Migration and Labor Supply Shocks

UniTo, Labor Economics Part II
Christoph Albert

Lecture 7

Agenda

The Labor Market Effects of Immigration

- The canonical model
- Empirical strategies

Area approach

- Classic natural experiments
- Recent applications
- Shift-share instruments that don't shift

Skill-Cell and Structural Approach

Assimilation studies

- Traditional approach
- Combining assimilation and structural approach

The economics of migration

Research on the economics of migration addresses several distinct questions, such as:

- Migration decision and selection of migrants
- Integration in the destination country
- Impact in the sending country (e.g., "brain drain")
- Fiscal impacts

We focus on the labor market effects of immigration at destination.

Introduction

What is the effect of immigration on labor markets in the destination country. What is the impact on native workers?

- Large literature, long-standing dispute on core issues

  Still interesting: "The immigration Equation" (2006, NYT)

So why keep going on about it?

- Topic is politically charged
- Relates to fundamental questions on (local) labor markets.

  Do factor prices respond to changes in factor supply? Do we understand how labor markets function and adjust?

Figure: The Short-Run Impact of Immigration

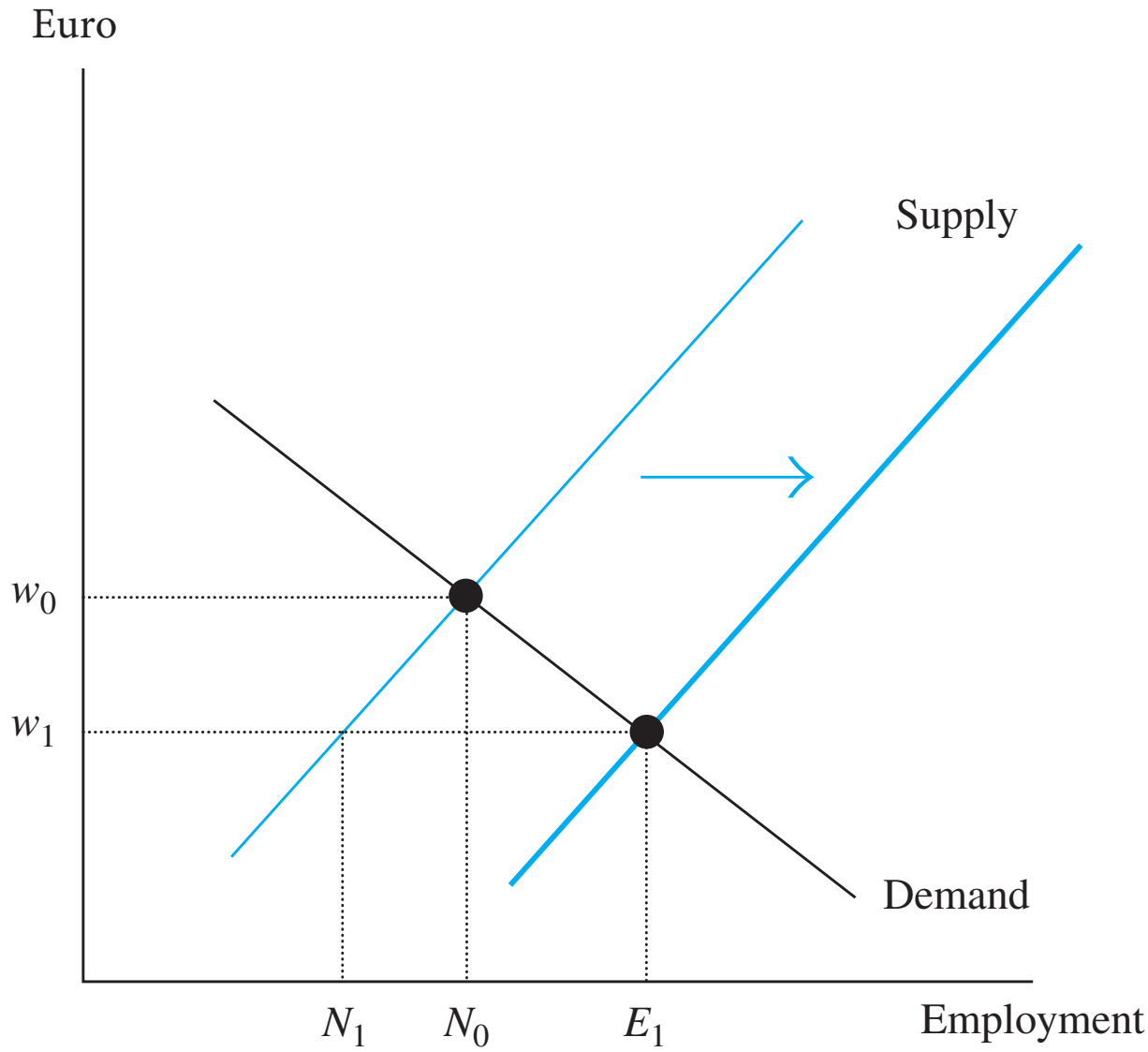


Figure: Borjas (2003), Quarterly Journal of Economics

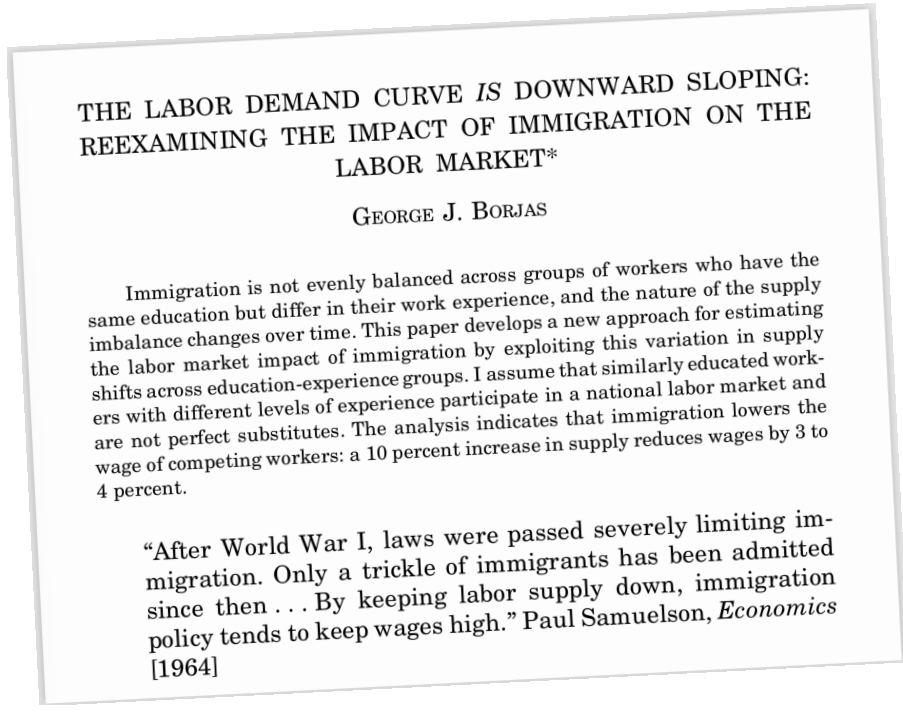
THE LABOR DEMAND CURVE *IS* DOWNWARD SLOPING: REEXAMINING THE IMPACT OF IMMIGRATION ON THE LABOR MARKET*

GEORGE J. BORJAS

Immigration is not evenly balanced across groups of workers who have the same education but differ in their work experience, and the nature of the supply imbalance changes over time. This paper develops a new approach for estimating the labor market impact of immigration by exploiting this variation in supply shifts across education-experience groups. I assume that similarly educated workers with different levels of experience participate in a national labor market and are not perfect substitutes. The analysis indicates that immigration lowers the wage of competing workers: a 10 percent increase in supply reduces wages by 3 to 4 percent.

"After World War I, laws were passed severely limiting immigration. Only a trickle of immigrants has been admitted since then . . . By keeping labor supply down, immigration policy tends to keep wages high." Paul Samuelson, *Economics*

Figure: Borjas (2003), Quarterly Journal of Economics



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"After World War I, laws were passed severely limiting immigration. Only a trickle of immigrants has been admitted since then . . . By keeping labor supply down, immigration policy tends to keep wages high." Paul Samuelson, *Economics* [1964]

Also running:

- Is the demand curve *really* downward sloping? (Bonin, 2005)
- The labor demand *was* downward sloping (Biavaschi, 2013)
- Revisiting the Labor Demand Curve (de Brauw and Russell, 2014)

Agenda

A simple factor proportions model

Assume Cobb-Douglas production function

$$Q = AK^{\alpha}L^{1-\alpha}$$

and that in competitive markets the price of each input is equal to its marginal product, such that (normalize price of output to one)

$$w = \frac{dQ}{dL} = (1-\alpha)AK^{\alpha}L^{-\alpha}$$

and therefore

$$\log w = \log(1-\alpha)A + \alpha \log K - \alpha \log L$$

Short-term effect

We have

$$\log w = \log(1-\alpha)A + \alpha \log K - \alpha \log L$$

The short-term effect of immigration (with fixed capital)

$$\left.\frac{d \log w}{d \log L}\right|_{dK=0} = \alpha \underbrace{\frac{\partial \log K}{\partial \log L}}_{=0} - \alpha = -\alpha$$

where α is also the capital share of production.

CES: Short-term effect

The implication of a negative short-term effect ($\left.\frac{d \log w}{d \log L}\right|_{dK=0} < 0$) generalizes to other production functions.

For example, with a CES production function

$$Q = \left[\alpha K^{\delta} + (1-\alpha) L^{\delta}\right]^{\frac{1}{\delta}}$$

where $\delta \leq 1$ and $\sigma = 1/(1-\delta)$ is elasticity of substitution ($\delta = 1$ $\Rightarrow$ perfect substitutes; $\delta = -\infty \Rightarrow$ perfect complements) we have

$$\left.\frac{d \log w}{d \log L}\right|_{dK=0} = -(1-\delta) s_K$$

where $s_k = \frac{\alpha K^{\delta}}{Q^{\delta}}$ is the capital share of production.

