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The Gravity of High-Skilled Migration Policies

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- analyse migration as part of broader global change
- contribute to new theoretical approaches
- advance understanding of the multi-level forces driving migration

Abstract

Despite the almost ubiquitously held belief among policy makers that immigration policies aimed at attracting high-skilled workers meet their desired aims, academics continue to debate their efficacy. This paper presents the first judicious assessment on the effectiveness of such policies. We combine a unique new data set of annual bilateral high-skilled immigration labour flows for 10 OECD destinations between 2000 and 2012, with new databases comprising both unilateral and bilateral policy instruments, to examine which types, and combinations, of policies are most effective in attracting and selecting high skilled workers using a micro-founded gravity framework. Points-based systems are much more effective in attracting and selecting high-skilled migrants in comparison with requiring a job offer, labour market tests or working in shortage-listed occupations. Financial incentives yield better outcomes in 'demand-driven' systems than when combined with points-based systems however. Offers of permanent residency, while attracting the highly skilled, overall reduce the human capital content of labour flows since they prove more attractive to non-high skilled workers. Bilateral recognition of diploma and social security agreements, foster greater flows of high skilled workers and improve the skill selectivity of immigrant flows. Conversely, double taxation agreements deter high-skilled migrants, although they do not alter the overall skill selectivity. Higher skilled wages increase the number and skill selectivity of labour flows, whereas higher levels of unemployment exert the opposite effects. Migrant networks, contiguous borders, common language and freedom of movement, while encouraging greater numbers of high skilled workers, exert greater effects on non-high skilled workers, thereby reducing the skill content of labour flows. Greater geographic distances however, while deterring both types of workers, affect the high skilled less, thereby improving the selection on skills. Our results are robust to a variety of empirical specifications, accounting for destination-specific amenities, multilateral resistance to migration and the endogeneity of immigration policies.

Keywords: High-skilled immigration, human capital, immigration policy; **JEL classification:** F22, J61

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Contents

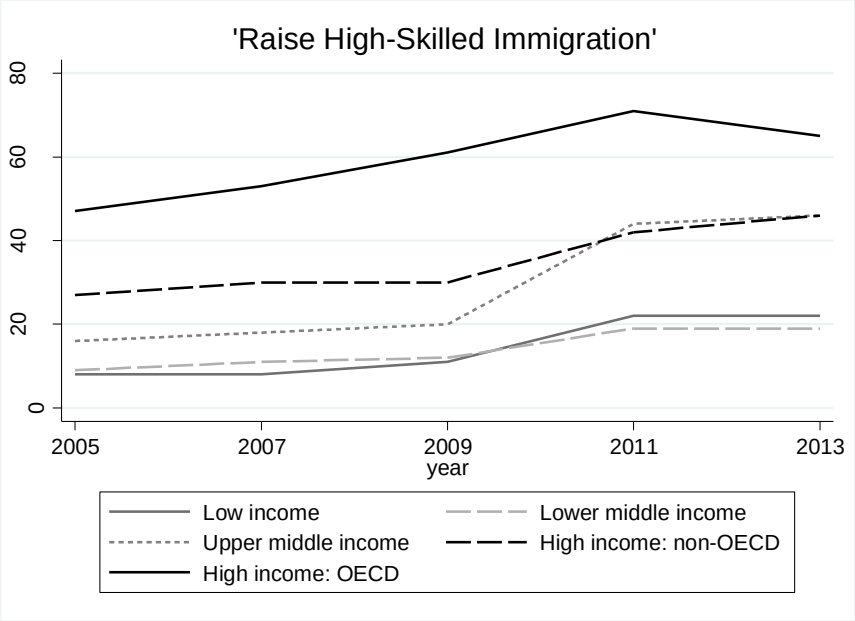
1 Introduction

> '…more than 40 per cent of Fortune 500 companies were founded by immigrants or their children…The revenue generated …is greater than the GDP…of every country in the world outside the U.S., except China and Japan.' Forbes (2011)[1]

> '…if Europe really wants to have a knowledge based economy, if it wants to play a leading role in innovation and research, if it wants to be competitive in the global economy, it needs to do much more to attract the smartest and the brightest.' Cecilia Malmström, EU Commissioner, (2012)[2]

Policy makers worldwide, cognizant of the pivotal role human capital plays in the economic development of receiving nations, increasingly vie to attract 'The best and brightest' (Kapur and McHale, 2005) in the 'Global competition to attract high-skilled migrants' (Boeri et al., 2012). At the centre of this contest are the countries of the OECD that historically have attracted the largest proportion of high-skilled migrants (Artuç et al., 2014), at least in part, since the domestic supply of skills is falling short of domestic demand (Papademetriou and Sumption, 2013). Since high-skilled migrants are motivated to move internationally by myriad factors however, the efficacy of nation states' (high skill) immigration policies remain highly contested. Indeed scientific debate on immigration policy until now has largely focused upon low-skilled, asylum or illegal migration and states' efforts to reduce and control these forms of migration as opposed to analysing the efficacy of high-skilled migration policies (Boeri et al., 2012). The lack of existing evidence is largely due to conceptual and methodological flaws and the paucity of adequate data (Czaika and de Haas, 2013). This paper contributes to the literature by overcoming these shortfalls to test the efficacy of high-skilled migration policies with rich panel data.

Figure 1 Government policy objectives on high-skilled migration, [% of countries]



Data source: UN World Population Policies (2013)[3]

[1] http://www.forbes.com/sites/stuartanderson/2011/06/19/40-percent-of-fortune-500-companies-founded-by-immigrants-or-their-children/.

[2] http://europa.eu/rapid/press-release_SPEECH-12-312_en.htm?locale=fr.

[3] http://esa.un.org/PopPolicy.

Faced with a limited domestic supply in certain skills and occupations, national governments increasingly vie to attract talent, to respond to immediate and long-term labour requirements and skill shortages. As shown in Figure 1, ever more countries are now engaging in the intense global competition to attract internationally mobile human capital, by redesigning their immigration regimes, thereby leading to a diffusion of high-skilled migration policies globally. In 2013, approximately 40 per cent of the 172 UN member states declared an explicit interest to increase the level of high-skilled migration either by attracting foreign or retaining native talent. This share has almost doubled since 2005, when 22 per cent expressed a similar preference. Highly developed destinations are at the vanguard of this global trend, with two thirds of OECD nations having implemented, or are in the process of implementing, policies specifically aiming to attract high-skilled migrants. Thus, between the last two census rounds in 2000/01 and 2010/11, the countries of the OECD witness an unprecedented rise of 70 per cent in the number of tertiary-educated migrants to 35 million (Arslan et al., 2014). The desirability of high-skilled workers (immigrants) and thus the reason for the proliferation of policies aimed at attracting the highly-skilled has been well documented across a number of literatures.

First, increasing the human capital stock through immigration raises overall productivity and contributes to economic growth in receiving countries (Boubtane et al., 2014). A key global trend in international migration is that increasing numbers of origin countries send high-skilled migrants that agglomerate in the main destination countries of the world, which in turn increases the diversity of the migrant stocks in receiving countries (Czaika and de Haas, 2014; Özden and Parsons 2015). Alesina et al., (2013) demonstrate that such diversity by birthplace significantly and positively spurs economic growth. Peri et al. (forthcoming) show that STEM (i.e. scientists, technology professionals, engineers, and mathematicians) workers are the main drivers of productivity growth in the United States. These authors show H1-B driven increases in STEM workers raise both college and non-college educated native wages, but for the college educated far more. Since no effects on employment are found, these results imply a significant positive impact of STEM workers on Total Factor Productivity. High-skilled immigrants spur technological progress through the creation and diffusion of knowledge and innovation (Kerr and Lincoln, 2010). Hunt and Gauthier-Loiselle (2010) show for the United States that between 1990 and 2000, the 1.3 per cent increase in the share of the population composed of immigrant graduates, and the comparable 0.7 per cent increase in the share of post-college immigrants, increased patenting per capita by 21 per cent,[4] a substantial proportion of which is estimated to be the positive spillovers from skilled workers. In particular, knowledge that cannot be codified and transmitted through other information channels requires 'knowledge-carriers' to physically move in order to transfer knowledge across borders and to create spillovers elsewhere (OECD, 2008).

There are also many reasons why high-skilled migrants might be better received by host country populations. Facchini and Mayda (2012), analyse a specific question pertaining to high-skilled immigration from the 2002–03 round of the European Social Survey to examine over 30,000 individuals' attitudes to high-skilled immigration across 21 European countries. These authors' summary statistics demonstrate that on average public opinion is in favour of more skilled migration. In other words, high-skilled migration is likely politically more acceptable as well as economically attractive. In their analysis, Facchini and Mayda examine two economic channels through which high-skilled migrants may affect natives' attitudes toward them, a labour market channel (where migrants' education is the key determinant of attitudes) and a welfare channel (through which immigrants' income level and thus movers' net fiscal contribution to society is the pivotal factor). The results conform to their theoretical predictions, since higher levels of education among natives reduce natives' pro-high-skilled immigrant stance, while more wealthy individuals are more likely to favour high-skilled immigration.

