The Economics of International Migrations: The Aggregate Effects

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Lecture 4

Can we isolate the aggregate effects of Immigrants?

- Effects on Employment of natives, at the national level
- Effects on Hours worked at the national level
- Effects on investment and capital per worker
- Effects on Total factor Productivity
- Effects on Average Wages

- Use a production function and growth "accounting" framework

Aggregate Effects of Immigration

- Consider the receiving country. Production function Approach

$$Y_{dt} = A_{dt} K_{dt}^{\alpha} L_{dt}^{1-\alpha}$$

- Then effects on total income and wages, of any change can be obtained as:

$$\frac{\Delta Y_{dt}}{Y_{dt}} = \frac{\Delta A_{dt}}{A_{dt}} + \alpha \frac{\Delta K_{dt}}{K_{dt}} + (1-\alpha) \frac{\Delta L_{dt}}{L_{dt}}$$

$$\frac{\Delta y_{dt}}{y_{dt}} = \frac{\Delta w_{dt}}{w_{dt}} = \frac{\Delta A_{dt}}{A_{dt}} + \alpha \left(\frac{\Delta K_{dt}}{K_{dt}} - \frac{\Delta L_{dt}}{L_{dt}} \right)$$

Effects of Immigration on each term

- Labor, measured as hours worked: 1 for 1 or crowding out? Depress labor supply of natives?
- Capital: Investment respond to marginal product of K, is adjustment fast or slow (does K/L change)?
- Productivity:
  - scale effects (agglomeration, Ciccone-Hall 1996, Ottaviano and Peri 2007)?
  - Specialization-efficiency-competition effects (Peri-Sparber 2009, Card 2007, Schollmann 2008)
  - Adoption of unskilled-intensive technologies (Lewis 2005)

Estimate the following equations

$$\frac{\Delta X_{dt}}{X_{dt}} = D_t + \gamma_x \frac{\Delta F_{dt}}{Pop_{dt}} + e_{st}$$

- Where X_{dt} is, in turn, labor, capital, TFP or output
- Need for an exogenous shifter of immigration ΔF_{dt} as instrument:
- From the gravity equation, $ln(Migrant\ Flow)_{odt} = \hat{D}_{ot} + \hat{D}_{od}$ including pull factors in the regression but omitting them in the predicted flow. It depends only on country of origin by time and bilateral costs.

Discussion of the Instrument

- Obtained from the Bilateral flow equation:

$$ln(Mig_{ojt}) = D_{ot} + D_o + \alpha(w_{jt} - w_{ot}) + \beta_c[Geography, Laws - Policies, Networks]_{ojt} + u_{ojt}$$

- We also constructed it only including demographic, income inequality of the country of origin and controlling for trade flows.

- Results are robust but instruments are weaker, so standard errors are larger

Construction of aggregate Variables

- Hours worked: from the OECD-STAN dataset (includes employment and total hours, for all 14 countries 1980-2005)

- Total Output: OECD-STAN dataset, cross-checked with Penn World Table 6.2. Real US $ in 2000 PPP.

- Capital Services: from OECD Productivity dataset, that measure the services (adjusting for age, depreciation and vintage) complemented with data on investment to calculate gross stock (from PWT 6.2) in the missing years

Estimation results: First Stage

	(1) *Basic*	*(2)* *Omitting US*	*(3)* *Europe Only*	*(4)* *1990-2005*
Coefficient	0.67**	0.67**	0.67**	0.62**
	(0.03)	(0.03)	(0.04)	(0.03)
F-test	495.1**	496**	319.2**	539.14
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)
Partial R-Square	0.43	0.44	0.42	0.41
Observations	350	325	225	210

Estimation results:
Table 6: 2SLS short-run effects

	(1) *basic 2SLS*	*(2)* *Omitting US*	*(3)* *Europe only*	*(4)* *1990-2005*	*(5)* *Using Net Immigration*
ΔL/L	1.02**	0.99	1.00	0.96**	4.00**
	(0.12)	(0.08)	(0.08)	(0.08)	(0.29)
ΔEmployment/ Employment	1.22**	1.21**	1.22**	1.22**	4.81**
	(0.09)	(0.10)	(0.13)	(0.12)	(0.37)
ΔHours per worker /Hours per worker	-0.20*	-0.20	-0.25**	-0.26**	-0.80
	(0.10)	(0.11)	(0.08)	(0.10)	(0.45)
ΔK/K	1.36**	1.37**	1.49**	1.38**	5.37**
	(0.17)	(0.18)	(0.20)	(0.19)	(0.52)
ΔA/A	-0.13	-0.11	-0.06	-0.37	-0.51
	(0.17)	(0.16)	(0.14)	(0.14)	(0.67)
ΔY/Y	0.99**	0.99**	1.09**	0.94**	3.91**
	(0.50)	(0.17)	(0.20)	(0.17)	(0.62)
ΔCapital per worker/ Capital per worker	0.14	0.16	0.23	0.15	0.56
	(0.13)	(0.14)	(0.14)	(0.14)	(0.51)
ΔOutput per hour/ Output per hour	-0.02	0.03	0.08	-0.04	-0.10
	(0.20)	(0.19)	(0.15)	(0.17)	(0.80)
Observations	350	325	225	210	350

Is there a difference if immigrants enter the country in a recession?

