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Electoral Systems and Immigration

Giuseppe Russo and Francesco Salsano

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Abstract

Unexplored stylized facts on OECD countries suggest that plurality electoral systems are associated with higher openness to immigration. We propose an explanation based on a retrospective voting model where immigration hurts voters but benefits a rent-seeking policymaker who appropriates part of the income generated by immigrants. To be reappointed, the policymaker must distribute compensation. With respect to proportional systems, plurality systems make it possible to compensate only a few decisive districts and leave higher after-compensation rents, producing therefore higher immigration. In our model, non-decisive districts receive no compensation at all under both electoral systems, providing a rationale for widespread anti-immigration attitudes. Notably, our results also help to explain why governments often seem more pro-immigration than voters. Finally, our model suggests that proportional systems may incentivize the enfranchisement of immigrants with voting rights and that opposition to immigration is more territorially dispersed in plurality systems. Basic evidence supports both predictions.

JEL Classification. D72, D78, F22, H00, H40

Keywords. electoral systems, rent extraction, retrospective voting, immigration

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Electoral Systems and Immigration*

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1 Introduction

A broad theoretical and empirical literature, in economics and political science, has examined the effects of electoral systems since the pioneering contributions of Duverger (1954) and Buchanan and Tullock (1962). This vast body of research ranges from fiscal policy to growth, corruption, income distribution, and even to economic development. Nonetheless, the possibility that electoral systems may affect immigration flows has not yet been investigated, although this contingency is a matter of the utmost importance. Actually, although immigration is in many ways beneficial,¹ its gains are not evenly distributed and voters are concerned of labor market competition, access to welfare benefits and threats to national identity. This was tangible in the latest elections for the US presidency, where immigration has been a key issue. In the UK, concerns for immigration have been crucial for the Brexit. In the EU, immigration is now perceived as the most important issue facing the Union.² A recent 22-country survey shows that 49% of respondents agree that "there are too many immigrants in our country" and only 19% disagree.³

On the other hand, many major corporations call for less stringent immigration rules both in the US and in the EU.⁴ These companies include not only hi-tech firms searching for skilled workers, but also farm groups, the construction sector, maintenance industries and the food services business. Policymakers are therefore caught between a rock and a hard place, and they have to find a balance between these contrasting stances. According to the literature, governments are often more pro-migration than voters because they are responsive to corporate lobbying activities (Hanson and Spilimbergo, 2001; Fasani, 2009; Freeman, 1992; Chiswick and Hatton, 2003; Facchini and Testa, 2015). Is it possible that also electoral systems play a role in this process?

If we look at immigration inflows controlling for per-capita Gross Domestic Product (GDP), an overlooked stylized fact appears, namely, inflows into countries with plurality electoral systems are much higher than inflows into countries with proportional systems (see Figure 1 and Figures 2, 3 in the Appendix). This striking difference increased during the 1996/2014 period.

¹Immigration not only provides workers to many industries but, in the long run, also supports pension systems by contrasting the effects of decreasing fertility rates (see Storesletten 2000; Sand and Razin 2007; Gonzalez et al., 2009).

²See European Commission, (2015). See also Mayda (2006); O'Rourke and Sinnott (2006).

³Source: Ipsos 2016 Global Views on Immigration and the Refugee Crisis. In this 22-country survey, 46% of respondents agree that "Immigration is causing my country to change in a way that I don't like" and only 22% disagree. Also, 50% agree that "immigration has placed too much pressure on public services" while 18% disagree. Finally, 43% agree that "Immigrants have made it more difficult for people of your nationality to get jobs", and 25% disagree. See also Card et al. (2012), who find that worries about preserving shared religious beliefs, traditions, and customs are three to five times more important than economic competition in shaping individual attitudes to immigration.

⁴For the US, see Forbes, 09-17-2013, "Where do Major US Corporations Stand in the Immigration Debate?", N. P. Flannery. For the EU, see the discussion by P. Gattaz, president of the MEDEF (National Confederation of French Employers) on "Le Monde" 09-08-2015. See also the report # 26-2016 of Centro Studi Confindustria (Federation of Italian Employers) "Immigrants: from emergency to opportunity".

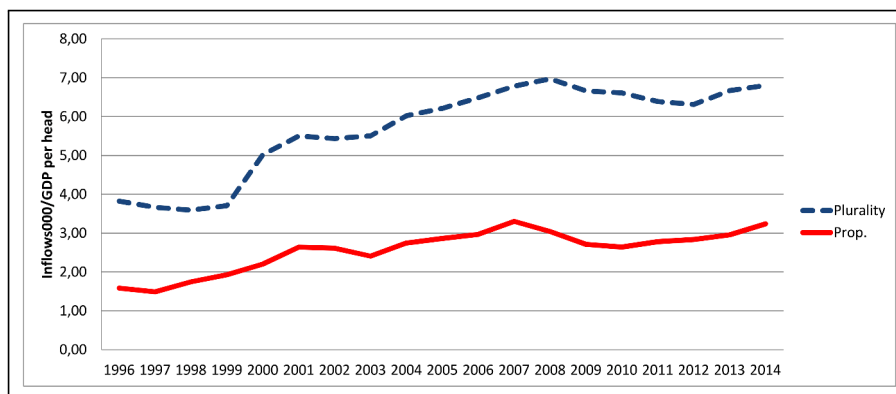


Figure 1: immigration and electoral systems

What makes these figures so different? Simple cross-country regressions based on OECD countries during the 1998/2014 period confirm that a "plurality" dummy has a significant effect on per-capita immigration inflows (Table 3).⁵ Why do plurality systems reduce barriers to immigration? How do these systems shape policymakers' incentives in immigration policies?