Of course non-economic factors also determine natives' attitudes (Card et al., 2012). Since high-skilled migrants will likely integrate into host economies faster and will be less likely to become undocumented etc. *a priori* we might expect a pro-high-skill positive bias. In political science it is rather assumed that native workers will be less in favour of immigrants at the same skill level as themselves, since in that case additional migration will lead to additional competition for their jobs. Hainmueller and Hiscox (2010) however find that both low- and high-skill natives favour high-skilled migrants. Corroborative evidence is offered by a recent YouGov poll, the fieldwork for which was conducted across the United Kingdom, between 16 and 22 January 2015. This survey

[4] This estimate is based upon those authors' instrumental variable estimates.

found, even among the selected sample of *Sun* newspaper readers that supported the United Kingdom Independence Party (UKIP) – which campaigned in the 2015 UK general election primarily on an anti-immigration platform – that 55 per cent of those canvassed were still in favour of maintaining or raising the present numbers of well-educated and highly skilled migrants in the domestic labour market.[5]

Despite the concurrent rise in the number of high-skilled immigrants worldwide and the proliferation of high-skilled immigration policies, the degree to which high-skilled immigration policies have been effective remains contested (Bhagwati and Hanson, 2009). Jasso and Rozenzweig (2009) examine the roles of skill premia and cultural proximity in their study of the skill composition of immigration to Australia and the United States and conclude that '*There is no evidence that the differences in the selection mechanism used to screen employment migrants in the two countries play a significant role in affecting the characteristics of skill migration*' (p. 4). A general review concludes that immigration policies are likely relatively ineffective when compared to other social, economic and political determinants (Czaika and de Haas, 2013). Doomernik, Koslowski and Thränhardt (2009) argue that attracting highly skilled migrants will likely depend upon broader economic and social factors as opposed to the 'technical approach' adopted. Highly skilled migrants likely value myriad non-economic factors such as standard of living, quality of schools, health services and of infrastructure and the presence of a well-established professional network (Papademetriou et al., 2008). Papademetriou et al (2008) coined the term 'immigration package' to describe the overall basket of factors that feature in high skilled migrants' calculus when deciding where to move.

In this paper we examine the degree to which skill-selective migration policies are effective in increasing the inflow and selection of high-skilled labour immigrants; having accounted for a raft of economic and non-economic factors. Our empirical (pseudo-gravity) model is derived from, and consistent with, an underlying micro founded random utility model (Beine et al., 2014; Bertoli and Huertas-Moraga, 2015) and is arguably the richest to date in terms of the model being well-specified; whilst importantly also accounting for recent innovations in the empirical literature, namely a high proportion of zeroes in the dependent variable and multilateral resistance to migration (Santos Silva and Tenreryo, 2006, Bertoli and Huertas-Moraga, 2013).

Broadly our paper contributes to the literature on the determinants of international migration, which to date has emphasised the roles of income and wage differentials (Grogger and Hanson, 2011; Belot and Hatton, 2012; Ortega and Peri, 2013; Beine et al., 2013), social networks and diasporas (Pedersen et al 2008, Beine et al. 2011, Beine and Salomone, 2013), credit constraints (Vogler and Rotte, 2000; Clark et al., 2007; Belot and Hatton, 2012) and (un)employment (Beine et al 2013, Bertoli et al., 2013). Our paper speaks most directly to the strand of this literature that specifically examines immigration policies as drivers of international migration however. To date these studies have used cross-country panels to evaluate the effects of entire immigration regimes on aggregate bilateral migration flows (Mayda, 2010; Ortega and Peri, 2013; Czaika and de Haas, 2014) or else focused on particular migration categories such as asylum seekers (Vogler and Rotte, 2000; Holzer, Schneider, and Widmer, 2000; Hatton, 2005, 2009; Thielemann, 2006) or irregular migrants (Czaika and Hobolth, 2014).

Rinne (2012) provides a literature review on the evaluation of immigration policies, highlighting the scarcity of empirical evidence on the efficacy of immigrant selection policies. Cobb-Clark (2003) examines the effect of a change in the selection criteria in Australia on migrants' labour market integration and finds that immigrants facing more stringent entrance criteria fared significantly better in the labour market. Antecol et al. (2013) conduct a cross-sectional empirical analysis for Australia, Canada and the United States and argue that migrants to all three countries have similar observable skills once Latinos in the United States are removed from the analysis; thereby concluding that the relatively low average skill level of migrants to the United States is largely driven by the geographic and historic proximity of Mexico, as opposed to differences in immigration policy. For Canada, Green and Green (1995) conduct a time-series analysis to examine the impact of changes in the Canadian points-based system introduced in 1967 on the occupational composition of immigrants. They find that changing point requirements proved effective in altering the occupational composition of migrant inflows,

[5] The detailed results of the survey can be found here: https://d25d2506sfb94s.cloudfront.net/cumulus_uploads/document/9n3rbm3yf2/YG-Archive-150122-TheSun-Immigration.pdf.

but that it was predominantly large changes in the required points that exerted the greatest effect on the occupational composition.

Boeri et al. (2012) analyse the role of 'pro-skill' policy changes in 14 Western immigration countries on constructed bilateral skill-specific flows, which apply dyadic skill shares as recorded in stock data (in 1990 and 2000) to aggregate immigrant flows as recorded elsewhere for the years 1980–2005.[6] These authors conclude that high-skilled migration policies have a noticeable impact on the skill-composition of immigration flows. This methodology suffers from the fact that migrant stocks are a function of net migration flows (as well as any attrition in the stocks) such that it is unclear whether contemporary flows reflect the same skill level of the prevailing stock; and since a constant skill flow alters the share of high skill at destination this would not be captured by applying a constant skill share to the inflow of immigrants. Furthermore, these authors' use of an index to record policy changes means that conclusions can only be made with regards the within variation of policy changes since it is unclear at which level of 'restrictiveness' these countries have initially anchored their immigration policy to. No conclusions can therefore be made with regards to the effectiveness of specific skill-selective policy instruments.

In assessing for the efficacy of specific high-skilled immigration policies across countries for the first time, the analysis in this paper combines three new data collections. The first is a unique data set of bilateral migration flows harmonised by skill level and migrants' origins for 10 OECD destinations and 185 origin countries (see appendix Table A3) for the period 2000–12, as detailed in Czaika and Parsons (2015). These data allow us to analyse the determinants of high-skilled migration dynamics; thereby moving beyond existing studies that examine the determinants of aggregate skilled migration flows (e.g. Pedersen et al., 2008; Mayda, 2010; Ortega and Peri, 2013) or else skill-specific migration stocks (e.g. Belot and Hatton, 2012; Grogger and Hanson, 2011; Brücker and Defoort, 2009; Beine et al., 2011).

The second is a unique database of unilateral high-skilled immigration policies. These are modelled by implementing a dummy variable for each policy that taked the value of one should a particular policy be in place in a specific country-year (see Czaika and Parsons, 2015). This innovation is important since: our data are specifically coded for high-skilled immigrants, such that we need not apply policy changes that relate to an unknown share of the migration flow in question; we can identify the unique effects of these policy instruments on high-skilled immigration flows as opposed to modelling immigration policies by using an index of policy restrictiveness (Mayda, 2010, Ortega and Peri, 2013), and because modelling each unilateral policy individually also allows us to compare, both over time and across countries, the effects of such policies, and allows us to examine how various policies work in combination.

Our third data collection comprises myriad additional factors that might be considered to form part of the 'migration package'. These include a battery of bilateral migration policies, namely: social security agreements, recognition of diplomas and double taxation agreements and several variables that capture additional factors that might influence the mobility of the highly skilled: measures of health, education, taxation, quality of living and infrastructure.

Our results show that points-based systems are much more effective in attracting and selecting high-skilled migrants in comparison to those demand-led policies that include requiring a job offer, clearance through a labour market test or working in a shortage listed occupation. The provision of post-entry rights, as captured in our model by the offer of permanent residency, is effective in attracting high-skilled migrants, but overall this is found to reduce the human capital content of labour flows since 'roads to permanency' prove more attractive for non-high skilled workers. Particular policies, however, are more effective when combined with other policy instruments. For example, financial incentives in 'demand-driven' systems yield better outcomes than when combined with points-based systems.

We find that bilateral agreements that serve to recognise the credentials of diplomas earned overseas and transfer social security rights between country-pairs, foster greater flows of high-skilled workers in addition to

[6] Specifically, the 1990 skill shares are applied to flows prior to 1990, the 2000 skill shares to years after 2000 and interpolated skill shares are applied to the flows between 1990 and 2000.

improving the skill selectivity of immigrant flows. Conversely, double taxation agreements on net, are found to deter high-skilled migrants, although we find no evidence that such policies alter the overall skill selectivity of labour flows.

Higher skilled wages increase both the overall number of high-skilled workers and the degree of human capital within migration corridors. We find the opposite in the case of higher levels of unemployment. Finally, many of our variables that capture various migration costs: migrant networks, contiguous borders, common language and freedom of movement, while all encouraging greater numbers of high-skilled workers, all exert greater effects on non-high skilled workers, thereby reducing migrant skill selection. Our measure of distance however, has the opposite effect and while deterring both types of workers affects the high-skilled less, such that greater geographic distances are associated with an improved selection on skills.

The following section outlines our theoretical approach, while Section 3 discusses a number of empirical considerations for which our model needs to account. Section 4 details the data used in our model, while Section 5 presents our baseline results, a series of robustness checks, the results when policies are used in combination and the results on the selectivity of immigrant flows. Section 5 offers our conclusions.

2 Theoretical framework

The canonical paper of Sjaastad (1962) arguably laid the foundation for the modern theoretical approaches adopted in the economics of migration, casting as it did potential migrants as rational maximisers of human capital investments that weigh up the attractiveness of potential destinations by comparing the costs and benefits associated with each location. Nowadays, the micro-founded pseudo-gravity model of international migration has arguably become the theoretical workhorse on which the majority of studies that examine the determinants of migrants' location decision are now based. Our theoretical foundations, derived from a Random Utility Model, are therefore largely off-the-shelf and have been detailed elsewhere (see Grogger and Hanson, 2011; Beine et al., 2011; Boeri et al., 2012; Ortega and Peri, 2013; Beine et al., 2013; Beine and Salamone, 2013; Bertoli and Fernandez Huertas-Moraga, 2013; Bertoli et al., 2013; Beine et al., 2014; Beine and Parsons, 2015; Bertoli and Fernandez Huertas-Moraga, 2015). In particular, we denote scale (of the total of high-skilled migration) and selection (the share of high-skilled to migrants of all skill categories) equations, see for example Grogger and Hanson (2011), Beine et al. (2011), Boeri et al. (2012), Ortega and Peri (2013).

