1 Introduction

A generous welfare state serves as a magnet to foreign migrants ("welfare migration"). This idea, that migrants are attracted to the welfare state because of its benefits, in the form of social security, education, family aid etc., has generated extensive empirical research over the last two decades. The literature on international migration, addressing mainly the volume of migration, frequently gives evidence for welfare migration, with some exceptions. Our focus in this paper is whether the generosity of the welfare state migration affects the skill composition of immigrants, but not the volume of migration. The novelty here is to cast this question in the context of two alternative regimes of migration in host countries: free and policy controlled.

Free migration has been one of the important qualities of the integration of Europe into the European Union. Freedom of movement, and the ability to reside and work anywhere within the EU, are one of the fundamental rights to which member states of the EU are obligated towards each other.[1] In contrast, labor mobility into the EU members states from non EU states is still restricted by national policies. This difference in policy regimes across EU and non EU states provides an opportunity to test theory predictions

[1]Despite the legal provision for the free movement of labor among EU-15 (the old member countries), the level of cross-border labor mobility is low. Reasons cited for this include the existence of legal and administrative barriers, the lack of familiarity with other European languages, moving costs, inefficient housing markets, the limited portability of pension rights, problems with the international recognition of professional qualifications and the lack of transparency of job openings. The expansion of the EU to 25 member states in May 2004, was accompanied by concerns over the possibility of a wave of migration – particularly of the low-skilled – from the then ten new member states to the EU-15.

about key differences between free and restricted migration.

We argue that the differences in migration policies are tightly linked to the effect of the generosity of the welfare state on the skill composition of migrants. For example, an impetus for relaxing migration restrictions by EU member states, towards non-EU countries, is that birth rates dwindle and life expectancy goes on rising. Consequently, EU native born population is both declining and ageing. A declining productive workforce needed to finance the increased economic burden of the costly welfare-state institutions, puts a downward pressure on output growth[2]. One alternative is to adopt more liberal migration policies, especially towards skilled migrants, solidifying the financial soundedness of the welfare state. Unskilled migrants, in contrast, which are usually heavy users of the benefits of the welfare state, may put further strains on the welfare state. This positive sorting, in fact, can describe the desire of any EU host country which aims to sustain a relatively generous welfare state. That is, the voters in such country may opt for a more liberal migration policy, which would also upgrade the skill composition of migration. However, the ability of an EU member state to regulate

[2]The Financial Times puts it sucsinctly: "Over the next 10 years Germany faces a demographic disaster and immigrantion could be part of the solution. As the birth rate dwindles and life expectancy goes on rising, the country's population is both declining and ageing. Unless this double-whammy is confronted head-on, the economy will collapse under the weight of an expensive welfare state that lacks the productive workforce to finance it. Something has to be done – and fast – as Germany's leaders and parts of its economic elite are finally realising. And now they have come up with a last-ditch plan to avert meltdown: a plan designed to harness the untapped resources of its migrant community, whose youth, ambition and skills Germany needs to keep its economic engine running." (FT June 27, 2008). See also Brucker et al (2001).

and control the migration into it from another EU member state is much more limited. The freedom of migration among EU countries undermines their ability to control the migration inflow, as well as its skill composition. Hence, among EU countries, the generousity of the welfare state may induce negative sorting of migrants. The reason is simple: unskilled migrants are attracted to generous welfare state; skilled migrants are deterred thereby.

A constructive way to describe the different effects of welfare state benefits on the skill composition of migration is by decomposing it into two elements: the market-based supply-side effect and the policy-based demand-side effect. We present a parsimonious model that explains both effects.

Consider first the market-based supply-side effect, which accounts for the motivations of potential migrants in a source country. Generous benefits of the welfare state may increase the volume of migrants. However, while low-skilled individuals indeed are attracted to a generous welfare state, high-skilled individuals are deterred thereby. A low skilled immigrant opts for the country with generous benefits, as he is a net beneficiary of the tax-benefits scheme. Other things being equal, a high skilled immigrant opts for the country with moderate benefits, as he is a net contributor to the tax-benefits scheme.

This argument is the conventional one. It is pioneered by Borjas (1987) negative sorting model analysis. Countries with generous welfare system are more egalitarian than countries with moderate welfare system. Namely, the post-tax returns to skills are higher in countries with moderate welfare systems, thus its immigrants are expected to be positively selected. On the other hand, countries with generous welfare system, and thus, lower (post-

tax) returns to skills, are expected to attract negative selection of immigrants. Hence, the skill composition of immigrants, in equilibrium, should be adversely affected by the welfare generosity of host countries.

Consider now the determination of immigration policy in the host country (the policy-based demand-side). In a generous welfare state high taxes are required. It inflicts a fiscal burden upon the high-skilled workers of the host country. Therefore, the domestic voters (especially the high-skilled) support the admission of additional immigrants on skill-selection basis. Skill-selection immigration policy mitigates the fiscal burden.

Clearly, this simple intuition suggests that the policy-based demand-side and market-based supply-side effects of the welfare state generosity on the skill composition of migrants, are conflicting effects. We further argue that different migration regimes are each dominated by a different effect of the two.

Free migration means that all individuals can freely move into the host country, reside, work and retire there. As indicated above, the European Union is an example of such regime (especially with respect to the original EU-15 countries). EU members, in general, are obligated by international treaties to enable free entrance to any individual originated in other EU country.

Policy-controlled migration is exercised between any pair of countries that are not obligated to free migration. Immigration quota is one sort of such policy. Another sort, which becomes increasingly popular, is quality-selection migration policy. The host country screens out less desirable immigrants. Immigrants with high skills and education are preferred over immigrants with

low skills and education. Quality-selection immigration policy is well established in Australia, New Zealand and Canada. The U.S. has also adopted such rules in 1990, as well as in a growing number of EU countries, including France, Ireland and the UK (Docquier and Marfouk (2006)).

Why such a distinction is of crucial importance to the analysis of welfare migration? The "free migration" regime enables each person free entrance to the host country. Therefore, the political considerations of the host country are less relevant. Thus one can expect the considerations of the potential immigrants, namely, the market-based supply-side effect, to dominate. The "policy-controlled" migration regime can be construed as determining simple quotas for differently skilled immigrants. Therefore the considerations of the immigrants are less relevant. Thus one can expect the considerations of the host country, namely, the policy-based demand-side, to dominate.

Consequently, welfare state policy should have a negative effect on the skill composition of immigrants under the free migration regime. On the other hand, welfare state policy should have a (weak) positive effect on the skill composition of immigrants under the policy-controlled regime. Pooling together both effects distorts the estimation of the welfare state generosity effect on the skill composition of immigrants. Separating between both migration-regimes, however, enables a more accurate understanding of that effect.

We confront the predictions of the theory with a cross section data of source-host developed country pairs[3]. We use the international immigration

[3]We restrict attention to OECD countries in order to get a relatively homogeneous classification of skill levels.

dataset introduced by Docquier and Marfouk (2006). It contains stocks of immigrants by the year 2000, based on census and register data. Immigrants are at working age (25+), defined as foreign born, subdivided into three classes of education level: low (0-8 schooling years), medium (9-12 schooling years) and high (13+ schooling years). The data is decomposed into two groups. Group A contains only source-host pairs of countries which enable free mobility of labor between them. Any kind of discrimination between native born and immigrants, regarding labor market accessibility and welfare-state benefits eligibility, is prohibited. These are 16 European countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, U.K., Norway and Switzerland. Group B includes only source-host pairs of countries within which the source country residents cannot freely move, work and get benefits in either of the host countries. The host countries are the same 16 countries as in group A. The source countries are 10 developed countries: U.S., Canada, Japan, Australia, New Zealand, Israel, Taiwan, Hong Kong, Korea and Singapore.

This decomposition is vital to identifying the effect of (pre-determined) welfare-state benefits, on the skill composition of immigrants:

1. Immigration within group A is free, which isolates the effect of welfare on the considerations of the potential immigrants (the "market-based supply-side effect").

2. Immigration within group B is controlled by policies of the host countries. This assumption highlights the effect of welfare on the considerations of the host country (the "policy-based demand-side effect").

3. The decomposition into groups A and B is exogenous to the skill

composition of immigrants. This assumption relies on the fact that this categorizing reflects the history of the EU establishment, since the post-WWII treaties. It is safe to assume that these agreements were not signed with regard to the skill composition of their future immigrants. Hence, the difference between the estimated parameter within group A and group B can also be identified.

Our findings match the predictions of the theory. We observe a negative and significant impact of the welfare-state benefits over the skill composition of immigrants, when estimation is restricted to group A. We also observe that the effect of welfare is significantly higher in group B, but not significantly different than zero. These results repeat in several estimations and robustness tests.

