the model → too little variation to estimate the effects.
- Simulations are used to predict the effects of immigration, comparing the labor supply of different skill levels with and without immigration, using previously estimated demand elasticities
- Naturally, immigration has a negative effect on the market outcome of similarly skilled domestic workers.

Borjas (2003)

- Basic assumption:
  - Workers participiate in *national labor market* and differ in
    - *Education*
    - *Workplace experience*
  - Workers of different levels of experience are not perfect substitutes

Data

- US Census Figures and CPS
- Years: 1960, 1970, 1980, 1990, 2000
- 4 education attainment levels
  - High school dropouts
  - High school graduates
  - Some College
  - College Graduates
- 8 classes of workplace experience

TABLE I

LOG WEEKLY WAGE OF MALE NATIVE WORKERS, 1960–2000

Education	Years of experience	1960	1970	1980	1990	2000
High school dropouts	1–5	5.535	5.758	5.722	5.494	5.418
	6–10	5.920	6.157	6.021	5.839	5.751
	11–15	6.111	6.305	6.166	6.006	5.932
	16–20	6.188	6.360	6.286	6.087	5.989
	21–25	6.201	6.413	6.364	6.180	6.034
	26–30	6.212	6.439	6.368	6.268	6.036
	31–35	6.187	6.407	6.419	6.295	6.086
	36–40	6.175	6.377	6.418	6.295	6.168
High school graduates	1–5	5.940	6.132	6.090	5.837	5.773
	6–10	6.257	6.476	6.343	6.159	6.140
	11–15	6.392	6.587	6.497	6.309	6.273
	16–20	6.459	6.639	6.609	6.415	6.323
	21–25	6.487	6.664	6.638	6.495	6.406
	26–30	6.478	6.677	6.662	6.576	6.414
	31–35	6.450	6.674	6.667	6.572	6.493
	36–40	6.435	6.622	6.657	6.548	6.460
Some college	1–5	6.133	6.322	6.237	6.085	6.013
	6–10	6.412	6.633	6.472	6.387	6.366
	11–15	6.535	6.752	6.641	6.534	6.489
	16–20	6.604	6.805	6.762	6.613	6.591
	21–25	6.634	6.832	6.764	6.711	6.626
	26–30	6.620	6.841	6.789	6.771	6.648
	31–35	6.615	6.825	6.781	6.740	6.662
	36–40	6.575	6.728	6.718	6.658	6.623
College graduates	1–5	6.354	6.612	6.432	6.459	6.458
	6–10	6.625	6.891	6.702	6.766	6.747
	11–15	6.760	7.032	6.923	6.908	6.943
	16–20	6.852	7.109	7.043	7.005	7.046
	21–25	6.876	7.158	7.087	7.112	7.051
	26–30	6.881	7.146	7.085	7.122	7.084
	31–35	6.867	7.095	7.079	7.095	7.074
	36–40	6.821	7.070	6.985	6.950	6.944

The table reports the mean of the log weekly wage of workers in each education-experience group. All wages are deflated to 1999 dollars using the CPI-U series.

