The Skill Composition of Migration and the Generosity of the Welfare State

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Abstract

Skilled migrants typically contribute to the welfare state more than they draw in benefits from it. The opposite holds for unskilled migrants. This suggests that a host country is likely to boost (respectively, curtail) its welfare system when absorbing high-skill (respectively, low-skill) migration. In this paper we .rst examine this hypothesis in a politico-economic setup. We then confront the prediction of the theory with evidence. In doing so, we reckon with an endogeneity problem that arise because the skill composition of migration is itself affected by the generosity of the welfare state.

Road Map

We first develop a parsimonious model in which the extent of the welfare state is determined by majority voting. We then study how the skill composition of a given migration volume affects the political economics equilibrium level of the welfare state.

Road Map (continue)

we adopt a twofold identification strategy:

First, we employ instrumental variables that are commonly used in gravity models - whether or not the source and host country share a common language and the distance between them - for high- and low-skill migration.

Second, as shown in Cohen and Razin (2008), when estimating the effect of generosity of the welfare state on the skill composition of immigrants, one must account for different (source-host country pairs) migration regimes. Specifically, when migration is policy-controlled, the host country can react to low-skill dominated immigration pressures not only by curtailing welfare state benefits (as suggested herein) but also by controlling for the skill composition of the immigrants, via screening migration policy or limiting access to some welfare bene.ts3.

To capture the full effect of the skill composition of migrants on the welfare state, therefore, we focus only in a sample of countries that enable free migration among themselves, as well as equal treatment of the welfare system for domestic and migrants.

Parsimoneous Model

$$Y = AL_s^{\alpha} L_u^{1-\alpha}, \quad 0 < \alpha < 1$$

wages of skilled and unskilled labor

$$w_s = \alpha Y / L_s$$

$$w_u = (1 - \alpha) Y / L_u$$

Labor Supply

$$L_s = (s + \sigma\mu)\, l_s$$

$$L_u = (1 - s + (1 - \sigma)\,\mu)\, l_u$$

Population

$$N = 1 + \mu$$

Government Budget Constraint

$$Nb = \tau Y$$

Utility function for the skill level ith individual

$$u_i = c_i - \frac{\varepsilon}{1+\varepsilon} l_i^{\frac{1+\varepsilon}{\varepsilon}} + g(b)$$

Individual budget constraint

$$c_i = (1 - \tau) l_i w_i$$

Individual's labor supply

$$l_i = \left(w_i\left(1-\tau\right)\right)^{\varepsilon}$$

Equilibrium Wages

$$w_s = A\left(\alpha\delta^{\varepsilon}\theta^{1-\alpha}\right)^{\frac{1}{1+\varepsilon}} \tag{9}$$

$$w_u = A\left(\left(1-\alpha\right)\delta^{\varepsilon}\theta^{-\alpha}\right)^{\frac{1}{1+\varepsilon}}$$

$$\text{where } \delta \equiv \alpha^{\alpha}\left(1-\alpha\right)^{1-\alpha}$$

$$\text{and } \theta \equiv \frac{1-s+\left(1-\sigma\right)\mu}{s+\sigma\mu}$$

In order to ensure that the skilled wage always exceeds the unskilled wage, $w_s > w_u$, we assume that

$$\frac{\alpha(1-s)}{(1-\alpha)(s+\mu)} > 1 \tag{10}$$

Indirect utility function

$$V_i(\tau;\sigma) = g\left(b(\tau;\sigma)\right) + \frac{1}{1+\varepsilon}\left[(1-\tau)w_i(\sigma)\right]^{1+\varepsilon}$$

First order condition for the vote on the tax rate

$$\frac{\partial V_i}{\partial \tau} = g'(b)\frac{\partial b}{\partial \tau} - w_i\left[(1-\tau)w_i\right]^{\varepsilon} = 0$$