Our model comprises agents of z-skilled persons ($z = \text{high (H), low(L)}$), who reside in country $o \in O = \{1, \dots O\}$ and who face a static optimization problem in time t as to whether to remain at home or else migrate abroad to one of multiple destinations, $d \in D = \{1, \dots D\}$. For a representative agent i, of skill-group z, the utility derived from migration from origin o to destination d in year t, can be expressed as a function of the net costs and benefits from migration (that are assumed identical across similar individuals between the same country pairs in the same year) γ_{odt}^{z}; as well as an idiosyncratic agent-specific term ∂_{odit}^{Z}. In turn γ_{odt}^{z} is assumed to be an increasing function f_1 of expected wages for individuals of skill type z at destination d, and h_1 of any amenities at destination d that migrants of both skill types may 'consume' in year t, A_{dt}; and a decreasing function f_2 of expected wages of skill type z at origin and h_2 of any amenities at origin o; net of bilateral migration costs that are captured by the function $g(C_{odt})$, which are assumed identical across skill groups. Formally, and assuming separability of migration costs and benefits the utility function can be expressed as:

$$U_{odit}^{z} = \gamma_{odt}^{z} - \partial_{odit}^{Z} = f_1(W_{dt}^{z}) + h_1(A_{dt}) - f_2(W_{ot}^{z}) - h_2(A_{ot}) - g(C_{odt}) - \partial_{odit}^{Z} \quad (1)$$

Following McFadden (1974) and assuming that ∂_{odit}^{z} follows an extreme value type-1 distribution, such that ∂_{odit}^{z} are i.i.d. randomly distributed, the problem at hand can be considered as a discrete choice logit problem wherein the utility of agents' migration decision is commensurate to the logarithm of the share of migrants of skill type z from origin o that move to each destination d in year t, s_{odt}^{z}, relative to those that remain at home s_{oot}^{z}:

$$ln\, s_{odt}^{z} - lns_{oot}^{z} = f_1(ln\, W_{dt}^{z}) + h_1(ln\, A_{dt}) - f_2(ln\, W_{ot}^{z}) - h_2(ln\, A_{ot}) - g(ln\, C_{odt}) \quad (2)$$

where $s_{odt}^{z} = n_{odt}^{z}/n_{ot}^{z}$. n_{ot}^{z} is the total number of individuals of skill type z born in origin o. s_{oot}^{z} is the total number of individuals of skill type z born in origin o that remain at home. Re-arranging (2) and solving for lnn_{odt}^{z} and including origin-time fixed effect, δ_{ot}, to control for wages at origin in addition to the proportions of natives that remain at home, both of which are unobservable in our data, yields:

$$ln\, n_{odt}^{z} = f_1(ln\, W_{dt}^{z}) + h_1(ln\, A_{dt}) - g(ln\, C_{odt}) + \delta_{ot} \quad (3)$$

Such that the estimated coefficient on $f_1$will provide a measure of the difference in expected earnings of migrants between the origin and destination (when estimated for each skill type separately). We broadly conceive migration costs C_{odt} to comprise: time varying economic factors at destination E_{dt}, which include the prevailing unemployment rate and the total population, time varying destination-specific migration policies P_{dt}, time invariant bilateral factors X_{od} that include geographical factors, physical distance between origins and destinations and whether country pairs share a common border; as well as cultural factors, common languages or a colonial heritage; time varying migrant networks M_{odt} and finally time varying bilateral and multilateral policies P_{odt}.

Putting everything together, equation (4) is our estimable *scale* equation that we subsequently use to estimate total high-skilled migration flows to our 10 OECD destinations:

$$ln\, n_{odt}^{HIGH} = \beta_1(ln\, W_{dt}^{HIGH}) + \beta_2(ln\, A_{dt}) - \beta_3(ln\, E_{dt}) - \beta_4(P_{dt}) - \beta_5(X_{od}) - \beta_6(ln\, M_{odt}) - \beta_7(P_{odt}) + \delta_{ot} + \varepsilon_{odt}^{HIGH}$$

il

(4)

To derive our *selection* equation, we estimate the share of high-skilled migrants in the total labour inflow, i.e. the sum of high- and non-high-skilled migrants:

$$ln(n_{odt}^{HIGH}/\textstyle\sum_z n_{odt}^{z}) = \beta_1(ln\, W_{dt}^{HIGH} - ln\, W_{dt}^{AVERAGE}) + \beta_2(ln\, A_{dt}) - \beta_3(ln\, E_{dt}) - \beta_4(P_{dt}) - \beta_5(X_{od}) - \beta_6(ln\, M_{odt}) - \beta_7(P_{odt}) + \delta_{ot} + \varepsilon_{odt}$$

(5)

3 Empirical considerations

Given recent advances in the literature, the estimation of equation 4 evokes a number of empirical considerations. A particular feature of both trade and migration data are the large proportions of zeroes that are typically present, particularly at finer levels of disaggregation. Equation 4 is therefore estimated using the Pseudo-Poisson Maximum Likelihood (PPML) estimator. In their seminal paper, Santos Silva and Tenreryo (2006) show, in the presence of zeroes in the dependent variable, when the variance of the error term is a function of the independent variables in Equation 4, that the expected value of the error term will also depend on the value of the regressors. In addition, in the presence of many zeroes, as in the case of our dataset – 8,168 – out of the maximum 23,920 observations – the Gauss Markov homoscedasticity assumption will be violated, resulting in biased and inconsistent OLS estimates. Santos Silva and Tenreryo (2006) propose the use of the PPML estimator that instead results in consistent and unbiased estimates in the presence of heteroscedasticity.

Next, as discussed in detail in Beine et al. (2014) and Bertoli and Fernandez Huertas-Moraga (2015) the derivation of equation 4 is dependent upon the assumptions that a) the utility derived from each destination varies neither across origins *nor* individuals and b) the stochastic component of utility is i.i.d. and conforms to an EVT-

1 distribution; which while computationally appealing may not be the case. Two key implications result. The first is that the scale of migration from country *o* to country *d* crucially depends upon the utility associated with all other possible destinations. Bertoli and Fernandez Huertas-Moraga (2013), coined the term 'Multilateral Resistance to Migration' (MRM), a concept analogous to the concept first introduced by Anderson and Van Wincoop (2003) in the context of trade. The second is that for our model to be consistent with the underlying RUM, one which doesn't violate the IIA assumption, it is necessary to include a set of origin-time dummies, to control for the population at origin, which in turn implies that the expected value of our gross migration flow conditional on our independent variables (as well as the dummies) are independent across all individuals in the dataset. Importantly, the imposition of these fixed effects also controls for credit constraints, the omission of which will likely lead to alternative results (Belot and Hatton, 2012).

A failure to account for multilateral resistance constitutes an omitted variable bias and across the trade and migration literatures a number of approaches have been adopted to deal with this potential omission. In their famous paper, Anderson and van Wincoop (2003) estimate a large set of non-linear simultaneous equations to explicitly calculate the relevant terms. Feenstra (2004) states the easiest way to deal with multilateral resistance is through the imposition of origin-time and destination-time fixed effects. Head, Mayer and Ries (2010) calculate multilateral resistance terms by estimating trade triads, the relative importance of trading pair's trade links with major trading countries of the world. Bertoli and Fernandez Huertas-Moraga (2013) take advantage of particularly rich and high frequency data, which allows them to use the CCE estimator of Peseran (2006). In this paper, we adopt an alternative approach as suggested by Baier and Bergstrand (2009) to explicitly model the multilateral resistance to migration terms, as first applied to the migration literature by Gröschl (2012).[7]

Quantitative empirical research has operationalized migration policies using two alternative techniques. The first approach constructs policy indices that measure the restrictiveness of various facets of immigration systems (Mayda, 2010; Boeri et al 2012; Peri and Ortega 2013). Typically a value of zero is assigned to the index for a particular country in period zero, which is increased or decreased by one should a policy in a particular year be deemed to be more or less restrictive. Such an approach assumes an equal weighting of the relative importance of various policies, however, and further assumes that such policies affect various groups of immigrants in a uniform way. Lastly, it is unclear at what level of restrictiveness each destination country began the period, such that assigning a zero value to each country militates against being able to examine cross-country variation. The second approach is to use a binary variable that equals unity should a particular policy be in force in a specific year, or else if a policy is absent (Czaika and de Haas, 2014). Such an approach is advantageous in that both the within and between variations can be exploited. In this paper we follow the latter approach as we focus upon a range of policy instruments specifically targeted at highly skilled migrants and which are indicated by separate dummy variables for each.

4 Data

The core analysis of the paper requires new data on both bilateral migration flows disaggregated by skill, in addition to measures of migration policies specifically targeting highly skilled migrants. Additionally, given the contested nature of the efficacy of these policies, a full battery of other potential determinants must also be considered. All three data collections represent substantial contributions of the current work.

[7] Following Gröschl (2012), the MRM terms are calculated as:

$$MRDIST_{odt} = \left[\left(\sum_{k=1}^{C} \theta_{kt} lnDist_{ok}\right) + \left(\sum_{m=1}^{C} \theta_{mt} lnDist_{md}\right) - \left(\sum_{k=1}^{C} \sum_{m=1}^{C} \theta_{kt}\theta_{mt} lnDist_{km}\right)\right]$$

$$MRADJ_{odt} = \left[\left(\sum_{k=1}^{C} \theta_{kt} Adj_{ok}\right) + \left(\sum_{m=1}^{C} \theta_{mt} Adj_{md}\right) - \left(\sum_{k=1}^{C} \sum_{m=1}^{C} \theta_{kt}\theta_{mt} Adj_{km}\right)\right]$$

θ refers to a country's share of population as a fraction of the world population, N_{kt}/N and N_{mt}/N.