CES: Short-term effect

CES wage elasticity

$$\left.\frac{d \log w}{d \log L}\right|_{dK=0} = -(1-\delta)s_K < 0$$

Short-term wage elasticity is negative:

- Larger capital shares $\Rightarrow$ larger wage effects
- K and L more complementary $\Rightarrow$ larger effects
- Immigration redistributes from labor to capital

Generalization in Borjas (2013):

- Negative wage elasticity is true for any linearly homogeneous production function

CES: Long-term effect

The long-term effect of immigration (price of capital fixed, such that $\left.\frac{d \log K}{d \log L}\right|_{dr=0} = 1$)

$$\left.\frac{d \log w}{d \log L}\right|_{dr=0} \alpha \underbrace{\frac{\partial \log K}{\partial \log L}}_{=1} - \alpha = 0$$

- $\partial \log K / \partial \log L = 1$ due to fixed capital to labor ratios
- 10 % $\uparrow$ in $L \Rightarrow$ 10 % $\uparrow$ in $K \Rightarrow$ no effect on wages

Nested CES with heterogeneous labor

The factor proportions model with different skill groups:

First layer: Cobb-Douglas production function

$$Q = AK^{\alpha}L^{1-\alpha}$$

with capital K and labor L.

Second layer: unskilled labor L_U and skilled labor L_S (CES)

$$L = \left[\theta_U L_U^{\beta} + \theta_S L_S^{\beta}\right]^{\frac{1}{\beta}}$$

with $\beta \leq 1$ and elasticity of substitution $\sigma = 1/1-\beta$.

Nested CES with heterogeneous labor

Short-term wage response for skill group g (capital fixed):

$$d \log w_g = -\alpha d \log L + (\beta - 1)(d \log L_g - d \log L)$$

consists of average and distributionary wage effect.

Implications:

- In the short run, average wage declines
- Wages of skill group for which $m_g > m$ decline relative to the other skill group

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Area approach

- Classic natural experiments
- Recent applications
- Shift-share instruments that don't shift

Skill-Cell and Structural Approach

Assimilation studies

- Traditional approach
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Empirical evidence

The implications of the canonical model are straightforward.

However, the empirical evidence is very mixed:

- A string of natural experiments in the '90s found no or small short-term effects on wages; even for "similar" natives
  most famous: Card's 1990 paper on the *Mariel Boatlift*
- Many other studies find little or even positive impacts
- But quite a few recent studies find substantial negative effects (in the short term; very difficult to estimate long-term effects)

Empirical strategies

Empirical approaches:

1. **Area** approach
   slice labor market into multiple areas, to exploit variation in immigrant inflows across "local labor markets"
2. **Skill cell** approach
   slice labor market into different skill cells
3. **Structural** approach
   estimate parameters of skill-cell production function, simulate wage impact of immigration

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Area approach

Area (or spatial correlation) approach: relate wage differences across areas to differences in immigrant inflows:

- For example, estimate linear regression

$$\Delta \log w_{rt} = \alpha + \beta m_{rt} + \varepsilon_{rt}$$

  where $\Delta \log w_{rt}$ is the change in log wages in area r period t and m_{rt} is the immigrant arrival rate (or change in share)

- Similarly, can estimate group-specific effect

$$\Delta \log w_{grt} = \alpha_g + \beta_g m_{rt} + \varepsilon_{rt}$$

  where $\Delta \log w_{grt}$ is change in log wage of group g.

Area approach

The area approach (or spatial correlation approach)

$$\Delta \log w_{grt} = \alpha_g + \beta_g m_{rt} + \varepsilon_{rt}$$

has intuitive appeal:

- Identifies overall effect of immigration (?), no pre-sorting of immigrants required, directly ties shock to outcome.

But:

- Selection problem
  Immigrants are attracted to areas with favorable demand conditions (Jaeger, 2007). Often addressed by shift-share IV.
- Spatial spillover
  Internal migration or trade may lead to factor price equalization across areas.

Area approach

The area approach (or spatial correlation approach):

- Early area studies
  Grossmann (1982), Altonji and Card (1991), Borjas (1999)
- "Classic" natural experiments
  Card (1990), Hunt (1992) and Friedberg (2001)
- Revisiting the classics
  Borjas (2015; 2017), Peri and Yasenov (2015), Borjas (2016), Borjas and Monras (2018), Edo (2018), Borjas (2018)
- Recent studies
  Dustmann, Stuhler and Schoenberg (2017), Monras (2020), Ortega and Verdugo (2021)

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Classic natural experiments

Three classic quasi-experiments

1. Card (1990) on the Mariel Boatlift in Miami
2. Hunt (1992) on Algerian immigration in France
3. Friedberg (2001) on Russian immigration in Israel

Example: The Mariel Boatlift

Card (1990), "The Impact of the Mariel Boatlift on the Miami Labor Market." Industrial and Labor Relations Review

Example: The Mariel Boatlift

In 1980, an unexpected change in political conditions led to a sudden emigration wave from Cuba. From May to September 1980, 125,000 Cubans travelled by boat to the US (*"Mariel Boatlift"*). Half of the *Marielitos* located in Miami, the closest metropolitan area to Cuba, raising Miami's labor supply by 7 percent.

- Difference-in-differences approach: Compare Miami to four comparison cities
- Finds that migration had little adverse consequences on the local labor market

Example: The Mariel Boatlift

Table 3. Logarithms of Real Hourly Earnings of Workers Age 16–61 in Miami and Four Comparison Cities, 1979–85.

Group	*1979*	*1980*	*1981*	*1982*	*1983*	*1984*	*1985*
Miami:							
Whites	1.85	1.83	1.85	1.82	1.82	1.82	1.82
	(.03)	(.03)	(.03)	(.03)	(.03)	(.03)	(.05)
Blacks	1.59	1.55	1.61	1.48	1.48	1.57	1.60
	(.03)	(.02)	(.03)	(.03)	(.03)	(.03)	(.04)
Cubans	1.58	1.54	1.51	1.49	1.49	1.53	1.49
	(.02)	(.02)	(.02)	(.02)	(.02)	(.03)	(.04)
Hispanics	1.52	1.54	1.54	1.53	1.48	1.59	1.54
	(.04)	(.04)	(.05)	(.05)	(.04)	(.04)	(.06)
Comparison Cities:							
Whites	1.93	1.90	1.91	1.91	1.90	1.91	1.92
	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)
Blacks	1.74	1.70	1.72	1.71	1.69	1.67	1.65
	(.01)	(.02)	(.02)	(.01)	(.02)	(.02)	(.03)
Hispanics	1.65	1.63	1.61	1.61	1.58	1.60	1.58
	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)	(.02)

Note: Entries represent means of log hourly earnings (deflated by the Consumer Price Index—1980 = 100) for workers age 16–61 in Miami and four comparison cities: Atlanta, Houston, Los Angeles, and Tampa–St. Petersburg. See note to Table 1 for definitions of groups.

Example: The Mariel Boatlift

Table 5. Means of Log Wages of Non-Cubans in Miami by Quartile of Predicted Wages, 1979–85.
(Standard Errors in Parentheses)

	Mean of Log Wage by Quartile of Predicted Wage				*Difference of*
Year	*1st Quart.*	*2nd Quart.*	*3rd Quart.*	*4th Quart.*	*Means: 4th − 1st*
1979	1.31	1.61	1.71	2.15	.84
	(.03)	(.03)	(.03)	(.04)	(.05)
1980	1.31	1.52	1.74	2.09	.77
	(.03)	(.03)	(.03)	(.04)	(.05)
1981	1.40	1.57	1.79	2.06	.66
	(.03)	(.03)	(.03)	(.04)	(.05)
1982	1.24	1.57	1.77	2.04	.80
	(.03)	(.03)	(.03)	(.04)	(.05)
1983	1.27	1.53	1.76	2.11	.84
	(.03)	(.04)	(.03)	(.05)	(.06)
1984	1.33	1.59	1.80	2.12	.79
	(.03)	(.04)	(.04)	(.04)	(.05)
1985	1.27	1.57	1.81	2.14	.87
	(.04)	(.04)	(.04)	(.05)	(.06)

Note: Predicted wage is based on a linear prediction equation for the log wage fitted to individuals in four comparison cities; see text. The sample consists of non-Cubans (male and female, white, black, and Hispanic) between the ages of 16 and 61 with valid wage data in the earnings supplement of the Current Population Survey. Wages are deflated by the Consumer Price Index (1980 = 100).