Predictions of the model

$$\frac{\partial^2 V_i}{\partial \sigma \partial \tau} + \frac{\partial^2 V_i}{\partial \tau^2} \frac{\mathrm{d}\tau}{\mathrm{d}\sigma} = 0. \tag{13}$$

Because of the second-order condition, $\frac{\partial^2 V_i}{\partial \tau^2} \leq 0$, it follows that

$$sign\left(\frac{\mathrm{d}\tau}{\mathrm{d}\sigma}\right) = sign\left(\frac{\partial^2 V_i}{\partial \sigma \partial \tau}\right) \tag{14}$$

for $i = s, u$. In Appendix A we show that $\frac{\partial^2 V_s}{\partial \sigma \partial \tau} > 0$ and that $\frac{\partial^2 V_u}{\partial \sigma \partial \tau} > 0$.[7]

Therefore, we can conclude that

$$\frac{\mathrm{d}\tau_i}{\mathrm{d}\sigma} \geq 0 \text{ for both } i = s, u. \tag{15}$$

The econometric model

$$b_i = \alpha_0 + \alpha_g m_{g,i} + \alpha_u m_{u,i} + X_i^b \beta + \epsilon_i^b$$

Endogeneity Problem

Note that there is an endogeneity problem concerning equation (16). It is difficult to identify the direction of causality between spendings, b_i, and migration of the two types. Indeed the m's affect b as specified in this equation. But, on the other hand, the generosity of the welfare state also affects the level of migrations of the two types. Specifically, as demonstrated in Cohen and Razin (2008), the generosity of the welfare state has a negative effect on the migration of skilled individuals (who are net fiscal contributors), but a positive effect on the migration of unskilled (who are net fiscal beneficiaries), when migration is free.[8]

Instruments

We therefore introduce instrumental variables for the two skill types of migrants. We assume that bilateral migration stocks for skill level $e = (s, u)$, between any source-host country pair (j, i), are determined in accordance with the following equation:

$$m_{e,j,i} = a_0 + a_1 Comlang_{j,i} + a_2 Dist_{j,i} + X^m_{j,i} b + \epsilon^m_{j,i},\ e = \{s, u\} \qquad (17)$$

where $Comlang$ depicts a dummy variable, with the value 1 if the source and host countries share a common language, and 0 otherwise, $Dist$ captures the

Instruments (continued)

geographical (great circle) distance between the source-host pair, X^m is a vector of other control variables (note that it may be pairwise specific (which further helps the identification), hence the different superscript) and ϵ^m is an error term.

Auxilliary equation

We therefore introduce instrumental variables for the two skill types of migrants. We assume that bilateral migration stocks for skill level $e = (s, u)$, between any source-host country pair (j, i), are determined in accordance with the following equation:

$$m_{e,j,i} = a_0 + a_1 Comlang_{j,i} + a_2 Dist_{j,i} + X^m_{j,i} b + \epsilon^m_{j,i},\ e = \{s, u\} \qquad (17)$$

Fitted values of migration variables

Estimating equations (17) yields the fitted values for the bilateral skill-dependent immigration stocks. We sum these fitted values across source countries:

$$\widehat{m}_{e,i} = \sum_{j \neq i} \widehat{m}_{e,j,i} \tag{18}$$

where the hat symbol denotes the fitted value estimation.

Therefore, our estimated equation is:

$$b_i = \alpha_0 + \alpha_s \widehat{m}_{s,i} + \alpha_u \widehat{m}_{u,i} + X_i^b \beta + \epsilon_i^b \tag{19}$$

Data

Our country sample includes 16 European countries, 14 EU members (Austria, Belgium, Denmark, France, Germany, Italy, the Netherlands, Sweden, Finland, Greece, Ireland, Portugal, Spain and the U.K.), as well as Norway and Switzerland. Naturally there is free labor mobility among the (old members) EU countries. The two other countries enjoy bilateral agreements with the EU, ensuring free labor mobility. (See Cohen and Razin (2008) for detailed description of the free labor mobility treaties among countries in this sample.)