4.1 High-skilled migration flows

Our migration flow data disaggregated by skill are derived from a variety of sources including administrative data files (Australia, Canada, Israel, New Zealand, the United States), work or residence permits (Switzerland, the United Kingdom), population and employment registers (Norway, Sweden) and employment visas (Korea), the precise details of which are provided in Czaika and Parsons (2015). As opposed to the case of immigrant stocks, immigration flows are seldom recorded by immigrants' educational attainment. Czaika and Parsons (2015) therefore collates immigration flow data pertaining to incoming economic migrants, those entering destination country labour markets and as such those that have their occupation recorded. This focus upon migrants entering destination countries for employment purposes is important, since these are exactly the individuals that those policies whose efficiency we test in this paper are attempting to attract. Moreover, since our data record those entering countries for the purposes of work, we can be confident that our results are not capturing high-skilled individuals that are employed in jobs that are not commensurate with their level of education, those that suffer from so-called 'brain waste' (Mattoo et al., 2008).

As discussed in detail in Czaika and Parsons (2015), these data are harmonized to the greatest degree possible. First, the flow data pertain to labour migrants arriving from abroad as opposed to those individuals that change their status in the destination country. Secondly, with the exception of Israel,[8] all the data refer to immigrants' nationality, as opposed to their country of birth or country of last previous residence, which is important since migration costs are at least in part determined by nationality (Beine et al., 2014). Thirdly, the data refer to those staying for 12 months and more. Finally, since countries variously adopt differing occupational nomenclatures when recording individuals' occupations (Parsons et al., 2014), these data were collected at the lowest possible level of disaggregation to ensure that they could be suitably harmonized to a broad notion of human capital; one based on the first three major groups of the International Standard Classification of Occupations (ISCO) 2008 (Ref): (1) managers, senior officials and legislators, (2) professionals and (3) technicians and associate professionals. This broader measure of skill was decided upon since i) these three categories are commensurate with tertiary and/or graduate educational attainment, ii) major group (3) includes many science and technology occupations and iii) for the sake of pragmatism this broader definition ensures an accurate matching between those data from which countries do not adhere to the ISCO classification (see Czaika and Parsons, 2015). These harmonizations are important since they facilitate meaningful cross-country comparisons over time. Between 2000 and 2012, our data capture, on average, over 700,000 skilled migrants per year from 185 origins that reside in 10 OECD destinations, according to our harmonised definition, with the greatest number in 2007, when over 830,000 were recorded in total.[9]

4.2 High skilled migration policies

Labour immigration systems can broadly be distinguished by whether or not labour migrants are required to have obtained a job offer before gaining entry to the domestic labour market. Immigration systems that do require such a job offer have been termed 'demand-driven' systems (Chaloff and Lemaitre, 2009) and employers typically take a leading role in the recruitment process. Most European systems as well as the US labour immigration system are, at least in part, employer-driven. This means that an employer must sponsor a foreign worker in order for them to qualify for a work permit. The job offer requirement is in effect a general test of a foreign worker's employability in the domestic labour market. Such requirements are effective in selecting migrant workers that are immediately employable but potentially deter skilled migrants that do not fill an immediate shortage in the

[8] The majority of immigrants that arrived in Israel over the period (74%), comprised individuals arriving from the countries of the former Soviet Union, which is recorded as a single entity in the dataset. This no doubt reduces any discrepancies between the two series.

9 It is important to emphasize that while this number is somewhat artificially inflated due to the inclusion of H1B visa data for the United States, which are based on I-94 admissions data (see Czaika and Parsons, 2015), our results remain robust to their inclusion and exclusion.

domestic labour market. As discussed in Parsons et al. (2014), 'demand-driven' systems often comprise additional assessment mechanisms that indirectly impose additional transition and uncertainty costs on incoming migrants, giving rise to increasing incentives for both the migrants themselves and their would-be employers to pursue entry through other channels.

Immigration systems in which highly qualified migrants can apply for a work permit without a job offer, have conversely been termed 'supply-driven' systems (Chaloff and Lemaitre 2009); although an offer of a job may still grant preferential access. Under such policy regimes, qualifications, age, work experience, language skills and prior wages are usually assessed on an individual basis through a points-based system, whereby applicants are selected independently of prevailing labour market conditions. Canada since 1967 and Australia since 1989 pioneered these skill-selective immigration systems, which aim to attract high-skilled migrants in large numbers. Despite any potential downside regarding the (immediate) employability of workers admitted through a points-based system, supply-driven systems are often seen as relatively effective in attracting high-skilled migrants in large numbers (Facchini and Lodigiani, 2014). In fact Boeri et al. (2012) argue that it is only such 'supply-driven' systems that can meaningfully attract and capitalize upon human capital over the longer term.

Whether a country has implemented an employer-driven ('demand') or rather an immigrant-driven ('supply') system, or a mix of both, depends upon policy makers' priorities when addressing long-term deficiencies in human capital compared to short-term labour market shortages. In practice, despite countries tending to lean toward a demand- or supply- orientation, immigration policies tend to comprise a mixture of elements, both demand and supply, which have been termed 'hybrid systems' (Papademetriou et al., 2008). For example, Australia and Canada have recently begun to combine their points-based systems with shortage lists that constitute demand elements, since applicants gain additional credit if their occupation is recognised as being in high demand.

In order to capture immigration policy systems therefore, in this paper we choose six separate policy elements that collectively capture many of the key differences between destination countries' policy stances, not least since it is unlikely that a single policy instrument *per se* makes a particular destination country more or less attractive for high-skilled migrants, but rather a set of immigration policies in combination. These elements are: job offer, points-based system, labour market test, shortage list, offers of permanent residency and financial incentives.

Labour market tests are case-by-case assessments that no 'equivalent' domestic worker is currently available to fill an advertised position. Labour market tests constitute tools to avoid the recruitment of unemployable migrants and those that might reduce the employability of native workers. To lower the bureaucratic burden of labour market tests, particularly in cases where it is obvious that entire occupations cannot be filled locally, countries have developed shortage lists of occupations that are exempt from labour market tests. Labour market shortages are assessed on an occupation-by-occupation basis (in contrast to the individual approach of a labour market test) by experts, the accuracy of which in terms of identifying and assessing labour market needs has been criticised (Sumption, 2013). High-skilled migrants are also hypothesized to be strongly attracted by prospects of permanent residency, and today most OECD destinations offer a 'road to permanency' after living and working in the country for a number of years. Finally, financial incentives schemes including tax exemptions and other economic incentives predominantly target high-skilled migrants.

For each of our six policy variables, we code a dummy variable as a 1 should the answer to a particular statement be in the affirmative. For example, in the case of a Labour Market Test, the statement is simply '*Is there a mechanism in place to attempt to ensure the position cannot be filled by domestic workers?'* The remaining statements can be found in appendix Table A1. Nevertheless, since destination countries typically implement a raft of policies that often relate to more than one class of migrant (Czaika and de Haas, 2014), a series of coding assumptions were adhered to, to ensure that the data are comparable both across countries and over time. These assumptions can also be found in appendix Table A1.

The contested efficacy of immigration policies generally, and policies that focus on attracting and selecting highly skilled immigrants in particular, derives from the fact that migrants endowed with high levels of human capital are likely attracted to particular destinations by a broad range of social and economic factors above and beyond any policies that might be orientated toward them. In order to test the efficacy high skill policies,

therefore, it proves crucial to control for other key constituent elements of the 'policy package'; for which we include measures of bilateral migration policies and a range of destination country amenities in addition to the usual economic and gravity controls.

Many countries have signed various types of bilateral agreements. In this paper we include bilateral treaties that relate to social security, double taxation (and tax evasion) and the recognition of diplomas, which aim to facilitate the admission and transition of high-skilled employees. Social security agreements regulate the equality in treatment between signatories regarding the payment of benefits abroad, which include: old age pension, pension portability, disability support, parenting payment for widowed persons and unemployment benefits. Double taxation agreements ensure the avoidance of double taxation of income, capital and inheritances that are increasingly important for facilitating the attractiveness of destinations in the context of highly mobile skilled workers who may hold multiple residences including one in their 'home country'. These agreements also seek to reduce fiscal evasion however. Finally, we include bilateral agreements that aim to recognise the qualifications of migrants to better streamline their integration into host country labour markets. Our three bilateral agreement variables are all coded as a 1 should a particular policy be in place for a particular country pair in that year.

To isolate the effect of unilateral immigration policies, it is necessary to control for treaties that facilitate the freedom of movement of people. Existing studies have shown for example that the Schengen agreement significantly fosters bilateral migration flows between signatories (Grogger and Hanson, 2011, Beine et al., 2013, Ortega and Peri, 2013). In this paper we construct a single variable that is both bilateral and time varying, which captures whether a country pair in a particular year are signatories to a freedom of movement agreement. The agreements captured by our variable include: the Schengen agreement, the freedom of movement afforded to member states of the European Union and the European Free Trade Association, the de facto right to abode between Australia and New Zealand and the Common Travel Area. Importantly, our variable captures both the outermost regions (OMR) of the European Union that comprise part of an EU member state as well as those overseas countries and territories (OCT), for which nationals are granted citizenship of an EU member state and who therefore also have freedom of movement.

4.3 Amenities and 'gravity' variables

A rich set of covariates is drawn upon to ensure that our model is well specified. Turning first to our unilateral destination country controls, the total unemployment data are taken from the OECD,[10] while total population is taken from the International Database of the US Census Bureau.[11] High-skilled wages are also taken from the OECD.[12] In order to calculate high-skilled wages, average annual wages were multiplied by the ratio of the ninth decile to the fifth decile, the data for which are also available from the OECD website.

Our dyadic control for immigrant networks is taken from the three rounds of the OECD DIOC database, which provides statistics for the numbers of immigrants residing in each of our OECD countries in the years 2000, 2005 and 2010.[13] Flows from 2000–04 are equated with the 2000 network, flows from 2005–09 with the 2005 stock and flows from 2010–2012 with the 2010 stock. The now standard gravity variables ubiquitous throughout the literature, contiguity, common language, distance and share colonial heritage are all taken from the CEPII database (see Head, Mayer and Ries, 2010).

