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ABSTRACT

Immigration and the Political Economy of Public Education: Recent Perspectives^{*}

This paper reviews the recent literature on the effects of immigration on the public education of the host country, emphasizing the political economy implications. In particular, we are interested on what happens to enrollment in public schools and the quality of education in these schools. Our review of the literature, which includes both quantitative and empirical studies, suggests the following conclusions. First, immigration has triggered *native flight* toward private schools in a wide variety of contexts. Some studies also find that the households that switch to private schools tend to be those with higher socio-economic status. Secondly, because of these changes in school choices, one consequence of large-scale immigration is that it appears to undermine the political support for public education, resulting in a deterioration in the funding and quality of public schools that seems to affect negatively the educational outcomes of disadvantaged native students. We offer some suggestions for policies that might help mitigate the negative consequences of immigration outlined above so that host countries can maximize the overall economic benefits of immigration.

JEL Classification: D7, F22, H52, H75, J61, I22, I24

Keywords: education, public school, immigration, naturalization

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1 Introduction

Decisions over public education can have enormous social consequences. In societies where public schools are well funded, it is often the case children of all socio-economic backgrounds share the same classrooms. This helps weave the social fabric by establishing relationships that cut across economic and ethnic strata, fostering solidarity, cooperation, and tolerance for diversity. In contrast in countries with low-quality public schools those who can afford it typically opt out into tuition-based private schools that may offer higher quality. In the current context of growing economic inequality high-quality public education has probably never been as essential as it is today.

The goal of this paper is to review the recent literature on the effects of large-scale immigration on public education.¹ In particular, we are interested on what happens to the overall enrollment of students in public schools in countries where families have the choice of sending their children to public or to private schools. We also ask whether immigration has an effect on the school choices of native families and, in particular, whether there is a native flight out of public and toward tuition-based private schools. Third, we also examine the political-economy implications of these choices since the funding and, hence, the quality of public schools ultimately depends on the share of voters that support it, together with their income and their preferences over education. Finally, we survey empirical studies that are relevant to evaluate the plausibility of the predictions derived from the theory. In terms of data the studies reviewed in this paper cover several large immigration episodes: California 1970-2000, Israel in the 1990s, and Spain in the 2000s. It seems to us that it is important to evaluate multiple immigration episodes since the answers to our questions may very well vary across episodes, as a function of the economic, demographic, and cultural characteristics of the immigrant population in each case.

Our main methodological focus is on studies that adopt a political economy approach. Thus we view the quality of public education as being endogenously determined and reflecting, to a large extent, voters' preferences. Naturally, these preferences vary dramatically across households, depending on whether one sends their children to a public school or not. Specifically, we are interested both in the short-run effects of immigration on the choices of native voters, and in the long-run effect that operates through the political channel, once immigrants are naturalized and can express their preferences by voting. Regarding the former, we ask whether native households' school choices are affected by immigration. And, if

¹Our focus is on public education at primary and secondary levels. Higher education is out of our scope.

so, what are the characteristics of the ‘displaced’ households in terms of their socio-economic status.

The structure of the paper is as follows. [Section 2](#) presents some descriptive statistics. In [Section 3](#) we review studies that focus on the effects of immigration on the school choices of natives. In [Section 4](#) we review work that has explored implications for immigration policy, for migrant self-selection, and for domestic politics. [Section 5](#) surveys related empirical studies and, more specifically, evidence on the effects of immigration on the school choices of natives and on the quality of public education. [Section 6](#) gathers our conclusions.

2 Descriptive Statistics

In order to frame our discussion it is helpful to provide some descriptive statistics. [Table 1](#) presents data for OECD countries for year 2012 on the percent of students in public schools (column 1), the private-public gap in math test scores in PISA (column 2), and the foreign-born share (in year 2011).²

Let us begin with column 1. The numbers listed here are the percentage share of enrollment in public schools for students at age 15.³ There is a wide disparity in the share of students in public schools across countries. While in Belgium, the Netherlands and Chile only a minority of students attend public schools (about one third), in other countries, such as in Turkey, Iceland or Israel, virtually all students are in public schools. In comparison the OECD average is about 80 percent of students enrolled in public schools (for the population of 15-year-olds).

Turning now to column 2, we note that practically almost all entries are positive, indicating that the average mean test PISA score in math is higher among private-school students than among public-school ones. The OECD average is a 6.32 percent gap (relative

²Programme for International Student Assessment (PISA) is an international survey aiming at evaluating education systems worldwide by testing the skills and knowledge of 15-year-old students. The sampling design used for the PISA assessment was a two-stage stratified sample in most countries. The first-stage sampling units consisted of individual schools having 15-year-old students. In the second stage, 35 students are randomly chosen from each school selected in the first stage. In almost all countries, schools were sampled systematically from a comprehensive national list of all eligible schools having 15-year-old students. The private-public gap in math test scores is defined as the average score in private schools minus the average score in public schools, relative to the average score in private schools. Thus a positive value for this gap indicates that students attending private schools obtained higher test scores on average than those attending public schools. According to PISA public schools are defined as those managed by a public agency. In contrast private schools are managed by a non-government organization (e.g. a church or a private institution). Private schools may be dependent on government funding (if they receive more than 50% of their core funding from the government) or independent.