The dependent variable

The dependent variable, b, is social expenditure, in cash or in kind, per capita, at constant (2000) prices, PPP converted into US$, averaged between 2000 and 2005 (source: OECD.stat). The averaging is done in order to filter out business-cycle variations. Social expenditure encompass all kinds of social public expenditures, in cash or in kind, including, for instance, old age transfers, incapacity related benefits, health care, unemployment compensations and other social expenditures.

The explanatory variable

The stocks of migrants in either country, originated in all of the remaining countries, by education attainment, is our variables of interest. Migrants are at working age (25+), defined as foreign born, subdivided into three classes of schooling years: low (0-8), medium (9-12) and high (13+). The stocks of migrants we use are lagged (1990) to further avoid possible endogeneity problem (source: Docquier and Marfouk (2006)).

Results

Dependent variable: benefits per capita (2000-2005)		
	OLS	2SLS
High skilled migrants (1990)	-17.532	45.506
	(8.348)*	(17.015)**
Low skilled migrants (1990)	1.866	-7.011
	(0.245)***	(2.627)**
GDP per capita (2000-2004)	368.13	433.613
	(58.054)***	(84.725)***
Old age share (2000-2007)	521.675	557.530
	(137.087)***	(108.549)***
Domestic high-skilled (2000)	0.045	-0.401
	-0.109	(0.178)*
Domestic low-skilled (2000)	-0.053	0.068
	(0.015)***	(0.040)
Observations	16	16
R-squared	0.884	0.836
all variables are in thousands, except for Old age share (in %)		
Robust standard errors in parentheses		
2SLS uses distance and common language as IV		
* significant at 10%; ** significant at 5%; *** significant at 1%		

Table 1: The effect of Skill Composition of Migrants on Welfare-State Spendings

Robustness

Dependent variable: benefits per capita (2000-2005)		
	OLS	2SLS
High skilled migrants (1990)	-6.287	26.325
	(3.085)*	(11.781)*
Low skilled migrants (1990)	1.210	-7.426
	(0.188)***	(3.541)*
GDP per capita (2000-2004)	379.862	410.406
	(63.505)***	(82.132)***
Old age share (2000-2007)	581.111	399.920
	(120.049)***	(112.922)***
Domestic med-skilled (2000)	-0.024	-0.063
	(0.018)	(0.028)**
Domestic low-skilled (2000)	-0.047	0.073
	(0.018)**	(0.056)
Observations	16	16
R-squared	0.889	0.834
all variables are in thousands, except for Old age share (in %)		
Robust standard errors in parentheses		
2SLS uses distance and common language as IV		
* significant at 10%; ** significant at 5%; *** significant at 1%		

Table 2: Robustness: Medium- vs. Low-skilled

Robustness (continued)

Dependent variable: benefits per capita (2000-2005)		
	OLS	2SLS
High skilled migrants (1990)	-21.768	49.632
	(9.080)**	(17.571)**
Medium-Low skilled migrants (1990)	1.869	-6.094
	(0.398)***	(2.294)**
GDP per capita (2000-2004)	365.327	433.934
	(56.684)***	(85.087)***
Old age share (2000-2007)	503.101	593.742
	(143.144)***	(114.168)***
Domestic med-skilled (2000)	0.077	-0.404
	(0.115)	(0.177)**
Domestic low-skilled (2000)	-0.054	0.053
	(0.016)***	(0.036)
Observations	16	16
R-squared	0.878	0.836
all variables are in thousands, except for Old age share (in %)		
Robust standard errors in parentheses		
2SLS uses distance and common language as IV		
* significant at 10%; ** significant at 5%; *** significant at 1%		

Table 3: Robustness: High vs. Medium-low-skilled

Robustness (continued)

