

Measuring Cross-Country Immigration Policies*

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Abstract

In the face of the intensified international migration pressures of the recent decades, many developed countries were spurred to revise their immigration regulations and increase border controls. However, the development of these reforms as well as their effectiveness in actually managing new immigration flows remains poorly understood. Part of the reason is that immigration policies are hard to quantify in practice such that a universal measure does not exist. To fill this gap in the literature this paper constructs a composite indicator of the overall restrictiveness of policy barriers across countries, allowing us to gauge the factors determining the toughness of immigration regulations. Empirical studies of immigration policy have focused either on the economic effects of migration or on the political effects using a median voter or interest group approach. In this paper, we look at the relative importance of economic versus political factors in explaining immigration policies in developed countries. Because of the lack of a universal policy measure, such a cross-country analysis has not been performed so far.

Keywords: International migration, Immigration Policy, Median voter model, Interest group approach

JEL codes: to be completed

1 Introduction

Because of its worldwide surge in recent decades, international migration can be considered a defining feature of present-day globalization. The total number of immigrants in the world has been growing at a steady pace, estimated by the UN to reach 214 million (or three percent of the world population) in

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2010. Overall, migration towards high income (mainly OECD) countries has dominated global migration flows since the 1960s and traditional destination countries in Western Europe and New World countries such as the United States, Canada, Australia and New Zealand still appear the most important settling destinations in 2010. Migration pressures both within and across borders are expected to be further intensified by demographic forces, globalization, environmental change and technological revolutions.

Yet, despite the renewed attention to international migration and its driving forces, little is known about how a country's immigration policies are set and to what extent they have actually managed to shape recent migration patterns in the world. Which factors (economic or political) drive the restrictiveness of legal barriers to migration? How do immigration policies affect the size and composition of cross-border migration? If one compares the study of international migration policy with the related field of international trade policy, one will immediately notice some pronounced differences. Empirically as well as theoretically, the research on international trade policy has a rich tradition, reviewed in, for example Rodrik (1995) or Gawande and Krishna (2003). In contrast, in particular empirical studies on international migration policy remain infrequent.¹

For the most part, this gap in the literature is due to the lack of comprehensive and comparable data on immigration policies. As Czaika and De Haas (2013) remark, it is the qualitative nature of immigration policies that has obstructed the development of a systematic method for measuring and classifying immigration policies across countries and over time. Data sources that would remedy this, like the United Nation's International Immigration Policies Database or the Migrant Integration Policy Index (MIPEX) (Niessen et al., 2007), have only recently become available. Furthermore, when constructing an indicator of immigration policy, what one aims at is a measure of (primarily) the *overall openness* of a country to international migration, just as an aggregated tariff measure is used to approximate the overall level of openness to trade. Access to a country is regulated by entry laws from which the toughness of the immigration policy must be derived. On top of the qualitative information on which this is based, immigration policy is likely to be reflected in a large, complex and multidimensional set of criteria and therefore not straightforwardly to reduce to a single or a few representative indicators. If a summary measure is required that integrates the information of all the available data, then this brings immediately up the problem of how to summarize (i.e. aggregate) the individual indicators and which weighting scheme to use. This problem is compounded by the overabundance of missing data in the existing indicators of migration policy.

¹The theoretical analysis of international migration policy has a well developed political economy approach, of which Benhabib(1996), Razin and Sadka(2000), Razin et al. 2009, 2011) and Facchini and Willman(2005) are some key contributions. Reference empirical studies on the determinants of immigration policy are, amongst others, Facchini and Mayda (2008), Facchini et al. (2008) and Facchini and Steinhardt (2011).

A small number of studies have made an effort to explicitly take into account some measure of the toughness of immigration policies in their analysis of the determinants of migration flows (see Ortega and Peri, 2009; Mayda, 2010).² In general, they rely either on migration policy dummies (at the national level or bilateral and multilateral migration agreements) or on migration policy indices (see also Czaika and De Haas, 2013), derived from ‘major changes’ in the different dimensions of the policy.³ The first category is typically used to account for changes in migration policies whereas the latter category provides a more profound measure of toughness that allows for comparison across countries and/or time. However, these different measures of restrictiveness of immigration policy are difficult to compare and making their representativeness a validity is hard to test. For example, dummies capturing migration policy or indexes tracking ‘major changes’, typically dichotomized and then aggregated, provide no information on the initial level of tightness nor on the relative magnitude of the change.

This paper addresses the data issues by analyzing the reliability of the available migration policy indicators in the literature and constructing a composite indicator of policy toughness that is comparable across countries and covers all legal barriers potentially influencing the decision to migrate. To this end, we rely on a Bayesian state-space approach that combines all immigration policy measures available in the literature, e.g. sub-indicators of MIPEX and the United Nation’s International Immigration Policies Database.⁴ The novelty of the Bayesian immigration policy indicator is that it is able to differentiate between the different measures in terms of their reliability. In addition, the accuracy of the estimates can be taken into account in any subsequent computations or regressions. By using the time-dependence in the underlying indicators and circumventing the problem of missing observations, the state-space framework can provide more stable and reliable estimates while significantly increasing data availability and coverage without imputations or other ad-hoc manipulations. The framework is used to construct a single indicator of the overall immigration policy restrictiveness as well as sub-indicators corresponding to specific policy instruments: entry and stay policies, regulations for family reunification and integration policies.

After constructing a synthetic indicator of immigration policy, we use the measures to explore the determinants of legal barriers to migration in developed countries. The literature on the determinants of immigration policy is scarce but typically makes the distinction between economic and political determinants of toughness and finds that immigration policies are much more liberal than what would be expected based on median voter preferences. This suggests a clear role for economic determinants or

²To our knowledge, there are no quantitative studies dealing with the impact of emigration policies on migration flows.

³See also Hatton, 2009 for an application of the same methodology to asylum policy.

⁴The IMPALA data promise to substantially improve data availability and consistency and might easily be integrated in the composite indicator when they become available.

interest groups. The newly constructed indicator allows for a cross-country analysis of economic and political determinants corresponding to both median voter and interest group approaches. Indicators for each of these determinants are available for each country, allowing us to analyze immigration policies in the same way as is common practice in the international trade literature.

After reviewing the literature in the next section, we briefly describe in the third section the principles of the Bayesian state-space approach and the construction of the indicator of immigration policy using this methodology. In the fourth section, we discuss our findings regarding the determinants of immigration policy from a cross-country analysis. Section five draws some conclusions and discusses topics for further research.

2 Literature review

The lack of a standard measure of migration policy has resulted in very different methodological approaches. Most of the economic literature dealing with immigration policies is related to analyses of the determinants of flows which consider not only the supply but also the demand side of migration. In this literature, one strategy to account for immigration policies without having to explicitly incorporate them in the migration model is to compare findings across samples with different immigration policy regimes. Hatton and Williamson (2002), for instance, compare the experience in the age of free migration to Europe before 1914 with constrained migration to the US of more recent times. The authors view immigration policy as endogenous, i.e. depending on and determined by the same factors as the migrant flow itself. As such, they argue that this is the only way to provide useful insight into the impact of immigration policy. Another way to get around the difficulties described above is to simply add country-specific effects to capture time-invariant cross-country differences in tightness of immigration policies (see Leblang et al., 2007; Ortega and Peri, 2009; Mayda, 2010).