³These numbers may not be an exact measure of the overall enrollment for compulsory education as a whole because of differences across countries in the length of elementary and secondary education.

to the private-school average score). In some countries the gap can be 10 percent or more (Belgium, Chile, Portugal, Greece, Slovenia, Norway and Turkey) while in others the gap is much smaller. These figures indicate quite clearly that educational outcomes are systematically better for children attending private schools. However, the reasons behind this finding are less clear. For instance, it may be that private schools are higher quality (e.g. lower class size or better teachers), but it may also be the case that the results are driven by positive selection of students into private schools in terms of children’s ability and parental socio-economic background.

Column 3 reports the foreign-born share for year 2011, the last year for which comprehensive data is provided by the OECD (OECD (2013)). According to these data the average foreign-born share across OECD countries is over 13 percent. The countries with the highest shares of foreign-born in the population are Australia (27 percent), Luxembourg (42 percent), Canada (20 percent), Switzerland (27 percent), and New Zealand (24 percent). In contrast other countries exhibit very low immigration, relative to the size of their population: Chile (2 percent), Japan (2 percent), Korea (2 percent), Mexico (1 percent), Poland (2 percent), and Turkey (2 percent).

Let us now present some simple correlations by means of scatter plots. Figure 1 correlates the percent of enrollment in public schools with the foreign-born share in the country using the data in Table 1. The data show no clear pattern.⁴ This figure is consistent with a large degree of native displacement. In other words, it may be possible that the arrival of one immigrant child into a public school triggers the migration of one native child to a private school. In that case the enrollment in public schools will remain unchanged. A number of empirical studies have examined this relationship and found a large degree of displacement. We shall review these studies in Section 5.

Let us now turn to Figure 2. The data shows a mild negative correlation, driven heavily by the observations of Switzerland and Luxembourg. However, the coefficient is not statistically significant. Taken at face value this negative correlation would indicate that higher levels of immigration, relative to the population, are associated with a reduction in the advantage of private-school students over students attending public schools in terms of math test scores. But we should not draw any causal inference from this simple association. As usual, the reason is that immigrants are not randomly allocated to countries but, rather, choose their destination. It is plausible that immigrants choose to migrate to countries experiencing an economic boom. As a result these countries may be experiencing a fiscal

⁴The slope coefficient is slightly positive but we cannot reject a zero value.

boon, which may allow them to make investments in public schools that close the quality gap with private schools. There are several approaches to address these concerns on endogeneity bias. The theoretical models we will review will do so in a structural fashion. Some of the empirical studies that we will review shall instead adopt an instrumental-variable estimation strategy (Farre et al. (2011)).

3 Immigration and the School Choices of Natives

We begin by reviewing the political economy analysis of the effects of immigration on the school choices of natives. There are several outcomes of interest in these models: the extent of the native flight from public schools, the overall enrollment in public schools, the resources devoted to public education, and the degree of segregation in schools, both in terms of income and nativity or ethnicity.

3.1 The quantitative framework: Coen-Pirani (2011)

The basic set up builds on the work of Epple and Romano (1998) and Fernandez and Rogerson (1999). Coen-Pirani (2011) extended their framework in a number of dimensions in order to carry out credible quantitative analysis. The population is made of two groups: natives and immigrants. Each group is characterized by its own joint distribution of income and number of children per household.⁵ The main choice undertaken by households is to decide whether to send their children to tax-financed public school or to tuition-based private school. In addition the model in Coen-Pirani (2011) allows for differences between natives and immigrants in their preference for education, and household-level heterogeneity in the relative preference for public education. Finally, spending on public education is financed through a linear tax on household income.

All children attending public schools receive the same number of units of education. In contrast households that send their children to private schools are able to choose from a menu of schools that differ by tuition and quality (units of education). An important feature of the model is that conditional on household size, preferences, and education policy (the tax rate and the quality of public education), households segregate by income. Households with an income below a threshold send their children to public schools, and households with higher income send their children to private schools. The latter charge tuition but also offer

⁵Households with zero children (about 70 percent of the population) are assumed to care about public education. Otherwise the majority of voters are childless and therefore the political equilibrium would trivially imply that zero resources are devoted to public education, a clearly counterfactual prediction.

higher quality education than public schools. It is important to note that because households differ in their preference for public education, there will be some ‘mixing’. Namely, some high-income households will choose public schools. Nevertheless, the average household income of students in public school will be lower than the average income of private-school users.