In order to account for possible endogeneity of the welfare-benefits measure, we use two different instrumental variables, alternatively. First, we use the legal origin of the host countries: English, French, German or Scandinavian. Arguably, such classification is not correlated with our dependent variable, the skill composition of immigrants. Nevertheless, the legal system indicates some cultural features of the countries. Among other things, it reflects basic constitutional notion regarding the attitude towards property rights on the one hand, and social rights on the other hand. Hence, there is a strong correlation between the legal origin and the welfare benefits in these countries. The second IV is an alternative measure for the welfare-state benefits. We clustered the sample of host countries by linguistic similarity, legal origin and geographical proximity, into several groups. In each group, for either country, we constructed an IV measure for welfare benefits: the average

value of (predetermined) welfare state benefits of the other countries in that group. Plausibly, countries within any group have strong economic relations, thus their tax rates and welfare state benefits are correlated by competition. However, it is not likely that the decision whether to migrate into a certain host country or not, is affected by the lagged average of the welfare state benefits of the other countries in that group. The IV estimations further validate our hypothesis.

The remaining of the paper is organized as follows. Section 2 describes related literature, focusing on empirical evidence for welfare migration. Section 3 develops a parsimonious model of the welfare state and migration, divided into two alternative migration-regimes: free and policy-controlled. Section 4 discusses empirical evidence from the literature, focusing on the interaction between international migration and the welfare state. Section 5 concludes.

2 Empirical Evidence on Welfare Migration

Evidence for internal U.S. migration lends support to the welfare migration hypothesis[4]. Southwick (1981) shows that high welfare-state benefit gaps between the origin and destination regions in the U.S. increases the share the welfare-state benefit recipients among migrants. Gramlich and Laren (1984), who analyze a sample from the 1980 U.S. Census data, find that high benefit regions have a larger share of welfare recipients' migrants than the low-benefit regions. Employing the same data, Blank (1988) shows that

[4]See Brueckner (2000) for a review of empirical studies on welfare migration.

welfare benefits have a significant positive effect over the location choice of female-headed households, using a multinomial logit model. Walker (1994), who employs the 1990 US Census data, finds strong evidence in support of welfare-induced migration. Similarly, Enchautegui (1997) finds a positive effect of welfare benefits over migration decisions of women with young children. Meyer (2000) applies conditional logit model as well as the comparison-group method to the 1980 and 1990 U.S. Census data. He finds significant evidence for welfare-induced migration, particularly for high school dropouts. Borjas (1999), using the same data set, finds that low skilled migrants are much more heavily clustered in high welfare benefit states, in comparison to other migrants or natives. Gelbach (2000) finds strong evidence of welfare migration in 1980, but weaker evidence in 1990. McKinnish (2005, 2007) also finds evidence for welfare migration, especially for those who are located close to state borders (where migration costs are presumably lower). Levine and Zimmerman (1999) are somewhat exceptional. They employ data for the period 1979-1992, and estimate a probit model find that welfare benefits have only little effect on the probability of female-headed households (the recipients of the benefits) to relocate.

International migration studies, however, exhibit mixed results. Pedersen at el. (2004) find that the ratio of tax revenue to GDP (a proxy for the welfare state benefits generosity) is negatively correlated with immigration flows from 129 countries of origin into 27 OECD countries. To the contrary, Peridy (2006), who studies migration rates in 18 OECD host countries from 67 source countries, finds that the host-source ratio of total public spending has a significant positive effect on migration. Leblang et al. (2007) also

find that government spending has a positive effect on immigrants into 26 OECD countries from 128 countries of origin, during 1985-2004. Restricting the analysis only to the EU-15 countries, however, indicates a negative but insignificant effect of government expenditure over migration. Warin and Svaton (2008) explores migration flows into 14 EU countries, from 76 countries of origin, clustered by groups. They find that migrants from the EU-15, Central and Eastern European countries and the developing countries are all attracted to welfare benefits, as measured by total social protection expenditure per capita. Disaggregating social expenditure yields significant result only for the intra-EU migration: old age benefits attracts migrants but family aid benefits deters migrants. Geis et al. (2008) use multinomial-conditional logit model, inspecting migration into France, Germany, the U.K and the U.S, and find that on one hand unemployment benefits have positive effect on migration, whereas generous pension system may deter potential immigrants.

De Giorgi and Pellizzari (2006) conduct an empirical study of migrants from outside the EU-15 into EU-15 member states. Using the conditional logit approach, they find that welfare-state benefits attract migrants. When interacted with the education level, welfare benefits show a positive effect on the probability of the lowest group of education; but the probabilities of the secondary, and tertiary, education groups are not significantly affected.[5]

[5] Welfare benefits are defined in the study as monthly benefit received by a typical 40 years old person who has continuously worked and paid contributions since the age of 18, averaged over 60 months of non-employment, two earning levels relatively to the average production worker and three types of family status. The results are robust to replacing the welfare benefits measure with public expenditure on unemployment related benefits.

Docquier at el. (2006) study the determinants of migration stocks in the OECD countries in the year 2000, where the migrants from 184 countries are classified according to three education levels.[6] They find that the social welfare programs encourage the migration of both skilled and unskilled migrants. However, the effect on the unskilled is stronger than that on the skilled.

These mixed results can be a result of severe identification problems. First, there the problem of reverse causality between welfare-state benefits and immigration flows. A political economy argument in Razin et al. (1999) is that through the fiscal leakage effect, an increase in the flow of migrants tends to reduce the generosity of the welfare state. The endogenity of the welfare policy is considered by Facchini, Razin and Willmann (2004) and Fiva (2009), who find support for welfare migration. Second, there are conflicting effects of the demand and supply forces. Such effects can only be separated by recognizing the types of migration regimes: free migration, where the data reflects the supply-side choices, and policy-controlled migration, where the data reflects the demand-side choices. Studies of migration between states within the U.S. (such as Borjas (1999), for example), which evidently are confined to a single migration regime (namely, free migration), can produce unbiased estimates of the supply-side effect of welfare migration. In contrast, international migration studies, which blends together both migration regimes, without controlling the supply-side and demand-side forces, may

[6]The database was first presented in Docquier and Marfouk (2006). The data that we use in Section 4 is extracted from this database, which is also employed in Docquier et al. (2006).

yield biased estimates.

3 Parsimonious Model of Migration

Assume a Cobb-Douglas production function, with two labor inputs, skilled and unskilled[7]:

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

where Y is the GDP, A denotes a Hicks-neutral productivity parameter, and L_i denotes the input of skilled and unskilled labor i, where $i = (s, u)$.

The competitive wages of skilled and unskilled labor are, respectively

$$\begin{aligned} w_s &= \alpha Y / L_s \\ w_u &= (1-\alpha)\, Y / L_u \end{aligned} \tag{2}$$

Aggregate labor supply, for skilled and unskilled workers, respectively, is given by:

$$\begin{aligned} L_s &= (s + \sigma\mu)\, l_s \\ L_u &= (1 - s + (1-\sigma)\, \mu)\, l_u \end{aligned} \tag{3}$$

There is a continuum of workers, where the number of native born is normalized to 1; s denotes the share of native born skilled in the total native born labor supply; σ denotes the share of skilled migrants in the total number of migrants; μ denotes the total number of migrants; and l_i is the labor supply of an individual with skill-type i.

[7]The parsimonious model is developed with an application to the cross-section data in mind. In the cross-section data, the suitable migration variable is the stock of migrants; migration flows are relevant if one conducts a dynamic analysis on panel data.

Total population (native born and immigrants) is:

$$N = 1 + \mu \tag{4}$$

We specify a simple welfare-state system which levies a proportional labor income tax of the rate τ, with the revenues redistributed equally to all residents (native born and migrants alike), as a demogrant, b, per capita. The demogrant captures not only a cash transfer but also outlays on public services such as education, health, etc., that are distributed to all workers, regardless of their contribution to the tax revenues.

The government budget constraint is:

$$Nb = \tau Y \tag{5}$$

The utility function for skill-type i is:

$$u_i = c_i - \frac{\varepsilon}{1+\varepsilon} l_i^{\frac{1+\varepsilon}{\varepsilon}} \tag{6}$$

where c_i denotes consumption of an individual with skill-type i, and $\varepsilon > 0$.

The individual budget constraint is:

$$c_i = b + (1-\tau)\, l_i w_i \tag{7}$$

Individual utility maximization yields the labor supply equation:

$$l_i = (w_i (1-\tau))^{\varepsilon} \tag{8}$$

It is then straightforward to calculate the equilibrium wages:

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

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

$$\text{where: } \widehat{\alpha} \equiv \alpha^{\alpha} (1-\alpha)^{1-\alpha};\ \theta \equiv \frac{1 - s + (1-\sigma)\,\mu}{s + \sigma\mu}$$

To guarantee that $w_s > w_u$, we assume:

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

3.1 Policy-Controlled Migration

Assume that the migration policy is determined by the majority of voters in the host country .We assume that the policy decisions on the tax rate, τ, and the total volume of migration, μ, are exogenous. We do this in order to focus the analysis on a single endogenous policy variable, the skill composition of immigrants, σ. Note that once the policy variables σ, μ, τ are determined, then the demogrant, b, is given by the budget constraint; we thus denote the demogrant b as $b(\sigma;\tau)$; where the exogenous variable μ is suppressed.