Dependent variable: benefits per capita				
	1995-2005		1990-2005	
	OLS	2SLS	OLS	2SLS
High skilled migrants (1990)	-16.667	47.365	-14.530	44.525
	(9.442)	(18.534)**	(11.335)	(20.411)*
Low skilled migrants (1990)	1.980	-6.672	1.946	-6.043
	(0.283)***	(3.030)*	(0.339)***	(3.763)
GDP per capita (2000-2004)	374.372	427.927	360.927	407.284
	(63.088)***	(92.659)***	(70.980)***	(113.945)***
Old age share (2000-2007)	557.052	593.406	559.026	586.002
	(151.257)***	(132.101)***	(179.440)**	(159.413)***
Domestic high-skilled (2000)	0.035	-0.417	0.014	-0.394
	(0.117)	(0.191)*	(0.139)	(0.206)*
Domestic low-skilled (2000)	-0.056	0.059	-0.057	0.049
	(0.016)***	(0.048)	(0.019)**	(0.059)
Observations	16	16	16	16
R-squared	0.867	0.819	0.817	0.774
all variables are in thousands, except for Old age share (in %)				
Robust standard errors in parentheses				
2SLS uses distance and common language as IV				
* significant at 10%; ** significant at 5%; *** significant at 1%				

Table 4: Robustness: Different Average of the Benefits

Robustness (continued)

Dependent variable: benefits per capita				
	1985-2005		1980-2005	
	OLS	2SLS	OLS	2SLS
High skilled migrants (1990)	-13.401	42.919	-12.181	39.637
	(11.831)	(20.596)*	(12.193)	(20.467)*
Low skilled migrants (1990)	1.911	-5.625	1.788	-4.850
	(0.332)***	(3.906)	(0.326)***	(3.942)
GDP per capita (2000-2004)	359.515	399.841	358.796	386.988
	(71.559)***	(117.620)***	(66.613)***	(112.629)***
Old age share (2000-2007)	553.145	577.039	547.650	572.696
	(177.261)**	(157.583)***	(173.751)**	(155.899)***
Domestic high-skilled (2000)	-0.008	-0.395	-0.021	-0.379
	(0.147)	(0.207)*	(0.151)	(0.206)*
Domestic low-skilled (2000)	-0.054	0.045	-0.052	0.033
	(0.018)**	(0.062)	(0.016)***	(0.064)
Observations	16	16	16	16
R-squared	0.812	0.771	0.819	0.782
all variables are in thousands, except for Old age share (in %)				
Robust standard errors in parentheses				
2SLS uses distance and common language as IV				
* significant at 10%; ** significant at 5%; *** significant at 1%				

Table 5: Robustness: Different Measure of the Benefits

Robustness (continued)

Dependent variable: GDPpc * (tax rate - defense pc)		
	OLS	2SLS
High skilled migrants (1990)	5.057	105.361
	(39.165)	(45.259)**
Low skilled migrants (1990)	2.562	-4.258
	(1.622)	(6.543)
GDP per capita (2000-2004)	509.746	389.185
	(116.065)***	(168.228)**
Old age share (2000-2007)	391.386	511.042
	(244.199)	(305.853)
Domestic high-skilled (2000)	-0.298	-1.096
	(0.371)	(0.460)**
Domestic low-skilled (2000)	-0.047	0.009
	(0.060)	(0.079)
Observations	15	15
R-squared	0.728	0.847
all variables are in thousands, except for Old age share (in %)		
Robust standard errors in parentheses		
2SLS uses distance and common language as IV		
* significant at 10%; ** significant at 5%; *** significant at 1%		

Table 6: Robustness: Different Measure of the Benefits

Robustness (continued)