Public education policy – the tax rate and the spending per student in public schools –, are determined by majority vote.⁶ For the main results of the paper only natives are allowed to vote. In voting households take as given their own school choice behavior as well as of all other households.⁷ In this model two groups of voters support low tax rates, and thus low spending per student in public schools. The first group is high-income households that send their children to private schools. These households would like to minimize their taxes. The second group are low-income households. These households send their children to public schools. However, they are not able to afford higher taxes.⁸

What are the effects of immigration in this model? For the case of California, immigration leads to an increase in the tax price of public education for all households.⁹ The reason is that immigrant households have lower average income and a higher number of children than native households. As a result, the quality of public education (measured by spending per student) falls and this leads to a *native flight* out of public and toward private schools. This, in turn, reduces the political support for public education.

The model is calibrated to the economy of California around 1980 and used to conduct the following counterfactual experiment: what would have been the enrollment in public schools and the level of (public) education spending per student in California if immigration had remained at its 1970 level? The first finding is that public spending per student in year 2000 would have been about 24 percent higher than in the data (around \$1,400). The author conducts a decomposition of the factors behind this result and finds that almost all of the effect (84 percent) is due to the larger household size of immigrant households. Practically all of the remaining gap is due to the lower average income of immigrant households (14 percent).¹⁰ The second main result is that public school attendance rates for the native

⁶Obviously, in reality public policies are determined in a much more complex process, involving the interaction between several layers of government. However, the political economy literature typically simplifies the institutional structure in order to build tractable models.

⁷In general this model can give rise to multiple equilibria. However, this is not the case under the parameters determined in the calibration.

⁸In a sense, education is a normal good in this model.

⁹The tax price is the amount by which taxes need to increase in order to obtain one more unit of education in public schools.

¹⁰Interestingly, the magnitude of the effect of the increase in the average number of children per household

population would have been substantially higher (about 1 in 3 students).

We conclude our review of this paper by discussing some of the limitations of the analysis, some of which have been addressed in the literature while others remain unexplored. First, this model assumes that immigration does not affect the earnings of natives. The empirical literature on the effects of immigration on wages is largely consistent with this view ([Card \(2001\)](#)). In fact it appears to be the case that the wages of most native workers experience an increase as a result of immigration ([Manacorda et al. \(2012\)](#), [Ottaviano and Peri \(2012\)](#)). Nevertheless, there is evidence of a negative effect of immigration on the wages of those workers who are in direct competition with immigrants in some specific occupations ([Cortes \(2008\)](#)). [Coen-Pirani \(2011\)](#) addresses this point in his sensitivity analysis and finds that, quantitatively, the wage effects of immigration are too small to affect much the predictions of the model. It is also worth noting that in reality public schools are financed to a large extent by means of property taxes. Thus wealth may be a more relevant measure of the tax base than income. If this is the case then perhaps the assumption that immigration does not have an effect on the wealth distribution appears more plausible.¹¹

A second limitation of the analysis is that the immigrant population is viewed as monolithic, disregarding different countries of origin and, potentially, different preferences for education. While this may not be relevant for the case of California, where a large majority of immigrants are Hispanic, it may be an important limitation for the analysis of other immigration episodes.

Third, the model by [Coen-Pirani \(2011\)](#) assumes that there is only one route for native households to segregate from immigrants. Namely, given that immigrants are much more concentrated in public schools than natives, the latter have the option to switch to private schools, where the share of immigrant students is much lower. In reality, there is another route available to native households. They can migrate to another school district (or whatever the appropriate regional unit may be in each application). In that case the choice is between attending public school in a district with many immigrants or attending public school in a (presumably more expensive) district with fewer immigrants. In fact [Cascio and Lewis \(2012\)](#) find evidence along these lines taking place in California.

Finally, the model presented here assumes a very simple production function in schools, on spending per student in public schools is very similar to the empirical estimates in [Fernandez and Rogerson \(2001\)](#), who find an elasticity of minus 1.

¹¹A number of studies have aimed at estimating the effects of immigration on housing prices ([Saiz \(2007\)](#), [Gonzalez and Ortega \(2013\)](#)). Consistently, the finding is that immigration leads to increases in housing rents and prices. To the extent that the largest asset owned by most households is their home, one can argue that immigration may increase the wealth of the native households.

abstracting from peer effects, the use of vouchers, teachers' effort, sorting in ability at the school or classroom level, and so on. Some models have been developed to study these issues in the literature (Epple and Romano (1998)). However, they have not yet been adapted for quantitative analysis or applied to analyze the effects of immigration. In our view this is a promising venue for future research.

3.2 Heterogeneity in immigrant population: Tanaka et al. (2014)

Building on the work of Coen-Pirani (2011), these authors recognized two important limitations of his framework. First, sociologists have documented that there are sizable differences within the immigrant population regarding the educational aspirations and attitudes of their children toward education (Goyette and Xie (1999), Hsin and Xie (2014)). What lies at the root of these cross-group differences is less clear. There may be cultural differences (as stressed by Fernandez and Fogli (2006) or Nollenberger et al. (2014)) but it is also possible that ethnic capital (Lee and Zhou (2014)) or teachers' expectations and prejudices may also play a role. In terms of modeling, these differences can be incorporated by allowing for differences across immigrant groups in the preference for education.