The indirect utility of an individual with skill level i is given by:

$$\begin{aligned} V_i(\sigma;\tau) = \\ = b(\sigma;\tau) + (1-\tau) l_i(\sigma;\tau) w_i(\sigma;\tau) - \frac{\varepsilon}{1+\varepsilon} l_i(\sigma;\tau)^{\frac{1+\varepsilon}{\varepsilon}} \\ = b(\sigma;\tau) + \frac{1}{1+\varepsilon} l_i(\sigma;\tau)^{\frac{1+\varepsilon}{\varepsilon}} \end{aligned} \tag{11}$$

Differentiating Equation (10) with respect to σ, and employing the envelope theorem, yields[8]:

$$\frac{dV_i(\sigma;\tau)}{d\sigma} = \frac{db(\sigma;\tau)}{d\sigma} + (1-\tau) l_i(w_i(\sigma;\tau)) \frac{dw_i(\sigma;\tau)}{d\sigma} \tag{12}$$

Thus, a change in the share of skilled migrants in the total number of migrants, σ, affects the utility level through two channels. First, an increase in σ raises average labor productivity and thereby tax revenues. This, in

[8] We assume that second order condition for maximization holds.

turn, raises the demogrant, b. Second, an increase in σ, which raises the supply of skilled labor relative to the supply of unskilled labor depresses the skilled premium in the labor market, w_s/w_u.

We assume that only the native born is eligible to vote about migration policy. If the decisive voter is unskilled, both of the above effects are positive. Thus, an unskilled voter would like to set the skill-composition of migrants at a corner solution, $\sigma = 1$. If the decisive voter is skilled, however, the two effects are conflicting: an increase in σ raises b but lowers w_s. Thus the derivative in equation (12) is equated to zero by the skilled worker at a level of σ below one. This means that the share of skilled migrants preferred by a skilled voter must be lower than the share of skilled immigrants preferred by an unskilled voter. Defining σ^i as the share of skilled immigrants most preferred by a skill-type i individual, where $i = s, u$,we get:

$$\sigma^s < \sigma^u = 1$$

Our goal is to find the effect of the change in the generosity of the welfare state on the migration policy concerning σ. The generosity of the welfare state, captured by the demogrant, b, depends on the tax rate, τ (as the economy is assumed to be on the "right side" of the Laffer curve). We can readily show that:[9]

$$\frac{d\sigma^u}{d\tau} = 0; \; \frac{d\sigma^s}{d\tau} > 0 \tag{13}$$

This means that an exogenous increase in the tax rate, τ, would leave the skilled-only migration policy unchanged, if the decisive voter is an unskilled worker. It is simply because the unskilled median voter prefers only skilled

[9]Fo detailed derivations, see Appendix A.

immigrants regardless of the level of τ. If, however, the decisive voter is a skilled worker, an exogenous increase in the tax rate, τ, must change the policy concerning the skill-composition of migrants in the direction toward a larger share of skilled immigrants. The reason is that when the tax rates rise, the redistribution burden upon a skilled decisive voter increases, and allowing an additional skilled migrant can ease this fiscal burden.

3.2 Free Migration

We now assume that no restrictions are placed on migration by the policymakers in the host country. The level of migration depends entirely on the choice of potential migrants. In choosing whether to migrate or not, a potential migrant of skill i compares his prospect utility, V_i, in the migration destination, to the reservation utility in the source country, denoted by u^i. For each skill level i, we assume that there is a continuum of would-be migrants, different with respect to their reservation utility level, distributed according to some function f (with cumulative distrbution function F). This heterogeneity of reservation utilities in the source country could stem from different traits of the potential migrants (e.g., family size, age, moving cost, forms of pensions, housing, cultural ties, etc.).

Let m_s be the number of skilled immigrants, and m_u is the number of unskilled immigrants. The proportion of skilled migrants, σ, is uniquely defined by

$$\sigma = \frac{\frac{m_s}{m_u}}{1 + \frac{m_s}{m_u}} \tag{14}$$

The indirect utility function no longer depends on σ and is given by:

$$V_i(\tau) = b(\tau) + \frac{1}{1+\varepsilon}\left(w_i(1-\tau)\right)^{1+\varepsilon} \tag{15}$$

The following equations determine, for each τ, the cut-off levels of the reservation utilities, $\overline{u}^s$ and $\overline{u}^u$, for a would-be migrant of skill $i = \{s, u\}$:

$$V_i(m_s, m_u; \tau) = \overline{u}^i(m_s, m_u),\ i = s, u \tag{16}$$

The prospect utility, V_i, defines the cut-off level of reservation utility, $\overline{u}^i$, below which individuals opt to migrate. Therefore, the number of migrants for each skill level i, is determined accordingly;

$$m_i(\tau) = F^i(V_i(\tau)) \tag{17}$$

. We now attempt to find the effect of an exogenous chnage in the generosity of the welfare state on the skill composition of the migrants. We show in the appendix that under plausible conditions

$$\frac{d\sigma}{d\tau} < 0 \tag{18}$$

The rationale for this result is as follows. An increase in τ raises the demogrant, b, but lowers the net wage, $w_i(1-\tau)$. For skill migrants the fall in net wage outweighs the increase in the demogrant. Thus, an increase in τ reduces the well-being of skill workers. Consequently, an increase in τ reduces the cut-off reservation utility of skilled migrants, $\overline{u}^s(\tau)$. As a result, those skill migrants with reservation utilities between the old one the new one will choose not to migrate. The opposite holds true for unskilled migrants. Thus the generosity of the welfare state under free migration deters skilled migrants and attracts unskilled migrants, thereby tilting the skill composition of migration towards unskilled migrants.

3.3 Testable Hypotheses

The main prediction of the parsimonious model relates to the differet effects of the generosity of the welfare state on the skill composition of immigrants, across different migration regimes. The policy based demand-side effect is non-negative whereas the market based supply-side effect is negative. In reality, the classification of migration regimes is not as sharp as in the theory. Plausibly, both the policy based demand- and market based supply-side effects exist. That is, a positive shock to the welfare state generosity may induce that country to increaes its demand for more skilled immigrants, to alleviate its increased fiscal burden. But, at the same time, it may deter high-skilled immigrants (and attract low-skilled immigrants) for the very same reason, because migration quotas are not perfectly enforced. These conflicting effects may account for the mixed results in the empirical, international, welfare migration literature.

When migration is completely free, migration rates and skill composition are determined by the considerations of the immigrants themselves. Therefore, we argue that under the free migration regime the supply-side effect can be teased out from the data. However, when migration is controlled by policy, for instance, using qoutas or skill-based selection policies, the considerations of the immigrants themselves are suppressed. Specifically, we assume that the migration policy is effective, in the sense that in either skill level, less immigrants are entering the host country than under the free migration regime alternative. Hence immigration equilibrium rates are to a large extent determined by the host country. Any change in the immigration rates, or skill composition, is due to the policy of the host country. Therefore, we argue

that given such regime the policy based demand-side effect dominates.

Denote by $\sigma^F$and σ^R, respectively, the skill composition of migrants in free migration regime and the policy-controlled regime. Formally,

$$\frac{d\sigma^F}{d\tau} < 0, \frac{d\sigma^R}{d\tau} > 0$$

thus the differential effect must be positive, $\frac{d\sigma^R - \sigma^F}{d\tau} > 0$. The importance of the hypothesis extends beyond merely accounting for a possible reason for the mixed results in the empirical literature. If indeed this argument is true, it may suggest that countries who control the skill composition of their immigrants are able to sustain a more generous welfare state than countries who do not.

4 Empirical Analysis

4.1 Identification Strategy

We now turn to confront the prediction of the theory with a cross-section data of source-host developed country pairs. We confine ourselves to developed countries in order to use similar skill levels (proxied by education attainment levels). Given the heterogeneity in education institutes across developed and developing countries, the latter are excluded from the analysis. Our data is decomposed into two groups. Group A contains only the source-host pairs of countries which enable free mobility of labor between them. Any kind of discrimination between native born and immigrants, regarding labor market accessibility and welfare-state benefits eligibility, is illegal. These are 16 European countries: Austria, Belgium, Denmark, Finland, France, Germany,

Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, U.K., Norway and Switzerland.

Group B includes only the source-host pairs of countries within which the source country residents cannot freely move, work and get social benefits in either of the host countries. In group B, the host countries are the same 16 countries as in group A. The source countries however are 10 developed countries: U.S., Canada, Japan, Australia, New Zealand, Israel, Taiwan, Hong Kong, Korea and Singapore.