Hunt (1992)

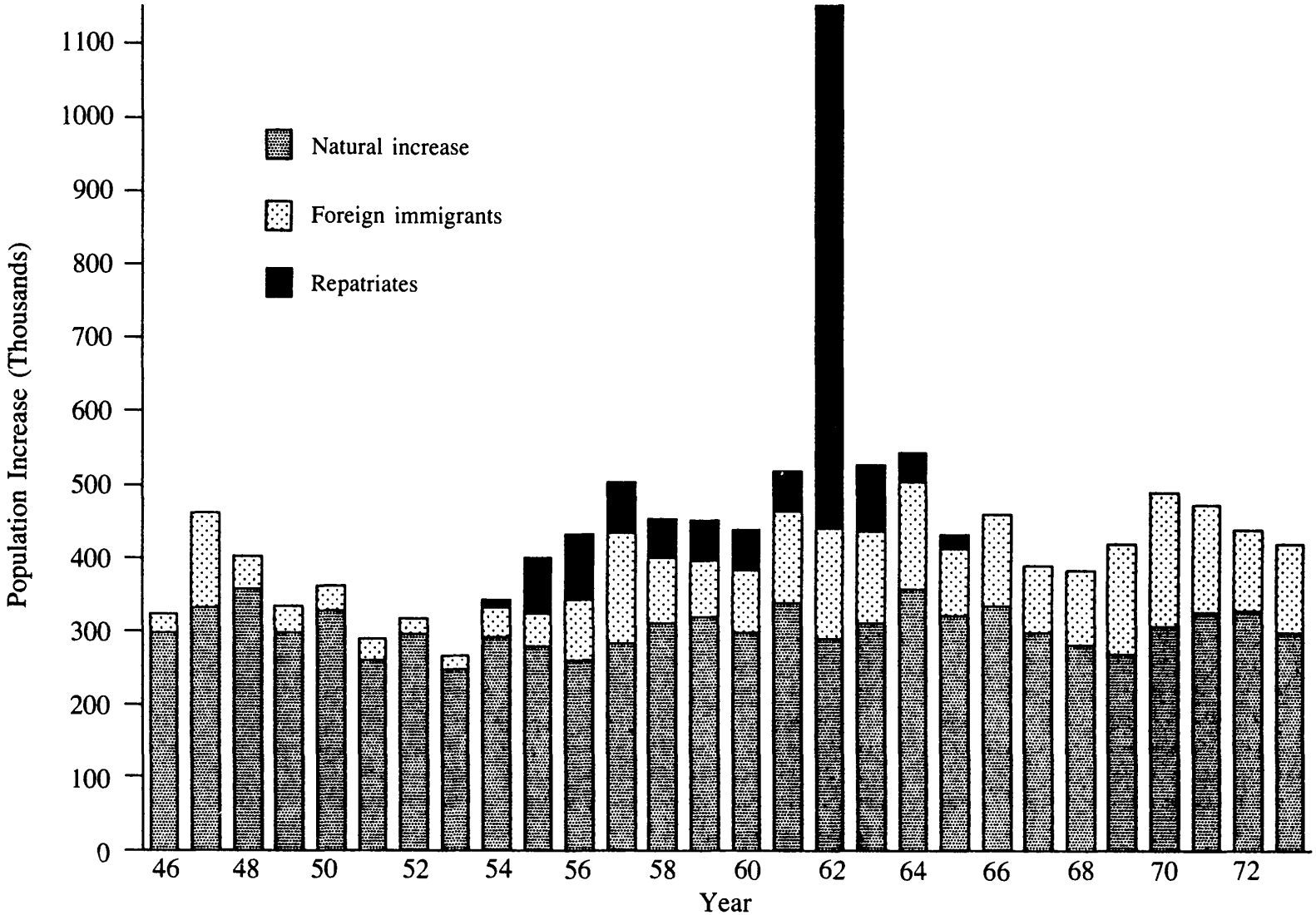
Hunt (1992), "The Impact of the 1962 Repatriates from Algeria on the French Labor Market." Industrial and Labor Relations Review

Example: The Algerian inflow in France

After Algeria's independence from France in 1962, large emigration wave from Algeria to France (in particular of people of European origin). About 900,000 returned to France within one year. They settled primarily in south of France, creating spatial variation in their distribution.

- Analysis across areas in cross-sectional and first-differenced data
- Finds modest increase in unemployment, small decrease in wages: (a 1-percentage point increase in repatriate share reduces local wages by at most 0.8 percent)

Hunt (1992)



Source: G. Tapinos (1975).

Figure 1. Sources of Increase in the French Population, 1946–1973.

Hunt (1992)

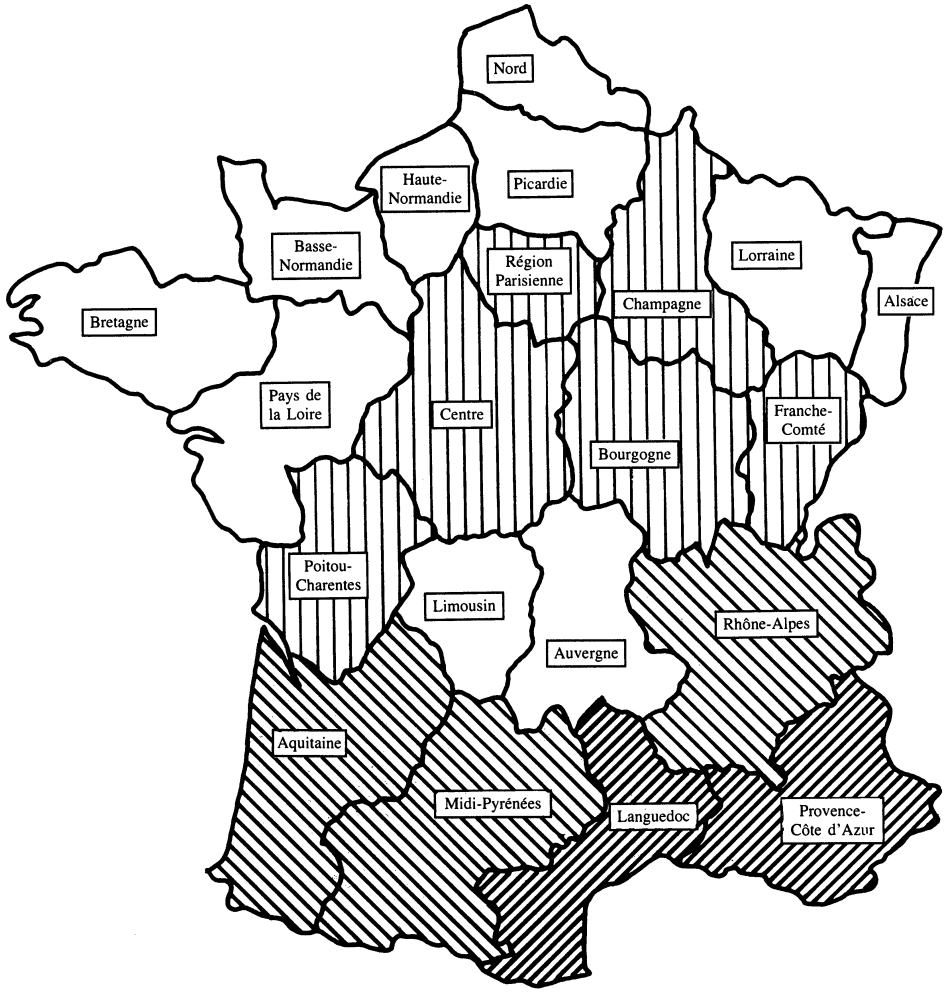


Figure 2. Map of France Showing Repatriates as a Proportion of the Labor Force by Region, 1968.

Hunt (1992)

Table 4. Determinants of Salaries of French Workers, 1962 and 1968.
(Standard Errors in Parentheses; All Coefficients and Standard Errors Multiplied by Ten)

	Cross-Sectional Results		*First Differenced Results, 1968 minus 1962*		
	1968	*1962*			
Independent Variable	*GLS* *(1)*[a]	*GLS* *(2)*[b]	*GLS* *(3)*[c]	*GLS* *(4)*[c,d]	*OLS* *(5)*[c,d]
Repatriates	−0.197**	−0.139**	−0.051	−0.080**	−0.067
(% of 1968 Labor Force)	(0.066)	(0.068)	(0.033)	(0.033)	(0.046)
Age 15–24	0.025	−0.024	0.035	0.029	0.010
(% of Labor Force)	(0.037)	(0.043)	(0.050)	(0.051)	(0.066)
Education (% with Bac.)	0.552**	0.638**	0.223**	0.647**	0.547**
	(0.097)	(0.115)	(0.091)	(0.093)	(0.212)
Services[e]	0.087	0.194**	0.056	−0.087	−0.153
	(0.069)	(0.072)	(0.100)	(0.102)	(0.124)
Commerce and Banking	−0.015	−0.095**	0.143*	0.185**	0.152
	(0.043)	(0.044)	(0.073)	(0.075)	(0.102)
Mining	0.043*	0.068**	0.112**	0.102**	0.116
	(0.022)	(0.017)	(0.043)	(0.044)	(0.076)
Other Industry	0.052**	0.068**	0.079**	0.045*	0.049
	(0.010)	(0.009)	(0.023)	(0.024)	(0.033)
Construction	0.148**	0.126**	0.159**	0.167**	0.154**
	(0.046)	(0.049)	(0.050)	(0.051)	(0.063)
Public Sector	−0.034	−0.003	−0.017	−0.086*	−0.076
	(0.047)	(0.038)	(0.042)	(0.043)	(0.046)
Transport	0.255**	0.248**	−0.176	−0.322**	−0.317
	(0.042)	(0.038)	(0.133)	(0.136)	(0.199)
Adjusted R^2	0.96	0.96	0.42	0.56	0.27

Note: The dependent variable is the log of the average annual earnings of all salaried workers. The sample size is 88. Columns 1–4 are estimated using GLS; the weights are the 1967 salaried labor force (w_{67}) (column 1), the 1962 salaried labor force (w_{62}) (column 2), and $1/(1/w_{62} + 1/w_{67})$ (columns 3, 4).

Friedberg (2001)

Friedberg (2001), "The Impact Of Mass Migration On The Israeli Labor Market", Quarterly Journal of Economics

Example: The Russian inflow in Israel

Immigration increased Israel's population by 12 percent between 1990 and 1994. Mainly from Soviet Union, where economic conditions were unstable and emigration restrictions were lifted.