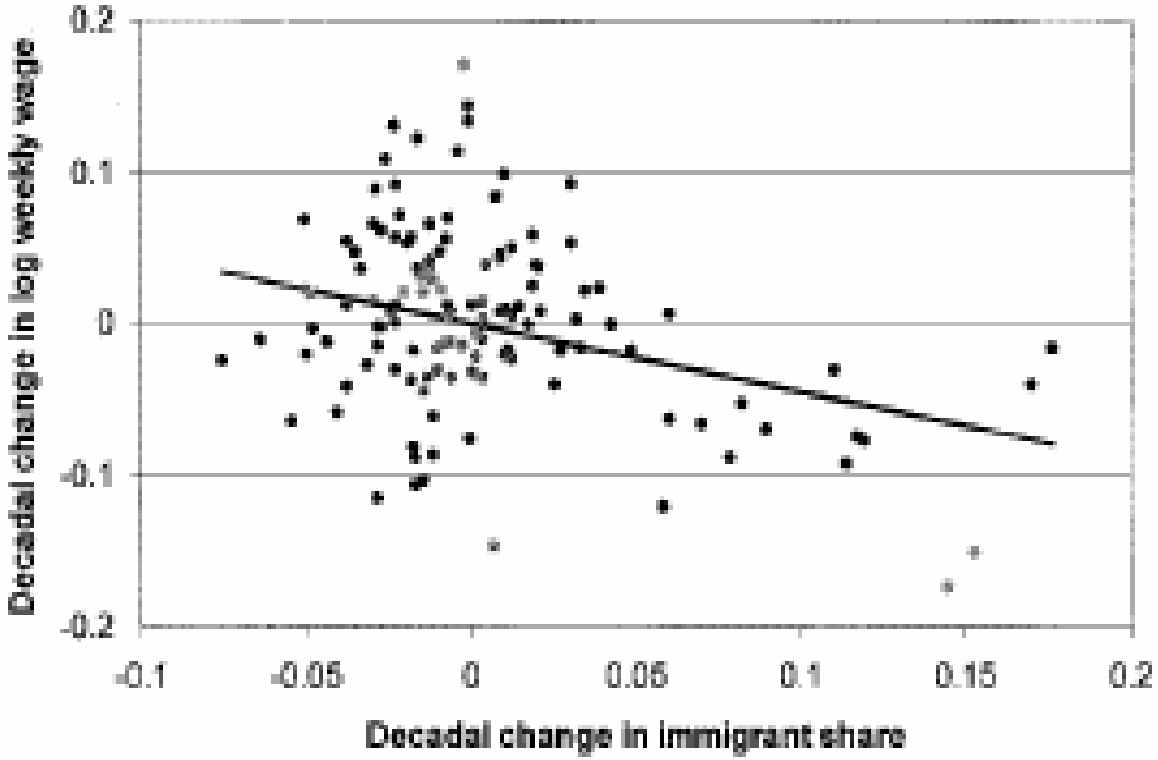


FIGURE II
Scatter Diagram Relating Wages and Immigration, 1960–2000

Weekly wages grew fastest for those education-experience groups that were least affected by immigration.

Basic Results

- Estimating equation

$$Y(ijt)=\theta p(ijt)+s(i)+x(j)+s(i)*x(j)+ s(i)* \pi(t)+x(j)* \pi(t)+\varphi(ijt)$$

- Where
  - $p(ijt)=M(ijt)/[M(ijt)+N(ijt)]$
  - Y(ijt) is a measure of labor market outcome
  - s(i) is a vector of fixed effects indicating the groups educational attainment
  - x(j) is a vector of fixed effects indicating the group's work experience

Basic Results

- $\pi(t)$ are time fixed effects

- Interactions
  - $s(i)^* \pi(t)$, $x(j)^* \pi(t)$ control for the possibility that the effect of education and experience have changed over time
  - $s(i)^*x(j)$ controls for the possibility that the experience profile for a particular outcome differs across schooling groups

TABLE III

IMPACT OF IMMIGRANT SHARE ON LABOR MARKET OUTCOMES OF NATIVE EDUCATION-EXPERIENCE GROUPS

Specification:	Dependent variable		
	Log annual earnings	Log weekly earnings	Fraction of time worked
1. Basic estimates	−0.919	−0.572	−0.529
	(0.582)	(0.162)	(0.132)
2. Unweighted regression	−0.725	−0.546	−0.382
	(0.463)	(0.141)	(0.103)
3. Includes women in labor force counts	−0.919	−0.637	−0.511
	(0.661)	(0.159)	(0.148)
4. Includes log native labor force as regressor	−1.231	−0.552	−0.567
	(0.384)	(0.204)	(0.116)

The table reports the coefficient of the immigrant share variable from regressions where the dependent variable is the mean labor market outcome for a native education-experience group at a particular point in time. Standard errors are reported in parentheses and are adjusted for clustering within education-experience cells. All regressions have 160 observations and, except for those reported in row 2, are weighted by the sample size of the education-experience-period cell. All regression models include education, experience, and period fixed effects, as well as interactions between education and experience fixed effects, education and period fixed effects, and experience and period fixed effects.