Our identification strategy is twofold:

(1) In order to identify the difference in the welfare-state benefits effect on the skill composition of immigrants across migration regimes, the decomposition of the sample into group A and group B should be exogenous to the dependent variable, the skill composition of migrants. We argue that this is indeed the case. The European integration is the result of long term developments of multilateral treaties, whose content extends far beyond the issue of immigrants and their skill composition. The historical development of the "free migration" group goes far back. The Treaty of Paris (1951) established the European Coal and Steel Community (ECSC) and was signed by France, West Germany, Italy, Belgium, Luxembourg and the Netherlands. The underlying idea was based on supra-nationalism, aiming to help the economy of Europe and prevent future war by integrating its members together. This treaty, among other things, enabled the right to free movement for workers in these industries. Following that, the Treaty of Rome (1957) established the European Economic Community (EEC), signed by the same countries. The main goal of the EEC was to "preserve peace and liberty and to lay

the foundations of an ever closer union among the peoples of Europe". This treaty also provided for the free movement of all workers within the EEC.

The first enlargement was in 1973, with the accession of Denmark, Ireland and the United Kingdom. In 1981 Greece has joined, and Spain and Portugal became members in 1986. Transitional periods of 6 years, postponing free labor mobility were introduced for these three countries. In 1990, after the fall of the Iron Curtain, the former East Germany became part of the EEC as part of a newly reunited Germany. The Maastricht Treaty came into force on 1 November 1993, introducing the European Union (EU), which absorbed the EEC as one of its three pillars, to be called as the European Community (EC). The agreements reiterated the free movement of persons (article 39). That is, citizens can move freely between member states to live, work, study or retire in another country. Such freedom of movement also entails the abolition of any discrimination based on nationality between workers of the member states as regards employment, remuneration and other conditions of work and employment. Austria, Sweden and Finland joined in 1995. These countries together form the EU-15 (or, the "old members states").[10]

[10]The accession treaties normally allow for the introduction of 'transitional measures'. For instance, transitional periods of 6 years, postponing free labor mobility were introduced with respect to Greece, Spain and Portugal. The transitional measures obliges the member states to declare whether they will open up their labor markets for workers from the newly accessed countries, or keep restrictions in place for several (limited) years. In the eastern accession of the EU-8 (Poland, Lithuania, Latvia, Estonia, the Czech Republic, Slovakia, Hungary and Slovenia) in 2004, the restrictions will definitely end on 30 April 2011. A similar scheme (known as '2+3+2' on account of the possible periods of restrictions) is in place with respect to workers from Romania and Bulgaria, which joined the EU on 1 January 2007. Most EU-15 Member States (with the exception of the United King-

The European Economic Area (EEA) came into being on January 1, 1994. The contracting parties to the EEA agreement are Iceland, Liechtenstein and Norway - and the EU Member States along with the European Community. Switzerland is not part of the EEA. However, Switzerland is linked to the European Union by bilateral agreements. The EEA as well as the Switzerland bilateral agreements with the EU are based on the same "four freedoms" as the European Community, which includes the free mobility of labor and equal treatment clauses.[11]

This historical description demonstrates that free migration is allowed among all the 16 countries of group A. Furthermore, it shows that the inclusion of those countries (and the exclusion of others) under the "free migration" treaties is the result of historical reasons, which extends far beyond the skill composition of immigrants. Hence, we believe that this decomposition is exogenous to our dependent variable.

(2) In order to identify the welfare-state benefits effect on the skill composition of immigrants itself, the explanatory variable of interest, welfare-state benefits, should also be exogenous to the dependent variable, the skill composition of migrants. To accomplish this, we first take the lagged average

dom, Ireland and Sweden) took the decision after the 2004 EU enlargement to maintain restrictions on the cross-border mobility of labour from the EU-8 (Malta and Cyprus were excluded from these restrictions), which delayed the migrant flow between the EU-8 and EU-15 Member States for up to seven years. Portugal, Finland, Spain and from July 2006 also Italy decided to lift restrictions, while Belgium, Denmark, France, the Netherlands and Luxembourg decided to alleviate them. The restrictions remain unchanged in Austria and Germany.

[11]This historical sketch is based on the descriptions in Wikipedia of the Treaties of Rome, the E.U., the E.E.A. and the Four Freedoms.

of welfare benefits (1974-1990), where the dependent variable is the skill composition of immigration stock in 2000. Second, because the 2000 stock may be correlated with migration flows prior to 1990, we also include past migration stock, in 1990, as a control variable. Third, we define the skill composition as the difference between migration rates. Therefore, skill-invariant effects (whether the variable itself is skill-dependent, or not) are controlled for. Fourth, we control for the source-host market returns to skills by using the domestic stocks of labor force for each skill level. Fifth, we use two alternative instrumental variables. The first IV is the legal origin of the host country. Legal origin classifies our country-sample into several groups: countries whose system relies on the English common law, the continental system (French-German origin) and the Scandinavian system. Arguably, such classification is not correlated with the dependent variable, the skill composition of immigrants. Nevertheless, the legal system indicates some cultural features of the countries. Among other things, it reflects basic constitutional notion regarding the attitude towards property rights on the one hand, and social rights on the other hand. Hence, there is a strong correlation between the legal origin and the welfare benefits in these countries. The second IV is an alternative measure for the welfare-state benefits. We clustered the sample of host countries by linguistic similarity, legal origin and geographical proximity, into several groups. In each group, for either country, we constructed an IV measure for welfare benefits: the average value of (predetermined) welfare state benefits of the other countries in that group. The groups are as follows: (England, Ireland); (Austria, Germany, Switzerland); (Belgium, France, Italy, the Netherlands, Greece); (Denmark, Sweden, Nor-

way, Finalnd); (Portugal, Spain). Plausibly, countries within any group have strong economic relations, thus their tax rates and welfare state benefits are correlated by competition. However, it is not likely that the decision whether to migrate into a certain host country or not, is affected by the lagged average of the welfare state benefits of the other countries in that group.

We confront our results with several robustness tests, including different measures for welfare benefits, different time average thereof and also specifying different kinds of benefits. We also consider several specifications for control variables.

4.2 The Econometric Model

We start with the following migration stock shares equations:

$$\begin{aligned} M_{s,h,t,H} &= M_{s,h,t-1,e}\alpha_H + z_{s,h,t,e}\gamma + y_{s,h,t,e}\beta_H \\ M_{s,h,t,L} &= M_{s,h,t-1,e}\alpha_L + z_{s,h,t,e}\gamma + y_{s,h,t,e}\beta_L \end{aligned} \tag{19}$$

The dependent variable M in the first (second) equation is the migration stock in period t, from the source country s into the host country h, of high-skilled H (low-skilled L) individuals, as a share of the host country's individuals at the same skill level. The explanatory variables are as follows:

First, $M_{s,h,t-1,e}$ is the stock of migrants in the host country h, from the source country s, at the preceding period, $t-1$, as a share of the host country's individuals at the same skill level. Naturally, the stock share in period t is dependent upon the stock share in the previous period, $t-1$. The auto-correlation effect is depicted by α_H and α_L, for high skill migrants and low skilled migrants, respectively. Note that we denote the lagged stock

shares with the index e. That is, we allow the stock share of migrants in each equation to be affected by the stock shares of migrants of both skill levels.

Second, $z_{s,h,t,e}$, is a group of variables that have the same effect on the immigration of high and low skilled individuals, γ. For instance, it is reasonable to assume that the democracy level, or corruption level in the host country, bear the same impact on the immigration of low and high skill individuals, as captured by γ. Note that the variables in z are not confined to the skill level of the dependent variable.

Third, $y_{s,h,t,e}$, is a group of variables that have a different effect across skill level, β_H and β_L, respectively. For instance, y can include the source-host ratio of the unemployment rates of the diffenert skills (college graduates and high school dropouts). It could be that unemployment deters low-skilled more than high-skilled potential immigrants, given alternative employemt options (like the ability to change carrer into a more desirable one under market conditions).

We now difference the equations in (19), yielding the skill-differences equation:

$$M_{s,h,t,H-L} = M_{s,h,t-1,e}\alpha_{H-L} + y_{s,h,t,e}\beta_{H-L} \tag{20}$$

The dependent variable, $M_{s,h,t,H-L}$, can be considered as a measure for the skill composition of the flow of immigrants. The skill-differences model estimates therefore relative effects of the regressors over $M_{s,h,t,H-L}$. The higher $M_{s,h,t,H-L}$ is, the higher is the skill composition the immigrants' flow. Hence, a positive estimation of a certain coefficient indicates a positive effect on the skill composition measure of the immigrants, and vice versa.

An important feature of the model is that it eliminates the group of

variables, z. Any variable whose impact on migration is skill invariant, is canceled out. This accounts, for instance, for country fixed effects (source or host).