Finally, we include a number of amenity variables that aim to capture the relative attractiveness – in terms of the quality of life – of our 10 OECD destinations. Our net-of-tax measure captures differences in tax rates across countries. To calculate this, we apply a fixed annual salary of $150,000 PPP to the differing tax schedules as provided by the OECD.[14] We expect ceteris paribus that lower taxes increase the relative

[10] http://stats.oecd.org/index.aspx?queryid=36324#.
[11] http://www.census.gov/population/international/data/idb/informationGateway.php.
[12] https://stats.oecd.org/Index.aspx?DataSetCode=AV_AN_WAGE.
[13] http://www.oecd.org/els/mig/databaseonimmigrantsinoecdcountriesdioc.htm.
[14] http://www.oecd.org/tax/tax-policy/tax-database.htm#pir.

attractiveness of particular destination for high-income earners.[15] We proxy the appeal of global cities – in which high-skilled migrants no doubt agglomerate – with the prevailing UN salary country multipliers in each year.[16] These are calculated based on the cost of living in major cities in each of our OECD destinations and reflect among other things, the variety of goods high-skilled migrants are able to consume, and the urban amenities available to them. A quality of education variable is included, by way of the PISA scores, as provided by the OECD,[17] since it is hypothesized that high-skilled workers value the educational provision of their children. Finally, we proxy the level of technological development that we hypothesize high-skilled migrants will favour, with the density of mobile phone use (ICT coverage), the number of mobile-cellular phone subscriptions per 100 inhabitants. These data are taken from the United Nations.[18]

5 Results

5.1 Baseline results

Table 1 reports our baseline results from estimating our scale equation (4). Model 1 reports estimates of our economic and standard gravity variables, in addition to our freedom of movement dummy variable. Models 2 to 3 additionally include our measures of bilateral and unilateral policies respectively, while Model 4 presents the results from estimating all of our core variables. All regressions reported in Table 1 include a full set of origin-time fixed effects, to ensure the theoretical consistency of our empirical estimates.

Notably, across the first four models, our estimates are remarkably stable. Despite the fact that all ten destination countries are highly developed, an increase in high-skilled wages of ten per cent is associated with an increase in high-skilled immigration flows of between six and 11 per cent. Our results also demonstrate that high-skilled migrants include in their calculus prevailing unemployment rates and are deterred from moving to areas with fewer job opportunities. Migration networks facilitate, and potentially perpetuate high-skilled migration flows. A ten per cent increase in the size of the bilateral migrant community is associated with an increase in high-skilled flows of more than one per cent along the same migrant corridor. Other migration cost-reducing factors captured by cultural, linguistic, geographical and political proximity are all statistically significant and in the expected direction. Shared common border, language, colonial heritage and freedom of movement between origin and destination all have a positive influence on high-skilled flows. Increasing geographical distance however, a proxy for migration costs naturally reduces high-skilled worker flows.

[15] Our results do not change when we consider alternative annual salaries $150,000, $200,000 and $250,000.
[16] These were calculated from data available at: http://icsc.un.org/secretariat/cold.asp?include=par.
[17] http://www.oecd.org/pisa/.
[18] http://data.un.org/Default.aspx.

Table 1 Drivers of high-skilled migration flows (level equation)

		(1) PPML	(2) PPML	(3) PPML	(4) PPML	(5) PPML
Destination controls	**HS wages (log)**	1.069***	1.066***	0.751***	0.749***	0.657***
		(0.119)	(0.120)	(0.123)	(0.124)	(0.128)
	Unemployment (log)	-0.719***	-0.695***	-0.533***	-0.482***	-0.445***
		(0.113)	(0.117)	(0.148)	(0.145)	(0.150)
	Population (dest, log)	1.544***	1.519***	1.083***	0.976***	0.912***
		(0.127)	(0.132)	(0.174)	(0.172)	(0.181)
Dyadic controls	**Network size (log)**	0.130***	0.119***	0.141***	0.128***	0.125***
		(0.0107)	(0.0104)	(0.0112)	(0.0105)	(0.0115)
	Contiguity	0.577***	0.648***	0.317***	0.420***	0.456***
		(0.122)	(0.124)	(0.0979)	(0.0972)	(0.0977)
	Common language	0.950***	0.953***	0.878***	0.846***	0.850***
		(0.0914)	(0.0962)	(0.0729)	(0.0762)	(0.0796)
	Distance (log)	-0.0812	-0.117**	-0.0958**	-0.111**	-0.138***
		(0.0545)	(0.0545)	(0.0464)	(0.0443)	(0.0463)
	Colony	0.324***	0.305***	0.300***	0.216***	0.183**
		(0.0572)	(0.0623)	(0.0612)	(0.0637)	(0.0797)
	Free mobility	1.139***	1.017***	0.719***	0.552***	0.494***
		(0.135)	(0.136)	(0.120)	(0.115)	(0.116)
Bilateral agreements	**Diploma recognition**		0.305***		0.631***	0.599***
			(0.0896)		(0.100)	(0.0978)
	Social security		-0.0369		0.121**	0.117*
			(0.0628)		(0.0603)	(0.0596)
	Double taxation		-0.299***		-0.375***	-0.343***
			(0.0487)		(0.0480)	(0.0473)
Unilateral Policies	**Permanency**			1.062***	1.075***	1.193***
				(0.156)	(0.152)	(0.159)
	Financial incentive			0.0801	0.0358	-0.192*
				(0.0967)	(0.0932)	(0.115)
	Job offer			-1.854***	-1.896***	-1.893***
				(0.175)	(0.166)	(0.172)
	LM test			0.169	0.143	0.113
				(0.164)	(0.159)	(0.158)
	Shortage list			-0.641***	-0.699***	-0.649***
				(0.0778)	(0.0813)	(0.0977)
	PB system			1.492***	1.382***	
				(0.124)	(0.117)	
	PB system (GBR)					1.299***
						(0.122)
	PB system (CAN)					0.959***
						(0.192)
	PB system (AUS)					1.530***
						(0.183)
	PB system (NZL)					1.507***
						(0.195)
	Origin*Time FE	yes	yes	yes	yes	yes
	N	20,240	20,240	20,240	20,240	20,240
	R-sq	0.961	0.962	0.969	0.971	0.971

Note: Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

Models (2) and (4) include three major types of bilateral agreements that have been suggested as shaping the dynamic of (high-skilled) migration, among which are agreements aimed at recognizing foreign qualifications. Policy makers in most countries remain agnostic with regards the efficacy of such instruments however, since recognition might erode occupational standards and depreciate the value of domestic degree programs.

Nevertheless, in particular shortage occupations, some migration policy instruments may be rendered ineffective should foreign degrees not be recognized, or only recognized after additional training and/or examinations. Our results show a robust positive effect of degree recognition in increasing the number of high-skilled migrants by 30 to 60 per cent. We do not find any evidence that bilateral agreements that regulate social security concerns, such as pension transfers, affect bilateral flows of high-skilled workers in model (2) but find mild evidence of such an effect in our full model (4). The net effect of two countervailing forces underpinning the expected sign of our double taxation agreements variable interestingly is negative. This suggests that high-skilled individuals care more about avoiding tax in comparison with the benefits they might face from only being taxed once as provided for by such agreements.

Models (3) and (4) include a set of six (skill-selective) unilateral policies. Two of the three main instruments of 'demand-driven' immigration systems, namely the need to obtain a job offer and shortage lists, significantly deter the absolute inflow of high-skilled migrants. The job offer contingency shows by far the strongest negative effects. Countries with a job offer requirement recruit almost half as many high-skilled migrants. Labour market tests, however, that are often required before a sponsoring employer can offer a job to an applicant, have no influence on high-skilled migration flows in our baseline models. Shortage lists which are even more rigid in 'pre-selecting' (high-) skilled migrants, seem to constitute an additional barrier for recruiting high-skilled migrants in large numbers. It must be noted however that the main purpose of occupational shortage lists, is rather to avoid the recruitment of skilled, though *unemployable*, migrants.

The main result of the paper is that points-based systems represent the most effective policy for attracting high-skilled migrants. Major 'PBS-countries' (AUS, CAN, GBR, NZL) attract on average one and a half times the number of high-skilled migrants when compared to countries that adopt alterative policy tools. As opposed to our other policy measures however, the points-based systems across our destination countries might well operate differently, at least in respect to the proportion of high-skilled migrants that enter a labour market through such a mechanism. To address this concern, Model (5) further includes separate PBS-country dummy variables, the results from which show that Australia's and New Zealand's systems are the most effective.

The provision of permanency rights also represents an important incentive for high-skilled migrants. Countries providing a 'road to permanency' attract on average 100 per cent more high-skilled migrants than countries that are reluctant to provide such post-entry rights. Permanency rights, even if permanent settlement is not the prime intention of the migrant at entry, increase the option value of staying longer in the host country and expand future opportunities. Apart from providing more generous post-entry rights to high-skilled workers, the implementation of some extra financial incentives such as tax breaks is another attempt to attract international talent. We find no effect of such schemes in our baseline model however.

5.2 Robustness checks

Table 2 reports a series of robustness tests of the core model specification. Model (1) in Table 2 includes two multilateral resistance terms, which while both significant do not alter our other estimates significantly – except for financial incentive schemes, which are now statistically significant at the 10 per cent level. The estimates for these terms (negative for our distance measure and positive for our adjacency measure) are omitted for the sake of brevity. Model (2) includes dyad fixed effects to address concerns that an omitted variable, for example cultural distance, might be driving our results. They adequately control for such an omission since, as shown by the pioneering work of Geert Hofstede (for example 1980 and 2010), cultural distances change extremely slowly over time. While with the addition of dyad fixed effects improves the goodness of fit, several of the other estimates are now smaller in size; our social security variable is no longer significant and the labour market test variable negative and significant. Nevertheless our key findings remain intact.