Many scholars have used dummies to capture changes in migration policies at the national level. Typically, they provide a crude measure of policy change that is nearly always based on legislative changes rather than ex post evaluations of policy outcomes. Vogler and Rotte (2000), for instance, find a strong negative impact on migration from Africa and Asia of legal restrictive measures concerning asylum seekers taken in Germany in 1987 and 1993, and a highly significant positive effect for the abolition of the temporary work ban for asylum seekers in 1991. Hatton (2005) analyses the effect of changes in UK migration regulations on immigration and emigration between 1976 and 2000 but finds rather ambiguous effects on migration flows. Karemera et al. (2000) find that the tightening of immigration policies in 1976, 1980 and 1986 in the US and in 1976 and 1978 in Canada reduced migration to these countries.

Boeri et al. (2002) and Brucker and Siliverstovs (2006) on the other hand find ambiguous results from the inclusion of a free movement dummy within the EU on German immigration from 18 European countries between 1967-1998 and 1967-2001, respectively. For roughly the same period, bilateral guest worker agreements included in both Boeri et al. (2002) and Fertig (2001), finally, appear as a highly significant and positive factor in explaining German immigration from the same set of countries. Ortega and Peri (2009) analyze the determinants of immigration to OECD destination countries between 1980 and 2005 and explicitly incorporate dummies for the two most important multilateral treaties affecting several of the considered countries, i.e. the Maastricht treaty and the Schengen agreement.

Other studies provide a more comprehensive measure of policy stance by identifying major changes in different policy dimensions and combining them into a single index. Hatton (2004), for instance, uses a variety of sources including the OECD's Trends in International Migration as well as the United States Committee for Refugees' World Refugee Survey, to define 11 components which are likely to offer a reasonable reflection of the overall toughness of a country's policy stance. The indicators of policy stance were derived for 14 EU countries and incorporated in an empirical analysis to explain asylum flows from Africa, Asia and Eastern Europe to these countries between 1981 and 1999. The dummy variables take the value zero or one, where a change from zero to one reflects a significant increase in restrictiveness in a particular dimension of policy. Furthermore, Hatton (2004) check whether the number of asylum applications is determined also by the stance of general immigration policy in the destination country. The latter is measured by the UN survey of governments concerning the objectives of immigration policy interventions, and coded one for 'lower', zero for 'maintain' and minus one for 'raise'. Surprisingly, a more restrictive immigration policy does not lead prospective migrants to choose asylum as a route to immigration, but rather serves as a signal for deterrence. This might however be explained by the potential correlation between the toughness of immigration policies and elements of asylum policy (such as enforcement) not fully captured in the asylum policy index.

In a later study, Hatton and Williamson (2009) examine the level of asylum applications to 19 destination countries between 1997-2006, using a similar index of asylum policy as the one described above. The index consists of 15 components of policy, divided into three groups: 'access' (the ability of asylum seekers to gain access to the country's territory), 'processing' (the toughness of the country's refugee status determination procedure) and 'welfare' (the welfare of asylum seekers during and after processing). Specifically, they compare the effects of these three different dimensions of policy to those of the total recognition rate (i.e. the proportion of asylum decisions to a given destination country that resulted in acceptance) and find that, after accounting for endogeneity, the recognition rate has a strong positive effect. Moreover, the policy components representing both access and processing have strong negative

effects whereas that reflecting welfare is not significant.

Based on an extensive review of migration laws by Mayda and Patel (2004), Mayda (2010) also constructs a dummy for changes in receiving countries' immigration legislation between 1980 and 1995. Particularly, the dummy identifies the timing and direction of policy changes (loosening vs. tightening) related to the size of immigration flows, as opposed to, for example, issues of citizenship. While a tightening of immigration policy appears insignificant in itself, it seems to mitigate effects on the supply side of the model (pull and push factors, geography and demographics).

The same approach is followed by Ortega and Peri (2009) who update the database on immigration policy laws developed by Mayda and Patel (2004) and merge it with the Social Reforms database (2007) from the Fondazione Rodolfo DeBenedetti. They construct three separate indices (provisions on the entry and stay of non-asylum immigrants as well as the entry of non-asylum immigrants), allowing them to identify an immigration reform as increasing (+1) or decreasing (-1) the tightness of immigration laws. The authors report that each reform that introduced less restrictive measures increased migrant flows by 5 to 9 percent, on average. The impact on immigration of the tightening of asylum laws, on the other hand, turns out negative but rarely significant.

Yet, given that these dummies lack a specific range and allow only for one unit changes in either direction, they provide no information on the initial level of restrictiveness nor on the relative magnitude of the change. All of the authors above attempt to control for initial immigration policy restrictiveness by including country-specific effects, which capture all unobserved country characteristics and not solely reflect initial levels of immigration policy tightness. Moreover, as put forward by Czaika and De Haas (2013), the effect of a gradual policy adaptation can not be distinguished from that of big bang reforms.

Some scholars have turned to surveys of policymakers and 'outcome-based' measures of immigration policy, which evaluate the perceived results of a country's immigration policy rather than its intended objectives. For instance, Clark et al. (2002) look at the effects of immigration policy on migration to the US between 1971 and 1998 by taking into account the scarcity of visas and hence the cost of immigration (see also Hatton, 2004). In addition, the authors control for special circumstances: the effects of the IRCA legalization program during the years 1989-1991 and the effect of the increased processing backlog caused by administrative changes between 1995 and 1998. The same approach is used in Hatton and Williamson (2009) who also control for the tightness of US immigration policy by including total US immigration quota relative to the population of all three sending regions (Africa, Asia and Latin America).

Based on surveys of policymakers responsible for population policies in their respective countries, Leblang et al. (2007) construct two indices of a country's immigration policy: (1) the objective pursued

via current immigration policies, i.e. to lower, maintain or raise the level of immigration; and (2) the government's perception of the level of immigration, i.e. too high, satisfactory or too low. The authors find a significant impact of immigration policies on migration to 26 OECD destination countries between 1985-2004. In addition, they find that if policymakers perceive the current level of immigration as too high, immigration rates subsequently start to drop. The authors also consider less straightforward measures of immigration policy, such as right wing support, voting rights for immigrants and citizenship policies based on birth place (*jus solis*).⁵

A number of scholars have developed an actual immigration policy index comparable across countries and time. In his analysis of the determinants of asylum applications in 20 OECD countries for the period 1985-1999, Thielemann (2004) developed a deterrence index covering three aspects of immigration policy: (1) access control, (2) the determination process and (3) migrant integration policy. The index is based on two sets of annual reports, the OECD's 'Trends in International Migration' (SOPEMI) and the US Committee for Refugees' 'World Refugee Survey'. Five of the measures at their disposal are proxied by dummy variables that take the value one when in the destination country: (1) there are safe third country provisions, (2) the percentage of asylum seekers in the destination country is above the OECD average, (3) there is a dispersal scheme, (4) a non-cash based system of benefits, and (5) a law which prohibits asylum seekers to work until their claim has been accepted, and zero otherwise. Adding these dummy variables for each country and year with equal weight results in a country's deterrence index for a particular year.

