

Rationing As a Determinant of Immigrant Composition and Outcomes

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The US faces an excess supply of potential immigrants and must ration immigration slots. In any given year, approximately 1 million immigrants obtain residency status (green cards), but almost 4 million remain on the waiting list.¹ The phenomenon is not specific to the US. Six of the ten largest immigrant recipient countries are G-7 countries and all restrict immigration.²

When supply of applicants exceeds a quota, the openings must be rationed. The pool of potential immigrants is determined by supply factors, like earnings in the destination country versus those in the origin country, but those who become immigrants depend on the country's admission rules. When excess supply is large and heterogeneous, as it is in the United States, the origin and general composition of immigrants will be a closer reflection of immigration policy than of market forces.

Economic models of migration date back at least to Sjaastad (1962).³ The economic framework, where individuals assess the costs and benefits of a migration decision, assumes that migration is up to the individual, much like occupational choice. For within-country migration, the assumption is reasonable. It is less applicable to international migration because countries

¹US Department of State (2018). In 2015-2017, about 1.1 million per year obtained lawful permanent residence status in the US. <https://www.dhs.gov/immigration-statistics/yearbook/2017/table1> More evidence of excess supply of immigrants is provided by the Pew Foundation, which reports that in 2017 there were 22.4 million applications for entry through the diversity lottery for 50,000 slots. Lottery allocated slots are supply determined because the rationing rule is random selection from those who apply. But the diversity lottery accounts for only about 5% of green cards issued (Connor, 2018).

²United Nations (2017a, 2017b).

³Borjas (1987) refines this by emphasizing the role of comparative advantage in the migration decision.

restrict entry and the restrictions play an important role in observed immigration patterns.

The most significant manifestation of rationing is the seemingly perverse attainment of immigrants by country of origin.⁴ Immigrants to the United States from Algeria have higher educational attainment than those from Israel despite Israel's average level of education being 12.5 years and Algeria's being only 7.6 years. Also true is that Israelis are over-represented among US immigrants by a factor of three and Algerians are under-represented by a factor of ten relative to their proportions of the world population. The US immigration process, which places a high emphasis on family reunification, forces Algerians to enter primarily on the basis of their skills.⁵ Algerian immigrants to the US have higher educational attainment than native born Americans.⁶ The same pattern of high attainment and under-representation would not be true of Algerians in France, where Algerians comprise the largest immigrant group and have much lower educational attainment than native-born French.⁷

Insufficiency of Supply Explanations

A couple of statistics make clear the obvious, namely, that supply is insufficient to explain immigration patterns and that immigration policy has profound effects on immigrant

⁴See Lazear (2020) for a more complete analysis of this issue.

⁵The primary source of data for the analysis contained is the American Community Survey, 2011-2015 as described in detail in Lazear (2020). Other data sources for education and population are detailed there. Means of variables based on country of origin are used so there are approximately 130 observations. Algerians make up .0005 of immigrants to the US and .005 of the world's population.

⁶The immigrants with highest attainment are those from the former USSR who came in the 80s. They are here because the USSR let them out and the US let them in.

⁷INSEE (2018) and Silberman, et al. (2007).

composition. The Immigration and Naturalization Act of 1965 changed the slot allocation system from quotas based on national origin to one that favored family reunification. The effects were profound. First, there was a statistically significant discontinuous increase of about 30% in the number entering at the time of the legislation.⁸ Second, the composition of immigrants by country of origin changed immediately. For example, the number from Asia quadrupled in the five years after the laws passage.⁹ At the same time, northern European countries that were previously favored experienced significant changes in migration. The share of US immigrants coming from France, favored under the prior system but less favored under the post-1965 rules, averaged about 4% between 1960 and 1965, but dropped to about 1% in the five years after passage of the Act.¹⁰ No reasonable supply-based model can account for these discrete changes in immigrant numbers or composition.

An Alternative Model of Immigrant Composition and Outcomes

To explain the composition and especially the outcomes of immigrants in slot-rationed countries, a model that is admittedly a caricature of reality is proposed. The model's major attributes are its parsimony and that its two variables explain over half the variation in immigrant educational attainment and wages by country of origin. The model assumes that the US takes immigrants from the top of the country's human capital distribution and goes as far down as

⁸U.S. Department of Homeland Security (2017). Compare the ten year period before 1965 to the ten year period after 1965 or each of the two five year periods before 1965 with each of the two five year periods after 1965.