The relationship between electoral systems and immigration is the core of this paper. We propose an explanation based on a simple model of retrospective voting à la Persson and Tabellini (2002) with a rent-seeking policymaker. As argued above, the policymaker can benefit from immigration thanks to the lobbying activities of firms. Our model simplifies this framework through the assumption that he directly benefits from immigration by appropriating part of the tax revenues it generates.⁶ However, the policymaker cannot set immigration as he pleases. In our model, voters are hurt because immigration congests public goods provision. To be reappointed, he must compensate decisive districts for this congestion. The net benefits available to the policymaker after distributing compensation depend on the electoral system. Plurality systems make it possible to compensate only a few decisive districts,⁷ and this allows to retain higher after-compensation rents for any immigration inflow. This explains why plurality systems are more open to immigration. Our approach based on rent-seeking and compensation brings to light another consequence, namely, the need to compensate only decisive districts implies that immigration is excessive in all other districts. Actually, since in both electoral systems non-decisive districts are disregarded, there will always exist an excess of immigration.

This distortion is particularly serious in the plurality system, where only the

⁵Our dependent variable is the per-capita immigration inflow. Our explanatory variables include a dummy for the electoral system, standard indicators of per-capita income and economic development, controls for the demographic structure and for several institutional characteristics, such as former colonial empires and the rules that grant citizenship. The results are shown in Table 3. We also perform standard robustness checks.

⁶For the purposes of our model it is indifferent whether rents come from tax appropriation or from lobbying activities.

⁷This mechanism is better explained at the beginning of section 3 and is at the core of section 4.

voters of few decisive districts are compensated. We obtain this outcome in a framework where public spending operates either through locally provided public goods (henceforth "public goods") or through non-targetable, wide-ranging welfare programs that benefit individuals based on their personal characteristics (henceforth "transfers").⁸ Therefore, the model also addresses the bias in public expenditures introduced by electoral systems. In line with many authors, we find that proportional systems may bias spending toward extensive, non-targeted transfer programs, which better fit the need to secure larger majorities (Persson, 2004 and 2002; Persson and Tabellini, 2002; Lizzeri and Persico, 2001; Milesi-Ferretti et al., 2002; Ticchi and Vindigni, 2009). However, we point out that immigration may reverse this bias. The reversal occurs because it is hard to deny transfers based on nationality: Immigrants with the same characteristics as the natives cannot be discriminated forever.

Transfers to non-voting immigrants reduce the policymaker's rent but are useless for re-election. Therefore, the policymaker may be better off by securing re-election through public goods or, if reforming public spending proves too difficult, by extending the voting franchise. This result provides us with an additional prediction, namely, proportional systems could favor voting enfranchisement. We checked whether access to voting rights for immigrants is easier under proportional representation. In the OECD, immigrants have voting rights in 74% of countries with proportional systems and in 36% of countries with plurality systems (see Table 4). The possibility of using enfranchisement to gain immigrants' vote can be considered another form of the Curley effect put forward by Glaeser and Shleifer (2005): The incumbent policymaker strategically grants voting rights to enlarge his political base. Summarizing, the model accounts for several stylized facts: it explains why governments tend to be more pro-immigration than voters; why plurality systems allow for more immigration; why proportional systems seem to encourage voting enfranchisement. In addition, the model suggests that large shares of population are not compensated for the costs of immigration, and this could help to explain the anti-immigration sentiment in the public opinion.

The paper is organized as follows: Section 2 focuses on the empirical background that motivates the analysis; section 3 first describes the differences between plurality systems and proportional systems, then introduces the policymaker's and voters' utility. Section 4 presents the results of the retrospective voting model, section 5 discusses some testable implications and section 6 concludes. The proofs are shown in the Appendix.

⁸Although there is no general agreement on this notation (Lizzeri and Persico, 2001, argue that targetable expenditures should more properly be defined as pork-barrel spending), these definitions are often adopted in the literature (see, for example, Milesi-Ferretti et al., 2002). According to Persson (2002), what matters is that some expenditures can be targeted to specific areas, while others cannot. The specific form of targeting is not important.

2 Empirical background

In this section, we present empirical facts that suggest a relationship between electoral systems and immigration.

2.1 Data

We use data for OECD countries (listed in Table 1) during the 1996/2014 period. The database includes economic, institutional and demographic variables. Economic variables are per-capita Purchasing Power Parity (PPP) adjusted real GDP, tax revenues in terms of the GDP, and the trade to GDP ratio.⁹ Per-capita GDP proxies for wage differentials. Tax revenues over GDP account for the weight of the state in the economy, which, in turn, is a proxy of business freedom, and trade to GDP accounts for the economy's openness to international trade.¹⁰

Institutional variables come from the World Bank's DPI database (Keefer, 2006). Electoral systems are denoted by a dummy, which is 1 if representatives are elected with a winner-takes-all/first-past-the-post rule, and zero if the electoral system is proportional.¹¹ We also include dummies for EU membership and for the presence of former colonial empires, because the Schengen Treaty could foster within-EU migration and former colonial empires may ease mobility from these countries.