An alternative is offered by Bertocchi and Strozzi (2008) who investigate the determinants of 19th century immigration to 14 OECD countries between 1870 and 1910. Their 'migration institutional index' combines four institutions which make a country more attractive to migrants and can be interpreted as components of a broad migration policy package: citizenship laws; land distribution policy; public education policy; and attitudes toward immigration. Each variable enters the index with equal weight. Their results confirm the effectiveness of these institutions in attracting migrants.

In a similar fashion, Berthélemy et al. (2009) use the migration component of the 'Commitment to Development Index' (CDI) (Center for Global Development), originally designed by Grieco and Hamilton (2004), to account for the extent to which rich countries aid poor countries by opening their frontiers to the migrants. More recent versions of the index depart from the original design by Grieco and Hamilton

⁵In their estimation of the migration determinants for 21 European destinations between 1980 and 2004 including only political control variables, Hooghe et al. (2008), on the other hand, obtain insignificant parameters for all variables of this type: voting rights for non-EU nationals, naturalization granted easily and legislation against discrimination. Consequently, they argue that, with the data available thus far, it is not possible to develop an adequate and comprehensive measurement of state policies in the field of integration, migration and discrimination policies.

(2004) by substantially revising and updating some of the components. Although a nice attempt to offer a comprehensive index on migration policy, the migration component of the CDI is outcome-based as opposed to law-based, thereby curtailing its application possibilities to test for the effectiveness of migration because of endogeneity (Czaika and De Haas, 2013).

Niessen et al. (2007) developed another extensive index on migration policy: the Migrant Integration Policy Index or MIPEX. It deals with the integration policy of migrants in 25 EU Member States and three non-EU countries and is available for the years 2007 and 2010. The index covers six policy areas which define a migrant's opportunities to participate in European societies: labour market access, family reunion, long-term residence, political participation, access to nationality and anti-discrimination. Specifically, it combines 140 policy indicators: questions related to a specific policy components corresponding to Council of Europe Conventions or European Community Directives. Each policy indicator is awarded a score, which is then averaged within each of the six dimensions and subsequently across dimensions to get an overall country score. Overall, it appears that the EU-25's policies on integration lie midway between worst and best practice. Only the Nordic countries, the Western Mediterranean, the Benelux countries, Canada and the UK have policies that were overall partially favourable. The ten lowest scores are assigned to the Baltic Republics, the countries of the Eastern Mediterranean and Central Europe, and Denmark.

Finally, the Multiculturalism Policy (MPC) index developed by Queen's University provides a measure of multiculturalism policies at three points in time - 1980, 2000 and 2010 across 21 Western democracies. The index seeks to measure to what extent these liberal-democratic states are accommodating and supportive of ethnocultural minorities. As such, it can be informative about the well-being of immigrants and therefore the openness of the countries to immigration.

Considering the range of indicators of migration policy described above, we can conclude that there is no universally accepted policy measure on offer. Most attempts, while unquestionable to the best of their authors' knowledge and skills, remain subjective and ad hoc. Frequently, they tend to focus on specific aspects of migration policy such as citizenship policies, integration policies or non-discrimination policies. In building a composite index, arbitrary weighting schemes are used and the uncertainty of the scores or their interpretation, i.e. the fact that they are *estimates* rather than measures, is not taken into account in the analysis. Different methodological approaches lead to diverging results: for example, if one would try to have an idea of the evolution of immigration policy over time, from the UN's International Immigration Policies Database, for Canada, one would conclude to more restrictive policy around 1996 which was eased after 2004, whereas the Ortega and Peri (2009) indicator suggests an easing already in the 1990s. As regards the UK, Ortega and Peri (2009) point an alteration between easing and

strengthening of the policy - at least at level of access to the country- that is lacking in the UN source (strengthening until 2000, easing afterwards). A same divergence between the two sources is observed for the US policy and for Australia, Ortega and Peri (2009) point to a strengthening of the (access) policy until the beginning of 2000 that the UN source does not report. In addition, the coverage of the two sources differs considerably. This may underline the need for an internationally comparable indicator of immigration policies covering all aspects of immigration policy.

Perhaps the most structural approach in the empirical analysis of immigration policy is found in the few studies that try test for the determinants of (the restrictiveness of) migration policy using either a median voter approach (see e.g. Hix and Noury (2007) for the EU or ? and Facchini and Steinhardt (2011)) or an interest group approach (see Facchini and Mayda, 2008, for the US). These studies avoid the construction of indicators of immigration policies by focussing on the voting behaviour of legislators (like the members of the US house of representatives) on immigration law projects or proposals, or on the attributed number of visa and test directly for the significance of the behaviour of (immigration friendly or reticent) interest groups or the median voter characteristics, typically taking into account the(i) economic effects of migration (such as mean weakly earnings, the fraction of the unemployed by industry, output by industry, inward foreign direct investment by sector or prices by industry) (see Hix and Noury, 2007; Facchini and Steinhardt, 2011) or the (ii) political effects (like the ratio of left to right votes, pro to contra EU votes, racism by national party supporters or shares of unemployed or unskilled national party supporters), whereas Facchini and Mayda (2008) use data on the contributions for political campaigns by sectoral lobby groups.

However, because of the lack of reliable data on immigration law that is comparable over time and countries, there have been no cross-country analyses with the exception of Hix and Noury (2007). In addition, given that the indicators of immigration law or policy used in these analyses fall short of an overall policy indicator, the impact of the determinants they identify on global immigration policy remains unclear.

3 Construction of the migration policy index

3.1 Selection of individual indicators

For the selection of individual measures of immigration policies, we rely on five criteria as suggested by De Lombaerde et al. (2008), i.e. (1) availability , (2) relevance, (3) comparability, 4 timeliness, and (5) accuracy. Specifically, we select all measures publicly available (both levels and changes) dealing

with economic migration (excluding asylum) for the years 2000 to 2010, while ignoring outcome-based measures in order to avoid endogeneity in the empirical analyses making use of our index. The measures passing those selection criteria are:

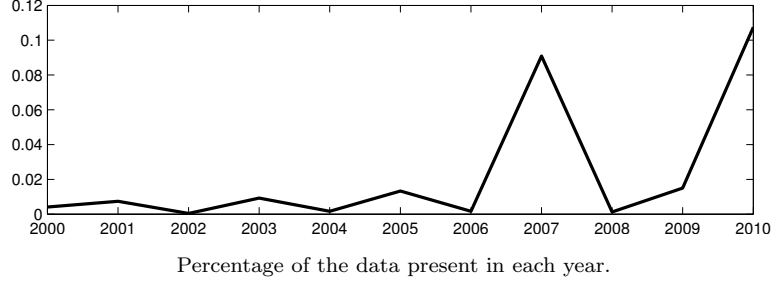
- The policy change dummy constructed by Mayda and Patel (2004) and updated by Ortega and Peri (2009) - available for 22 Western countries between 1980-2003
- The UN's International Immigration Policies Database - available for UN members between 1976-2011
- The Migrant Integration Policy Index (MIPEX) constructed by Niessen et al. (2007) - available for 31 Western countries for the years 2007 and 2010
- The migration component of the Commitment to Development Index (Grieco and Hamilton, 2004; Berthélemy et al., 2009), of which we retain 1 component, namely the proportion of non-DAC students in all foreign students - available for 22 Western countries between 2003-2007
- The Multiculturalism Policy Index developed by Queen's University - available for 21 Western countries for the years 1980, 2000 & 2010

Specifically, we are interested in the sub-indicators used to construct most of these compound measures. Each of these underlying indicators has been screened and carefully selected based on the five criteria mentioned above (policy regulations related to economic migration which are not outcome-based). Subsequently, we classified all the individual indicators into four main categories: (1) entry policies; (2) stay policies; (temporary versus permanent migration); (3) family reunification regulations; and (4) integration policies.