Secondly, Tanaka et al. (2014) point out that in some countries there is a widespread use of private schools. For example, in Spain about one third of primary and secondary school students attend private schools, compared to about 10 percent in the United States. The main reason for this large disparity is that many private schools in Spain are heavily subsidized by the government. As a result, tuition is much lower.¹² In light of this important fact these authors incorporate in their model an (exogenously determined) subsidy to private schools.

Using this new framework, Tanaka et al. (2014) investigate the effects of Spain's recent large immigration wave (between years 2000 and 2008) on its public education system, distinguishing between the effects in the short run and in the long run, that is, once the immigrant population has become naturalized and can influence policies directly through voting. These authors simulate the model under two counterfactual scenarios. First, they simulate the economy under the assumption that the immigrant population in Spain had remained as in year 2000. By comparing the equilibrium outcomes to the benchmark for year 2008 this exercise identifies the effects of immigration arising from the increased demand for schooling by the immigrant households and their contribution to the public coffers through

¹²The average private school tuition in the United States in 2008 was approximately \$8,500 (18 percent of GDP per capita) whereas in that same year it was 500 Euros in Spain (2 percent of GDP per capita).

taxes. Second, they consider a counterfactual scenario where the immigrant population in year 2008 is naturalized, and thus allowed to vote.¹³

Their analysis produces two main findings. First, the combined (long-run) effects of immigration and naturalization will lead to a small increase in the *size* of public education, consistent with the descriptive evidence in [Figure 1](#). However, this increase in size masks an important composition effect: there is an important reduction in the enrollment of native students in public schools who flee toward private schools (of about 3 percentage points). However, this is offset by the enrollment of a large number of immigrant children in public schools. Secondly, there will be a large reduction in the *quality* of public education, with public spending per student projected to fall by 11 percent. Their analysis suggests that these effects will unfold unevenly over time. While the changes in the size (and student composition) of public schools will take place promptly upon arrival of the immigrants, the reduction in funding will be more gradual and only fully take place once the immigrant population has been fully enfranchised. Ultimately these effects will depend on the degree of economic and cultural assimilation of the immigrant population. However, assimilation of the immigrant population is gradual and often incomplete in most countries ([De la Rica et al. \(2015\)](#)).

While these authors have extended the quantitative framework proposed by [Coen-Pirani \(2011\)](#) along a couple of important dimensions, their work is also subject to some of the same limitations discussed in the previous section. Perhaps chiefly among these is the assumption that households will not migrate in or out of the relevant school district.¹⁴

4 Further Implications

4.1 Implications for Immigration Policy

As we saw in the previous section, large-scale immigration has the potential to affect the public education system of the host country through its effect on demographics and on the income distribution. It is perhaps not a coincidence that immigrants differ from natives along these dimensions. In fact immigration policies in many countries attempt to attract immigrants with skills that are in short supply in those countries (e.g. Canada or Australia).

¹³Since on average immigrants in Spain had lower income than natives, the median voter shifted down in the income distribution and this affected the policy supported by the majority of voters.

¹⁴In a different context, [Armenter and Ortega \(2010\)](#) and [Armenter and Ortega \(2011\)](#) have explored models with endogenous income redistribution where individuals make residential choices. In the context of education see [Fernandez and Rogerson \(1996\)](#).

[Dottori et al. \(2013\)](#) study theoretically how the schooling system of the host country may be impacted by the number and skill type of immigrants. Their main goal is to characterize the immigration policy chosen by the voters of the host country.¹⁵ The framework employed by these authors is very similar to that in [Coen-Pirani \(2011\)](#). Households choose whether to send their children to public or to private school. Public schools are financed by a proportional income tax and have no tuition. In contrast private schools are (fully) financed by the tuition paid by their users, and the quality offered by each private school is proportional to its tuition.

While their setup is simpler than Coen-Pirani's along several dimensions, it incorporates a novel feature. Namely, these authors allow household income to be endogenous. In their model, there are two types of households: skilled and unskilled. Both skilled and unskilled labor are used to produce final consumption, and complement each other in production. Hence the income distribution, summarized by the wage skill premium, depends on the skill composition of the labor force. Another novel feature of their model is that public education policy is determined by *probabilistic voting* (as in [Lindbeck and Weibull \(1993\)](#)), as opposed to majority vote. In practice this implies that the equilibrium policy in [Dottori et al. \(2013\)](#) is the one that maximizes the welfare of the population of *voters*. Thus when only natives vote, the equilibrium immigration policy is the one that maximizes the welfare of *native* households.¹⁶

In their model economy, unskilled immigration reduces welfare for two reasons. First, the average native will choose less redistribution in order to mitigate the cost increase of maintaining the same level of public education quality as prior to immigration. This is called the *fiscal leakage* effect by [Razin et al. \(2002\)](#). Second, unskilled immigration will increase income inequality (the wage skill premium). Because the utility function of households exhibits decreasing marginal utility, an increase in income inequality will tend to reduce total welfare. For these reasons they find that the optimal immigration policy is to admit more skilled immigrants (or fewer unskilled). In this manner immigration helps redistribute income toward the poorer local households both by reducing the wage skill premium and through an increase in the funding of public education.