- Exploits variation in immigrant density across area x occupation cells ("mixed approach")
- IV estimates based on immigrants' former occupation abroad suggest no adverse impact of immigration
- Cohen-Goldner and Paserman (2006, 2011) study same period, find small negative wage impact in short-run that disappears in longer run

Friedberg (2001)

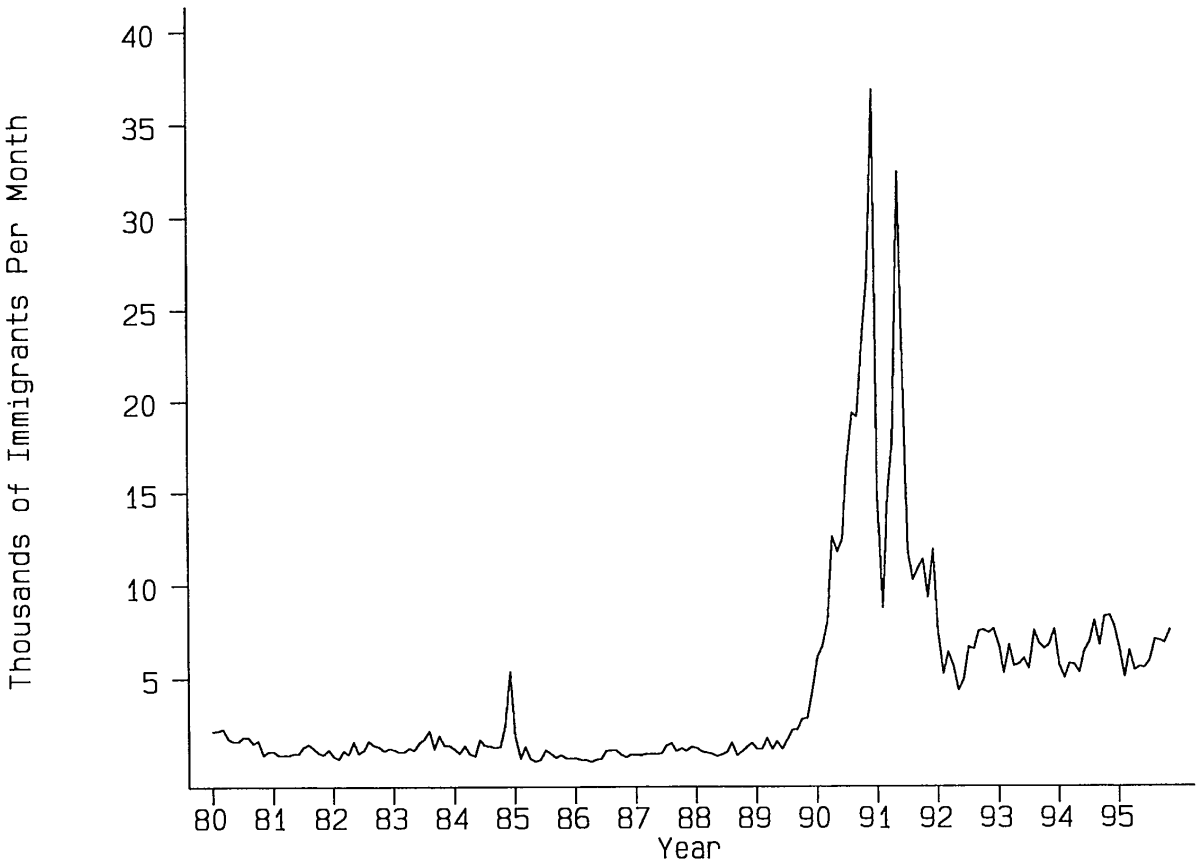


FIGURE I
Immigration to Israel

Note: Number of immigrants, including immigrating citizens, per month. Sources are Bank of Israel [1999] and Israeli Central Bureau of Statistics [1997].

Early natural experiments: Summary

Friedberg and Hunt (1995) in the Journal of Economic Perspective

> "*On the whole, the natural experiment literature adds to the evidence suggesting a limited impact of immigrants on natives.*"

In particular, Card (1990) was interpreted as "gold standard" evidence that immigration has only limited effect on native workers.

Early natural experiments: Problems

Very innovative and influential work. However:

- Poor data (repeated cross-section, small surveys)
- Simple difference-in-differences, with little information on pre-trends
- Problematic specification choices (choice control groups, estimation of standard errors)

In contrast, more recent studies often have:

- Panel data (can follow workers over time and control for selection), information on pre-trends, placebo tests, etc

Counterviews on Mariel Boatlift

Card's results on the Mariel Boatlift have been influential, but also controversial. Related work:

- Borjas (2017) argues that the Mariel Boatlift did have a substantial negative impact on natives with less education
- Peri and Yasenov (2019) argue that Borjas' results are not robust to changes in specification
- Borjas (2016), Clemens and Hunt (2017), Borjas and Monras (2017) provide additional evidence and arguments

The debate has become fairly contentious, but these papers make interesting conceptual points.

- For example, how to do statistical inference with only one treated unit (e.g. randomization inference, Borjas 2017)

Counterviews on Cuban case

- Borjas (2017) revisits the results of the original Card (1990) article
  - 60% of Mariels were high-school dropouts, compared to only 27% in the labor force of Miami
    $\rightarrow$ Number of HS dropouts rose by 18% due to Mariel Boatlift.
  - Plotting raw data of HS dropouts in Miami and outside shows much stronger drop starting in 1980 in Miami, recovering just after 1985.
  - Criticism of Card placebo group: based on trends observed also *after* Mariel supply shock.
  - Uses instead as placebo four cities similar to Miami *prior* to 1980 and synthetic control method.

Diff-in-diffs methodology

A revisit of Card (1990)

Table 2. The size of the Mariel supply shock

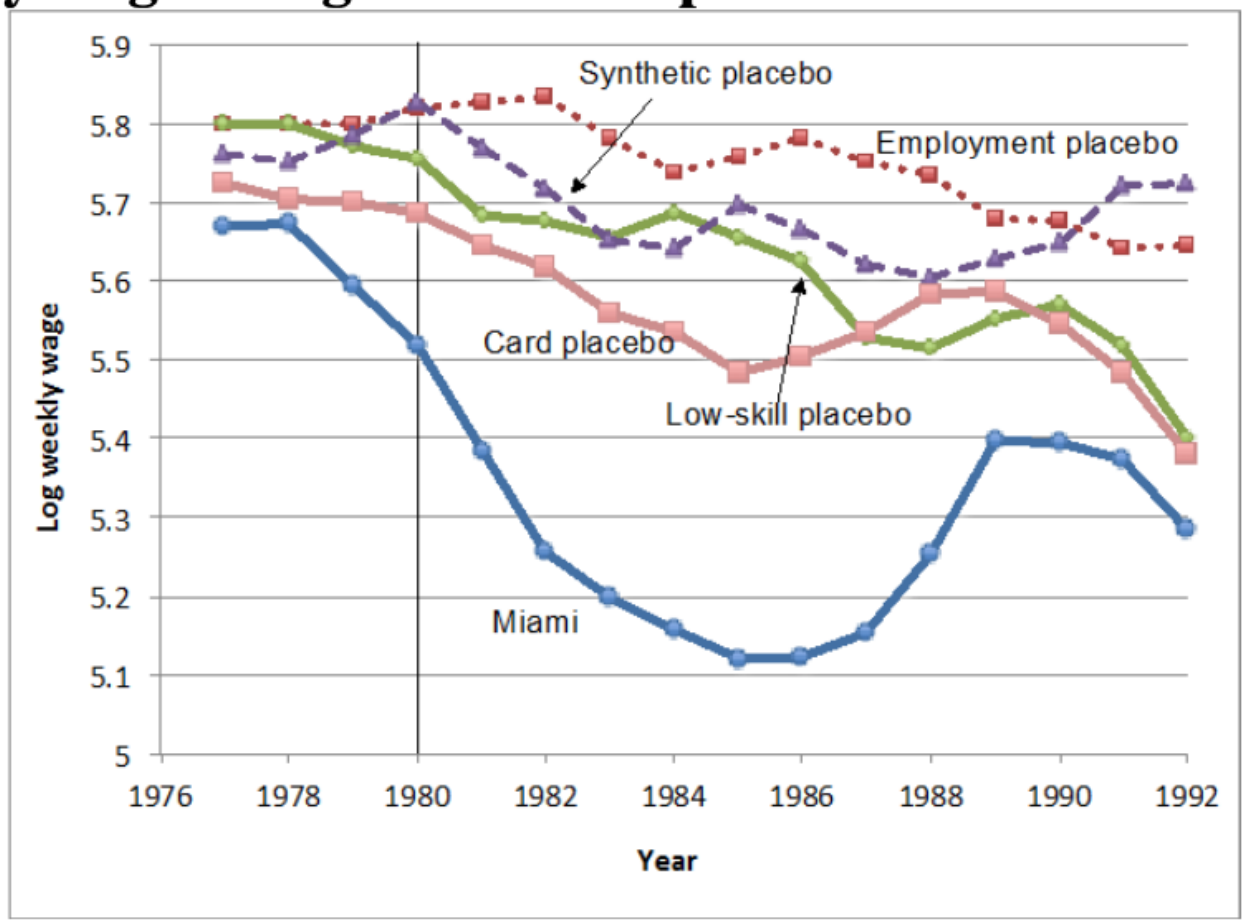
Education group:	Size of Miami's labor force in 1980 (1000s)	Number of *Marielitos* in labor force (1000s)	Percent increase in supply
High school dropouts	176.3	32.5	18.4
High school graduates	187.5	10.1	5.4
Some college	171.5	8.8	5.1
College graduates	124.1	4.2	3.4
All workers	659.4	55.7	8.4

Notes: The pre-existing number of workers in Miami is calculated from the 1980 census; the number of *Marielito* workers (at least 18 years old at the time of Mariel) is calculated from the 1990 census, and a small adjustment is made because the 1990 census reports the number of Cuban immigrants who entered the country in 1980 or 1981.