We now specify $y_{s,h,t,e} = (x_{s,h,t-1,e}, u_{s,h,t,e})$, into observable variables, $x_{s,h,t-1,e}$, and unobservable varibles, $u_{s,h,t,e}$. Note that we lag our observable variables, to reduce the possibility of correlation with the unobservable variables. Hence:

$$M_{s,h,t,H-L} = M_{s,h,t-1,e}\alpha_{H-L} + x_{s,h,t-1,e}\beta_{H-L} + u_{s,h,t,e} \tag{21}$$

We now turn to express our decomposition of the data into two groups: group A (of (s,h) pairs within which free migration is allowed) and group B (of (s,h) pairs where the source country originated individuals cannot freely migrate into the host countries):

$$M_{j,t,H-L} = M_{j,t-1,e}\alpha_{H-L} + D_j M_{j,t-1,e}\alpha^0_{H-L} + x_{j,t-1,e}\beta_{H-L} + D_j x_{j,t-1,e}\beta^0_{H-L} + u_{j,t,e} \tag{22}$$

$$\text{where } D_j = \begin{cases} 0, & \text{if } j \in A \\ 1, & \text{if } j \in B \end{cases}$$

Finally, we specify the model as follows:

$$M_{j,00,H-L} = ben_{h,74-90}\beta_{ben,H-L} + D_j b_{h,74-90}\beta^0_{ben,H-L} + X_{j,t-1,e}\alpha_{H-L} + D_j X_{j,t-1,e}\alpha^0_{H-L} + u_{j,00,e} \tag{23}$$

where $M_{j,00,H-L}$ is the high-low difference in stocks shares of migrants, in 2000.

4.3 Data

Migration data is taken from Docquier and Marfouk (2006)[12]. The data set contains bilateral stock of migrants, based on census and register data, for the years 1990 and 2000. Stock variables are more attractive for analysis than flows because our model describes a long-run equilibrium of migration and voting decisions. Also, as indicated by Docquier and Marfouk (2006), data on migration flows are less reliable than stock data, because flow data disregard return migration movements, which may distort the estimation. Immigrants are at working age (25+), defined as foreign born, subdivided into three classes of education level: low-skilled (0-8 schooling years), medium-skilled (9-12 schooling years) and high-skilled (13+ schooling years). We also use Docquier and Marfouk (2006) to extract the native labor stocks for the differently skilled individuals.

Our variable of interests is the welfare-state benefits per capita. This data is taken from Razin, Sadka and Swagel (2002), which is based on OECD's Analytical Database (average for 1974-1990). The data is PPP-converted to 1990 U.S. dollars. In our robustness tests, we use the same variable, for different periods between 1980-2005, extracted from OECD's Social Expenditure Database (SOCX 2007). 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. We also use the latter database to replace the total welfare benefits index with its old age benefits component.

[12]Specifically, the data is available at the web-site of the author, F. Docquier, http://www.ires.ucl.ac.be/CSSSP/home_pa_pers/Docquier/oxlight.htm.

The remaining of the variables are used in our robustness tests. We construct an alternative welfare index, based on labor tax rates and defense expenses. Labor tax rates are averaged between 1974-1990. The data originally relies on Mendoza, Razin and Tesar (1994) and Daveri and Tabellini (2000). The technique for producing the average tax rates uses revenue statistics and national accounts data. Following the same technique, we extend the original database, using SourceOECD National Accounts Database (Annual National Accounts Volume II - Detailed Tables - Main Aggregates 2007) and SourceOECD Revenue Statistics of OECD Member Countries Database (Total tax revenue in millions of US dollars 2006). The average labor tax rate includes the households taxes over income, profits, capital gains, social security contributions and payroll taxes. Missing data is interpolated. Data on defense expenses is taken from national accounts within OECD.stat (beta version), during 1990-2000, and presented as the ratio from the GDP[13].

We use gini coefficient (before taxes and transfers, mid-2000) for the host countries, taken from OECD.stat. We also include GDP per capita, PPP adjusted to US$ in constant prices (2000), averaged between 1974 and 1990 (source: Penn World Tables 6.2). The (great circle) geographical distance and the common language (zero-one) bilateral variables are commonly used in gravity models, and taken from Razin, Sadka and Tong (2005)[14]. Finally we borrow legal origin data from La-porta et al. (2003) to construct instrumental variables estimation. Legal origin is classified according to the source of the host countries' commercial laws: English, French, German and Scandinavian.

[13]Switzerlands' defense expenses measure as a percentage of its GDP (average of 1989-1991) is supplemented from Bernauer and Koubi (2008).

[14]We supplement the distance measure from http://www.convertunits.com/distance.

4.4 Main Findings

Table 1 presents the main estimation results. The difference between columns 1 and 2 is in the specified dependent variables. Columns 1 contains only the migration stock shares, skilled and unskilled, in the year 1990, aside from our variable of interests. Columns 2 includes also the log-values of the skilled-unskilled native labor stocks ratio, in the host country, in the year 1990, to capture possible variations in the returns to skill.

Dependent Variable: High-Low Difference in Migration Stock Shares at 2000		
	OLS	**OLS**
benefits per capita (in logs) 1974-1990 (host)	-0.139	-0.111
	(0.049)***	(0.054)**
benefits per capita (in logs) 1974-1990 (host) X R	0.135	0.133
	(0.054)**	(0.061)**
migration stock share in 1990 - low skilled	-0.755	-0.757
	(0.097)***	(0.095)***
migration stock share in 1990 - low skilled X R	1.673	1.694
	(0.185)***	(0.180)***
migration stock share in 1990 - high skilled	1.076	1.082
	(0.131)***	(0.127)***
migration stock share in 1990 - high skilled X R	-0.729	-0.734
	(0.134)***	(0.130)***
high-low labor ratio in 1990 (host country)		-0.459
		(0.165)***
high-low labor ratio in 1990 (host country) X F		-0.088
		(0.558)
Observations	400	400
R-squared	0.857	0.858
Migration into 16 European countries, from 26 developed countries (inclusive of the 16 host countries, among which free migration is allowed); F (R) is a dummy variable for the 16 (10) source countries whose emigration into the 16 host countries is (not) free; Robust standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%		

Table 1: Welfare Migration: The High-Low Skilled differential Effect between Free and Policy-Controlled Migration Regimes

Our first hypothesis relates to the effect of welfare state benefits on the skill composition of immigrants within migration regime. This hypothesis is indeed varified (the first row). The coefficient is negative and significant.

That is, the generosity of the welfare state adversely affects the skill composition of migrants in the free migration regime, capturing, thereby, the market-based supply-side effect. The inclusion of the returns to skill proxy (column 2) does not have much of an effect on on the magnitude of the coefficient.

Our second hypothesis relates to the considerations of the host country's voters in policy-controlled migration regimes. We argue that the policy-based demand-side effect in these regimes, which is negligible in the free migration regimes, has an opposite effect. Indeed, the coefficient is positive and significantly different than that in the free migration regimes (second row). That is, the effect of the generosity of the welfare state on the skill composition of migrants is positively affected by the migration policy of the host countries. Again, The inclusion of the returns to skill proxy (column 2) does not have much of an effect on on the magnitude of the coefficient. The overall coefficient of welfare state benefits within policy-coltrolled migration pairs is not different than zero. This results is also predicted by our parsimonious model.

Turning to the other control variables, the effect of low (high) skilled migration stock rate in 1990 on the skill-composition of migration in 2000 is negative (positive) and significant, in the free migration regime. An interpretation of this result is that in the free-migration regime there is an inertia over time for each skilled group of migrants. More unskilled migrants bring about further waves of unskilled migrants; and similarly, more skilled migrants bring about further waves of skilled migrants.

In the policy controlled migration regime, past migration of the unskilled increases the skill composition of immigrants in 2000 (past skilled migration

increases the skill composition of immigrants in 2000, but less than in the free migration regime). The interpretation of this result, consistent with our model, is that having initially (i.e., in 1990) a large stock of unskilled migrants, which poses a fiscal burden on the welfare state, induces its voters to opt for more skilled migrants selection in order to ease the burden. This explanation is supported in columns 2. The ratio of high-low skill labor also can be a proxy for the voters' ratio, in the host countries. One can see that as this ratio is higher, the skill composition of immigrants is lower. Clearly, this outcome can capture another effect. As the high-low skill ratio of labor increases, the returns to skill ratio, between high and low skill workers, declines, which, in turn, decreases the skill composition of the immigrants.

4.5 Robustness Tests

Our robustness test is divided into three parts. First, we replace the measure of our variable of interests. Instead of using the log-value of the average between 1974-1990, we use different periods (1980-1985, 1980-1990, 1980-1995, 1980-2000, 1980-2005). All estimations supports our hypothesis regarding the negative, market-based, supply-side effect. The positive, policy-based, demand-side effect is only weakly supported, as the results are not significant. We also replace the welfare-state benefits by the log-value of old age pension payments, averged between 1980-2000. Clearly, this is the largest component of social security. Based on the PAYG systems, it reflect redistribution of income which stands at the heart of our parsimonious model (whereas other components of welfare benefits may reflect additional considerations, like insurance and others). The results are perfectly in line with

our main findings. We also constructed a different index for the welfare generosity. We calculated the average tax proceeds per capita, excluding the portion for defense expenses. Again, the result match opur main findings. The complete results are reported in Tables 4-6 in Appendix B.