Combining the different indicators of migration policy into an index is less straightforward than it would seem. As figure 1 shows, data availability less than 3% between 2000 and 2010 and spread very unevenly: it jumps up to 10% in 2007 and 2010, the years the MIPEX data becomes available. Any index that ignores this availability problem will be distorted by it, making it impossible to distinguish actual changes in migration policy from changes in availability. Additionally, some variables are continuous while other are dichotomous and a number of the variables only capture the change over time, but cannot be compared over a cross section of countries.

In order to take these problems into account while making as few additional assumptions as possible, we use a state-space model to combine the indicators into the Migration Policy Index (MPI). This allows us to completely adjust the indexation method to the data and has a intuitive and easy solution to missing data. In addition, the estimation will return the entire distribution of the policy index at each point in

Figure 1: Data availability



time. This enable us to correctly take the underlying uncertainty into account when comparing the index over time or over countries and when using it in further regressions.

3.2 The state-space model

This section will only briefly discuss the state-space model used to construct the migration policy indices. For a thorough analysis and a detailed run-through of how to estimate it, see Kim and Nelson (1999, chapter 8).

The standard state-space model is defined by the following equations:

$$y_{i,t}^{\kappa} = C^{\kappa} + Z^{\kappa} * MPI_{i,t} + \epsilon_{i,t} \quad (1)$$

$$MPI_{i,t} = T_i * MPI_{i,t} + \mu_{i,t} \quad (2)$$

$$\epsilon_{i,t}^{\kappa} \sim N(0, H^{\kappa}) \quad (3)$$

$$\mu_{i,t} \sim N(0, 1) \quad (4)$$

in each year t and for each country i and each indicator of migration policy y^{κ} .

The first equation, the measurement equation, states that each indicator of migration policy y^{κ} captures the overall level of migration policy MPI . However, in doing so, it makes a certain measurement error (ϵ^{κ}), whose variance (H^{κ}) can differ for each indicator. Similarly, the scaling parameters C^{κ} and Z^{κ} can differ for each indicator. Cross-correlation between the error terms of different indicators is ruled out: $E(\epsilon^{k_1'} \epsilon^{k_2}) = 0$.

The state-equation (2) allows for the possibility that the level of migration policy depends on its previous value. The extent to which it does is governed by parameter T_i , which can differ for each country i .

By changing the measurement equation, we can adjust the model to deal indicators whose level cannot be compared over countries. For these indicators, the constant C_i^{κ} is allowed to vary over all countries.

$$y_{i,t}^{\kappa} = C_i^{\kappa} + Z * MPI_{i,t} + \epsilon_{i,t} \quad (5)$$

Similarly, the measurement equation can be changed to deal with dichotomous information. To this end, we define the continuous latent variable y^* in the style of a logit or probit model:

$$y_{i,t}^* = C + Z * MPI_{i,t} + \epsilon_{i,t} \quad (6)$$

$$y_{i,t}^\kappa = \begin{cases} 0 & \text{if } y_{i,t}^* \leq 0 \\ 1 & \text{otherwise} \end{cases} \quad (7)$$

This model is estimated using a Bayesian Gibbs sampler, a Markov chain Monte Carlo (MCMC) estimator. The Gibbs sampler ran for 25,000 iterations, of which the first 20,000 were discarded as burn-in. Seeing that ex-ante information on the distribution the parameters is lacking we used uninformative priors.

Before the model can be run the missing data is replaced by random and meaningless noise: if $y_{i,t}^\kappa$ is missing, it is set to zero while its error term $H_{i,t}^\kappa$ is set to infinity. As a results, the state space model will ignore the information in these observations seeing that they come from a source whose measurement error is infinitely large. Nevertheless, the information is no longer missing allowing the model to be run. To the extent that MPI depends on its previous values ($T \neq 0$), the information in preceding and future observations will be used to impute the level of migration polity at time t . However, this will be done within the model, removing the need to impute or otherwise manipulate the data ex ante.

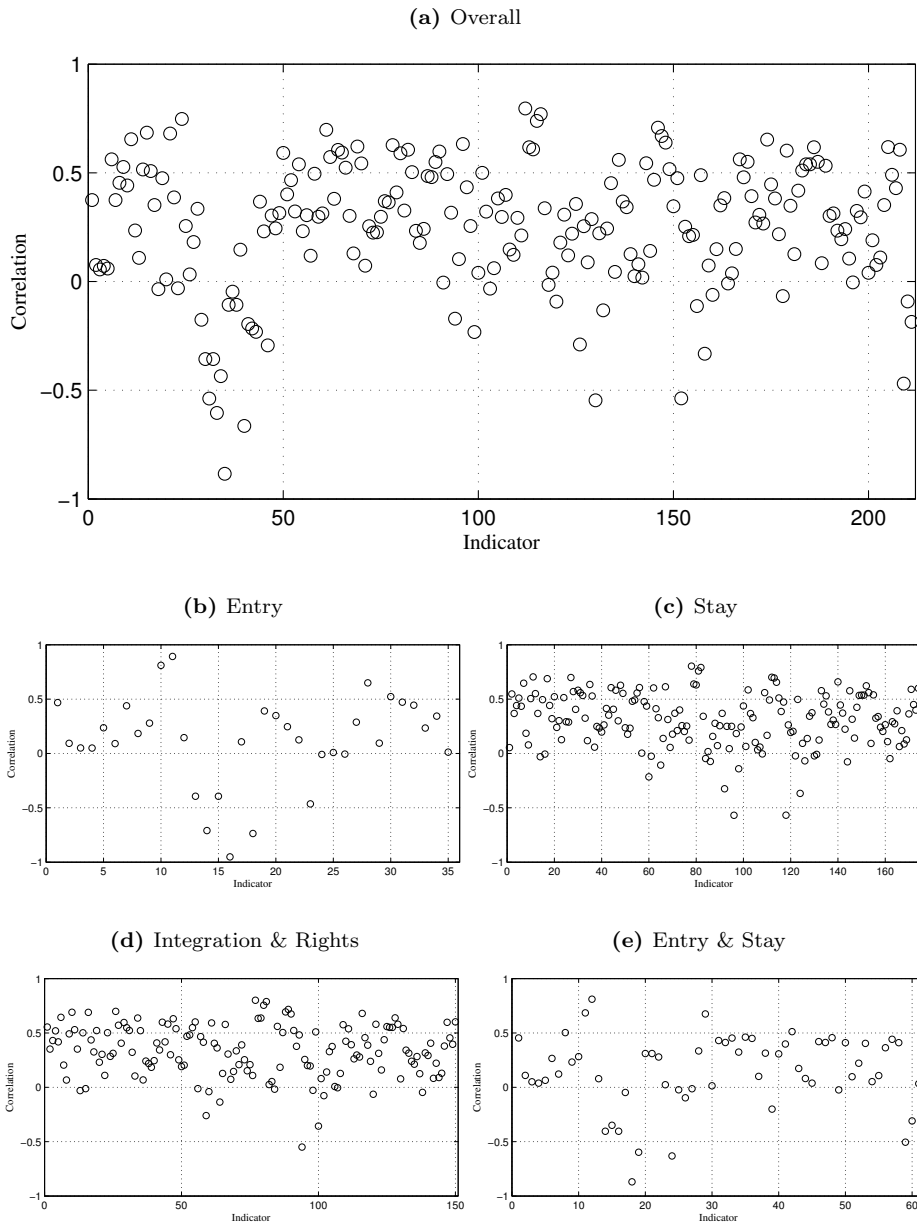
3.3 The migration policy indices

As detailed in Section 3, we constructed several indicators of migration policy: an overall index as well as indicators of the restrictiveness in various sub-components. Regardless of the definition of policy and its components, the indicators share a number characteristics.