Demographic variables include the log of the total population, the percentage of working-age population, and the percentage of elderly.¹² According to Persson and Tabellini (2003, 2004), total population is an important proxy of development: Highly populated countries are usually less developed and less attractive to immigrants. Working-age population is a measure of labor supply and indicates potential labor market competition. Finally, the percentage of elderly is important because immigration could support retirement schemes and provide domestic care services.

We remove short-term factors that affect immigration (e. g., business cycles or temporary shocks) by averaging the data over the whole sample period.

The measure of immigration is the 1996/2014 per-capita average inflow of immigrants in OECD countries.¹³ We are left with a small sample of 34 obser-

⁹Trade is defined as exports plus imports.

¹⁰Trade openness matters because it may substitute immigration through Stolper-Samuelson effects.

¹¹Note that many countries adopt a mix of the two systems. For instance, some seats may be allocated on a proportional basis in order to preserve representation. We take this feature into account by exploiting the "house system" dummy of the DPI database, which is coded 1 when the majority of seats is elected under plurality rule. When this dummy is 1, we classify a country as under plurality rule. Australia, Italy, Hungary, and Korea are included in the plurality systems. Greece, Germany, and Spain are included in the proportional systems.

¹²Source: OECD Online Statistics (2017). Working-age population is aged 20-64, and the elderly are aged 65 and older.

¹³Source: OECD Online Statistics (2017). For our purposes, immigration flows are better than stocks because flows reduce the potential bias due to historical reasons, such as the former presence of colonial empires. Table 2 shows the cross-sectional 1996/2008 average, the

vations that is, of course, by no means general but suggests several insights.

2.2 Estimation

We estimate a simple cross-country regression of the form

$$m_i = c + \eta z_i + \alpha x_i + \beta s_i + u_i, \quad (1)$$

where m_i is the measure of immigration in country i .¹⁴ z_i is the plurality dummy and x_i includes the economic and demographic variables. s_i includes the dummies indicating EU membership and former colonial empires. c and u_i are the constant term and the error term, respectively.

The results of the regressions (summarized in Table 3) are discussed in the Appendix, in which some robustness checks are also reported. The coefficient on plurality is positive and statistically significant at the 5% level in all our specifications. Thus, the available data indicate that the possibility of a relationship between electoral systems and immigration shown in Figure 1 cannot be easily discarded.

3 Electoral systems

In our model of representative democracy, an incumbent policymaker runs against an identical opponent. C seats can be assigned under either the plurality rule or proportional representation. For simplicity, we assume that $C/2$ seats are required to win the election. The plurality system partitions n voters into C constituencies. Each constituency assigns a seat. We assume that one half of the votes is sufficient to win in each constituency. To simplify the notation, we split each constituency into two equal-sized districts, so that the support of one district is sufficient to win the constituency's seat. As the appointed candidate needs $C/2$ seats, he has to secure $C/2$ districts. With some abuse of notation, we define these districts as "decisive districts" and their voters as "decisive voters."

Proportional systems can be depicted as a single national constituency in which a single decisive district assigns $C/2$ seats. Note that this district includes $n/2$ decisive voters. In a plurality system, each constituency includes n/C voters, and each district includes $\frac{n}{C} (\frac{1}{2})$ voters. Because the winning candidate needs the support of $C/2$ districts, there will be $n/4$ decisive voters. This well-known difference crucially affects the results.

3.1 The voters

The economy is populated by n voters and m immigrants. The policymaker determines the immigration level $m \in [0, \bar{m}]$, where \bar{m} is the stock of potential

standard deviation, the minimum and the maximum for each variable of the sample.

¹⁴We do not use a panel because electoral systems are in practice constant over time, and their effect is captured by the country effects. In other words, the time dimension is not useful in this case.

immigrants. The voters' indirect utility includes the after-tax wage and public spending, in the form of transfers (f) and local public goods (g_{jk}). For the analysis it is essential to stress that transfers are allocated based on individual characteristics and cannot be geographically targeted.¹⁵ On the other hand, local public goods are provided on a territorial basis, and this is why they are indexed by district (j) and constituency (k).¹⁶

We denote with ω_{ijk} the indirect utility of voter i in district j , in constituency k :

$$\omega_{ijk} = (1 - t) + \Psi_i f + h(g_{jk}, m) \quad (2)$$

$$i = 1, \dots, n/2C; \quad j = 1, 2; \quad k = 1, \dots, C; \quad 0 < t < 1$$

where $(1-t)$ is the after-tax income, $f \geq 0$ is a transfer, and Ψ_i is an indicator function that is one if the voter is entitled to a transfer and zero otherwise. $h(g_{jk}, m)$ is a continuously three-times differentiable function that depicts the utility of the public good and a congestion effect due to immigration. Because income is normalized to unity for natives and immigrants, we are able to skip the controversial issue of wage competition (Ottaviano and Peri, 2012; Aydemir and Borjas, 2011). For the results to hold, we only need that immigration hurts the natives' utility. The congestion effect is sufficient for this purpose. Moreover, this assumption perfectly fits the widespread preception that immigration places a burden on public services reported by the recent 22-country survey cited in the introduction (see also footnote 3).