Second, we used different specification for the estimation. We started by including the gini coefficient in host countries, before tax-transfers, so as to capture the returns to skill in the economy. The results are very similar to our main findings. We then included other variables, as in the standard gravity models (GDP per capita in the source and host countries, common language dummy variable and the geographic distance between any source-host pair). Again, the results are the same as predicted by our model. We also replaced the high-skill migrants with medium-skill (high school education). The main prediction is found to be robust also to this. The complete results are reported in Tables 7-9 in Appendix B.

Third, we used instrumental variables. The first instrumental variables is the set of dummy variables which captures the legal origin in the host country. The second, alternate, instrumental variable is the average of the welfare state benefits, for each country, in its designated group, as clustered by common language, distance and legal origin (see explanation in the identification strategy section above). The results are presented hereunder, and shows clearly another support for the predictions of our parsimonious model

Dependent Variable: High-Low Difference in Migration Stock Shares at 2000		
	IV	**IV**
fitted benefits per capita (in logs) 1974-1990 (host)	-0.226	-0.180
	(0.078)***	(0.076)**
fitted benefits per capita (in logs) 1974-1990 (host) X R	0.267	0.221
	(0.090)***	(0.090)**
migration stock share in 1990 - low skilled	-0.748	-0.752
	(0.098)***	(0.097)***
migration stock share in 1990 - low skilled X R	1.683	1.697
	(0.182)***	(0.178)***
migration stock share in 1990 - high skilled	1.068	1.074
	(0.132)***	(0.130)***
migration stock share in 1990 - high skilled X R	-0.719	-0.726
	(0.135)***	(0.133)***
high-low labor ratio in 1990 (host country)		-0.524
		(0.199)***
high-low labor ratio in 1990 (host country) X F		0.202
		(0.550)
Observations	400	400
R-squared	0.855	0.857
Instrumental variables are the legal origin dummy variables of the host countries (English, French, German and Scandinavian)		
Migration into 16 European countries, from 26 developed countries (inclusive of the 16 host countries, among which free migration is allowed);		
F (R) is a dummy variable for the 16 (10) source countries whose emigration into the 16 host countries is (not) free;		
Robust standard errors in parentheses		
* significant at 10%; ** significant at 5%; *** significant at 1%		

Table 2: Welfare Migration: The High-Low Skilled differential Effect between Free and Policy-Controlled Migration Regimes: Using Legal Origin as IV

Dependent Variable: High-Low Difference in Migration Stock Shares at 2000		
	IV	**IV**
fitted benefits per capita (in logs) 1974-1990 (host)	-0.168	-0.128
	(0.057)***	(0.061)**
fitted benefits per capita (in logs) 1974-1990 (host) X R	0.171	0.181
	(0.062)***	(0.069)***
migration stock share in 1990 - low skilled	-0.753	-0.756
	(0.098)***	(0.096)***
migration stock share in 1990 - low skilled X R	1.674	1.706
	(0.185)***	(0.178)***
migration stock share in 1990 - high skilled	1.074	1.080
	(0.133)***	(0.128)***
migration stock share in 1990 - high skilled X R	-0.726	-0.732
	(0.136)***	(0.131)***
high-low labor ratio in 1990 (host country)		-0.564
		(0.176)***
high-low labor ratio in 1990 (host country) X F		0.072
		(0.573)
Observations	400	400
R-squared	0.857	0.858
Instrumental variable is the benefits per capita average in the remaining countries in a certain country's group (clustered by legal origin, common language and distance)		
Migration into 16 European countries, from 26 developed countries (inclusive of the 16 host countries, among which free migration is allowed);		
F (R) is a dummy variable for the 16 (10) source countries whose emigration into the 16 host countries is (not) free;		
Robust standard errors in parentheses		
* significant at 10%; ** significant at 5%; *** significant at 1%		

Table 3: Welfare Migration: The High-Low Skilled differential Effect between Free and Policy-Controlled Migration Regimes: Using Group Benefits as IV

5 Conclusion

The existing literature on migration views it as an economic force, which can mitigate the fiscal burden induced by the process of aging. The reason is that an inflow of young working age immigrants may slow down population aging and help paying for social security. However, because immigrants often have low education and high fertility rates, their net fiscal impact may be costly rather than beneficial. Storesletten (2000) and Lee and Miller (2000) calibrate a general equilibrium overlapping generations model to investigates whether a reform of immigration policies could resolve the fiscal problems associated with aging. Storesletten finds that selective immigration policies, involving increased inflow of working-age high and medium-skilled immigrants, can remove the need for a future fiscal reform. Lee and Miller, on the other hand, base their conclusion on those immigrants have lower education and higher fertility rates than that of the native born population. Thus if more immigrants are admitted into the economy, they will ease temporarily the projected fiscal burden associated with the retirement of the baby boomers. But the overall fiscal consequences are relatively small.

Providing evidence on whether immigrants pay their way in the welfare-state is addressed in a series of influential paper by Borjas (Borjas (1994) provides a survey addressing this question; also see Borjas et al. (1996)). Razin and Sadka (2000, 2004) address the issue of the fiscal burden associated with immigrants in a pay-as-you-go fiscal system. They show that the additional fiscal burden could be shifted forward indefinitely, and all cohorts of the native born in the present and in the future could gain from the initial influx of unskilled migrants. There is also a potential for a reversed possible

effects that run from the skill composition of migrants to the generosity of the welfare state; and interactions between the skill composition of migrants and the generosity of the welfare state. The effect of immigration on the generosity of the welfare-state is addressed by Razin, Sadka and Swagel (2002). They use data for 11 European countries during 1974-1992, and find that the coefficient of the share of immigrants in the host country population is negative in the labor tax, and welfare-state benefits regressions. They also find some evidence that the medium and high educated group among the immigrants have a positive coefficient in the tax rate regression. They interpreted the result in terms of "fiscal leakage" from the median voter toward unskilled migrants, and "fiscal gain" from skilled migrants to the median voter. Facchini, Razin and Willmann (2004) treat the welfare-state benefits and immigration as being jointly determined. Some of their regressions show that the fiscal leakage effect dominates the shift-in-the median voter effect, but some other authors show the opposite. Their analysis also supports the welfare-state magnet argument, when labor tax rates proxy the welfare-state program. However, if tax rates are replaced by welfare-state transfers (per capita), the results become statistically insignificant.

Our paper analyzes the effect of the welfare state generosity on the skill composition of migrants across free and policy controlled migration regimes. We develop a parsimonious model in which the effect of an increase in the generosity of the welfare state on the skill composition of migrants under free migration is negative. But the model predicts positive sorting of migrants if migration is controlled by policymakers in the host country. We examine these hypotheses by using bilateral migration data in the EU, separated by

their origin from EU and non-EU countries. Such an exogenous separation into EU and non-EU countries (which conforms to free and policy-controlled migration regimes, respectively) serves as the basis for identification strategy, along with two alternative instrumental variables for the generosity of welfare benefits. We find strong support for the main prediction of the model concerning the difference in the effects of the generosity of the welfare state on the skill mix of migrants between free and policy –controlled migration regimes.

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A Proof

We first show that $\frac{\partial b(\sigma;\tau)}{\partial \sigma} > 0$:

$$\frac{\partial b(\sigma;\tau)}{\partial \sigma} = \frac{A\mu\tau\left(1-\tau\right)^{\varepsilon}}{1+\mu}\left\{\alpha w_s^{\varepsilon}\left[\frac{\left(1-\alpha\right)\theta^{\varepsilon}}{\alpha}\right]^{\frac{1-\alpha}{1+\varepsilon}}\left[1-\frac{\varepsilon\left(1-\alpha\right)\left(1+\mu\right)}{\left(1+\varepsilon\right)\left(1-s+\left(1-\sigma\right)\mu\right)}\right]\right. \tag{24}$$

$$\left.-\left(1-\alpha\right)w_u^{\varepsilon}\left[\frac{\left(1-\alpha\right)\theta^{\varepsilon}}{\alpha}\right]^{\frac{-\alpha}{1+\varepsilon}}\left[1-\frac{\varepsilon\alpha\left(1+\mu\right)}{\left(1+\varepsilon\right)\left(s+\sigma\mu\right)}\right]\right\} > 0$$