The trend in migration policy is very diluted: any measure of policy overall, or in any of the sub-components will hide a great underlying variability of the indicators. Figure 2 illustrates this by plotting the correlation between the MPI indices with the indicator used to create the indices. This correlation coefficient is small for most indicators and sometimes even negative. Focussing on only a specific aspect of migration policy does not change this. This uncertainty is in turn reflected in the confidence bounds of the migration policy index which are relatively large. The overall MPI ranges from -2.6 to 2.1 while the average standard deviation is 1.3.

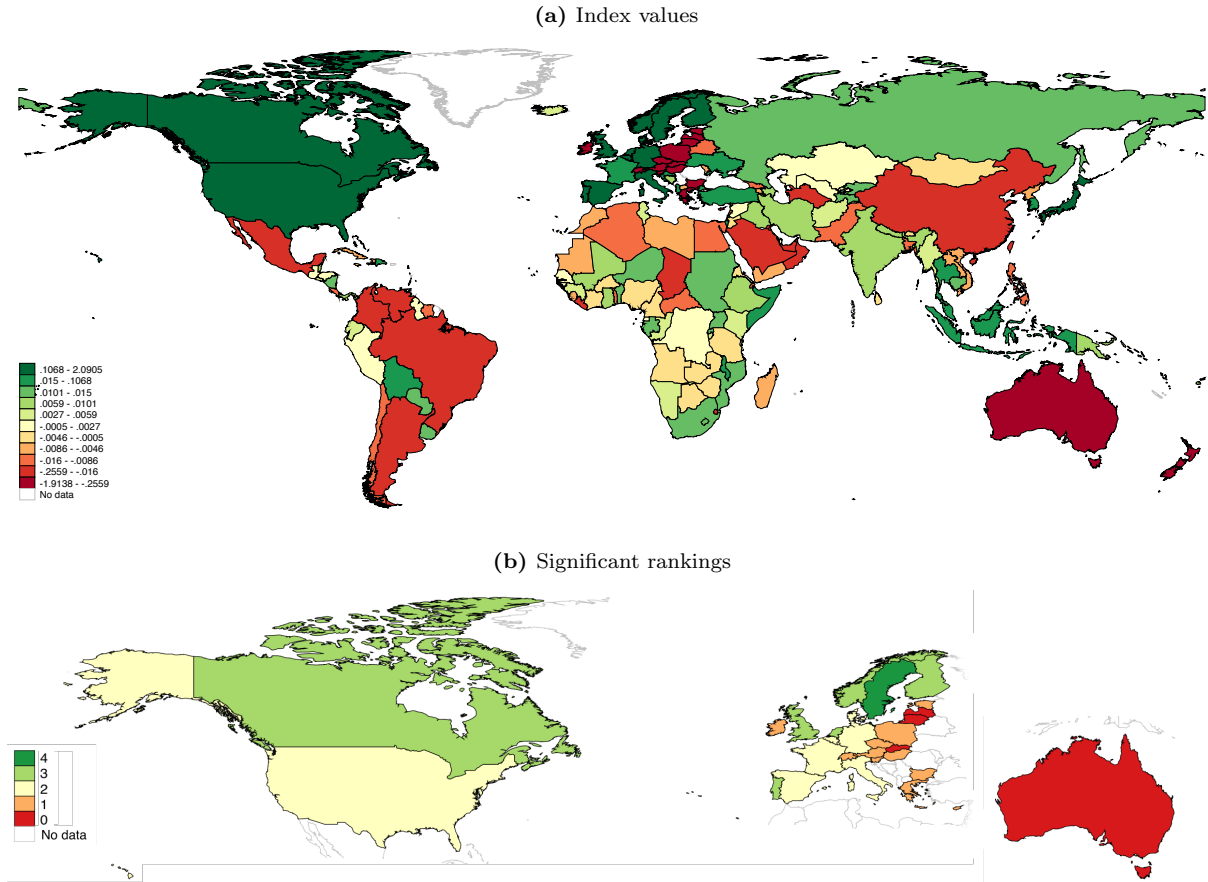
Using the converged draws from the Gibbs sampler, we can reconstitute the distribution of MPI at each moment for each country. It also enables us to identify significant differences between countries and over time. For example, if in more than 95% of the drawings, the MPI value of country A is larger than that of country B, we can state that country A is significantly more open than B at 5% significant level. The significance of changes over time can be identified in a similar way (Standaert, 2014, see).

Figure 2: Correlation of MPI with individual indicators



Correlation of the MPI indices with the individual indicators used to create them.

Figure 3: Overall migration policy in 2010: from open (dark green) to restrictive (dark red)



Plot of the MPI index (a) and its significant rankings (b). Two countries have a different color in panel b when their level of migration policy is significantly different. Countries for whom the differences were insignificant are left out.

These significant differences allow us to construct a ranking of the countries in each year using two simple rules. Firstly, a country will have rank $x + 1$ if it is significantly more open than at least one country with rank x . Secondly, if a country’s policy is not significantly different from that of any other country, it cannot be ranked. The advantage of constructing a ranking in this way, is that it takes into account the uncertainty in the index: small differences between countries will not lead to a different rankings unless they can be identified as statistically important.

The results are shown in figure 3. Panel a simply plots the overall openness of migration policy’s index values in 2010. When the uncertainty is taken into account by plotting the rankings only 32 countries remain in the dataset, mostly coming from the European continent (panel b). Sweden is consistently identified as having the most open migration policy overall and on all the different sub-components, while Australia occupies the other end of the spectrum.

3.4 Migration policy over time

When looking for significant differences over time (using the method to find significant differences described above) none of the indices is able to report any change in policy in any country even at the 10% significance level. The reason is that the underlying dataset only contains two sources that have enough observations to study changes over time (the UN and Ortega and Peri, 2009), both starting from an undefined initial level making them incomparable over countries. Furthermore, they contradict each other when it comes to the evolution of migration policy and are negatively correlated with each other (table 1).

Table 1: Pairwise correlation matrix of the UN and Ortega and Peri (OP) indicators

		UN				OP	
		policy	perm. set.	high skill	fam. reun.	entry laws	stay laws
UN	policy	1.0000					
	perm. set.	0.7859	1.0000				
	high skill	0.1569	0.1172	1.0000			
	fam. reun.	0.4657	0.4001	-0.0137	1.0000		
OP	entry laws	-0.2586	-0.0788	0.2392	-0.1056	1.0000	
	stay laws	-0.1896	-0.0655	0.3861	0.0023	0.5278	1.0000

In order to capture the variation over time, an additional sub-index was computed focussing only on the UN variables with the highest coverage. Ortega and Peri (2009) was left out because of its negative correlation and its more limited coverage (12 countries as opposed to the UN's 34). Also left out is the index on high-skilled migration since this policy is likely to fly in the face of the overall stance on migration, as evidenced by its much lower correlation with the other UN indicators (table 1).