We now specify the properties of $h(g_{jk}, m)$. As in Persson and Tabellini (2002), the marginal utility of the public good g_{jk} is positive and decreasing; thus, $h(g_{jk}, m)$ is strictly concave in g_{jk} . The following derivatives describe the congestion effect:

$$h_m(g_{jk}, m) < 0; \quad (3)$$

$$h_{mm}(g_{jk}, m) < 0. \quad (4)$$

Derivative (3) can be considered the marginal cost of immigration in terms of utility. It indicates that population inflows tend to jeopardize the provision of services such as education, public transportation, health care and so on.¹⁷ Derivative (4) assures that this marginal cost is increasing.

¹⁵As we will see in the next section, this crucially implies that immigrants who meet these characteristics cannot be indefinitely banned from transfers.

¹⁶For our argument, it is essential that public goods can be targeted precisely. Actually, they have to be provided to a subset of voters *within* a constituency: the "district" in the notation. This requires that expenditures can be addressed very precisely. This is possible for many important goods, like schools, roads or hospitals.

¹⁷Pure public goods are not rival, thus, for simplicity, they are omitted.

The cross derivatives show the effect of immigration on the marginal utility:

$$h_{gm}(g_{jk}, m) < 0; \quad (5)$$

$$h_{gmm}(g_{jk}, m) > 0. \quad (6)$$

Derivative (5) states that the marginal utility of the public good decreases as it is shared with immigrants. Derivative (6) states that immigration reduces the marginal utility at a decreasing rate.

3.2 The policymaker

We follow Persson and Tabellini (2002) and use a government made up of a rent-seeking policymaker. As we argued in the introduction, in order to preserve simplicity we abstract from showing the interaction between the policymaker and the pro-immigration lobbies. For our model, we only need that the policymaker gets some benefits from immigration. It is not important where these benefits come from: Lobbying activities or tax appropriation are indifferent in this respect. Thus, we simplify our analysis by assuming that rents come from tax appropriation, and that the policymaker maximizes the following objective function:

$$E(U) = \gamma r + p_v R \quad (7)$$

where $r \geq 0$ denotes the rent he is able to extract. Rent extraction is assumed to be distortionary; thus, a percentage $(1 - \gamma)$ of the rent is wasted.

p_v is the probability of re-election, and R is the discounted expected utility of remaining in office. For simplicity, R is exogenous, but in a richer setting, R can be determined as the present value of expected future rents (see Ferejohn, 1986; Persson et al., 1997).

Under retrospective voting, the incumbent policymaker is reappointed if and only if he provides the decisive voters with their reservation utility ϖ . Thus, the probability of re-election is

$$p_v = \begin{cases} 1 & \text{if } \omega_{ijk} \geq \varpi; \\ 0 & \text{otherwise.} \end{cases}$$

The policymaker is subject to an aggregate budget constraint that includes expenditures for public goods, transfers, and his own rent:

$$t(n + m) = g + f(\sigma n + \rho m) + r. \quad (8)$$

The left-hand side of the budget constraint is the fiscal base. On the right-hand side, g is the aggregate expenditure for public goods,¹⁸ and $f(\sigma n + \rho m)$ is the aggregate expenditure for transfers, where σ and $\rho \in [0, 1]$ denote, respectively, the percentages of natives and immigrants entitled to transfers.¹⁹ In the following lemma, we argue that $\sigma = 1/2$ because in equilibrium the policymaker grants transfers to half the voters.

¹⁸We have $g = \sum_{j=1}^2 \sum_{k=1}^C g_{jk}$.

¹⁹The rent r is residual and is appropriated after transfers and public goods are distributed. Note that to maximize his rent the policymaker has to increase the fiscal base.

Lemma 1 *In any electoral system, either transfers are distributed to 1/2 voters, or transfers are not used at all. Thus, either $f > 0$ and $\sigma = 1/2$ or $f = 0$.*

Proof. See the Appendix. ■

To intuitively understand the lemma, consider a policymaker who satisfies *all* voters with transfers by setting $\sigma = 1$. In such a case, he can increase his rent by reducing σ to $1/2$, while still being reappointed. However, if he reduces σ below $1/2$, he will not be reappointed. The policymaker can restrain transfers to one half of the voters by properly choosing the personal characteristics Ψ_i .²⁰ Therefore, we can substitute $\sigma = 1/2$ into the aggregate budget constraint (8):

$$t(n + m) = g + f\left(\frac{n}{2} + \rho m\right) + r. \quad (9)$$

Now we turn to ρ , namely, the percentage of immigrants entitled to transfers. As entitlement depends on Ψ_i , it is crucial to note that immigrants who share these characteristics with natives cannot be discriminated forever. In other words, $\sigma > 0$ implies $\rho > 0$. In principle, ρ may be smaller, larger, or equal to σ depending on the prevalence of these characteristics in the immigrant population.²¹ Because what matters for our purposes is only that some leakage of transfers toward immigrants is ultimately inevitable, we keep the model as simple as possible and assume that immigrants are equivalent to natives, namely, that $\sigma = \rho = 1/2$. Although by no means necessary, this assumption remarkably simplifies our exposition. The budget constraint finally becomes

$$t(n + m) = g + f\left(\frac{n + m}{2}\right) + r. \quad (10)$$

We can now introduce the model.