There are several limitations of their analysis. First, their analysis is mainly qualitative and hence it is hard to evaluate the plausibility of the the parametric restrictions assumed in

¹⁵Naturally, their model leaves out many channels through which immigration affects the economy of the host country. Nevertheless their analysis is useful because it suggests how the optimal immigration policy may need to be adjusted when taking into account the consequences of immigration for the political economy of education.

¹⁶For an early application of probabilistic voting to the analysis of immigration policy see [Ortega \(2010\)](#).

their propositions. Second, their model is static and thus ignores any dynamic effects. While this was also a limitation of the previous models, it may be more important here because the main mechanism is based on redistribution in a model with exogenous labor supply. More realistically, labor supply and educational investments may depend on their expected payoff in the market.¹⁷ It is plausible to think that a relatively high wage skill premium acts as an incentive for educational investments. Besides the effects on the current generation, the skill distribution of today's population may also be an important determinant of the skill (and thus income) income distribution of the next generation, as emphasized in [Ray \(2006\)](#) and [Tanaka \(2007\)](#).¹⁸ If this is the case, the negative short-run effects of unskilled immigration emphasized here may be overturned in the medium or long runs.

Finally, another potential limitation of the model in [Dottori et al. \(2013\)](#) assumes that immigration, by changing the skill composition of the labor force, also affects the wage skill premium. However, the empirical evidence on this point is not so clear. Several authors have recently proposed reasons that can account for the apparent disconnect between changes in the skill composition and relative wages.¹⁹ First, immigrants may be poor substitutes in the labor market for natives with the same education and experience ([Manacorda et al. \(2012\)](#), [Ottaviano and Peri \(2012\)](#)). Second, immigration may trigger mechanisms that offset the effect on the relative supply of skilled to unskilled labor. For instance, unskilled immigration into a local labor market may lead firms to adopt unskilled-biased production technologies ([Lewis \(2011\)](#)), or it may make home services (e.g. cooking, cleaning, childcare or elderly care) more affordable and incentivize the labor supply of highly skilled native females ([Cortes and Tessada \(2011\)](#), [Farre et al. \(2011\)](#)).

Voters' preferences over alternative immigration policies are likely to be affected by considerations that go beyond the short-run effects on the labor market.²⁰ In particular, voters may be foresighted and try to anticipate the consequences of current immigration for domestic politics in the future, once these immigrants (or their children) gain the right to vote. This idea was first explored by [Ortega \(2005\)](#). To try to account for the widespread use of immigration quotas, this author developed a political economy model of immigration policy where voters are far-sighted.²¹ Specifically, voters in this model take into account

¹⁷In the framework of all models we have discussed education enters the utility function directly, in the so-called warm-glow fashion.

¹⁸An example of one such mechanism is to recognize that the production of new skills (education) requires skilled labor as an input (teachers).

¹⁹See [De la Rica et al. \(2013\)](#) for a recent review.

²⁰An empirical study on the determinants of voters' attitudes toward immigration that employs data for a large number of European countries is [Ortega and Polavieja \(2012\)](#).

²¹The model in [Ortega \(2005\)](#) is a dynamic extension of the static framework in [Benhabib \(1996\)](#).

that current immigrants (and their children) will be voters in the future. In this setup the preferred immigration policy of an unskilled voter depends on the resolution of a trade-off. On the one hand admitting more skilled immigrants would increase the current unskilled wage. However, once immigrants (or their children) get the right to vote the inflow of skilled immigrants will shift decision power away from unskilled voters. The main result in the paper is that immigration quotas may arise endogenously, as a way to resolve the trade-off faced by voters.

Ortega (2010) extends this framework by including tax-based income redistribution so that now voters decide both on immigration policy and on the size of a redistributive tax.²² The main result in this paper is that, under some conditions, political support for the welfare state (i.e. income redistribution) can only be maintained by means of a constant inflow of unskilled immigrants.²³

4.2 Implications for Migrant Self-selection: Albornoz-Crespo et al. (2011)

In a recent paper Albornoz-Crespo et al. (2011) document a new empirical fact: the children of immigrants who faced a higher cost of migration seem to perform better in school (at the host country) than the children of immigrants for whom migration was less costly.

The paper goes on to build a theory to explain this finding. The crux of their argument is as follows. In choosing whether and where to migrate, potential migrants take into account the quality of (public) education at destination. In addition potential migrants are heterogeneous in income and in their preference for education. Thus host countries with better education systems, or where skills are better rewarded, will tend to attract immigrant families that put a larger weight on the education of their children. When considering migration to a host country with better education, it will also be the case that, all things equal, migrants that face a higher cost of migration will only choose to migrate if their preference for education is high enough. Finally, in their model the effort of both students (and their parents) and teachers is endogenously determined. Thus positive selection in migration along the preference for education leads to better school outcomes for the children of natives because both teachers and (native) students put more effort.