While the resulting index (*MPI-UN*) cannot be compared over countries (because the initial level of toughness of immigration policy remains unknown), it is able to identify more than 300 significant changes between 1996 and 2011 at the 5% significance level, and twice as many at the 10% level. For example, the increase in the openness in Great Britain's policy between 1996 and 2003 is significant at the 5% level, while the subsequent decrease (2003-2011) is only significant at the 10% (figure 4). On the other hand, the increase in Sweden between 1996 and 2011 is significant at the 1% level.

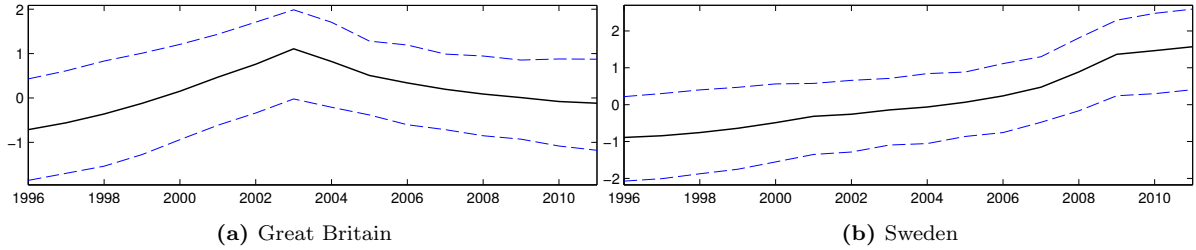


Figure 4: The migration policy index based on the UN indicators ($MPI-UN$) and its 95% confidence bounds.

4 A cross-country analysis of the determinants of migration policy

4.1 Theoretical framework

Quite similar to the central approach in the theoretical analysis of international trade policy, international migration policy is mainly explained from a political economy point of view. Either a median voter framework or a pressure group model is adopted. Initiated by Benhabib (1996), the median voter approach is seemingly the most commonly one. Benhabib (1996) assumed an economy, characterised by constant returns to scale production using labour and human or physical capital. Each individual is endowed with labour and capital and migration policy is determined by majority voting. Assuming that the economic agents's objective is income maximization, then the median voter chooses for an immigration, which is the most complementary to his own endowment. Hence, if the median voter is unskilled (highly educated) he will favour the admission of highly (low-) skilled immigrants by setting a lower threshold (upper bound) on the skill level of potential immigrants.

Razin and Sadka (2000) propose a model of immigration in which the three channels through which immigrants affect the native's welfare (the labour market, the welfare state and the efficiency -immigration surplus- channel, see Facchini and Mayda, 2009) are combined. They assume that the economy consists of workers with different abilities, who live during two periods. Being young, they have to decide about the allocation of their time between education and work and about the allocation of their income between consumption and savings. In the second period, they retire and consume their savings of the previous period and a demogrant social security benefit, financed by the current young in a pay-as-you-go system. National output follows from a constant returns to scale production function using capital (i.e. the savings of the current young - natives as well as migrants) and labour in efficiency units. In a small open economy, characterised by factor price equalization (national factor rewards equal to their world level), Razin and Sadka (2000) show that an increase of immigration (of the young) is Pareto improving because its only effect is to relieve the burden of the pension system or to increase the pension benefit

of the currently old (i.e. the welfare and efficiency channel) without affecting the natives' factor rewards (the labour market channel). However, in the more realistic situation of nationally specific factor prices, natives will be negatively affected by the labour market channel (the downward pressure on wages as a consequence of immigration), which results in ambiguous welfare effects of immigration: at the benefit of the currently old, but at the expense of the currently young (disregarding their education level) and the future generations. One factor that affects the distribution of welfare gains and losses, discussed by Razin and Sadka (2000), is the elasticity of substitution between the production factors, which at a higher level results in welfare gains for the (current) higher skilled young as well. Therefore, given that in this setting, immigration entails winners and losers, the characteristics of the median voter will decide upon the features of immigration policy.

Razin and Sadka (2009) analyze the characteristics of the immigration policy in an extension of the Razin and Sadka (2000) setting with skill heterogeneity of the immigrants in which, like e.g. Ortega (2005) they allow for dynamic political economy considerations, i.e. the effect of the present voting behaviour on the economy and on the voting behaviour in the next period. The immigration policy consists of two distinctive dimensions, i.e. the skill composition of immigration and the size of the inflows, and is decided simultaneously with the rate of the redistributive tax. Two voting strategies are considered under a plurality rule: sincere voting, in which agents vote for their preferred policy whoever wins, and strategic voting, in which they (correctly) anticipate on the probability of winning the vote, taking account of the political position of each candidate (and therefore vote to avoid the least favourable policy proposal if their preferred policy cannot win). With sincere voting under relative majority, the policy of the largest group will win. The old and unskilled young vote for the entry of exclusively skilled immigrants, just like the skilled young with exogenous wages, but not if wages are endogenous (when they would restrict skilled immigration). The currently old would also prefer a large inflow of immigrants, but not (forward-looking) unskilled young and the skilled young. Under endogenous wages, (forward-looking) unskilled young would even vote for the lowest inflow of the three groups. The currently old would vote for the highest (revenue maximizing) tax rate, whereas the skilled young prefer a zero-tax rate and the unskilled young an intermediate one between these two extremes. Because of its intermediate position between the preferred policy of the currently old and skilled young, with strategic voting the immigration policy will be determined by the preferred policy of the unskilled young.

From a median voter perspective, it seems that actual migration policies are more open than expected (Facchini and Mayda, 2008). Several explanations for this discrepancy have been offered: policy toughness

could already be high in general; immigrant policies aimed at controlling economic migration flows might be inefficient; the policies might affect the composition of immigration flows rather than their level; or it might be due to lobbying activities of special interest groups. A simplified pressure group model is proposed by Facchini and Mayda (2008), who assume a specific factors small open economy, consisting of $n + 1$ sectors. The numeraire sector is characterised by constant returns to scale in (sector-specific, but internationally mobile) labour, whereas in the other sectors returns are diminishing to sector-specific labour, because of a fixed amount of sector-specific capital. Restrictions on international mobility of labour keep the reward of sector-specific labour above the international wage. Assuming that utility is a quasi-linear function, the indirect utility consists of income, the consumer surplus as well as the share of the immigration surplus, captured and redistributed by the government. Immigration policy takes the form of binding quota by type of labour on the number of immigrants. The quota are determined by the influence (expenditures) in each sector of a pro- and anti-migration lobby, who have as objective the maximization of their net welfare. Solving the simultaneous system of the two first-order conditions, Facchini and Mayda (2008) obtain an expression for the sector-specific quota, set by the government, which are increasing in labour demand, decreasing in domestic labour supply and influenced by the lobby expenditures. High expenditures of the protectionist sectoral labour unions imply lower quotas whereas lobby expenditures by capital will lead to a less restrictive immigration policy (higher quotas).