Diff-in-diffs methodology

A revisit of Card (1990)

A. Log weekly wage of high school dropouts



Counterviews on the Algerian case

Edo (2019), "The Impact of Immigration on Wage Dynamics: Evidence from the Algerian Independence War", JEEA

- Studies dynamics of wage adjustment after sudden and unexpected inflow of repatriates to France in 1962
- Finds strong decline in wages between 1962 and 1968, before average wages return to their pre-shock level after 15 years
- Persistent effect on wage inequality

Why differences to Hunt (1992)?

- Better wage data, allows separation of repatriates and natives (and repatriates had comparatively high education and wages)

Counterviews on the Algerian case

	Change in native wages between					
	1962-1968		1968-1976		1962-1976	
	Baseline	Additional controls	Baseline	Additional controls	Baseline	Additional controls
1. OLS estimate	-1.29***	-1.34**	0.86**	1.40***	-0.40	-0.01
	(-3.13)	(-2.71)	(2.34)	(4.43)	(-0.90)	(-0.02)
2. IV estimate using **rainfall** as instrument	-1.91**	-2.07**	0.96**	1.72***	-0.97	-0.72
	(-2.56)	(-2.51)	(2.16)	(4.30)	(-1.45)	(-0.60)
F-stat of instrument	86.76	63.36	79.32	59.09	79.78	45.18
3. IV estimate using **distance** as instrument	-1.21*	-1.70**	1.37*	1.59***	0.10	0.53
	(-1.68)	(-2.40)	(1.78)	(3.26)	(0.10)	(0.35)
F-stat of instrument	13.64	20.66	13.17	18.93	13.45	15.65
4. IV estimate using **shift-share** instrument	-1.70***	-1.58***	0.23	1.05***	-1.37	-1.36
	(-2.80)	(-2.82)	(0.47)	(2.65)	(-1.57)	(-1.36)
F-stat of instrument	390.91	512.86	316.59	333.41	390.13	363.35
Education-sector FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	21	21	21	21	21	21
Observations	168	168	168	168	168	168

Key. ***, **, * denote statistical significance from zero at the 1%, 5%, 10% significance level. T-statistics are indicated in parentheses below the point estimate.

Counterviews on the Israelian case

Borjas and Monras (2017), "The labour market consequences of refugee supply shocks", Economic Policy

- Borjas and Monras study all three natural experiments: Mariel Boatlift, Algerian to France, Russian to Israel
- Estimate substantial negative effect on wages

Why differences to Friedberg (2001)?

- Argue that difference between OLS and IV results in Friedberg is puzzling (why should OLS estimates be downward biased)
- Use educational attainment of the emigrants as an additional measure of skill (area x occupation x education)

Counterviews on the Israelian case

Table 7. Own and cross effects of the Soviet émigrés in Israel

	Less than primary	Primary completed	Secondary completed	University completed
Change in log annual earnings	0.350 (0.184)	−0.070 (0.117)	−0.083 (0.121)	−0.739 (0.208)

Notes: Standard errors are reported in parentheses. The unit of observation is an occupation, and there are eight occupations in the analysis. The table reports the coefficient of the "émigré supply shock for high-skill workers," which gives the ratio of the number of Soviet émigrés who completed a university education relative to the number of natives who also completed a university education in 1995 in the particular occupation. The regressions also contain regressors giving the change in the size of the native population for the own education group. The regressions are estimated separately for each occupation group using IV and have eight observations.

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Recent area studies

Some recent area studies:

- Dustmann, Stuhler and Schönberg (2017) exploit a natural experiment in Germany
- Monras (2020) exploits a natural experiment in the U.S.
- Ortega and Verdugo (2022) use the past-settlement instrument in France
- Jaeger, Ruist and Stuhler (2018) on the past-settlement instrument in U.S. context

Area approach: Summary

Spatial approach:

Spatial Approach	*Country*	*Specification*	*Group*	*Coefficient*	*S.E.*
Card (1990)	United States	OLS, 3-year difference	natives, white[a]	−0.14	–
Altonji and Card (1991)	United States	IV, weighted decadal	natives, low education	−1.21	(0.34)
			natives, white dropouts	−1.10	(0.64)
Dustmann, Fabbri, and Preston (2005)	United Kingdom	IV, weighted, yearly	natives	0.91	(0.58)
Card (2007)	United States	IV, weighted, cross-section	natives	0.06	(0.01)
Boustan, Fishback, and Kantor (2010)	United States	IV, weighted, cross-section	men	0.01	(0.54)
Dustmann, Frattini, and Preston (2013)	United Kingdom	IV, yearly	natives	0.40	(0.11)
			natives, 10th pct.[b]	−0.52	(0.18)
			natives, 90th pct.[b]	0.41	(0.19)
Borjas (2015)	United States	OLS, weighted, 3-year difference	natives, dropouts[c]	−2.63	(1.08)
Dustmann, Schönberg and Stuhler (2016)	Germany	IV, weighted, 3-year difference	natives	−0.13	(0.05)
			natives, young, low education	−0.56	(0.11)
Peri and Yasenov (2016)	United States	OLS, weighted, 3-year difference	natives, dropouts[d]	0.56	(0.73)
Foged and Peri (2016)	Denmark	IV, weighted, yearly	natives, low education	1.80	(0.64)

Area approach: Summary

Mixed approach:

Mixed Approach	*Country*	*Specification*	*Group*	*Coefficient*	*S.E.*
LaLonde and Topel (1991)	United States	OLS, weighted, decadal	immigrants, recent (≤5 yrs.) arrivals	−0.09	(0.03)
Card (2001)	United States	IV, weighted, cross-section	natives, men	−0.10	(0.03)
Borjas (2006)	United States	OLS, weighted, decadal	natives	−0.06	(0.02)
Card and Lewis (2007)	United States	IV, weighted, decadal	natives, men	−0.04	(0.06)
Card (2009)	United States	IV, weighted, decadal	natives, men	−0.42	(0.28)
Lewis (2011)	United States	IV, weighted, decadal	natives, manufacturing	−0.14	(0.04)
Glitz (2012)	Germany	IV, weighted, yearly	natives	−0.26	(0.19)
Dustmann and Glitz (2015)	Germany	IV, weighted, decadal	natives, manufacturing	−0.10	(0.06)
Özden and Wagner (2015)	Malaysia	IV, weighted, yearly	natives	0.02	(0.01)

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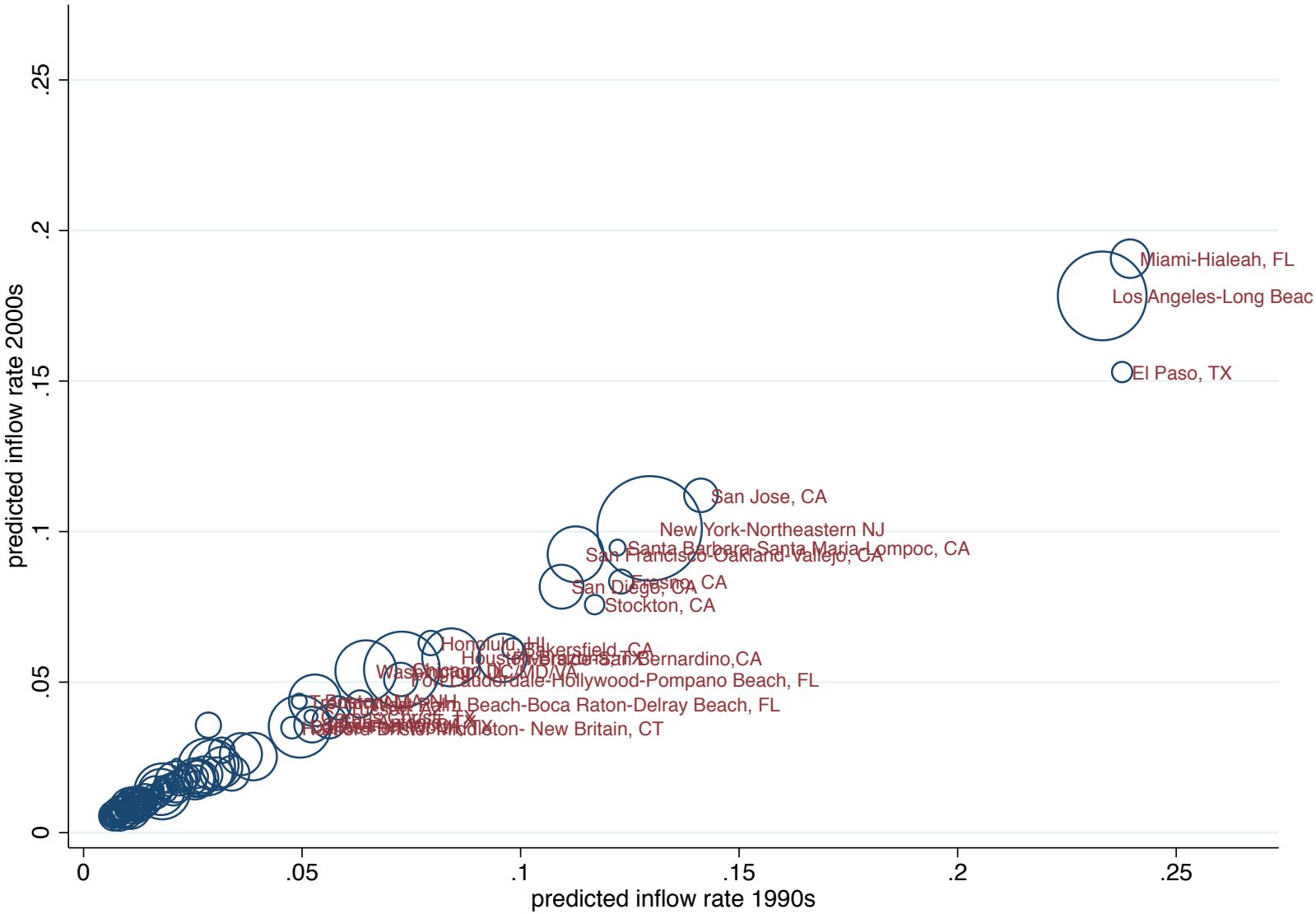
Jaeger, Ruist and Stuhler (2018)