Structural Approach

- Three-tiers CES production function

$$Q_t = [\lambda_{Kt} K_t^{v} + \lambda_{Lt} L_t^{v}]^{1/v'} \quad v' = 1 - 1/\sigma_{KL}, -\infty < v \leq 1$$

- Where $v = 1 - 1/\sigma_{KL}, -\infty < v \leq 1$

  and λ is a vector of time variant technology shifters
- Multi-tier structure:

$$L_t = \left[\sum_i \theta_{it} L_{it}^{\rho} \right]^{1/\rho}$$

Structural Approach

- Where $\rho = 1 - 1/\sigma_E$
- L(it) is the number of workers with education i at time t and

$$L_{it} = \left[\sum_j \alpha_{ij} L_{ijt}^{\eta} \right]^{1/\eta}$$

and $\eta = 1 - \frac{1}{\sigma_X}$

- Marginal product condition results in

$$(13) \quad \log w_{ijt} = \log \lambda_{Lt} + (1 - v) \log Q_t + (v - \rho) \log L_t + \log \theta_{it} + (\rho - \eta) \log L_{it} + \log \alpha_{ij} + (\eta - 1) \log L_{ijt}.$$

Structural Approach

- which can be estimated by

$$\log w_{ijt} = \delta_t + \delta_{it} + \delta_{ij} - (1/\sigma_X) \log L_{ijt}$$

  (Card and Lemieux 2001)

- where

$$\delta_t = \log \lambda_{Lt} + (1 - v) \log Q_t + (v - \rho) \log L_t$$

$$\delta_{it} = \log \theta_{it} + (\rho - \eta) \log L_{it},$$

$$\delta_{ij} = \log \alpha_{ij}$$

Structural Approach

- We can therefore identify σ_X
- Can repeat the same procedure to estimate the other parameters of the three –tier production function
- Issues:
  - 33 factors (32 different types of labor, capital)
  - Advantages:
    - with multi-tier CES approach, only need to estimate 3 parameters (the three elasticities of substitution)
    - With more general (translog) production function would need to estimate 561 (!) parameters

Structural Approach

- Limitation: The structure restricts the type of susbtitutability among factors:
  - Elasticity of substitution across experience groups is the same, independently on whether the groups are adjacent or far away
  - Elasticity of substitution b/w education groups is the same too.

Structural Approach

- Estimated values are

$$\log w_{ijt} = \delta_t + \delta_{it} + \delta_{ij} - \underset{(0.115)}{0.288} \log L_{ijt}.$$

- and

$$\log w_{it} = \delta_t + \text{linear trend interacted with education fixed effects} - \underset{(0.646)}{0.741} \log L_{it}. \quad (17)$$

Structural Approach

- Thus, as a result

$$\sigma_X = 3.5, \sigma_E = 1.3$$

- In other words:
  - Workers within experience group are not perfect substitutes
  - There is more substitutability among workers that have the same education and different labor market experience than among workers that have different levels of education

TABLE VIII

ESTIMATED FACTOR PRICE ELASTICITIES, BY SKILL GROUP

Education	Years of experience	Own elasticity	Cross elasticity (within education branch)	Cross elasticity (across education branches)
High school dropouts	1–5	−0.313	−0.028	0.002
	6–10	−0.330	−0.044	0.003
	11–15	−0.344	−0.059	0.004
	16–20	−0.341	−0.056	0.004
	21–25	−0.339	−0.053	0.004
	26–30	−0.352	−0.066	0.004
	31–35	−0.358	−0.072	0.005
	36–40	−0.361	−0.076	0.005
High school graduates	1–5	−0.316	−0.030	0.012
	6–10	−0.335	−0.050	0.020
	11–15	−0.343	−0.057	0.023
	16–20	−0.337	−0.051	0.020
	21–25	−0.333	−0.047	0.019
	26–30	−0.330	−0.044	0.017
	31–35	−0.323	−0.037	0.015
	36–40	−0.315	−0.029	0.012
Some college	1–5	−0.318	−0.032	0.012
	6–10	−0.339	−0.054	0.020
	11–15	−0.349	−0.063	0.024
	16–20	−0.348	−0.063	0.024
	21–25	−0.339	−0.054	0.020
	26–30	−0.324	−0.038	0.015
	31–35	−0.313	−0.028	0.010
	36–40	−0.305	−0.019	0.007
College graduates	1–5	−0.317	−0.031	0.017
	6–10	−0.335	−0.049	0.026
	11–15	−0.341	−0.056	0.030
	16–20	−0.348	−0.062	0.033
	21–25	−0.332	−0.046	0.025
	26–30	−0.318	−0.032	0.017
	31–35	−0.309	−0.023	0.013
	36–40	−0.302	−0.016	0.009