Observe that:

$$\alpha w_s^{\varepsilon}\left[\frac{(1-\alpha)\,\theta^{\varepsilon}}{\alpha}\right]^{\frac{1-\alpha}{1+\varepsilon}} > (1-\alpha)\,w_u^{\varepsilon}\left[\frac{(1-\alpha)\,\theta^{\varepsilon}}{\alpha}\right]^{\frac{-\alpha}{1+\varepsilon}}$$

$$\Leftrightarrow \alpha w_s^{\varepsilon}\left[\frac{(1-\alpha)\,\theta^{\varepsilon}}{\alpha}\right]^{\frac{1}{1+\varepsilon}} > (1-\alpha)\,w_u^{\varepsilon}$$

$$\Leftrightarrow \frac{\alpha}{1-\alpha}\left(\frac{\alpha\theta}{1-\alpha}\right)^{\frac{\varepsilon}{1+\varepsilon}}\left[\frac{(1-\alpha)\,\theta^{\varepsilon}}{\alpha}\right]^{\frac{1}{1+\varepsilon}} > 1$$

$$\Leftrightarrow \left(\frac{\alpha\theta}{1-\alpha}\right)^{\frac{2\varepsilon}{1+\varepsilon}} > 1$$

$$\Leftrightarrow \frac{\alpha\theta}{1-\alpha} > 1$$

which is true by assumption, equation (10). Additionally, observe that:

$$1-\frac{\varepsilon\,(1-\alpha)\,(1+\mu)}{(1+\varepsilon)\,(1-s+(1-\sigma)\,\mu)} > 1-\frac{\varepsilon\alpha\,(1+\mu)}{(1+\varepsilon)\,(s+\sigma\mu)}$$

$$\Leftrightarrow \frac{\alpha}{(s+\sigma\mu)} > \frac{(1-\alpha)}{(1-s+(1-\sigma)\,\mu)}$$

$$\Leftrightarrow \frac{\alpha\theta}{1-\alpha} > 1$$

which, again, is true by assumption, equation (10). Hence, it follows that $\frac{\partial b(\sigma;\tau)}{\partial\sigma} > 0$.

Employing equation (**??**) yields:

$$\frac{\partial w_s\,(\sigma;\tau)}{\partial\sigma} = -\frac{A\alpha\widehat{\alpha}^{\varepsilon}\,(1-\alpha)\,\theta^{-\alpha}\mu\,(1+\mu)\left(\alpha\widehat{\alpha}^{\varepsilon}\theta^{1-\alpha}\right)^{\frac{1}{1+\varepsilon}-1}}{(1+\varepsilon)\,(s+\sigma\mu)^2} < 0 \qquad (25)$$

$$\frac{\partial w_u\,(\sigma;\tau)}{\partial\sigma} = \frac{A\alpha\widehat{\alpha}^{\varepsilon}\,(1-\alpha)\,\theta^{-\alpha-1}\mu\,(1+\mu)\left((1-\alpha)\,\widehat{\alpha}^{\varepsilon}\theta^{-\alpha}\right)^{\frac{1}{1+\varepsilon}-1}}{(1+\varepsilon)\,(s+\sigma\mu)^2} > 0$$

which, indicates, as expected, that wages of each skill type fall with its proportions in the labor market.

Then it follows from the equations in the text that $\frac{\partial V_u(\sigma;\tau)}{\partial\sigma} > 0$.Therefore, if the decisive voter is an unskilled individual he opts for $\sigma^u = 1$, no matter

what is τ. Thus $\frac{d\sigma^u}{d\tau} = 0$.When the decisive voter is a skilled individual, he opts for a skill composition of migrants, σ^s, which is given by the first order condition

Total differentiation of their preferences yields:

$$\frac{\partial V_s^{\shortmid}(\sigma;\tau)}{\partial \tau} + \frac{dV_s^{\shortmid}(\sigma;\tau)}{d\sigma}\frac{d\sigma^s}{d\tau} = 0 \tag{26}$$

Given the second order condition assumption:

$$sign\left(\frac{d\sigma^s}{d\tau}\right) = sign\left(\frac{\partial^2 V_s(\sigma;\tau)}{\partial\sigma\partial\tau}\right) \tag{27}$$

Define $\frac{\partial b(\sigma;\tau)}{\partial\sigma} = \gamma\tau(1-\tau)^{\varepsilon}$, using equation (24), where $\gamma > 0$ is independent of τ. Hence, it follows that

$$\begin{aligned}
&\frac{\partial^2 V_s(\sigma;\tau)}{\partial\sigma\partial\tau} = \frac{d}{d\tau}\left[\gamma\tau(1-\tau)^{\varepsilon}\right] + \frac{d}{d\tau}\left[(1-\tau)\,l_s(\sigma)\frac{dw_s(\sigma)}{d\sigma}\right] = \qquad (28)\\
&= \gamma\left((1-\tau)^{\varepsilon} - \tau\varepsilon(1-\tau)^{\varepsilon-1}\right) - \frac{dw_s(\sigma)}{d\sigma}w_s^{\varepsilon}(\sigma)(1+\varepsilon)(1-\tau)^{\varepsilon} =\\
&= \left[\gamma\tau(1-\tau)^{\varepsilon}\right]\left(\frac{1}{\tau} - \frac{\varepsilon}{1-\tau}\right) + \left[(1-\tau)\,l_s(\sigma)\frac{dw_s(\sigma)}{d\sigma}\right]\left(\frac{1+\varepsilon}{\tau-1}\right)
\end{aligned}$$

Note that we got the first order condition, weighted by $\left(\frac{1}{\tau} - \frac{\varepsilon}{1-\tau}\right)$ and $\left(\frac{1+\varepsilon}{\tau-1}\right)$. Further note that

$$\begin{aligned}
&\frac{1}{\tau} - \frac{\varepsilon}{1-\tau} > \frac{1+\varepsilon}{\tau-1}\\
\Leftrightarrow\ &\frac{1}{\tau} - \frac{\varepsilon}{1-\tau} + \frac{1+\varepsilon}{1-\tau} > 0\\
\Leftrightarrow\ &\frac{1}{\tau(1-\tau)} > 0
\end{aligned}$$

It then follows that $\frac{\partial^2 V_s(\sigma;\tau)}{\partial\sigma\partial\tau} > 0$. Hence $\frac{d\sigma^s}{d\tau} > 0$.

2. Observe from the equations in the text that:

$$m_i(\tau) = F^i(V_i(\tau)),\ i = s, u \tag{29}$$

Thus:

$$sign\left(\frac{dm_i}{d\tau}\right) = sign\left(\frac{dV_i(\sigma,\mu;\tau)}{d\tau}\right) \tag{30}$$

Assuming that the secondary effects (induced by the marginal change in migration rates due to the tax shift) are small relatively to the primary effect, then $sign\left(\frac{dV_i(\sigma,\mu;\tau)}{d\tau}\right) = sign\left(\frac{\partial V_i(\sigma,\mu;\tau)}{\partial\tau}\right)$. Recall that

$$\frac{\partial V_i(\sigma;\tau)}{\partial\tau} = \frac{\partial b}{\partial\tau} - w_i\left(w_i\left(1-\tau\right)\right)^{\varepsilon} = \frac{Y}{N} - w_i l_i =$$
$$= \frac{w_s l_s\left(s+m_s\right) + w_u l_u\left(1-s+m_u\right) - w_i l_i\left(1+m_s+m_u\right)}{N}$$

Therefore, for the skilled migrants:

$$\frac{\partial V_s(\sigma,\mu;\tau)}{\partial\tau} = \frac{\left(1-s+\left(1-\sigma\right)\mu\right)}{N}\left(w_u l_u - w_s l_s\right) = \tag{31}$$
$$= \frac{\left(1-s+m_u\right)\left(1-\tau\right)^{\varepsilon}}{N}\left(w_u^{1+\varepsilon} - w_s^{1+\varepsilon}\right) < 0$$
$$\Leftrightarrow w_u < w_s$$

which entails that m_s decreases.

Whereas, for unskilled migrants:

$$\frac{\partial V_u(\sigma,\mu;\tau)}{\partial\tau} = \frac{\left(s+\sigma\mu\right)}{N}\left(w_u l_u - w_s l_s\right) = \tag{32}$$
$$= \frac{\left(s+m_s\right)\left(1-\tau\right)^{\varepsilon}}{N}\left(w_s^{1+\varepsilon} - w_u^{1+\varepsilon}\right) > 0$$
$$\Leftrightarrow w_u < w_s$$

which entails that m_u increases.