4 The model

We adopt a retrospective voting model with sequential decisions in line with Persson and Tabellini (2002). In this model, voters hold politicians accountable and reappoint the incumbent policymaker if and only if they are provided with a reservation utility ϖ at least. Retrospective voting has been studied extensively since the seminal work of Key (1966), and several papers over the last

²⁰In practice, different criteria for transfers benefit different individuals. For instance, the policymaker can allocate family aid depending on the number of children or on their age; the same holds for rent subsidies and scholarships. Criteria for entitlement to unemployment benefits are another example.

²¹Because immigrants tend to be poorer than natives, there are good reasons to expect $\rho > 1/2$. Such concerns are summarized by the famous quote by Milton Friedman: "It's just obvious that you can't have free immigration and a welfare state." and have generated extensive literature (see Facchini et al., 2004; Kaushal, 2005; Razin et al., 2002; Razin et al., 2011; Nannestad, 2007). Attempts to ostracize immigrants from welfare benefits are common: For instance, entitlement may be tied to a minimum residence period or receiving the host country citizenship. Former U.K. prime minister David Cameron recently proposed that low-paid UE immigrants should be prevented from receiving income supplements for four years (source: BBC, 29 Jan. 2016).

decades have supported the idea that voters reward incumbent politicians for good economic performances and punish them for bad economic performances (Kramer, 1971; Lewis-Beck, 1988; Markus, 1988). Wolfers (2013) confirms the robustness of this finding. In addition, experimental evidence shows that individuals over-condition on the observed outcomes their inferences regarding the leader's effort (Petty and Weber, 2007). Consequently, we are confident that our modeling strategy is well suited for the focus of this paper.

The timing of the model is the following:

- 1) Voters set a reservation utility ϖ required to reappoint the incumbent policymaker.
- 2) The policymaker decides the immigration inflow allowed into the economy.
- 3) The policymaker collects taxes, compensates the losses of the decisive voters and retains the remaining tax base as a rent.
- 4) Vote is held. The policymaker is reappointed if the decisive voters receive at least ϖ .

The model is solved backwards. Before we show the solutions, we discuss preliminary considerations to clarify our analysis.

First, we assume that immigrants are spread evenly among all districts. Clusters of immigrants in specific districts can be seen as a particular case that makes things simpler for the policymaker.²² Then, note that no policymaker would ever pursue re-election through public goods if their marginal utility were negligible. To rule out this implausible case, we put a lower bound on the marginal utility $h_g(g_{jk}, m)$, and we introduce the following assumption:

$$h_g(g_{jk}, m) \geq \frac{C}{n+m} \quad \text{for any } g_{jk} \text{ and any } m \in [0, \bar{m}]. \quad (11)$$

Assumption (11) makes the model very tractable and is not restrictive: Note that C/n is the number of seats per voter; thus, the lower bound $C/(n+m)$ is close to zero even for $m = 0$. The assumption means that the marginal utility of public goods is always sufficiently larger than zero, and enables us to plainly show the effect of a plurality system on public spending and reproduces a common outcome, namely, that plurality systems bias expenditures toward targetable public goods.²³ We summarize this result in the following lemma:

Lemma 2 *In a plurality electoral system, the policymaker secures the decisive voters through public goods.*

Proof. See the Appendix. ■

²²In such a case, the policymaker will consider districts with immigrants only when they are necessary to win the majority of seats. The possibility of compensating fewer districts leads to the detention of higher rents.

²³Assumption (11) rules out the unlikely case that in a *plurality* system a policymaker could retain higher rents by satisfying 1/2 voters with transfers instead of satisfying 1/4 voters with public goods. Because both sides of inequality (11) are decreasing in m (by eq. 5, $h_{gm}(g_{jk}, m) < 0$), the assumption imposes that the right-hand side decreases faster than the left-hand side.

This result is in accordance with Persson (2002, 2004), Persson and Tabellini, (2002); Milesi-Ferretti et al., (2002), and can be illustrated intuitively. The key point is that transfers cannot be restricted to a few decisive districts. Suppose, for instance, that the policymaker succeeds in a district by using transfers. Then, the voters of *all* districts would be entitled, and he would win *all* the seats. However, because half the seats are sufficient to govern, it follows that expenditures for the remaining half can go to rents. Public goods enable the policymaker to do so.

On the other hand, transfers can be convenient in proportional systems where the policymaker has to satisfy $n/2$ voters.²⁴ Actually, Persson (2002, 2004), Persson and Tabellini, (2002); Milesi-Ferretti et al., (2002) identify a bias of proportional systems toward transfers. We find however that immigration may reverse this bias and incentivize the policymaker to use public goods even in a proportional system. This happens because the leakage of transfers toward immigrants adds to the marginal cost of compensating the decisive voters. To illustrate this outcome we introduce a new lemma.