Jaeger, Ruist, Stuhler (2018) consider the use of shift-share instruments in **dynamic** settings:

1. Shift-share instruments tend to be serially correlated. Why?
   - Local shares are always highly serially correlated
   - Require aggregate shock to break serial correlation
2. Short-run $\neq$ long-run response ($\rightarrow$ dynamic treatment effect)
   - For example, over time a local labor market will adjust to demand / supply / trade-import shocks

(1) + (2) invalidates instrument (in either GP et al or Borusyak et al setting). Example: Past settlement IV

Figure: The past settlement IV: 1990s vs 2000s



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Skill-cell approach

The **skill-cell** approach chops the labor market into skill groups:

- Borjas (2003) estimates wage effect of immigration at national level by categorizing immigrants and natives into education-experience cells:

$$\log w_{gat} = \theta p_{gat} + \pi_{ga} + \zeta_{gt} + \lambda_{at} + \varphi_{gat}$$

- $\log w_{gat}$ is the native log wage in education group g, experience group a at time t
- p_{gat} is the education-experience-specific immigration share
- With two education and experience groups, θ may be thought of as a triple-difference estimator (differences over time, experience groups, and education groups)
  $\rightarrow$ Identifies only relative effects

Structural approach

Structural approach:

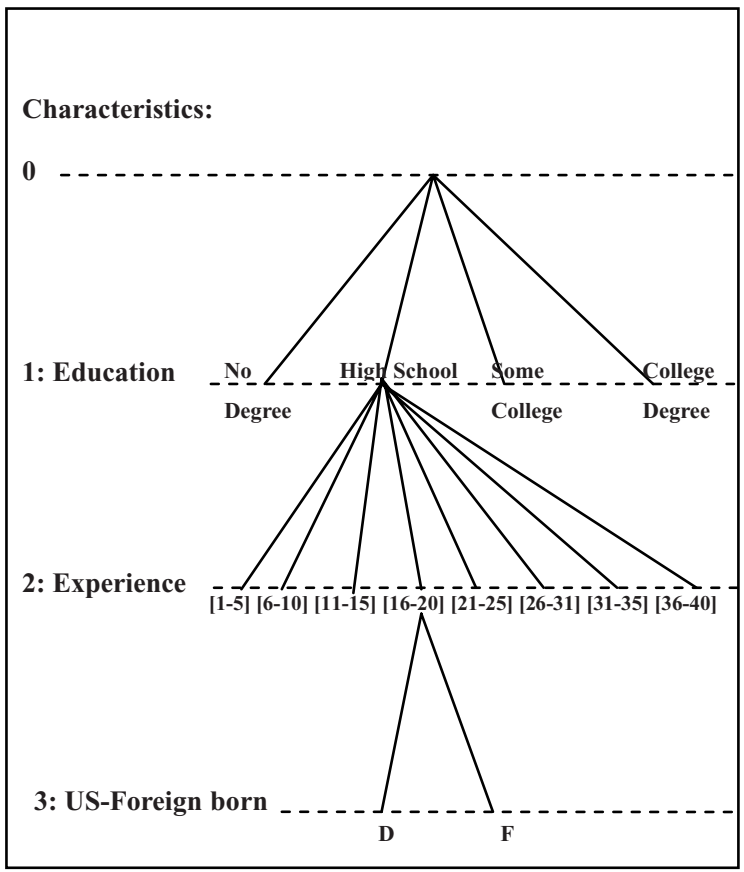
- Estimate the underlying parameters of the canonical model
- Use the fitted model to simulate wage effects of immigration
- Shares similar advantages and disadvantages as skill-cell approach
- Relies on strong structural assumptions, but can be used for counterfactual analysis

Examples:

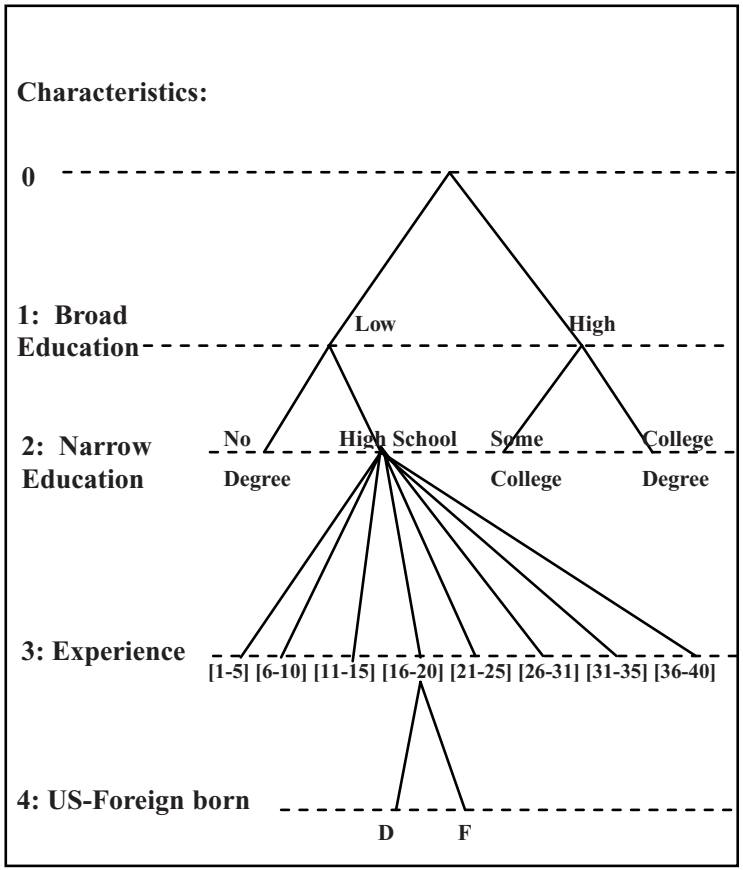
- Borjas, Freeman, and Katz (1997)
- Ottaviano and Peri (2012) and Manacorda, Manning, and Wadsworth (2012) consider more flexible production functions
- Llull (2013) and Piyapromdee (2015) also model labor supply choices

Ottaviano and Peri (2012)

Model A



Model B



Skill-cell and structural approach

Skill-cell approach:

Skill-Cell Approach	*Country*	*Specification*	*Group*	*Coefficient*	*S.E.*
Borjas (2003)	United States	OLS, weighted, decadal	natives, men	−0.57	(0.16)
Aydemir and Borjas (2007)	Canada	OLS, weighted, decadal	natives, men	−0.51	(0.20)
	United States	OLS, weighted, decadal	natives, men	−0.49	(0.22)
Llull (2014)	Canada, United States	IV, weighted, decadal	natives, men	−1.66	(0.66)
Borjas (2014)	United States	OLS, weighted, decadal	natives, men	−0.53	(0.10)
Card and Peri (2016)	United States	OLS, weighted, decadal	natives, men	−0.12	(0.13)

Structural approach:

Structural Approach	*Country*	*Group and Specification*[e]	*Elasticities of Substitution*[f]	*Simulated Impact*[g]
Ottaviano and Peri (2012)	United States	natives, long run	σ(X)=6.25, σ(E)=3.3, σ(MN)=20	0.05
		immigrants, long run		−0.60
Manacorda, Manning, and Wadsworth (2012)	United Kingdom	natives, low education, long run	σ(X)=5.2, σ(E)=4.9, σ(MN)=6.9	0.08
		natives, high education, long run		−0.23

Skill-cell and related approaches

Potential problems with skill-cell and structural approach:

- Skill distribution of immigrants may not be exogenous
  see Llull (2015) on using exogenous push factors
- Supply shock mis-measured if immigrants *downgrade* upon arrival, working in lower-paid occupations than we would expect given their observable characteristics
  e.g. Dustmann and Preston (2012), Dustmann, Frattini, Preston (2013)

More on Mechanisms

We focused on empirical issues in estimating whether immigration has an impact on employment and wages

- A lot can go wrong: endogeneity, downgrading, composition or selectivity bias, serial correlation in shock, ...

Other studies focus on mechanisms why the wage impact of immigration might not be as large as the canonical model predicts:

- Peri and Sparber (2009): Natives specialize in different tasks than immigrants (e.g. communication-intensive tasks), protecting them from potential adverse wage impacts
- Lewis (2011): Capital and low-skilled workers are substitutes? Plants in areas with higher immigrant inflows reduce capital investment, reducing the wage impact of immigration

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A modified Mincer equation

- Following Mincer (1974), after leaving school a worker continues to invest in human capital
- Migrants' HC acquired in the home country is only partially transferable to the foreign labour market
  $\Rightarrow$ Additionally accumulate host-country specific human capital
- A Mincer equation reflecting migrants' HC accumulation:

$$\log w_i = \beta_1 I_i + \beta_2 x_i + \beta_3 x_i^2 + \alpha_1 y_i + \alpha_2 y_i^2 + J_i' \gamma + \varepsilon_i$$

J_i	vector of socio-economic characteristics
I_i	dummy indicating foreign-born status
x_i	(potential) work experience (often age)
y_i	years since migration

Chiswick (1978)