TABLE IX

Wage Consequences of Immigrant Influx of the 1980s and 1990s (Predicted Change in Log Weekly Wage)

	Education				
Years of experience	High school dropouts	High school graduates	Some college	College graduates	All workers
1–5	−0.065	−0.021	0.004	−0.035	−0.024
6–10	−0.101	−0.027	0.001	−0.042	−0.029
11–15	−0.128	−0.036	−0.009	−0.059	−0.041
16–20	−0.136	−0.033	−0.011	−0.055	−0.039
21–25	−0.108	−0.025	−0.008	−0.049	−0.033
26–30	−0.087	−0.023	0.000	−0.049	−0.029
31–35	−0.066	−0.022	0.001	−0.050	−0.027
36–40	−0.044	−0.013	0.008	−0.056	−0.022
All workers	−0.089	−0.026	−0.003	−0.049	−0.032

The simulation uses the factor price elasticities reported in Table VIII to predict the wage effects of the immigrant influx that arrived between 1980 and 2000. The calculations assume that the capital stock is constant. The variable measuring the group-specific immigrant supply shock is defined as the number of immigrants arriving between 1980 and 2000 divided by a baseline population equal to the average size of the native workforce (over 1980–2000) plus the number of immigrants in 1980. The last column and the last row report weighted averages, where the weight is the size of the native workforce in 2000.

International evidence

- Aydemir and Borjas (2007) have carried out a comparative study following the same methodology as Borjas (2003) using data from Mexico, Canada and the USA.
- Migrant populations are rather different in Canada and the USA, as a consequence of the different immigration policies implemented by the two countries
- Mexico is an important source of emigrants. Most Mexican emigrants end up making the US their final destination.