4.2 Empirical specification and estimation issues

The theoretical analysis of immigration policy, suggests a general empirical specification as follows:

$$mpi_{it} = F(X_{it}, Z_{it}) + \varepsilon_{it}, \quad (8)$$

where mpi is an indicator of migration policy, X a vector of explanatory variables, Z a vector of control variables and ε an i.i.d. error term. As indicator of migration policy, we take the migration policy index that we have estimated.

X includes the determinants indicated in the median voter or pressure group framework. Therefore, regarding the former, we include an indicator of welfare state expenditure, in particular of age related welfare expenditures like the old-age dependency or the old-age (welfare) expenditure ratio, of public health expenditures and education expenditures (to take account of the public good provision or welfare expenditures that immigration may induce) or of global public expenditures (in terms of GDP). To take account of the other relevant groups or channels in the median voter framework, we include skill abundance of the working population (the skill ratio or the share of the young unskilled in the population at active age) as well as gdp growth, taken as a proxy of the immigration surplus. As in the empirical

analysis of trade policy, the empirical indicators have a somewhat promiscuous relation to the theories in the analysis of immigration policy (see e.g. Gawande, 2003), in the sense that identical variables can proxy different determinants in different theories. GDP growth can also be considered as an indicator of labour demand dynamism and, as such included at least as a control variable in an interest group model. Of central relevance in this framework are the interest groups' efforts to influence policy in their preferred direction. Theoretically, these efforts are represented by the financial expenditures for lobbying, of which however an (comparable) empirical indicator for a set of countries is lacking. Alternatively, we took an indicator of the organisational strength and institutional pressure of the labour movement, i.e. labour union membership, as proxy of interest group activity, respectively directly and inversely related to lobbying by labour and capital. As regards the specification of Z , there is neither a consensus in the literature about a set of control variables, nor rich data available to compose a proper, sufficiently encompassing set. Variables that could be included are past inflow of immigrants (controlling for ethnic homogeneity or congestion effects) or cultural and political preferences (attitude towards immigrants). In addition, a simple and efficient way to control for additional determinants is by including country fixed effects in the empirical model.

The data were obtained from the following sources. The migrant stock as a share of the population in the destination country for the year 2000 were calculated based on the comprehensive migration matrices by education level constructed by Artuc et al. (2014) and population data from the World Development Indicators. The share of the population aged 25 to 34 without tertiary education was compiled from data on the population by age and education from the United Nations and the OECD. Data on natives' attitude towards immigrants was taken from two questions of the World Value Survey⁶. Data on the government expenditures on health and education and GDP growth were obtained from the World Development Indicators. Data on the union membership of wage earners is available for OECD countries only and was taken from the OECD statistics, just like data on the old age expenditure and the old age dependency ratio.

Although the estimated migration policy index is basically available for all years and countries, the "signal" extracted from the individual indicators is affected by contradictory information (for example indicated by the low correlation of the index with the individual indicators shown in Figure ??), highly

⁶Namely: 'Could you please mention any that you would not like to have as neighbours?' of which 'immigrants/foreign workers' was one possible answer, and 'Do you agree or disagree with the following statements? When jobs are scarce, employers should give priority to native people over immigrants.'

uneven data availability as well as the usual shortcomings, i.e. noise and measurement error. As a result, the estimated index is characterised by substantial uncertainty that, if taken into account and adjusted for, reduces our data on migration policy to one value for a subset of 32 countries that can be meaningfully ranked in 6 categories (see section ??) and implies the loss of the complete time dimension in our data as well as a large share of the cross-sectional variation. The reduction of the data set after correcting for the uncertainty of the measurement has major methodological implications for the analysis of the data. Given that our measurement has only 6 meaningful different values, we are compelled to analyse our data as a limited dependent variable, for which the following ordered probit or logit model seems adequate. Consider the latent variable y^* :

$$y^* = W'\beta + \epsilon, \quad (9)$$

then

$$mpi = \begin{cases} 1 & \text{if } y^* \leq 0 & \Leftrightarrow \text{Prob}(mpi = 1|W) = \Phi(-W'\beta); \\ 2 & \text{if } 0 < y^* \leq \mu_1 & \Leftrightarrow \text{Prob}(mpi = 2|W) = \Phi(\mu_1 - W'\beta) - \Phi(-W'\beta); \\ 3 & \text{if } \mu_1 < y^* \leq \mu_2 & \Leftrightarrow \text{Prob}(mpi = 3|W) = \Phi(\mu_2 - W'\beta) - \Phi(\mu_1 - W'\beta); \\ \dots & & \\ 6 & \text{if } \mu_5 < y^* & \Leftrightarrow \text{Prob}(mpi = 6|W) = 1 - \Phi(\mu_5 - W'\beta); \end{cases}$$

with β is the vector of the parameters that have to be estimated and W the vector of the explanatory and control variables:

$$W = \begin{cases} \textit{share of young low-skilled in the total work force} \\ \textit{public health expenditures} \\ \textit{public education expenditures} \\ \textit{old age dependency ratio} \\ \textit{union membership;} \\ \textit{lagged low-skilled immigration} \\ \textit{gdp growth} \end{cases}$$

Depending on the assumptions made about the distribution of ϵ , i.e. either normally or extreme value distributed, Φ represents the standard normal or the logistic cumulative distribution function and we obtain an ordered probit or ordered logit model. However, we can only cope to a limited extent with the consequences of this reduction of the dataset after correction for uncertainty. In particular, with only 32 observations left, we may face degree of freedom or sample selection bias problems in the estimations of the

model(s). In addition, the loss of the time dimension implies that the controlling for unobserved heterogeneity or omitted variables becomes problematic, given the difficulty of defining and finding of adequate explicit empirical proxies. In this view, we use alternatively as index for migration policy the sub-index $MPI - UN$ (see section 3.4, which provide us with fairly reliable data for a panel of 34 countries for 16 years. This policy indicator allows the estimation of the following standard fixed effect static panel model:

$$mpi_{it} = X'_{it}\beta + Z'_{it}\gamma + e_i + \varepsilon_{it}, \quad (10)$$

where X represents the matrix of the potential determinants of immigration policy, in which we include the *old age dependency ratio*, *old age welfare expenditures*, the *skill ratio of the population at active age* and the *degree of union membership*. Z denotes the matrix of the control variables, but consists only of *annual growth of gdp*. Other determinants that may affect migration policy as well as unobserved heterogeneity are taken into account by country fixed effects e_i .

4.3 Estimation results

Table 2 presents the estimation results of model 9 for the migration policy index estimated using all available information (mpi). We only report the result for the logit specification as the results for the probit specification are very similar. Taking uncertainty of the index estimation into account reduces the data on migration policy to a cross-section of about 30 countries, but this allows to include the most control variables of all estimated models because we can use the whole available time series to calculate one central value for all variables and countries. We notice the negative significant effect of low-skilled immigration in the past on migration policy, i.e. the more low-skilled intensive past migration was, the higher the probability of a restrictive policy (a low mpi value) and the positive effect (hence a higher probability of a open migration policy) of the old age dependency ratio, the skill abundance of the national citizens and income inequality. However, given the small sample size as well as the impossibility to control for unobserved heterogeneity or omitted variables, we are rather reluctant to draw strong conclusion for these results, if any. Rather, our first major conclusion is that, in the present state of data availability, the uncertainty of the estimated migration policy index represents a serious obstacle for a cross-country analysis of migration policy.