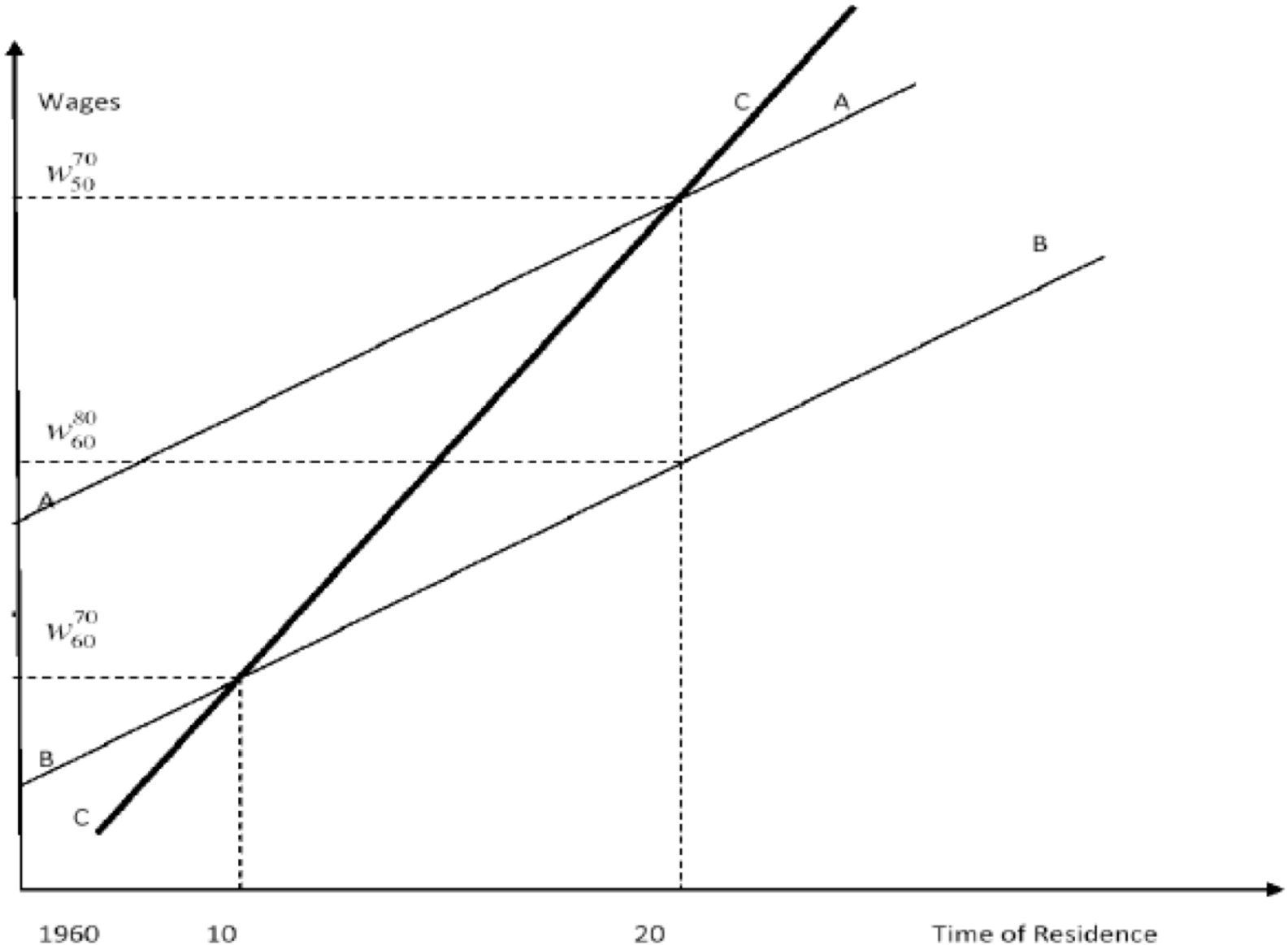
- The seminal analysis by Chiswick was based on an empirical model described above
- Chiswick uses data from the 1970 U.S. Census on annual earnings
- Includes education, the log of weeks worked, experience, and regional characteristics as controls
- His results show
  - $\beta_0 = -0.17$: immigrants earn 17% less than comparable natives at the time of arrival
  - $\alpha_1 = 0.01$: the gap narrows by (over) 1 ppt per year

$\Rightarrow$ Immigrants' earnings overtake those of natives 15 years after arrival

Borjas (1985)

- Borjas (1985) shows that estimation based on a cross section of data may lead to misleading conclusions.
- Immigrants who differ in their years of residence in the host country in a given year, will necessarily have arrived at different points in time.
- If entry wages, or the "cohort quality", have changed over time, then this may be picked up by the coefficient on the years since migration variable.
- One would erroneously confound differences in immigrant cohort quality with assimilation.

Borjas (1985)



Borjas (1985)

- One way to address the problem: use a further census year so that the same cohort of immigrants can be observed at two different points in time.
- In general, what you need is **longitudinal data** (panel or repeated cross-section)
- This allows to control for cohort FE by estimating

$$\log w_{ict} = \beta_1 l_i + \beta_2 x_i + \beta_3 x_i^2 + \alpha_1 y_i + \alpha_2 y_i^2 + J_i' \gamma + \theta_c + \phi_t + \varepsilon_i$$

Borjas (1999)

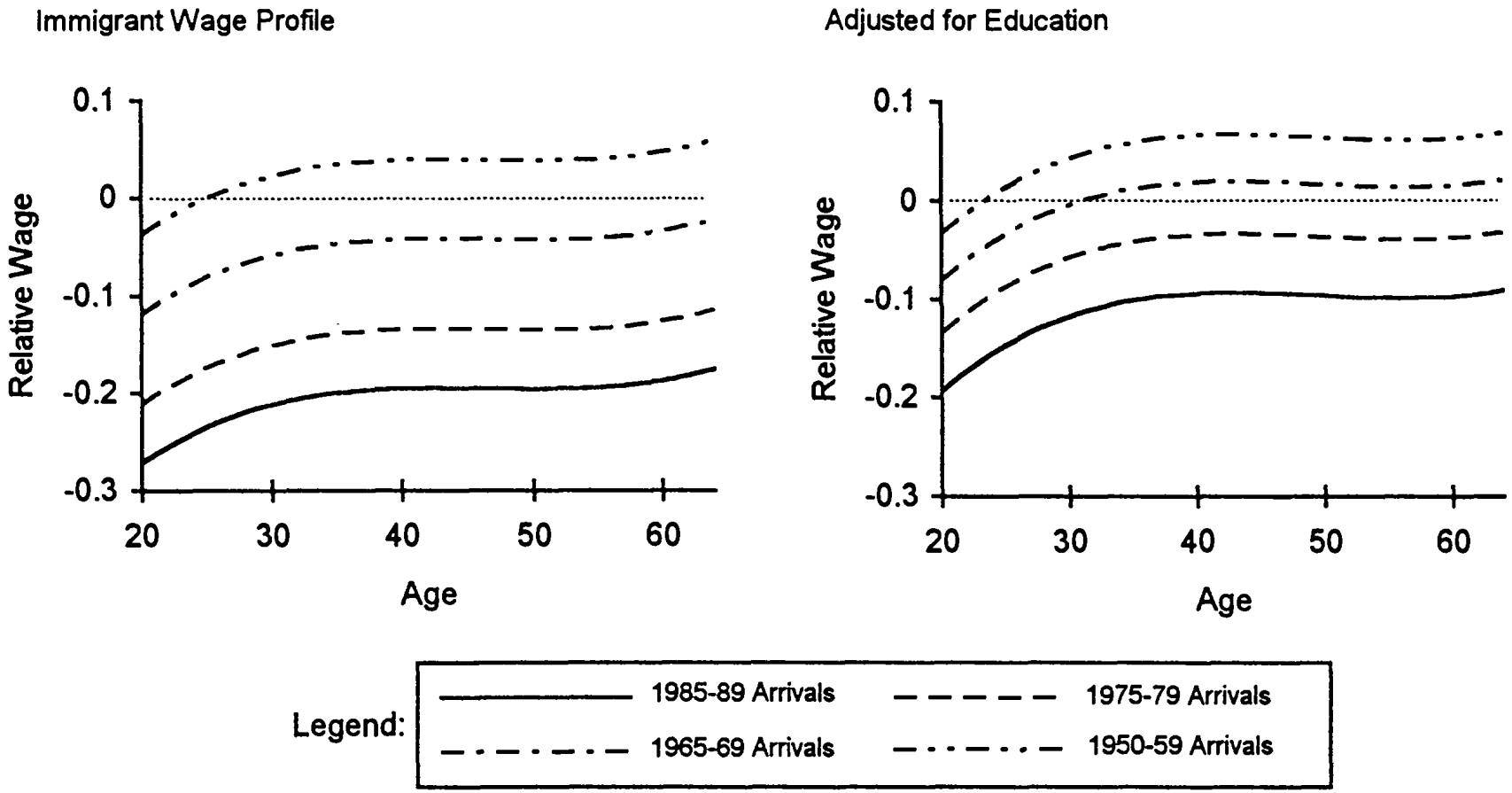


FIG. 1.—Predicted relative wage profiles of immigrants (using age-education deflator)

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Albert, Glitz and Llull (2023)

Albert, Glitz and Llull (2023):

- Study link between immigrants' assimilation and wage impact to explain the decline in relative wages of migrants since 1960s
- Main intuition: Natives and immigrants tend to have different skills sets