Lemma 3 *In a proportional electoral system, there exists a threshold level of immigration \tilde{m} such that for $m \leq \tilde{m}$ the marginal cost of compensating decisive voters through public goods is higher than the marginal cost of compensating decisive voters through transfers. The opposite occurs for $m > \tilde{m}$.*

Proof. See the Appendix ■

In other words, for low immigration levels ($m < \tilde{m}$), the marginal cost of compensation through transfers is lower. The opposite occurs for high immigration levels ($m > \tilde{m}$), because too much expenditure for transfers flows to immigrants. Since the marginal cost of compensation through transfers and the marginal cost of compensation through public goods cross at \tilde{m} , the policymaker may be better off using either the former or the latter. We present this result in a corollary to Lemma 3:

Corollary 4 *In a proportional electoral system, the policymaker can secure the decisive voters either through public goods or through transfers.*

Proof. See the proof of Lemma 3. ■

In the proof of Lemma 3, we also illustrate the simple condition that determines the optimal choice.

Corollary 4 shows that immigration may offset the bias of proportional systems toward transfers, and suggests that immigration puts pressure on countries used to high levels of transfers. However, a switch from transfers to public goods, as any radical reform of public expenditures, entails high political costs. If such a switch proves too hard, the policymaker could simply extend the voting franchise to immigrants. Although so doing does not increase his rent, he can gain the electoral support of immigrants. We discuss this important issue in section 5. For the moment, we show the solution to the model.

²⁴The proportional system is depicted as a single constituency with a single district.

4.1 Plurality system

Suppose that in stage 4 decisive voters have received their reservation utility, and the policymaker is reappointed.

4.1.1 Stage 3: loss compensation and rent appropriation

In the third stage, the policymaker collects tax revenues, secures decisive voters by compensating their loss due to immigration, and retains the (residual) rent. To maximize the rent, he has to find the cheapest method of compensation. From lemma 2, we know that he will do so by using public goods. Thus, the policymaker gives full compensation for immigration to decisive districts and disregards the others. The remaining tax base flows into rents. As a result, in equilibrium there are no transfers and public goods provision is restricted to $C/2$ decisive districts.²⁵

4.1.2 Stage 2: immigration

At this stage, the policymaker finds the optimal inflow m_{PL}^* of immigrants by allowing entry until the marginal benefit on the tax base equals the marginal cost of compensating decisive voters in each district. The marginal effect on the tax base TB is

$$\Delta TB = t\Delta m. \quad (12)$$

The marginal cost of compensation is computed in the Appendix and is shown in equation (33). Immigration is allowed until

$$t\Delta m \geq \frac{|h_m(g_{jk}, m)| \Delta m}{h_g(g_{jk}, m)} \left(\frac{C}{2} \right). \quad (13)$$

Condition (13) defines implicitly the optimal immigration level m_{PL}^* within a plurality system. We rule out corner solutions with freedom of immigration or no immigration at all, and we focus on interior solutions in which condition (13) holds with equality.²⁶ We do so for the corresponding conditions in a proportional system, namely equations. (20) and (21).

4.1.3 Stage 1: reservation utility

In the first stage, the voters set the highest reservation utility ϖ compatible with the policymaker's incentive constraint. Thus, it is necessary to construct the incentive constraint. In the case of re-election, the policymaker's utility specified in equation (7) is

$$U_E = \gamma r + R. \quad (14)$$

²⁵In practice, this means that local public goods are reduced to a minimum.

²⁶Corner solutions arise when the marginal effect of immigration on the tax base is not sufficient to compensate decisive voters and when the marginal effect of immigration on the tax base is always positive. In the first case, the policymaker chooses autarky; in the second case, he chooses not to restrict immigration.

Where r is the rent, $R > 0$ is the value of re-election and $\gamma \in (0, 1)$ is the distortion due to rent appropriation. If he is not reappointed, the policymaker appropriates the whole tax base, which gives the utility

$$U_{NE} = \gamma t(n + m_{PL}^*). \quad (15)$$

Solving the incentive compatibility condition ($U_E \geq U_{NE}$) for r gives the equilibrium rent

$$r_M^* = t(n + m_{PL}^*) - \frac{R}{\gamma}. \quad (16)$$

We substitute $f = 0$ and r_M^* into the budget constraint (9) and find the aggregate expenditure for public goods $g^* = R/\gamma$.²⁷ Because g^* has to be shared among $C/2$ decisive districts, each one receives

$$g_{jk}^* = \frac{R2}{\gamma C}. \quad (17)$$

Finally, to obtain the decisive voters' reservation utility, we plug g_{jk}^* into the utility (2)

$$\varpi_{PL} = (1 - t) + h\left(\frac{R2}{\gamma C}, m_{PL}^*\right). \quad (18)$$

Non-decisive voters, however, are not provided with public goods; thus, their utility is

$$\tilde{\omega}_{PL} = (1 - t) + h(0, m_{PL}^*). \quad (19)$$

Utilities (18) and (19) close the model in a plurality system.

4.2 Proportional System

Suppose again that the policymaker is reappointed in stage 4.

4.2.1 Stage 3: loss compensation and rent appropriation

In this stage, the policymaker retains the fiscal base left after compensating the decisive voters for the loss due to immigration. As we know from corollary 4, he may use either transfers or public goods for being reappointed. We show the two cases separately.