Another particular concern (as shown in appendix Table A2) is that our policy variables fail to capture many policy *changes* over the period 2002–2012, meaning that in our estimation we need to rely on both the within and between variation in the data. As such, we cannot impose a set of destination fixed effects, which might lead to fears of an omitted (destination country) variable bias. To address such concerns, Model (3) is equivalent to our core model including both origin-time and destination-time fixed effects. When we compare the R^2 from Model 3 with the R^2 from our core Model (4) in Table 1, the difference is only 0.1 per cent however, which gives us confidence that an omitted variable is not responsible for driving our results.

Model (4) extends our core model with the inclusion of five additional variables that proxy for the role of economic and social amenities which have been traditionally viewed as determining the relative attractiveness of potential destinations (Tiebout, 1956; Gosnell and Abrams, 2011). We include all of them simultaneously, without causing any significant changes in our other variables of interest. The coefficients on our amenity variables are largely as expected. Our ICT coverage variable is used to capture the degree to which a location is culturally and technologically *avant-garde*; since it has been argued that a rising 'creative class' (Florida, 2002) is attracted to such places. A 10 per cent increase in ICT coverage is associated with a nearly 9 per cent increase in the inflow of high-skilled workers. The net-of-tax variable rather proxies the attractiveness of national tax schemes and is shown, rather unsurprisingly, to significantly attract large numbers of foreign high-skilled workers. Whereas the importance of global cities for attracting international talent is well established (e.g. Sassen, 2011), rising living costs including property prices and rents, also represent major disincentives to move. The coefficient on our 'global city' living cost variable is insignificant and negative however, which suggests that the cornucopia of urban amenities and available product varieties compensate for relatively high living costs. The estimates of the coefficient on our measure of the educational sector, as measured by global PISA scores, is significantly negative. In other words, our results would suggest that high skilled workers locate to those destinations that fare relatively poorly in terms of education. This result is almost certainly driven by the fact that Korea, which performs best overall, plays host to the fewest high-skilled migrants in the sample; whereas the United States, which performs worst overall, rather plays host to the greatest number of migrants. No doubt, should we have been able to include a broader range (i.e. non-OECD) of countries in our sample, our estimates on our education variable would change. Of course, it is also likely that high-skilled migrant workers are able to place their children in private schools, such that concerns about average grades across the country might not be taken into consideration when they are deciding where to move to. Finally, a measure of life expectancy is included in estimation as a proxy for the overall quality of living conditions (including health service provisions), in addition to other factors that affect longevity; the coefficient on which is insignificant. This might suggest that high-skilled migrants care more about the provision of good healthcare, for example privately, as opposed to average health outcomes from across the country. The imposition of our amenity measures does not alter any of our results that concern economic or policy variables. Moreover, the R^2 of Model (4) in Table 2 is identical to our core Model (4) in Table 1, such that in our empirical framework, amenities, i.e. non-economic factors, seem to play little role in determining the destination choices of high-skilled migrants.

Table 2 Drivers of high-skilled migration flows: Robustness tests

		(1) PPML	(2) PPML	(3) PPML	(4) PPML	(5) PPML	(6) GMM-sys
Destination controls	**HS wages (log)**	0.830***	0.0986***		0.639***	3.900***	0.208**
		(0.129)	(0.0324)		(0.117)	(0.288)	(0.032)
	Unemployment (log)	-0.406***	-0.164**		-0.366**	-0.887***	-0.654**
		(0.155)	(0.0639)		(0.159)	(0.206)	(0.071)
	Population (dest, log)	0.914***	2.561***		0.941***	1.019***	1.110**
		(0.182)	(0.166)		(0.190)	(0.217)	(0.075)
Dyadic controls	**Network size (log)**	0.142***	0.0162***	0.136***	0.127***	0.101***	0.092**
		(0.0122)	(0.00455)	(0.00992)	(0.0102)	(0.00849)	(0.008)
	Contiguity	0.488***		0.157*	0.427***	0.169	-0.735*
		(0.103)		(0.0916)	(0.0964)	(0.111)	(0.334)
	Common language	0.822***		0.606***	0.826***	0.714***	0.387**
		(0.0786)		(0.0712)	(0.0773)	(0.0816)	(0.078)
	Distance (log)	-0.142***		-0.186***	-0.118***	-0.200***	-0.175**
		(0.0448)		(0.0428)	(0.0455)	(0.0539)	(0.064)
	Colony	0.186**		0.251***	0.165**	0.302***	0.074
		(0.0734)		(0.0935)	(0.0787)	(0.0841)	(0.195)
	Free mobility	0.402***	0.413***	0.497***	0.475***	0.380***	-0.142
		(0.119)	(0.125)	(0.117)	(0.119)	(0.139)	(0.190)
Bilateral agreements	**Diploma recognition**	0.619***	0.453***	0.727***	0.667***	0.695***	3.479**
		(0.100)	(0.0506)	(0.102)	(0.0993)	(0.101)	(0.571)
	Social security	0.131**	-0.0356	0.194***	0.109*	0.158**	-2.760**
		(0.0565)	(0.0695)	(0.0579)	(0.0570)	(0.0714)	(0.602)
	Double taxation	-0.375***	-0.209***	-0.332***	-0.364***	-0.269***	-0.071
		(0.0468)	(0.0379)	(0.0459)	(0.0466)	(0.0549)	(0.289)
Unilateral policies	**Permanency**	1.024***	0.297***		1.344***	1.395***	0.485**
		(0.147)	(0.0914)		(0.156)	(0.243)	(0.046)
	Financial incentive	0.196*	0.248***		0.229**	-0.00905	-0.114*
		(0.111)	(0.0478)		(0.0960)	(0.142)	(0.051)
	Job offer	-1.797***	-2.096**		-2.110***	-1.420***	-0.069
		(0.173)	(0.828)		(0.255)	(0.192)	(0.115)
	LM test	0.169	-0.210***		-0.0862	0.172	0.617**
		(0.156)	(0.0565)		(0.184)	(0.115)	(0.058)
	Shortage list	-0.657***	-0.0633*		-0.361***	-0.333***	-0.265**
		(0.0803)	(0.0330)		(0.0789)	(0.0862)	(0.054)
	PB system	1.499***	2.063**		1.977***	1.192***	0.789**
		(0.119)	(0.833)		(0.220)	(0.174)	(0.131)
Amenities	**ICT coverage**				0.886***		
					(0.187)		
	Net-of-tax				2.350***		
					(0.492)		
	'Global city' living costs				-0.0590		
					(0.0451)		
	Schooling quality				-7.467***		
					(2.381)		
	Life expectancy				-5.710		
					(3.756)		
	MRM terms	yes	no	no	no	no	no
	Origin x Time FE	yes	yes	yes	yes	yes	no
	Destination x Time FE	no	no	yes	no	no	no
	Origin + Time FE	no	no	no	no	no	yes
	Dyad FE	no	yes	no	no	no	no
	N	20,130	20,240	20,240	20,240	11,040	18,400
	R-sq	0.972	0.997	0.972	0.971	0.971	0.779

Note: Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01. System dynamic GMM Model (6) includes AR(1): 0.170*** (SE=0.027). Arellano-Bond test for AR(2) in first differences fails to reject null of no autocorrelation in errors (p=0.092).

Model (5) is estimated to address concerns that our results might be driven, at least in part, by the fact that our overarching dataset is not perfectly balanced. Model (5) is therefore estimated on a reduced, although balanced, panel of dyad-year observations for the period 2003 to 2008**.** Again, our main results remain unchanged. Finally, we estimate Model (6) with an Arrelano-Bond dynamic panel estimator (Roodman 2006) in order to capture serial correlation and any potential endogeneity in the policy variables. In addition to internal lags and first difference instruments we include unionisation in the destination country's labour force as another external instrument.[19] Unfortunately, given the large number of variables included in our system-GMM estimation, it is not possible to include a full set of origin-time fixed effects, but we include separate origin and time fixed effects; a modification that might drive some of the differences in the results. Nevertheless, our major policy results in terms of our estimates on permanency, points-based systems and shortage lists remain intact, although the coefficients on these variables are now significantly smaller.

5.3 Skill-selective policy combinations

To explore the effectiveness of skill-selective policy instruments in broader policy packages – in particular to identify if a particular policy instrument is contingent upon the existence of other (unilateral) policy instruments – we estimate (binary) policy interaction effects for all policy combinations. Based on Model 4 (Table 1), we estimate the effects of dual policy combinations, by running separate regressions that include an interaction term (P_{dt}^{q} x P_{dt}^{r}), to capture the combined effect of two (out of six) unilateral policy instruments with $q, r \in \{1, \ldots, 6\}$. We estimate β^{q}, β^{r}, and $\beta^{q,r}$, which in combination yield estimates of the effects of respective policy combinations. [20]

Table 3 HSM policy interaction effects

Policy: / **combined with:**		Labour market test	Shortage list	Points-based system	Job offer contingent	Permanent residency	Financial incentives
LM test	No		-0.927	1.400	-1.813	0	0
	Yes		-0.477	1.400	-1.813	1.770	0
Shortage list	No	0		1.391	-1.887	1.312	-0.569
	Yes	0.450		1.391	-1.887	0.037	0.238
PBS	No	0	-0.685		-1.896	1.075	-0.264
	Yes	0	-0.685		NA	NA	0.200
Job offer	No	0	-0.721	1.382		-0.821	0.200
	Yes	0	-0.721	NA		1.075	0.664
Permanency	No	-1.371	0	1.382	NA		0
	Yes	0.399	-1.275	NA	-1.896		0
Financial incentive	No	0	-1.053	1.270	-2.486	1.057	
	Yes	0	-0.246	1.734	-2.022	1.057	

Note: Only interaction effects significant at 5 per cent level are reported. "0" means not significantly different from zero. NA=interaction not available.

[19] Trade union density corresponds to the ratio of wage and salary earners that are trade union members, divided by the total number of wage and salary earners (see https://stats.oecd.org/Index.aspx?DataSetCode=UN_DEN).