In our view this paper brings a number of new insights to the analysis of the effects of

²²This paper also analyzes the outcomes of a majority-vote equilibrium and probabilistic voting (utilitarian social planner).

²³In Ortega (2010) at every period there is an increase in the share of native households that become skilled. While this *drift* in skills is not endogenous, the author interprets it as the possible outcome of a well-functioning education system.

immigration on the education system of the host country. It also emphasizes the importance of empirical work on several key questions. Specifically, is there evidence of peer effects among native and immigrant children? Or, in other words, do native children do better or worse when they are in classrooms with a higher fraction of immigrant children? In the theory presented here the answer to this question depends on the pattern of selection that takes place in equilibrium, which in turn is affected by the costs of migration to the host country. Hence, it is an empirical question to determine the sign and magnitude of these peer effects. We shall review the empirical literature on this question in the next section.

5 Related Empirical Studies

5.1 The School Choices of Natives

All previous theoretical studies share a common feature: the reason why immigration affects the size and quality of public education is that immigrants affect the school choices of natives. In what appears to be the relevant case for large-scale immigration episodes reviewed in this paper, immigration inflows typically trigger *native flight* from public and toward tuition-financed private schools. The goal of this section is to survey the empirical literature that has attempted to estimate the response of native households to immigration.²⁴

Using data for California [Betts and Fairlie \(2003\)](#) found that increases in the share of immigrants in a metropolitan area were associated to increases in the probability of native households to attend private school.²⁵ Complementing the previous study, [Cascio and Lewis \(2012\)](#) found evidence of native migration to other school districts (within a metropolitan area) in response to inflows of Hispanic students with low English proficiency. Both of these studies find evidence of native flight, however, while in the former the “displaced” households switch to private schools within the same geographic unit, in the latter they switch to public schools in other school districts with fewer immigrants.

Several authors have also found evidence of native displacement in Europe. [Kristen \(2008\)](#) provides evidence for Germany, [Gerdes \(2010\)](#) for Denmark, and ? for Austria. [Farre et al. \(2014\)](#) analyzes the issue in the context of Spain, using household expenditure data to identify school choices. They found that Spanish households responded to immigration by increasing their educational expenditures, which was mainly driven by native flight away

²⁴This section draws on the literature review in [Farre et al. \(2014\)](#).

²⁵The finding appeared to be driven by responses to inflows of immigrant children who speak a language other than English at home.

from public schools. These authors also find that the native households that changed their school choices were mainly those with higher socio-economic status, a phenomenon they label as *cream-skimming*.

5.2 The Quality of Public Education

Is there direct evidence of a negative effect of immigration on the quality of public education? One challenge in addressing this question is the measurement of school quality, which is not straightforward. Typical proxies for school quality are education spending per student or class size. However, several authors have criticized their use (e.g., [Hanushek \(2006\)](#)). Another complication is that immigration is likely to affect, positively or negatively, the quality of peers in an immigrant-receiving school, and peer effects have been documented as important determinants of school outcomes. However, measuring peer quality is also a difficult matter. Other researchers have looked at student outcomes, such as test scores, graduation rates, and future wages, as indirect measures of school quality. One limitation is that often some of these outcomes (e.g. graduation rates or future wages) can only be measured several years after the immigration episode.

In this section we focus on the studies that directly measure the effects of immigration on the educational outcomes of the native population. In the United States, [Betts \(1998\)](#) examines whether immigration reduces the high school graduation rate of American-born minorities. Using pooled 1980 and 1990 Census data, he finds a negative and significant impact on the probability of completing high school for native-born blacks and Hispanics.

[Hunt \(2012\)](#) uses panel data for the U.S. for the period 1940-2010 to examine the impact of immigration on the high school completion of natives at the state level. She finds a *positive* effect: an increase of one percentage point in the share of immigrants in the population aged 11-64 increases the probability that natives aged 11-17 eventually complete 12 years of schooling by 0.3 percentage points on average (and by 0.4 percentage points for native-born blacks). Hunt argues that, theoretically, immigrant children may affect the educational outcomes of native children along two channels. First, immigrant children may compete for school resources with native children, discouraging natives from completing high school. At the same time, native children may be encouraged to complete high school to avoid competing with immigrant high-school dropouts in the labor market. She finds that, indeed, these two channels are in operation. However, the positive effect due to competition in the labor market appears to be more important empirically than the negative effect of competition for school resources, contradicting somewhat the findings by [Betts \(1998\)](#).

Exploiting the episode of mass migration to Israel in the 1990s, [Gould et al. \(2009\)](#) examine the effect of immigrant concentration during elementary school on the academic outcomes of native students in high school. They find that the overall presence of immigrants affected negatively the chances of passing the high school matriculation exam necessary to attend college. They also find that the negative effect of immigrants on native outcomes is larger for native students from a more disadvantaged socio-economic background.