4.2.2 Stage 2: immigration

As in section 4.1.3, the policymaker finds the optimal inflow of immigrants by allowing entry until the marginal benefit to the tax base (12) equals the marginal cost of compensating $n/2$ decisive voters. Because compensation may occur through transfers or through public goods, two conditions determine the optimal immigration level. They are

²⁷The budget constraint becomes $t(n + m_{PL}^*) = g + r_M^*$. We solve the constraint for g and find the aggregate expenditures in equilibrium: $g^* = \frac{R}{\gamma}$.

$$t\Delta m \geq |h_m(g_{jk}, m)| (1-t)\Delta m \left(\frac{n}{2} + m\right) \quad (\text{transfers}) \quad (20)$$

and

$$t\Delta m \geq \frac{|h_m(g_{jk}, m)| (1-t)\Delta m}{h_g(g_{jk}, m)} (C) \quad (\text{public goods}), \quad (21)$$

respectively. The right-hand side of the inequalities is the marginal cost of compensation given by equations (34) and (37) in the Appendix. Conditions (20) and (21) define implicitly the equilibrium immigration levels m_{P1}^* and m_{P2}^* in a proportional electoral system. In section 4.3 we compare the equilibrium levels of immigration generated by the different electoral systems.

4.2.3 Stage 1: reservation utility (compensation through transfers)

To determine the reservation utility ϖ , we proceed as in section 4.1.4. The policymaker's incentive-compatible rent is

$$r_{P1}^* = t(n + m_{P1}^*) - \frac{R}{\gamma}. \quad (22)$$

We find the highest expenditure for transfers compatible with the policymaker's incentive constraint by substituting r_{P1}^* and $g = 0$ into the budget constraint (9). This gives $f\left(\frac{n}{2} + m_{P1}^*\right) = \frac{R}{\gamma}$; thus,

$$f^* = \frac{R}{\gamma} \left(\frac{2}{n + 2m_{P1}^*} \right). \quad (23)$$

Finally, we substitute f^* into utility (2), and we obtain the decisive voters' reservation utility:

$$\varpi_{P1} = (1-t) + \frac{R}{\gamma} \left(\frac{2}{n + 2m_{P1}^*} \right) + h(0, m_{P1}^*). \quad (24)$$

Non-decisive voters do not receive transfers; thus, their utility is

$$\tilde{\omega}_{P1} = (1-t) + h(0, m_{P1}^*). \quad (25)$$

4.2.4 Stage 1: reservation utility (compensation through public goods)

As in the previous sections, we first find the policymaker's incentive-compatible rent, namely,

$$r_{P2}^* = t(n + m_{P2}^*) - \frac{R}{\gamma}. \quad (26)$$

We find again the aggregate expenditure for public goods by substituting r_{P2}^* and $f = 0$ into the budget constraint (9), and we obtain $g_{jk}^* = \frac{R}{\gamma}$. Equilibrium public goods provision for the decisive districts will be then²⁸

$$g_{jk}^* = \frac{R}{\gamma C}. \quad (27)$$

²⁸As there is a single constituency, we have $i = 1 \dots n/2$; $j = 1, 2$; $k = 1$.

By substituting (27) into utility (2), we get the decisive voters' reservation utility:

$$\varpi_{P2} = (1 - t) + h\left(\frac{R}{\gamma C}; m_{P2}^*\right). \quad (28)$$

The utility of non-decisive voters is

$$\tilde{\omega}_{P2} = (1 - t) + h(0, m_{P2}^*). \quad (29)$$

We compare the outcomes of the different electoral systems in the next sections.

4.3 Electoral systems and immigration inflows

Conditions (13), (20), and (21) are the core of this paper. They implicitly define the optimal immigration level under plurality and proportional systems, respectively.

m_{PL}^* denotes the optimal immigration under plurality rule. m_{P1}^* and m_{P2}^* denote the optimal immigration level under proportional representation when decisive voters are compensated through transfers or public goods, respectively.

In what follows, we show that m_{PL}^* is larger than m_{P2}^* and m_{P1}^* , as we summarize in the following proposition:

Proposition 5 (*Electoral systems and barriers to immigration*): *Plurality electoral systems produce a higher equilibrium level of immigration.*

Proof. See the Appendix ■

Plurality systems support immigration because they enable the policymaker to compensate only $C/2$ districts that contain $n/4$ voters, and this can easily be achieved through local public goods. On the other hand, in a proportional system he has to compensate $n/2$ voters.²⁹ As a consequence, the marginal cost of compensation is always higher in the proportional system.³⁰ If compensation works through public goods, they must be distributed to C districts instead of $C/2$. If compensation works through transfers, they also flow to immigrants. In short, it seems that immigration may increase public spending especially in proportional systems. In section 5, we conjecture that this mechanism may lead to voting enfranchisement for immigrants. For now, we proceed to compare the equilibrium payoffs under the different electoral systems.

4.4 Equilibrium payoffs

In this section, we analyze the policymaker's and voters' payoffs under different electoral systems. By comparing the equilibrium rents (16), (22), and (26), it is straightforward to realize that $r_M^* > r_{P2}^* > r_{P1}^*$. As the policymaker uses immigration to increase his rent, it is not surprising that higher immigration

²⁹See the discussion in section 3.