[20] As an example of we calculate these effects: $\beta^{shortage} = -0.927$ is the unique average effect of an occupational shortage list *in the absence of* a labour market test. If, and only if, both policy instruments (i.e. a shortage list and a labour market test) are implemented in the same year, the average effect of a shortage list remains negative but increases to $\beta^{shortage} + \beta^{shortage,lmt} = -0.477$. On the other hand, a labour market test does not have a significant unique effect on high-skilled flows in absence of a shortage list but turns positive significant ($\beta^{lmt} + \beta^{shortage,lmt} = 0.450$) *if* implemented in combination with a shortage list.

Table 3 reports the estimated effects of all available policy combinations on the number of high-skilled migrants. Several interesting findings result. The negative effect of a labour market test for example, can turn positive if implemented either in combination with a shortage list or in combination with the provision of permanency rights. Similarly, the negative effect of a shortage list is reduced in combination with a labour market test. Financial incentive schemes are ineffective in attracting skilled migrants but only in the absence of a shortage list or a points-based system. Financial incentives seem to be more effective in so-called demand-driven systems, although the employability of high-skilled migrants that are recruited through a combination of a points-based system and a shortage list may be higher. The most constraining (demand-driven) skill-selective policy instrument (that of the job offer) is not significantly affected by other policy instruments.

5.4 The skill composition of international migration flows

The analysis so far has explored the unique and combined effects of skill-selective immigration policies on the absolute levels of high-skilled immigration. Even if particular skill-selecting and -attracting policies are associated with larger inflows of high-skilled migrants however, the overall effect on the *composition* of total labour migration flows – operationalized as the share of high-skilled in the total labour inflow – remains uncertain, since fundamentally the skill composition of labour flows also depends upon the movement of the non-high skilled.

This overall effect might in part result from our definition of high-skilled migration (ISCO classification categories 1 to 3). Some skill-selective policies at least do not solely target these occupations and may similarly apply and encourage workers of lower skill levels. Shortage lists for example, often include occupations that are not highly skilled according to our definition. Labour market tests and/or a job offer requirement are policy instruments that may be argued to be *a priori* skill-neutral, although their application largely depends upon the underlying labour market demand structures and labour shortages. Given that such shortages are generally more prevalent in high-skilled occupations however, we may still expect that even these demand-driven policies have somehow stronger effects on high-skilled labour inflows.

Whether these skill-selective policies are effective in altering the composition of labour inflows in favour of the highly skilled remains an empirical question however. Table 4 reports estimates of the proportion (i.e. share) of high-skilled migrants in total labour migration flows, see Equation 5. Since this share is bounded between 0 and 1, the effects of the explanatory variables tend to be non-linear, while the variances tend to decrease when the mean approaches the limits. This renders linear models inappropriate. Instead we apply a zero-one inflated betafit model with slightly modified zero-one boundaries (Smithson and Verkuilen, 2006). Model (1) reports the baseline, Model (2) includes the set of bilateral policy variables, whereas Model (3) adds the unilateral policy variables. In Model (4) we simultaneously run Seemingly-Unrelated Regressions (SUR) on high-skilled migration (4a) and on non-high-skilled migration (4b) in order to control for the cross-correlation in the error terms between the two groups of workers and to ensure that we maintain the greatest number of observations in the data.[21]

Similar to our results in Table 1, a rising skill premium, as captured by the difference between our measure of high-skilled wages and the prevailing median salary in a particular year, significantly alters the composition of labour flows in favour of high-skilled immigrants. While the wage gap between the 90th percentile and the mean wage was about 45 percent in 2000, it increased to more than 63 per cent in 2012 across these 10 OECD destination countries. Thus, a rising skill premium shifts the skill composition of labour inflows towards higher skilled as predicted by the Roy model (Borjas 1987).

Models (1) to (3) provide evidence that high-skilled foreign workers are more sensitive to business cycle fluctuations, such that higher unemployment at destination reduces the skill selection of incoming migrants. Interestingly, however, our SUR estimates show that while high-skilled migrants are significantly deterred by

[21] When calculating the shares of the high-skilled in the total (Models 1–3), regressions cannot be run if the total number of high-skilled is equal to zero, since these observations are dropped from estimation.

high unemployment, their other skilled counterparts are rather attracted to such areas. We also find evidence that migrant networks play a more important role in facilitating migration for lower-skilled workers, a result consistent with Beine et al. (2011). This result is perhaps unsurprising given that migrant networks are purported to reduce migration costs that are no doubt relatively higher for lower-skilled workers, such that the existence of migrant networks may alter the selection of migrants over time (see McKenzie and Rapoport, 2010).

Table 4 High-skilled vs. non-HS migration flow composition (selection equation)

		(1) Beta	(2) Beta	(3) Beta	(4a) SUR	(4b) SUR
Destination controls	HS wage premium (log)	1.019***	1.003***	0.946***		
		(0.049)	(0.049)	(0.057)		
	HS wages (log)				0.617***	
					(0.029)	
	Non-HS wages (log)					0.223***
						(0.038)
	Unemployment (log)	-0.746***	-0.754***	-0.684***	-0.728***	0.194***
		(0.037)	(0.037)	(0.044)	(0.040)	(0.049)
	Population (dest, log)	0.870***	0.879***	0.922***	1.198***	-0.083*
		(0.040)	(0.040)	(0.047)	(0.041)	(0.050)
Dyadic controls	Network size (log)	-0.046***	-0.050***	-0.045***	0.153***	0.229***
		(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
	Contiguity	-0.261***	-0.268***	-0.265***	-0.176**	0.079
		(0.093)	(0.094)	(0.092)	(0.087)	(0.107)
	Common language	-0.183***	-0.164***	-0.045*	0.492***	0.530***
		(0.024)	(0.025)	(0.025)	(0.026)	(0.032)
	Distance (log)	0.004	0.010	0.074***	-0.143***	-0.187***
		(0.017)	(0.017)	(0.018)	(0.015)	(0.018)
	Colony	1.371***	1.350***	1.321***	-0.097**	-1.545***
		(0.050)	(0.051)	(0.052)	(0.041)	(0.050)
	Free mobility	-0.027	-0.102*	-0.235***	0.470***	1.180***
		(0.055)	(0.056)	(0.055)	(0.045)	(0.055)
Bilateral agreements	Diploma recognition		0.190***	0.204***	1.050***	0.820***
			(0.028)	(0.028)	(0.037)	(0.046)
	Social security		0.036	0.082**	-0.097***	-0.111**
			(0.033)	(0.032)	(0.037)	(0.045)
	Double taxation		-0.012	-0.009	0.144***	0.287***
			(0.022)	(0.022)	(0.025)	(0.031)
Unilateral policies	Permanency			-0.345***	0.860***	1.015***
				(0.040)	(0.029)	(0.037)
	Financial incentive			0.575***	-0.114***	-0.550***
				(0.031)	(0.023)	(0.029)
	Job offer			0.155**	-0.582***	-0.351***
				(0.069)	(0.046)	(0.056)
	LM test			0.239***	0.328***	0.027
				(0.037)	(0.028)	(0.035)
	Shortage list			-0.389***	-0.488***	0.078**
				(0.032)	(0.026)	(0.032)
	PB system			0.238***	0.805***	0.198***
				(0.061)	(0.043)	(0.053)
	Origin x Time FE	yes	yes	yes	yes	yes
	N	14,352	14,352	14,352	20,240	20,240
	R-sq(^)	0.115	0.125	0.121	0.82	0.73

Note: Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01. (^) R-squared for beta regressions are calculated as the squared correlation coefficient between the actual and fitted values.

Our beta-fit regressions show that flows between contiguous country pairs tend to encourage fewer high-skilled workers, since low-skilled workers are more sensitive to migration costs and may take advantage of migrating to neighbouring countries. Countries among which there exists freedom of movement also encourage larger shares of non-high skilled workers, thereby leading to a more negative selection on skills. The results from our beta-fit regressions also seem to suggest that higher distances between two countries increase the selectivity of the migration flow, which again would suggest, as our SUR estimates show, that non-high skilled workers are more sensitive to increases in migration costs. Somewhat surprisingly, our regressions show that migration between countries that share a colonial heritage tend to be more skill selective and our SUR regressions show that this effect might be driven by a large deterrent effect for non-high skilled workers. Similarly, the estimated coefficient on language in our beta-fit regressions would indicate that common language reduces the selection on skills and our SUR regressions would suggest this is because a common language spurs the movement of non-high skilled more than their high skill counterparts.[22]

With regards to our measures of migration policies, it is points-based systems that prove most effective in improving the incoming distribution of skills at destination. Points-based systems assess skill profiles and filter labour migrants according to (perceived) long-term skill requirements and therefore represent effective instruments, not only in terms of recruiting relatively large numbers of high-skilled migrants, but also by shifting the skill composition in favour of the high-skilled.

Potentially due to a sample selection bias, in Model (3), the beta-fit regression suggests (albeit weakly) that employer-driven demand systems, those that require for example a job offer at entry, increase the selectivity of incoming workers. Our SUR results, however, those based on the full sample, rather suggest the opposite; that job-offer systems deter both sets of skilled workers, the high-skilled worst of all, the overall effect of which would be to reduce the incoming selectivity on skills. Highly skilled workers are less constrained when considering their options for migration, such that they might simply choose an alternative destination with easier entry requirements. Interestingly, labour market tests are shown to increase the share of high-skilled relative to lower-skilled migrants in a particular labour flow. Our SUR regressions suggest this is due to a positive effect exerted on the high-skill flow, which may be indicative that countries that implement labour market tests might be more successful at filling lower-skilled positions domestically, meaning that the overall skill composition of the income flow increases. The imposition of shortage lists however, significantly reduces the overall selection on skills because these deter high-skilled more than low-skilled migrants. Shortage lists seem rather inflexible and may even become politicized instruments. These are therefore not effective in attracting highly qualified migrants since they often comprise occupations that are not classified as highly skilled.