Dependent variable: benefits per capita (2000-2005)		
	OLS	2SLS
High skilled migrants (1990)	-18.807	49.465
	(9.144)*	(15.954)**
Low skilled migrants (1990)	1.916	-7.059
	(0.303)***	(2.630)**
GDP per capita (2000-2004)	366.775	418.696
	(58.073)***	(88.375)***
Old age share (2000-2007)	533.445	427.161
	(150.391)***	(119.470)***
Domestic high-skilled (2000)	0.063	-0.481
	(0.119)	(0.174)**
Domestic low-skilled (2000)	-0.053	0.053
	(0.018)**	(0.036)
Gini (before tax-transfer) (mid 2000)	-19.014	167.181
	(26.107)	(64.795)**
Observations	16	16
R-squared	0.888	0.846
all variables are in thousands, except for Old age share (in %)		
Robust standard errors in parentheses		
2SLS uses distance and common language as IV		
* significant at 10%; ** significant at 5%; *** significant at 1%		

Table 7: Robustness: Including Gini Coefficient

Robustness (continued)

Dependent variable: benefits per capita (2000-2005)		
	OLS	2SLS
High skilled migrants (1990)	-12.862	59.231
	(9.671)	(16.883)***
Low skilled migrants (1990)	1.741	-5.283
	(0.528)**	(2.527)*
GDP per capita (2000-2004)	321.299	257.661
	(75.802)***	(143.321)
Old age share (2000-2007)	457.474	401.993
	(194.730)*	(134.737)**
Domestic high-skilled (2000)	0.030	-0.482
	(0.097)	(0.146)**
Domestic low-skilled (2000)	-0.038	0.033
	(0.019)*	(0.024)
English legal origin	-81.775	-1,779.475
	(708.103)	(571.628)**
Scandinavian legal origin	812.909	1,008.628
	(601.369)	(1,235.552)
Observations	16	16
R-squared	0.913	0.901
all variables are in thousands, except for Old age share (in %)		
Robust standard errors in parentheses		
Benchmark legal origin is French-German		
2SLS uses distance and common language as IV		
* significant at 10%; ** significant at 5%; *** significant at 1%		

Table 8: Robustness: Adding Legal Origin

Robustness (continued)

Dependent variable: benefits per capita (2000-2005)		
	OLS	2SLS
High skilled migrants (1990)	-14.948	48.865
	(9.521)	(18.134)**
Low skilled migrants (1990)	1.998	-5.921
	(0.375)***	(3.233)
GDP per capita (2000-2004)	387.402	474.927
	(61.117)***	(98.614)***
Old age share (2000-2007)	592.595	717.591
	(187.959)**	(124.663)***
Domestic high-skilled (2000)	0.003	-0.473
	(0.128)	(0.175)**
Domestic low-skilled (2000)	-0.069	0.023
	(0.026)**	(0.052)
Unemployment (1990-1999)	71.235	231.502
	(72.151)	(82.683)**
Observations	16	16
R-squared	0.894	0.847
all variables are in thousands, except for Old age share (in %)		
Robust standard errors in parentheses		
2SLS uses distance and common language as IV		
* significant at 10%; ** significant at 5%; *** significant at 1%		

Table 9: Robustness: Adding Unemployment

Conclusion

Skilled migrants typically contribute to the welfare state more than they draw in benefits from it. The opposite holds for unskilled migrants. This suggests that a host country is likely to boost (respectively, curtail) its welfare system when absorbing high-skill (respectively, low-skill) migration. In this paper we examined this hypothesis. We first constructed a parsimonious politico-economic model. We showed that indeed a higher proportion of skilled migration for a given volume of migration encourages a host country to opt for a more generous welfare state system. We then confronted this prediction with evidence from EU countries. In doing so, we reckon with an endogeneity problem that arise because the skill composition of migration is

Conclusion (continued)

itself affected by the generosity of the welfare state. We indeed found that the evidence supports the prediction of the theory. Furthermore, if one ignores this endogeneity problem (and employs OLS estimation) the estimates of the effects of the skilled and unskilled migration on the generosity of the welfare state are severely biased, so much so as to reverse the direction of these effects.

We conjecture that in the same parsimonious model a brain drain from the source country will push it towards curtailing the extent of its welfare system. A useful direction for future research is to confront this hypothesis with evidence.