There are also studies examining the impact of immigrants on native test scores in Europe. Using aggregate multi-country data from the PISA study, [Brunello and Rocco \(2013\)](#) find evidence of a negative and statistically significant relationship between the share of immigrant pupils and test scores. [Geay et al. \(2013\)](#) use data for the UK and find no association between the percentage of non-native English speakers and the educational attainment of native English speakers at the end of primary state school.²⁶ [Jensen and Rasmussen \(2011\)](#) find that the immigrant concentration in the school influences adversely reading and math PISA test scores of native children in Denmark. [Schneeweis \(2013\)](#) analyzes the case of a large Austrian city between 1980 and 2001 and finds no effect of a higher share of migrant students on attendance after primary education and grade repetition. [Ohinata and van Ours \(2012\)](#) and [Ohinata and van Ours \(2013\)](#) do not detect negative effects of immigration on the test scores of native Dutch children. Overall, the effects of immigrant children on native children’s educational attainment in these European countries appear to be either zero or negative. Taken together these results suggest that there may be a negative effect of immigration on the school outcomes of native children, although not all studies support this conclusion.

Using cross-sectional data for 82 countries in year 2000, [Mavisakalyan \(2012\)](#) examines the impact of immigration on public education spending and private school enrollment. In the estimation she controls GDP per capita, Gini coefficient of income, population density, whether the country is under communist regime, whether the country is originally British colony or French colony, and openness to international trade. Potential endogeneity of the immigrant share is dealt with by instrumenting it using a gravity model (as introduced in [Ortega and Peri \(2014\)](#)). She finds that the immigrant share reduces public education spending as a share of GDP and raises private school enrollment. Although the link between public education spending and the quality of public education is not very tight, these findings tentatively suggest that immigration may lead to a deterioration of the quality of public

²⁶Their analysis controls for demographic factors and school characteristics.

education.²⁷

6 Conclusions

The conclusions of our review of the literature on the effects of immigration on the public education of the host country are the following. The simulations based on political economy models of school choice imply that i) immigration is likely to trigger a *native flight* toward private schools, and ii) that it may undermine the political support for public education, resulting in a deterioration in the funding and quality of public education. The empirical studies provide robust evidence of native flight in a wide variety of contexts. In addition there is also some evidence of a negative effect of immigration on the outcomes of native students, particularly for disadvantaged youth. The latter finding is consistent with a deterioration in the quality of public education, although it may also be caused by *cream skimming*, or the finding that the natives that switch toward private schools are those with higher socio-economic status.

In our view these findings raise an important concern. Large immigration flows into a country may threaten the quality of its public education system.²⁸ At the core of the problem is the lack of incentives of native households to stay in public schools after large immigration inflows. From the policy viewpoint the key question is what can be done to try to mitigate these consequences. One blunt choice is to ban private schools and force all (or at least most) children to attend public schools in order to maintain the support for public education. In essence this is the route chosen by Israel, Iceland, Turkey, Norway, and a number of other countries (Table 1). A less extreme policy that goes in the same direction is to ensure that private schools admit sufficient numbers of immigrant children.²⁹³⁰ Finally, governments may think of creative ways to use the tax system in order to incentivize native households, particularly those with higher socio-economic status, to

²⁷Looking at the effects of other controls, she finds that countries with high population density and/or under communist's regime tend to spend less on public education, and those with high openness to international trade and/or with British-colony origin tend to spend more on education. She also finds that in the countries under communist regime, enrollment in private primary and secondary schools are substantially smaller than the other countries.

²⁸Almost three decades ago Freeman (1986) argued that large-scale immigration may be incompatible with support for the welfare state. Our review has focused on a narrow interpretation of the welfare state as the provider of public education. While our findings do not imply the dismantling of public education they do suggest a reduction in its quality.

²⁹This is not easy in many cases. For instance in Spain most private schools are Catholic schools. However, a large share of recent immigrants are not Catholic and, therefore, not inclined to attend these schools.

³⁰Some may think that private education vouchers encourage enrollment of immigrant students in private schools. However, this may induce further cream skimming of native students and thus further segregation.

remain in public schools.³¹ In this manner the size of the native flight might be reduced, which would mitigate the problems highlighted in this paper. It is also worth noting that economic and cultural assimilation has the potential to mitigate these concerns. Hence, policies that stimulate assimilation should also be part of the response in order to establish harmonized societies with a diversity of economic, ethnic, and cultural backgrounds.

³¹One such policy might be a tax on private-school tuition, which could then be used to ensure that the quality of public schools is not negatively affected by immigration.