Similarly, our beta-fit regressions show that the availability of permanency rights reduces the overall skill selectivity of immigrant flows. Our SUR results indicate that while permanency rights prove to be positive incentives for both high- and other skilled workers, the effect on the latter is larger, such that the overall effect is negative. Both skill groups, somewhat counterintuitively, seem to be deterred by financial incentive schemes. Although we would expect that tax breaks and allowances are a relevant aspect in the migration decision-making of high-income earners, we do not find robust empirical support for this presumption. Finally, turning to our measures of bilateral agreements, recognition of diplomas and social security agreements, both seem to be effective in increasing the skill composition of migrant flows, while no overall effect of international double taxation agreements.

[22] Our SUR regressions however show there is no significant difference of the effect of common language on skill selectivity.

6 Conclusion

High-skilled migration policies are *en vogue*, in large part due to increasing demand from various businesses that lobby governments for political support in filling labour market shortages with foreign labour. The phenomenon of business-driven labour migration policies is not new, as demonstrated by the guest worker programs of the 1950s and 60s. The main difference though, is that employers increasingly demand skill sets that often require tertiary education or other highly qualified expertise; those that cannot be fully met by domestic labour alone. Governments have decided to respond to these demands by implementing various types of skill-specific and skill-selective immigration regimes that facilitate the international recruitment of respective workers.

This paper represents the first assessment of these policies to attract and select high-skilled migrant workers in a panel comprising 10 major OECD destinations and 185 origins over the period 2000–2012. We find strong evidence that supply-led systems, i.e. points-based systems, increase both the absolute numbers of high-skilled migrants and the skill composition of international labour flows. Conversely, demand-driven systems that are usually based on the principle of job contingency and which are often supplemented by a case-by-case (labour market test) or occupation-by-occupation (shortage lists) assessments of labour market needs, are shown to have rather little, and potentially even a negative effect. This general conclusion needs to be taken with caution however, since the aims of these policy tools differ. Points-based systems, like those pioneered by Canada and later Australia, were initially introduced with the idea that 'there can never be enough of a good thing' and implemented as population policies with the desired aim of achieving the large-scale immigration of skilled workers. Other countries' immigration policies, for example those largely used across Europe, have rather been preoccupied with the notion of integrating migrants both economically and socially. The European focus on the socio-economic integration of foreigners is reflected by the implementation of demand-driven systems that prioritize labour market *outcomes* over the *numbers* of migrants actually recruited.

What recent policy developments demonstrate, however, is an increasing 'hybridization' in skill-selective immigration systems with the co-existence of both demand- and supply-driven policy elements that attempt to balance the conflicting aims of numbers versus employability. Our results show that some policy combinations can actually increase the efficacy of particular policy instruments. For example, financial incentives as a separate policy scheme are significantly more effective in demand-driven systems than in combination with a points-based system. We further find some evidence for the relevance of international agreements, and in particular agreements addressing the mutual recognition of diplomas and credentials, in facilitating the mobility of migrants with foreign degrees. Our results, however, demonstrate that while being a member of a freedom of movement area increases the overall numbers of highly skilled immigrants, such membership also serves to reduce the overall skill selectivity of total labour flows.

7 Appendix

Table A1: HSM policy database: definitions of variables and coding rules

Labour market test	Is there a mechanism in place to attempt to ensure the position cannot be filled by domestic workers?
Shortage list	Is there a list of in-demand or otherwise valued occupations which is somehow incorporated into the selection process for HS migrants?
Points-based system	Is there a selection system that grants applicants points for particular attributes and allows entry to all those over a particular threshold?
Job offer contingency	Is it possible to enter the country as an HS migrant without first having a job offer?
Permanency rights (immediate or with delay?)	Are HS migrants privileged in getting permanent residence or citizenship? If so, is this because there are permanent-stay entry categories which are immediately accessible, or is it because they are privileged in broader applications for permanent residence once they have met the general requirements?
Financial incentives	Are there special financial arrangements (such as tax exemptions, or allowances) pertaining to HS migrants?
Data is always coded for the highest level of specificity: The scope of this project was to research policies relevant to HS migrants, rather than the impact of policies in general. This means that for each indicator, the data and the resulting score are based on the policy most relevant to HS migrants. If broader provisions (i.e. those applying to a wider pool of migrants) may favour HS migrants, but specific provisions favour them to a greater extent, the specific provision will be recorded and coded over the broader one. If broader provisions have effects that are relevant to HS migrants but apply equally to others, they will not be coded as positive. For example, if the permanency rights of HS migrants are simply through broad permanent resident routes, it will not be considered that an HS policy exists.	
Data is always for the most attractive policies: Similarly to the above, if there is more than one route of entry for HS migrants that entails significant numbers, the 'most appealing' route will be the one coded for. If this route is eliminated, but others remain, the coding will pertain to the next 'most appealing', and so on. Similarly, if more appealing routes are newly introduced, coding will prioritize them over the previously existing routes. This means that the coding at any one point in time may not relate to a single route of entry; rather the coding may reflect the most appealing entailments of multiple routes of entry, even when HS migrants cannot be subject to all the coded entailments at once. The above assumption is not made in cases where it has been decided to focus upon a specific route of entry to fit with the data.	
Continuity is assumed on the basis of highly similar conditions and legal continuity: If the conditions for HS entry at two points in time are highly similar (and, when possible, if they can be shown to be the artefact of the same law), it will be assumed that the conditions in the intervening period between the two points in time are also the same. Most notably, this risks missing new laws which were introduced and then revoked in the intervening period, as well as some bureaucratic reforms that may more subtly alter the entry regime.	
More detailed sources are privileged: In the event that different sources report conflicting information, and the conflict cannot be solved by seeking an additional, authoritative source, the source that provides greater detail will be used.	

Table A2 HSM policies across 10 Western destinations, 2000–12

	Labour market test	Shortage list	Points-based system	Job offer contingent	Immediate permanency rights	Financial incentives
Australia						
2012		■	■		■	■
2011		■	■		■	■
2010		■	■		■	■
2009		■	■		■	■
2008		■	■		■	■
2007		■	■		■	■
2006		■	■		■	■
2005		■	■		■	■
2004		■	■		■	■
2003		■	■		■	■
2002		■	■		■	■
2001		■	■		■	
2000		■	■		■	
Canada						
2012		■	■		■	
2011		■	■		■	
2010		■	■		■	
2009		■	■		■	
2008		■	■		■	
2007		■	■		■	
2006		■	■		■	
2005		■	■		■	
2004		■	■		■	
2003		■	■		■	
2002		■	■		■	
2001		■	■		■	
2000	■	■	■		■	
Switzerland						
2012	■			■		■
2011	■			■		■
2010	■			■		■
2009	■			■		■
2008	■			■		■
2007	■			■		■
2006	■			■		■
2005	■			■		■
2004	■			■		■
2003	■			■		■
2002	■			■		■
2001	■			■		■
2000	■			■		■

	Labour market test	Shortage list	Points-based system	Contingent on job offer	Immediate permanency rights	Financial incentives
Korea						
2012		■		■		■
2011		■		■		■
2010		■		■		■
2009		■		■		■
2008		■		■		■
2007		■		■		■
2006		■		■		■
2005		■		■		■
2004		■		■		■
2003		■		■		■
2002		■		■		■
2001		■		■		■
2000		■		■		■
Norway						
2012						■
2011						■
2010						■
2009						■
2008						■
2007						■
2006						■
2005						■
2004						■
2003						■
2002						■
2001	■					■
2000	■					■
New Zealand						
2012		■	■			■
2011		■	■			■
2010		■	■			■
2009		■	■			■
2008		■	■			■
2007		■	■			■
2006		■	■			■
2005		■	■			■
2004		■	■			■
2003		■	■			
2002		■	■			
2001		■	■			
2000		■	■			

United Kingdom							Sweden						
2012							2012						
2011							2011						
2010							2010						
2009							2009						
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2005							2005						
2004							2004						
2003							2003						
2002							2002						
2001							2001						
2000							2000						
Israel							United States						
2012							2012						
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Note: Light grey = policy does not exist. Dark grey = policy implemented.

Table A3: List of countries

Origins (185)

Afghanistan, Albania, Algeria, Andorra, Angola, Anguilla, Antigua and Barbuda, Argentina, Australia, Austria, Bahamas, Bahrain, Bangladesh, Barbados, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Botswana, Brazil, British Virgin Islands, Brunei Darussalam, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, Cayman Islands, Central Africa Republic, Chad, Chile, China, Colombia, Comoros, Congo, Cook Islands, Costa Rica, Cote d'Ivoire, Cuba, Cyprus, Czechoslovakia, Democratic Republic of Congo, Denmark, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Ethiopia, Falkland Islands, Federated States of Micronesia, Fiji, Finland, France, Gabon, Gambia, Germany, Ghana, Gibraltar, Greece, Grenada, Guatemala, Guinea, Guinea Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iran, Iraq, Israel, Italy, Jamaica, Japan, Jordan, Kenya, Kiribati, Korea, Kuwait, Laos, Lebanon, Lesotho, Liberia, Libya, Luxembourg, Macau, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Mauritania, Mauritius, Mexico, Mongolia, Montserrat, Morocco, Mozambique, Myanmar, Namibia, Nauru, Nepal, Netherlands, Netherlands Antilles, New Zealand, Nicaragua, Niger, Nigeria, Niue, North Korea, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Puerto Rico, Qatar, Republic of Ireland, Romania, Rwanda, Saint Helena, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Seychelles, Sierra Leone, Singapore, Solomon Islands, Somalia, South Africa, Spain, Sri Lanka, Sudan, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tanzania, Thailand, Timor Leste, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turks and Caicos Islands, Tuvalu, Uganda, United Arab Emirates, United Kingdom, United States, Uruguay, USSR, Vanuatu, Venezuela, Vietnam, Yemen, Yugoslavia, Zambia, Zimbabwe

Destinations (10)

Australia, Canada, Israel, Korea, New Zealand, Norway, Sweden, Switzerland, United Kingdom, United States

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