⁹<https://www.history.com/topics/immigration/us-immigration-since-1965>

¹⁰American Community Survey, 2011-15. France was favored by a quota system that was based on representation of origin countries in the US population but less favored by a system that favored family reunification because French immigration came earlier in US history meaning that few currently living in France would have close relatives in the US.

necessary to fill an exogenously set quota. The destination country, here the US, allows I_i to enter from country i . Let N_i be the population of country i and let $F_i(A)$ be the distribution of education or some other measure of ability or attainment, A , in country i . Then A_i^* is the cutoff ability level of immigrants from country i determined such that

$$N_i[1 - F_i(A_i^*)] = I_i$$

or equivalently

$$(1) \quad \frac{N}{I} [1 - F_i(A_i^*)] = \frac{I_i / I}{N_i / N} \equiv R_i$$

where N is the total population of the world, I is the number of immigrants in the US, and R_i is the “representation ratio.” Then, the expected level of attainment among those from country i in the US is simply the conditional expectation or

$$(2) \quad \bar{A}_i = \frac{1}{1 - F_i(A_i^*)} \int_{A_i^*}^{\infty} A f_i(A) dA$$

The cutoff depends on the representation ratio and the underlying distribution of attainment in the origin country. It is assumed that all countries have the same distribution of F , up to a mean shifter, μ_i . It follows directly that the expected level of attainment falls in the representation ratio and rises in the mean of the origin country’s attainment. Mexico is very much over-represented relative to India as an origin country, so immigrants from Mexico would be predicted to have lower attainment than those from India. Indeed, Indian immigrants are second-from-the-top in educational attainment while those from Mexico are near the bottom. It is also true, less surprisingly, that for a given representation ratio, the higher the mean attainment in an origin country, the higher the attainment of immigrants from that country.

Evidence on Supply, Rationing and Attainment

The empirical analysis reported in table 1 uses the ACS 2011-2015 data as the primary source on immigrant composition and attainment.¹¹ Column (1) attempts to explain a country's representation ratio R_i using factors that might reasonably be interpreted as reflecting primarily immigrant supply considerations. Variables like GDP per capita, percent in agriculture, wage ratio, and economic growth rates should be closely related to wage differences between the US and origin countries and therefore returns to migrating to the US. It seems reasonable that residents of wealthy Switzerland would be less anxious to move to the US than those from much poorer El Salvador. Only distance from the United States enters, consistent with gravity models of migration.¹² Small countries in the Western Hemisphere are generally over-represented as origin countries for US immigrants. But distance does not do well in explaining the largest immigrant origin countries, which are Mexico, the Philippines, India and China, three of which are half-way around the world.

Immigrant outcomes provide strong evidence that immigration policy and rationing is an important determinant of immigration flows. The more selective, explicitly or implicitly, is the immigration policy with respect to a particular country of origin, the higher is the attainment of the immigrants. Columns (2) and (3) test the rationing model proposed above, where the

¹¹See Lazear (2020) for a more complete description of the data. Variable means and sources are detailed in the notes to table 1. Number of observations differ across columns because in some cases, the included variables are not available for the larger set of 129 countries.

¹²Gravity models, used in trade, can be applied to immigration. See, for example, Bergstrand (1985), Karemera, Oguledo and Davis (2000), and Lewer and Van den Berg (2008), the latter two of which are direct applications to immigration.

representation ratio and mean level of origin country education are the only two variables that are used to explain immigrant outcomes. As predicted, immigrants from countries that are over-represented have lower educational attainment and wages. The effect is substantial. A one standard deviation increase in the log of the representation ratio implies a decrease in average educational attainment of almost a full year. The two variables explain over half the variation in educational attainment and wages across origin countries.

Column (4) examines the effect of supply variables on educational attainment. The supply variables used in column (1) are included and additionally, the 90/10 wage ratio of the origin country. If supply variables are important in determining who comes to the US, they should affect the educational attainment of immigrants from the country. For example, if a country is primarily agricultural, then educated residents might find it advantageous to move to the US where the returns to education would be higher. The same logic applies to the 90/10 wage ratio. The OECD gathers and harmonizes wage data on a subset of the countries in this study.¹³ Skill differentials in the US are large relative to those in other OECD countries.¹⁴ Comparative advantage implies that when the skill differential is low in a country, the highly educated should leave, implying higher educational attainment among immigrants from low 90/10 wage countries. None of the variables enters significantly in column (4). In contrast, the rationing model variables in column (2) are important both quantitatively and statistically.

Sweden

¹³OECD (2019a, 2019b).

¹⁴See Lazear (2019) for recent evidence on the comparison between the US and other OECD countries.