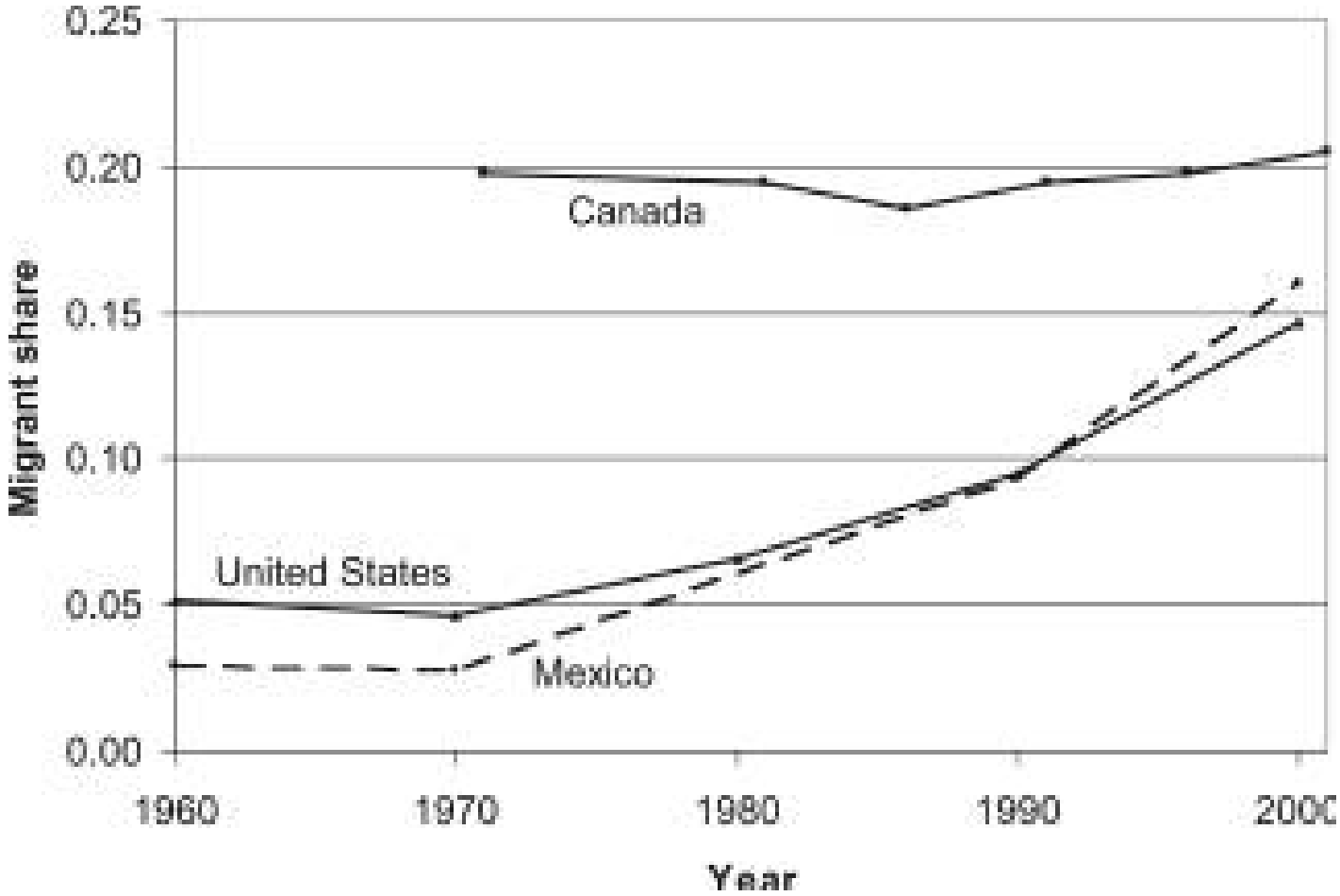
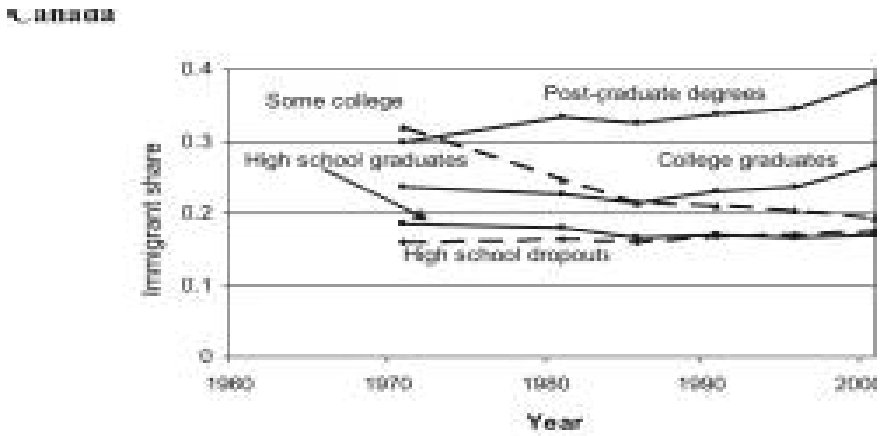
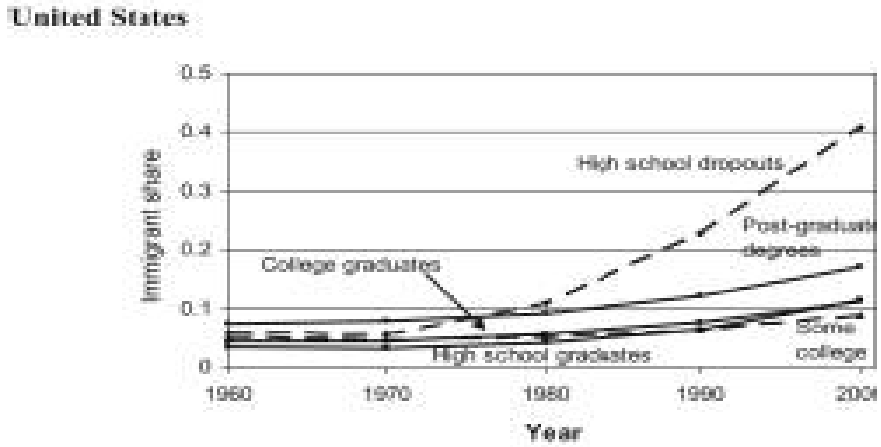