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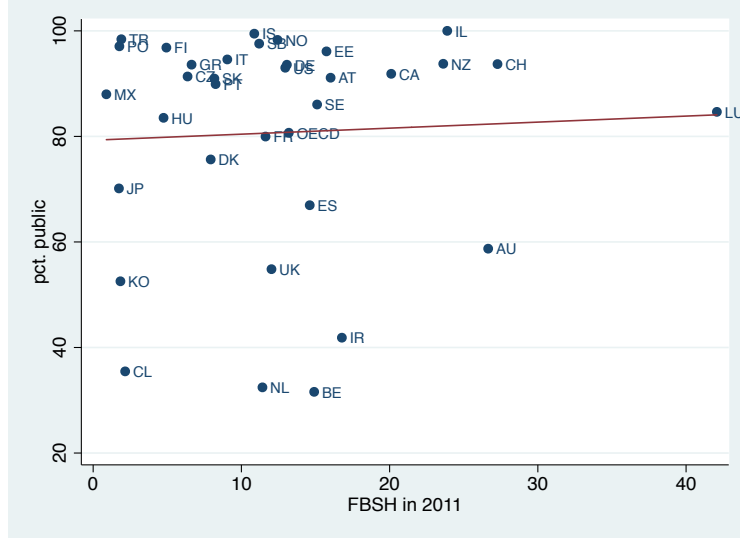
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Table 1: Descriptive statistics

Country	(1) Pct. Public	(2) Pct. Private Gap Math	(3) FBSH 2011
Belgium	31.59	11.07	14.91
Netherlands	32.44	0.96	11.42
Chile	35.47	11.76	2.16*
Ireland	41.85	3.15	16.78
Korea	52.54	3.02	1.84**
United Kingdom	54.84	4.53	12.03
Australia	58.72	7.03	26.65
Spain	66.96	7.65	14.61
Japan	70.14	0.93	1.74**
Denmark	75.63	5.00	7.93
France	79.97	5.77	11.63
Hungary	83.52	3.06	4.75
Luxembourg	84.65	-2.71	42.08
Sweden	86.04	3.05	15.11
Mexico	87.98	9.13	0.89*
Portugal	89.91	11.42	8.26
Slovak Republic	90.95	8.08	8.18**
Austria	91.12	8.23	16.02
Czech Republic	91.35	1.39	6.37
Canada	91.86	9.82	20.11
United States of America	93.01	0.82	12.96
Germany	93.58	7.26	13.07
Greece	93.59	11.07	6.64
Switzerland	93.7	-2.50	27.28
New Zealand	93.76	15.07	23.62
Italy	94.58	-0.62	9.05
Estonia	96.11	1.33	15.74
Finland	96.82	3.90	4.94
Poland	97.07	9.63	1.77
Slovenia	97.57	14.94	11.20
Norway	98.28	10.44	12.44
Turkey	98.41	11.49	1.90**
Iceland	99.46	.	10.87
Israel	100	.	23.89
OECD Average	80.69	6.32	13.20

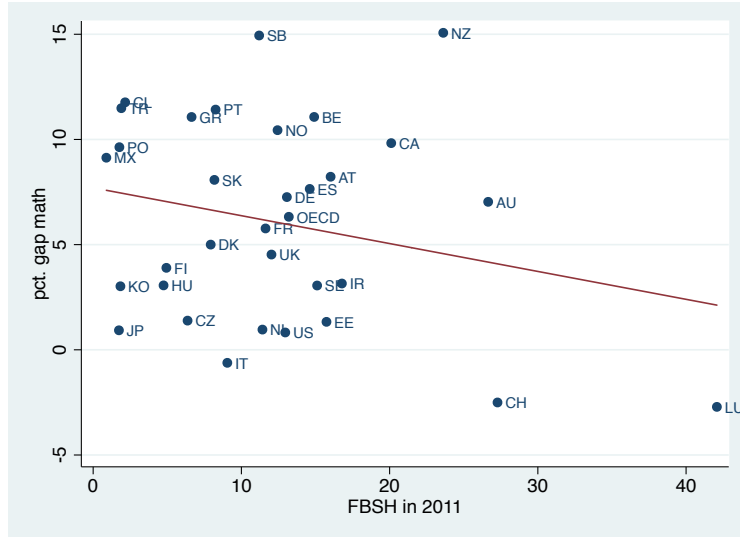
Notes: Share of students in public schools (Pct. Public) and mean test scores are from PISA 2012. We report the percent gap between the Math test score in private schools relative to public schools, as a percent of the mean score in private schools (Pct. Private Gap Math). The foreign-born share (FBSH) is from Table A.4 in [OECD \(2013\)](#). * indicates the data from 2010. ** indicates the data for 2008 from [OECD \(2011\)](#).

Figure 1: Percentage of students (age 15) enrolled in public schools



Notes: Slope coefficient is 0.11, not significantly different from zero.

Figure 2: Private-public gap in math test scores



Notes: Slope coefficient is -0.13, not significantly different from zero. The private-public gap in math test scores is defined as the average score in private schools minus the average score in public schools, relative to the average score in private schools. Thus a positive value for this gap indicates that students attending private schools obtained higher test scores on average than those attending public schools.