Therefore, we add to the first estimations, those of model 10, using only one data source (the UN International Migration Policies Database) that allows to estimate a migration policy index for a panel of countries and years (MPI-UN). We report in table 3 the estimation results of a standard fixed-effects panel model in two specifications: linear and semi-log linear. The number of degrees of freedom increases

Table 2: Determinants of migration policy - ordered logit model

Variables	MPI
lagged low-skilled immigration	-0.226** (0.117)
growth of gdp	2.990 (1.844)
skill ratio	40.767* (21.405)
old age dependency ratio	185.632** (94.466)
newborn of foreign nationality	0.076 (0.262)
unemployment rate natives	-1.682 (1.389)
union membership	0.194 (0.149)
public health expenditures	0.492 (0.723)
public education expenditures	3.654 (2.539)
gini coefficient	230.310* (120.476)
pseudo R-squared	0.669
Prob > χ^2	0.02
N	20

Note: standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% level respectively.

Table 3: Determinants of migration policy - panel fixed effects model

Variables	MPI-UN	MPI-UN	MPI-UN	MPI-UN
old age public expenditures	-0.003 (0.004)		-0.1 (0.15)	
log (old age public expenditures)		-0.015 (0.027)		-1.358 (0.909)
old age dependency ratio	1.738*** (0.376)		17.445 (15.208)	
log(old age dependency ratio)		0.463*** (0.107)		5.972 (3.931)
union membership	-0.002** (0.0008)		-0.064** (0.028)	
log(union membership)		-0.062** (0.003)		-1.675* (0.855)
real gdp growth rate	-0.001 (0.0008)		-0.012 (0.023)	
log(real gdp growth rate)		-0.005 (0.003)		0.024 (0.078)
skill ratio	0.0001* (7.0*10 ⁻⁵)		0.001 (0.002)	
log(skill ratio)		0.003 (0.004)		0.002 (0.105)
Country fixed effects	<i>yes</i>	<i>yes</i>		
R-squared	0.306	0.312		
F	12.23***	9.47***		
N	165	125		

Note: standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% level respectively. One-period lagged values are taken of the explanatory variables. A constant was included in all the estimated models but is not reported. Column 4 and 5 report the estimation results with a correction for the uncertainty of the MPI estimates, for the linear and semi-log specification respectively.

substantially and the loss of some control variables that could be used in the estimation of model 9 is compensated by the inclusion of country dummy variables that capture (time invariant) country specific characteristics in general.

In both specifications, union membership and the old age dependency ratio are significant with the theoretically expected sign: the higher old age dependency, the higher the incentive and the power of the currently old for an open migration policy to cope with the burden of ageing, in line with the median voter models of, e.g. Razin and Sadka, Higher union power is linked in the interest group theory to a more restrictive policy (as trade unions tend to organise in the first place the domestic workers to which immigrant labour is the closest substitute) and therefore, a negative sign is expected. This implies that our estimated model give indications for *both* the potential political economy hypotheses that are put forward to explain migration policy. In addition, in the linear model variant, the skill endowment of the domestic population is significant (with the expected positive sign) as well.

However, the estimations reported in the first two columns in table 3 do not take into account that the regressand is an *estimated* variable instead of a measured one. In other words, it takes the estimation for given and ignores its uncertainty. Hence, it is quite possible our results are not robust for correcting for the latter. We verified to what extent the estimation results are robust for the uncertainty of the migration policy estimates by estimating the model using a Gibbs sampler in which each iteration uses a different draw of the MPI index. The Gibbs sampler starts with a drawing a value of the MPI index from its distribution (which ultimately comes from the state-space model). Using this draw, the distribution of the β and γ is computed and drawn from. These draws are then saved and the subsequent iteration is started. Finally, using the converged draws of β and γ we can compute the expected values, standard deviation and significance of the parameters. We report in the fourth and fifth column of table 3 the estimation results for the linear and semi-log specification when correcting for the uncertainty of the MPI-UN estimates in this way. All variables loose their significance except union membership, which remains significantly negative. Hence, the indications for the interest group theory of migration policy seem the most robust.

Finally, we explored the extent to which migration policy may be correlated over countries and indications of international policy competition can be found. All theoretical models, as well as empirical analyses until now assume orthogonality between countries of immigration policy, though it is intuitively easy to understand that externalities of immigration policy in the neighbouring (or other) countries can affect the policy in the field a country adopts. Therefore we re-estimated model 10, but now including the spatially lagged dependent variable (MPI-UN) as additional regressor. The spatial weight matrix we used to construct this variable is the (normalised) inverse of the bilateral distance between the capitals

of the countries included in the sample (i.e. the OECD countries for which MPI-UN could be computed and data on the independent variables were available). We performed a maximum likelihood estimation of this spatial autoregressive model of which the results are reported in table 4. The need for a strongly balanced model compels us to eliminate from the specification the skill ratio variable, which is a commonly included and theoretically supported variable, though only marginally significant in our estimations. In any case, table 4 indicates the presence of *significantly* - as expected- *positive* spatial correlation in (the restrictiveness of) migration policy, in addition to the positive significant effect of the old age dependency ratio and the significant negative effect of union membership, previously found. Yet, now old age related public expenditures are significant as well, though with a negative sign. To the extent that this is unrelated to methodological issues, due to the omission of the skill endowment variable, it may indicate that, once controlled for its effect on the old age burden, immigration is discouraged because of the increase in public expenditure (old age related in particular) it implies. In addition, at this stage, we didn't try to correct for the estimation error in constructing the MPI-UN variable.

5 Conclusion

We tried to construct an index of migration policy that would allow for a cross-country comparison and analysis, using all available data sources at present. Though our computations converged and estimates were obtained, for most countries and years their uncertainty precludes a meaningful analysis. The signal to noise ratio in the available data seems too low to obtain an indicator for policy analysis and research. Perhaps more fundamentally, migration policy may be intrinsically multidimensional and is therefore difficult to reduce to the one dimension of policy toughness. Depending on the targeted social groups (or geographical origins), countries can be simultaneously open and restrictive in their migration policy. In order to analyse migration policy as much as possible with the available data, we constructed an alternative index from a more selective datasource, but which we consider more univocally informative about the policies' restrictiveness and that allows to construct for a subset of OECD countries a panel of data, which allows to control more adequately for unobserved heterogeneity and omitted control variables. An estimation of the determinants of immigration policy for two alternative model specification gave support for both the main theories to explain migration policy from a political economy perspective, i.e. the median voter and the interest group hypothesis. However, only the evidence for the latter seems robust for the correction of the uncertainty of the migration policy index estimates. Finally, a first exploration of policy interaction between countries gave significant indications of positive cross-country correlation in migration policy, a finding which intuitively plausible, yet ignored in the literature hitherto.

Table 4: Determinants of migration policy - spatial autoregression model

Variables	MPI-UN
old age public expenditures	-0.009*** (0.003)
old age dependency ratio	0.562*** (0.139)
union membership	-0.002*** (0.0004)
real gdp growth rate	-0.001 (0.0007)
ρ	0.335*** (0.079)
Country fixed effects	<i>yes</i>
R-squared	0.307
LL	837.503
N	378

Note: standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% level respectively. One-period lagged values are taken of the explanatory variables. A constant was included in all the estimated models but is not reported. We used the *xsmle* routine in STATA to estimate the SAR-model

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