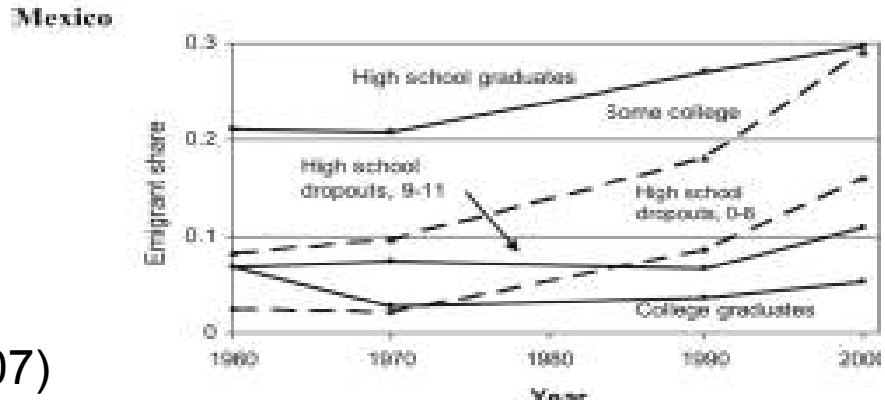
Figure 1. Trends in the immigrant/emigrant share for male workers, by country.

Source: Aydemir and Borjas 2007

The composition of the (e)migrant population in Canada, Mexico and the USA







Source: Aydemir and Borjas (2007)

TABLE 1. Relation between the immigrant/emigrant share and labor market outcomes.

	Earnings outcomes			Employment outcomes	
	Log annual earnings	Log weekly earnings	Log monthly earnings	Fraction of weeks worked	Labor force participation rate
Weighted Regressions					
1. Canada	−0.617	−0.507	–	−0.241	–
	(0.246)	(0.202)		(0.108)	
2. United States	−0.845	−0.489	–	−0.345	–
	(0.472)	(0.223)		(0.075)	
Mexico					
3. All workers	–	–	0.798	–	0.058
			(0.443)		(0.044)
4. All workers, 1990–2000	–	–	0.841	–	0.062
			(0.540)		(0.048)
5. Urban workers	–	–	0.652	–	0.065
			(0.419)		(0.055)

Notes: Standard errors are reported in parentheses and are adjusted for clustering within education-experience cells. All coefficients are obtained from regressions weighted by the sample size used to compute the dependent variable. For Canada and the United States, the table reports the coefficient of the immigrant share variable from regressions where the dependent variable is the mean labor market outcome of native-born persons in an education–experience group at a particular point in time. For Mexico, the table reports the coefficient of the emigrant share variable from regressions where the dependent variable is the mean labor market outcome of Mexican stayers in an education–experience group at a particular point in time. The regressions estimated in Canada have 240 observations; the regressions estimated in the United States have 200 observations; the wage regressions estimated in Mexico have 160 observations in rows 3 and 5, and 80 observations in row 4; and the labor force participation regressions estimated in Mexico have 120 observations in rows 3 and 5, and 80 observations in row 4. All regression models include education, experience, and period fixed effects, as well as interactions between education and experience fixed effects, education and period fixed effects, and experience and period fixed effects.

Interpretation

- For Canada: a 10% increase in the number of workers in a particular skill group reduces the wage of that group by 3.2 %
- For the USA the wage elasticity is about -0.36, a number very much comparable with what has been obtained for Canada
- Mexico: a 10% emigrant induced reduction in the labor supply in a given cell increases monthly earnings by 5.6%
- Results are thus fairly similar to the ones obtained in Borjas (2003)

Recent developments

- Ottaviano and Peri (2006) generalize Borjas approach in two directions:
  - Domestic workers and immigrants, even within the same education/skill cell are not perfect substitutes
  - The capital stock is free to adjust as a result of immigration
  - The result is that the effect of immigration on US workers with less than a highschool is negative but very small (about -1.5%), while the overall impact is substantially positive