Data from Sweden¹⁵ corroborate that policy-determined immigrant selection is a major factor in both country-of-origin patterns and outcomes of immigrants. Sweden accepts immigrants on the basis of refugee status to a much greater extent than does the US. Over-represented origin countries in Sweden are Bosnia, Lebanon, Somalia, Eritrea, and Iraq, which are countries where many were fleeing from war. Column (5) of table 1 replicates column (2), but uses Swedish data. Data formatting necessitate a different measure of educational attainment from that used in the US. The dependent variable for Sweden is the proportion of immigrants from an origin country who have successfully completed a post-secondary degree. Just as for the US, the Swedish representation ratio, calculated as the share of Swedish immigrants coming from a given country relative to the share of that country in the world population, has a strong negative effect on educational attainment. Important is that the negative effect of number of immigrants from an origin country is based on a completely different origin country distribution in Sweden than it is in the US. The correlation between origin country representation in the US and Sweden is almost zero. This is surely policy determined. Sweden has proportionately more Iraqis and Somalis than the US because Sweden chose to admit them in keeping with an explicit refugee policy. It is highly unlikely that Iraqis and Somalis find it economic beneficial to go to Sweden over the US, while Filipinos find it economic beneficial to go to the US over Sweden or that only a few of those who remain in those war-torn countries would turn down an opportunity

¹⁵The Swedish dataset contains statistics for 98 countries (including Sweden) between the years 2011 and 2015. The number of observations included for each year are as follows: 5,472,582 (2011); 5,499,465 (2012); 5,528,680 (2013); 5,568,916 (2014); and 5,605,685 (2015). Immigrants account for about 19% of the sample. The earnings and transfer values refer to individuals between the ages 20 and 64, while the education values refer to individuals between the ages of 25 and 64. All variables come from register data (administrative sources) by Statistics Sweden and therefore cover all individuals who were registered in Sweden each particular year. All variables associated with education level come from Statistics Sweden's *Registret över befolkningens utbildning* or "Register of Population Education."

to migrate to the US if permitted to do so. Yet column (3) for Sweden parallels columns (1) and (2) for the US.

Conclusion

Willingness to migrate is a necessary but not sufficient condition for migration from an origin to destination country. For countries like the United States and other G-7 countries that have excess supply of immigrants, the immigration slot rationing rule is a key determinant of immigrant composition. A model based on rationing goes far to explain attainment of immigrants in both the US and Sweden.

Table 1
Determining Immigrant Flows and Attainment

VARIABLES	(1) Represent- ation Ratio R_i	(2) Average Education of Immigrants from Country i	(3) Log of Average Wage of Immigrants from Country i	(4) Average Education of Immigrants from Country i	(5) Sweden
Log of GDP per capita origin country	-1.263 (1.271)			-1.987 (1.163)	
Percent of GDP from agriculture origin country	0.264 (0.271)			0.528 (0.356)	
5-year GDP growth rate origin country	-0.321 (0.288)			0.025 (0.091)	
Distance from the US in thousands of miles	-1.010** (0.444)			0.277 (0.142)	
90/10 Wage Ratio in origin country				-.206 (0.320)	
log of Representation ratio $\ln(R_i)$		-0.565*** (0.0595)	-0.0850*** (0.0114)		
log of Representation ratio $\ln(R_i)$ Sweden					-0.039 (0.0050)
mean level of education in origin country, μ_i		0.308*** (0.0349)	0.0688*** (0.00669)		0.029 (.0035)
Constant	9.225 (6.817)	10.97*** (0.312)	2.860*** (0.0598)	13.4 (1.25)	.0766 (.0323)
Observations	69	129	129	31	77
R-squared	0.129	0.527	.520	.246	.59

Notes:

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The unit of analysis is an origin country.

Variables reflect means of the immigrants from a particular origin country.

Sources: ACS 2011-15 (for I_i , R_i , education, wages and earnings of US immigrants);

UN Programme, Human Development reports provide information on average education within the origin country; Origin country population (N_i) and share of GDP from agriculture are taken from World Bank data base 2015; GDP per capita and GDP growth come from Heston and Summers (2012). 90/10 from OECD "Income Distribution", OECD Social and Welfare Statistics (database). Sweden: Statistics Sweden. "Registret över befolkningens utbildning."

Variable means:

Number of Immigrants from Origin Country in US=.234 (million);

Log of representation ratio = .44

Representation ratio = 6.27

Education of Immigrants US=13.4

Log of wage of Immigrants in US = 0.41

Log of GDP per capita = 1.43

Percent GDP agriculture = 6.97

Five year growth rate=3.77

Distance to US = 5.02

90/10 wage ratio =3.58

Mean education origin countries = 8.61

Proportion with post-secondary degree Sweden= .32

Log of representation ratio, Sweden = .699

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