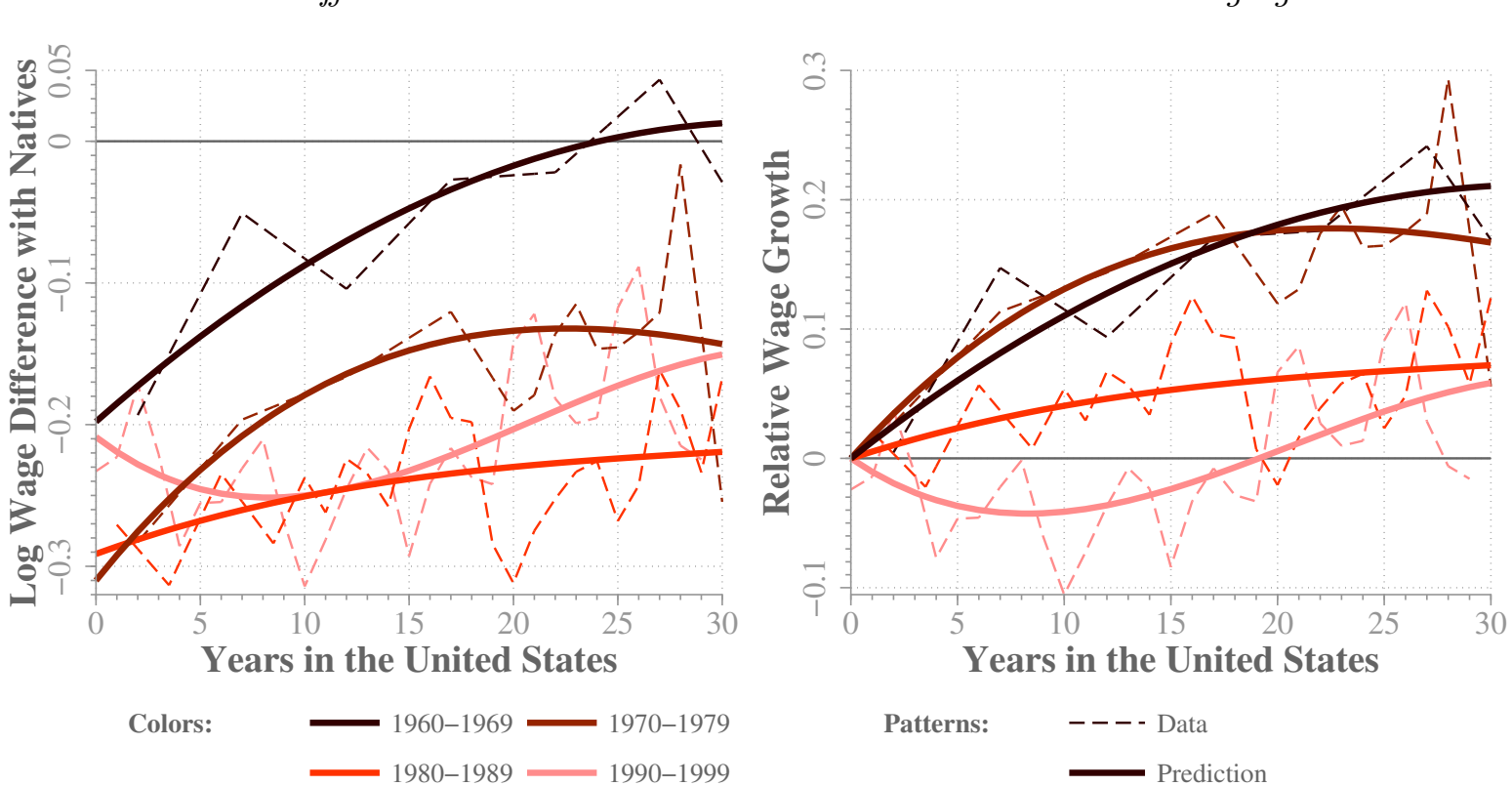
$\Rightarrow$ **Imperfect substitutes** in production

$\Rightarrow$ Increasing **immigrant cohort sizes** make immigrants' skills more abundant, resulting in:

  - Larger **wage gap** at arrival
  - Ambiguous effect on **speed of convergence**

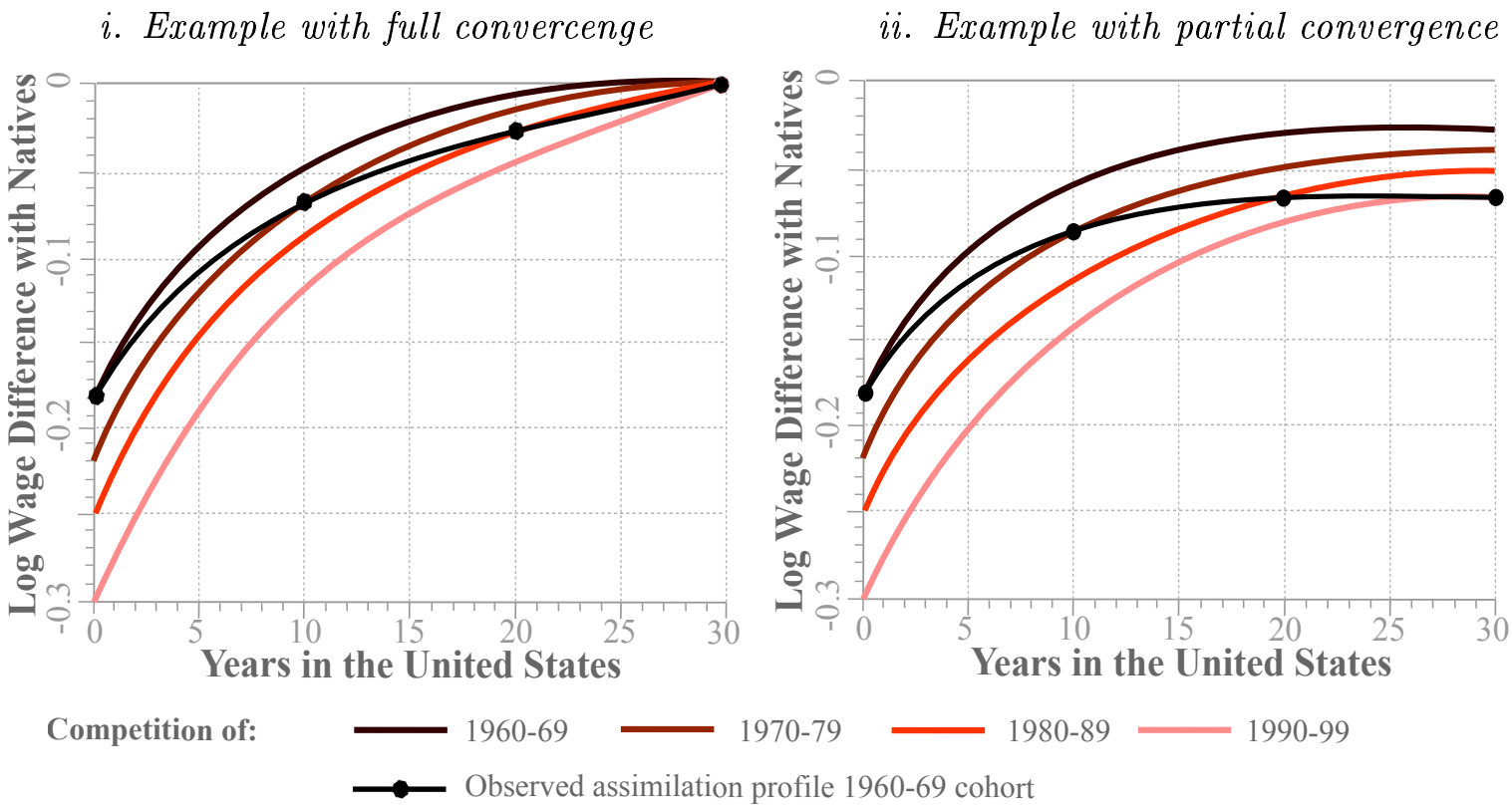
Assimilation Profiles in the United States

FIGURE 1. WAGE GAP BETWEEN NATIVES AND IMMIGRANTS AND YEARS IN THE U.S.



Main Intuition

"Dynamic competition effect" drives observed assimilation patterns



Theoretical Framework

Output is produced with general and specific skill units:

$$Y_t = A_t \left(G_t^{\frac{\sigma-1}{\sigma}} + \delta_t S_t^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}}$$

Equilibrium skill prices equal the respective **marginal products**:

$$r_{Gt} = A_t \left(\frac{Y_t}{A_t G_t} \right)^{\frac{1}{\sigma}} \qquad \text{and} \qquad r_{St} = A_t \delta_t \left(\frac{Y_t}{A_t S_t} \right)^{\frac{1}{\sigma}}$$

Individuals supply one **general skill unit** and s **specific skill units**

$$s_g(n, y, o, c, E, x) \equiv \begin{cases} 1 & \text{if } n = 1 \\ \theta_{1go} + \sum_{\ell=1}^{3} \theta_{2\ell go} y^\ell + \theta_{3ge} + \sum_{\ell=1}^{3} \theta_{4\ell ge} y^\ell & \\ \quad + \theta_{5gc} + \sum_{\ell=1}^{3} \theta_{7\ell gc} y^\ell + \sum_{\ell=1}^{3} \theta_{6\ell g} (x-y)^\ell & \text{if } n = 0 \end{cases}$$

- Accumulation of specific skills as in classic assimilation studies
- Function flexibly depends on **years in the host country** (y) interacted with origin (o), education (e) and cohort FE (c)

Skill Supplies and Wages

Relative wages of immigrants compared to equivalent natives are:

$$\frac{w_{gt}(0,y,o,c,E,x)}{w_{gt}(1,\cdot,\cdot,\cdot,E,x)} = \frac{r_{Gt} + r_{St}s_g(0,y,o,c,E,x)}{r_{Gt} + r_{St}}$$
$$= \frac{1 + s_g(0,y,o,c,E,x)\delta_t(G_t/S_t)^{\frac{1}{\sigma}}}{1 + \delta_t(G_t/S_t)^{\frac{1}{\sigma}}}$$

The model features:

- **Competition** effects as discussed above if $\sigma < \infty$.
- **Traditional** assimilation model if $\sigma = \infty$.

Decomposition of estimated assimilation profiles

Model simulations suggest that variation in wage gaps across cohorts would be smaller if competition had not increased:

FIGURE 9. WAGE GAP DECOMPOSITION: COMPETITION AND DEMAND EFFECTS

I. Assimilation profiles under different scenarios