- Relevant short-run question is: how to minimize the negative short-run impact of immigrants and maximize their long-run positive total effect.
  - In a period of low demand immigrants may be harder to absorb in the labor market
  - In a period of low demand, immigrants may cause a slow adjustment of investments
  - The first effect would harm employment, the second wages

Impact of immigration in Normal and Bad economic times: Period 1980-2005
2SLS estimates, instruments: gravity push factors only

Specification:	*(1) Basic 2SLS*		*(2) 2SLS Controlling for lagged income per worker*	
	Normal Times Output gap>-1%	**Bad Times: Output gap<-1%**	**Normal Times Output gap>-1%**	**Bad Times: Output gap<-1%**
ΔL/L	1.746**	0.520**	1.717**	0.498**
	(0.175)	(0.110)	(0.116)	(0.123)
ΔEmployment/ Employment	1.724**	0.883**	1.700**	0.866**
	(0.159)	(0.113)	(0.156)	(0.113)
ΔHours per worker /Hours per worker	0.022	-0.364**	0.017	-0.367**
	(0.0771)	(0.151)	(0.0884)	(0.153)
ΔK/K	1.676**	1.158**	1.714**	1.185**
	(0.205)	(0.149)	(0.257)	(0.177)
ΔA/A	-0.189	-0.091	-0.167	-0.075
	(0.156)	(0.184)	(0.182)	(0.182)
ΔY/Y	1.517**	0.634**	1.532**	0.645**
	(0.141)	(0.163)	(0.156)	(0.169)
ΔCapital per worker/ Capital per worker	-0.048	0.274**	0.0139	0.320**
	(0.167)	(0.125)	(0.200)	(0.148)
ΔOutput per hour/ Output per hour	-0.229	0.114	-0.185	0.147
	(0.182)	(0.219)	(0.178)	(0.224)
Observations	336		298	

Estimation results:
Table 7, 2SLS Long-run effects (5 year differences)

	(1) *basic 2SLS*	*(2)* *Omitting US*	*(3)* *Europe only*	*(4)* *1990-2005*
ΔL/L	0.99**	0.97**	0.97**	0.97**
	(0.09)	(0.08)	(0.10)	(0.08)
ΔEmployment/ Employment	1.18**	1.16**	1.21**	1.18**
	(0.09)	(0.09)	(0.10)	(0.10)
ΔHours per worker /Hours per worker	-0.19	-0.19	-0.23**	-0.22**
	(0.08)	(0.09)	(0.06)	(0.10)
ΔK/K	1.24**	1.25**	1.33**	1.22**
	(0.13)	(0.17)	(0.18)	(0.17)
ΔA/A	-0.09	-0.08	-0.03	-0.08
	(0.13)	(0.12)	(0.11)	(0.12)
ΔY/Y	0.96**	0.97**	1.05**	0.97**
	(0.14)	(0.16)	(0.18)	(0.15)
ΔCapital per worker/ Capital per worker	0.06	0.08	0.16	0.04
	(0.13)	(0.13)	(0.13)	(0.14)
ΔOutput per hour/ Output per hour	-0.02	0.01	0.09	-0.04
	(0.24)	(0.14)	(0.12)	(0.14)
Observations	70	65	45	56

Conclusions: Determinant and effects in Cross-Country analysis

- Immigration flows are sensitive to:
  - changes in income of receiving countries relative to the sending countries
  - Changes in immigration laws
- Push-driven immigration flows produce a 1 for 1 increase in overall employment and income in the short and long run
- No effect on capital-labor ratio and TFP in the short and long-run.
- Hence no negative effect on average wages.

Summarizing the cross-country and the US evidence

- 1) The approach uses a consistent model, production function based, with capital adjustment and TFP independent from immigration.
  - This is confirmed in the cross-country data
  - This implies that immigration does not change average wages
- 2) If there are two levels of schooling, imperfectly substitutable between them then immigration is rather balanced and has not contributed to the income inequality.
- 3) Given the large inflow of immigrants in 1990-2006 relative to their share in 1990, if there is some imperfect substitutability (even small) this hurts wages of previous immigrants.