Recall that:

$$\sigma = \frac{m_s}{m_s + m_u}$$

Hence, it follows that

$$\frac{d\sigma}{d\tau} = \frac{\frac{dm_s}{d\tau}(m_s + m_u) - \frac{dm_s}{d\tau}m_s - \frac{dm_u}{d\tau}m_s}{(m_s + m_u)^2} = \tag{33}$$
$$= \frac{\frac{dm_s}{d\tau}m_u - \frac{dm_u}{d\tau}m_s}{(m_s + m_u)^2} < 0$$

B Tables

Dependent Variable: High-Low Difference in Migration Stock Shares at 2000					
average years for the benefits:	**80-85**	**80-90**	**80-95**	**80-00**	**80-05**
benefits per capita (in logs) (host)	-0.054	-0.053	-0.059	-0.061	-0.078
	(0.024)**	(0.023)**	(0.025)**	(0.026)**	(0.032)**
benefits per capita (in logs) (host) X R	0.026	0.029	0.034	0.037	0.055
	(0.025)	(0.025)	(0.026)	(0.027)	(0.033)
migration stock share in 1990 - low skilled	-0.762	-0.762	-0.762	-0.762	-0.762
	(0.098)***	(0.098)***	(0.098)***	(0.098)***	(0.098)***
migration stock share in 1990 - low skilled X R	1.685	1.683	1.683	1.683	1.682
	(0.186)***	(0.186)***	(0.186)***	(0.186)***	(0.187)***
migration stock share in 1990 - high skilled	1.088	1.088	1.088	1.088	1.088
	(0.132)***	(0.132)***	(0.132)***	(0.132)***	(0.131)***
migration stock share in 1990 - high skilled X R	-0.741	-0.741	-0.741	-0.741	-0.741
	(0.134)***	(0.134)***	(0.134)***	(0.134)***	(0.134)***
Observations	400	400	400	400	400
R-squared	0.853	0.853	0.853	0.853	0.854
Migration into 16 European countries, from 26 developed countries (inclusive of the 16 host countries, among which free migration is allowed); F (R) is a dummy variable for the 16 (10) source countries whose emigration into the 16 host countries is (not) free; Robust standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%					

Table 4: Robustness test: replacing the period of the welfare-state benefits

Dependent Variable: High-Low Difference in Migration Stock Shares at 2000		
	OLS	**OLS**
Old age benefits (in logs) 1980-2000 (host)	-0.109	-0.079
	(0.040)***	(0.030)***
Old age benefits (in logs) 1980-2000 (host) X R	0.096	0.093
	(0.042)**	(0.034)***
migration stock share in 1990 - low skilled	-0.763	-0.764
	(0.097)***	(0.097)***
migration stock share in 1990 - low skilled X R	1.680	1.696
	(0.186)***	(0.183)***
migration stock share in 1990 - high skilled	1.088	1.092
	(0.131)***	(0.129)***
migration stock share in 1990 - high skilled X R	-0.741	-0.744
	(0.134)***	(0.131)***
high-low labor ratio in 1990 (host country)		-0.455
		(0.144)***
high-low labor ratio in 1990 (host country) X F		-0.074
		(0.494)
Observations	400	400
R-squared	0.856	0.857
Migration into 16 European countries, from 26 developed countries (inclusive of the 16 host countries, among which free migration is allowed); F (R) is a dummy variable for the 16 (10) source countries whose emigration into the 16 host countries is (not) free; Robust standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%		

Table 5: Robustness test: using old age pension payments instead of overall welfare transfers

Dependent Variable: High-Low Difference in Migration Stock Shares at 2000		
	OLS	**OLS**
benefits index (host)	-0.127	-0.083
	(0.049)**	(0.053)
benefits index (host) X R	0.102	0.092
	(0.056)*	(0.065)
migration stock share in 1990 - low skilled	-0.759	-0.762
	(0.098)***	(0.096)***
migration stock share in 1990 - low skilled X R	1.674	1.692
	(0.186)***	(0.182)***
migration stock share in 1990 - high skilled	1.083	1.089
	(0.132)***	(0.128)***
migration stock share in 1990 - high skilled X R	-0.736	-0.741
	(0.135)***	(0.131)***
high-low labor ratio in 1990 (host country)		-0.424
		(0.209)**
high-low labor ratio in 1990 (host country) X F		-0.161
		(0.593)
Observations	400	400
R-squared	0.855	0.857
benefits index=log(real GDP per worker * (tax rate - defense expenses/GDP))		
Migration into 16 European countries, from 26 developed countries (inclusive of the 16 host countries, among which free migration is allowed);		
F (R) is a dummy variable for the 16 (10) source countries whose emigration into the 16 host countries is (not) free;		
Robust standard errors in parentheses		
* significant at 10%; ** significant at 5%; *** significant at 1%		

Table 6: Robustness test: using index measure for welfare state benefits

Dependent Variable: High-Low Difference in Migration Stock Shares at 2000		
	OLS	**OLS**
benefits per capita (in logs) 1974-1990 (host)	-0.141	-0.109
	(0.050)***	(0.064)*
benefits per capita (in logs) 1974-1990 (host) X R	0.142	0.146
	(0.055)**	(0.072)**
migration stock share in 1990 - low skilled	-0.755	-0.757
	(0.097)***	(0.095)***
migration stock share in 1990 - low skilled X R	1.677	1.707
	(0.184)***	(0.178)***
migration stock share in 1990 - high skilled	1.076	1.082
	(0.131)***	(0.125)***
migration stock share in 1990 - high skilled X R	-0.729	-0.734
	(0.134)***	(0.128)***
gini coefficient (before tax-transfers) (host)	0.084	-0.044
	(0.234)	(0.369)
gini coefficient (before tax-transfers) (host) X R	-0.226	-0.238
	(0.245)	(0.385)
high-low labor ratio in 1990 (host country)		-0.601
		(0.214)***
high-low labor ratio in 1990 (host country) X F		0.032
		(0.729)
Observations	400	400
R-squared	0.857	0.859
Migration into 16 European countries, from 26 developed countries (inclusive of the 16 host countries, among which free migration is allowed);		
F (R) is a dummy variable for the 16 (10) source countries whose emigration into the 16 host countries is (not) free;		
Robust standard errors in parentheses		
* significant at 10%; ** significant at 5%; *** significant at 1%		

Table 7: Robustness test: including gini coefficient

Dependent Variable: High-Low Difference in Migration Stock Shares at 2000		
	OLS	**OLS**
benefits per capita (in logs) 1974-1990 (host)	-0.138	-0.147
	(0.068)**	(0.070)**
benefits per capita (in logs) 1974-1990 (host) X R	0.159	0.167
	(0.072)**	(0.074)**
migration stock share in 1990 - low skilled	-0.750	-0.751
	(0.096)***	(0.095)***
migration stock share in 1990 - low skilled X R	1.710	1.711
	(0.166)***	(0.165)***
migration stock share in 1990 - high skilled	1.076	1.081
	(0.128)***	(0.123)***
migration stock share in 1990 - high skilled X R	-0.731	-0.736
	(0.130)***	(0.126)***
common language	-0.061	-0.076
	(0.048)	(0.054)
common language X R	0.027	0.049
	(0.059)	(0.064)
distance	0.044	0.035
	(0.034)	(0.031)
distance X R	0.014	0.023
	(0.039)	(0.037)
GDP per capita 1990 (host)	0.029	0.188
	(0.074)	(0.129)
GDP per capita 1990 (host) X R	-0.097	-0.208
	(0.080)	(0.136)
GDP per capita 1990 (source)	-0.062	-0.070
	(0.084)	(0.085)
GDP per capita 1990 (source) X R	0.031	0.038
	(0.084)	(0.086)
high-low labor ratio in 1990 (host country)		-0.342
		(0.199)*
high-low labor ratio in 1990 (host country) X F		-0.852
		(0.874)
Observations	400	400
R-squared	0.863	0.865

Migration into 16 European countries, from 26 developed countries (inclusive of the 16 host countries, among which free migration is allowed);
F (R) is a dummy variable for the 16 (10) source countries whose emigration into the 16 host countries is (not) free;
Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 8: Robustness test: including gravity models variables

Dependent Variable: medium-Low Difference in Migration Stock Shares at 2000		
	OLS	**OLS**
benefits per capita (in logs) 1974-1990 (host)	-0.215	-0.126
	(0.082)***	(0.082)
benefits per capita (in logs) 1974-1990 (host) X R	0.198	0.113
	(0.082)**	(0.083)
migration stock share in 1990 - low skilled	-0.668	-0.666
	(0.139)***	(0.133)***
migration stock share in 1990 - low skilled X R	0.130	0.133
	(0.224)	(0.221)
migration stock share in 1990 - medium skilled	0.890	0.895
	(0.159)***	(0.152)***
migration stock share in 1990 - medium skilled X R	0.293	0.286
	(0.402)	(0.401)
medium-low labor ratio in 1990 (host country)		-0.065
		(0.056)
medium-low labor ratio in 1990 (host country) X F		-1.663
		(0.485)***
Observations	400	400
R-squared	0.727	0.746
Migration into 16 European countries, from 26 developed countries (inclusive of the 16 host countries, among which free migration is allowed); F (R) is a dummy variable for the 16 (10) source countries whose emigration into the 16 host countries is (not) free; Robust standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%		

Table 9: Robustness test: replacing high-skill migrants with medium-skill migrants