³⁰This is shown in the proof of Proposition 5.

is associated with higher rents.³¹ We also remark that the resources left to the voters once the policymaker's incentive constraint is satisfied are the same, namely R/γ , under both electoral systems (see equations (17), (23), and (27)). In other words, all the tax base exceeding R/γ flows into rents. Ultimately, we are left with a policy that concentrates the benefits on a small group of pro-immigration lobbies and spreads the costs over the remaining population: Decisive voters are kept indifferent to immigration, but the others are definitely hurt.

We cannot compare the decisive voters' utility given by equations (18), (24), and (28), because their arguments are different and the function $h(g_{jk}, m)$ is a generic one.³² However, we can compare the utility of non-decisive voters, as they have the same income $(1-t)$, and, in our simplified framework, they receive neither public goods nor transfers. As a consequence, the immigration level is the only difference in their utility, and they are worst off in the plurality system, that produces more immigration. Actually, under proportional representation $1/2$ voters receive no compensation at all for the cost of immigration. This figure climbs up to $3/4$ in the plurality system. The existence of large shares of neglected voters under both electoral systems provides a solid rationale for the formation of extensive anti-immigration sentiment.³³

Summarizing, we confirm two main results in the literature: 1) Plurality systems tend to convey locally provided public goods towards the decisive districts and reduce transfers; 2) The benefits of government spending are more evenly distributed under proportional systems. However, we add some novel results: 1) Plurality systems reduce barriers to immigration; 2) immigration may reverse the bias of proportional systems toward transfers; 3) proportional systems may incentivize the governments to extend the voting franchise to immigrants; 4) from the voters' perspective, immigration is excessive in both systems, and particularly under plurality rules. Results 3) and 4) have testable implications that we discuss in the next section, where we also report some stylized facts in line with them.

5 Further testable implications

In this section, we report simple stylized facts that support our predictions.

³¹This result is in line with Persson and Tabellini (2000, chapter 9) who find that plurality systems can produce higher post-election rents for the incumbent politician.

³²On comparing equation (18) and equation (28), we see that the former includes more public goods and more immigration (i.e., higher congestion), and the latter includes less public goods but also less immigration (i.e., lower congestion).

³³Note also that non-decisive voters are better off in the proportional system because equilibrium immigration is lower (see equations (19), (25), and (29)).

5.1 The voting franchise of immigrants in proportional systems

In Corollary 4 we have stressed that, in a proportional system, immigration may make it profitable for the policymaker to distribute compensation through public goods. This provides some interesting insights. Consider, in particular, that the structure of public expenditures depends very much on a country's history. Switching from transfers to public goods in order to extract more rents from immigration could be very hard for a policymaker: In practice, all radical reforms of public expenditures face fierce political opposition and are only partially implemented. In these contingencies, enfranchising immigrants with voting rights could be a way to turn transfers leakage into political consensus. In other words, a policymaker who finds it impossible to curb transfers to immigrants may try to win their vote. This could be even more important in local elections, where the vote of immigrants can be pivotal. We checked the existence of voting rights for immigrants in the OECD.³⁴ Typically, voting is allowed for municipal elections after 3/5 years of residence. Immigrants can vote in 17 countries out of 23 with proportional systems (74%) and in 4 countries out of 11 with plurality systems (36%). Although we do not claim that this descriptive evidence is sufficient to confirm our scheme, at least it does not contradict our predictions and is in line with the Glaeser and Shleifer's (2005) Curley effect.

5.2 The variance of the opposition to immigration

If we consider a proportional system as a single, nation-wide constituency, the half of the country that includes the decisive voters should be indifferent to immigration. On the other hand, in a plurality system, attitudes to immigration should change swiftly among compensated and non-compensated districts within the different constituencies. Thus, opposition to immigration should be more territorially dispersed within plurality systems. We have checked this prediction by using both World Value Survey (WVS) and European Social Survey (ESS) data.³⁵ Results clearly confirm the predicted pattern (see Table 5): the variance of anti-immigration attitude is higher in plurality systems by 46% (WVS) and 294% (ESS).

³⁴The type of election and the requirements necessary for voting are listed in Table 4 in the appendix.

³⁵Both WVS and ESS report regional identifiers of the respondents. Question V39 of 2000-2014 WVS asks the respondent whether he or she "would not like to have as neighbors: immigrants/foreign workers". Question B34 CARD 20 of the ESS (in several waves) asks "Is [country] made a worse or a better place to live by people coming to live here from other countries?" (Worse = 0; better = 10). We have considered all answers from 0 to 3 as expressing opposition to immigration. This way we obtain a measure of opposition to immigration comparable to the the WVS one. Our results do not vary if we use a more stringent definition.

6 Conclusions

This paper suggests that electoral systems matter not only in determining the size and the composition of government spending but also in determining barriers to immigration and the extension of voting rights to immigrants. Both findings are novel.

Overall, our model is consistent with several pieces of evidence: 1) governments seem generally more pro-immigration than voters; 2) For a given GDP per head, immigration to countries with plurality systems is twice as much immigration to countries with proportional systems; 3) The extension of voting rights to immigrants is more common in countries with proportional systems; 4) The territorial variance of anti-immigration attitudes is higher in plurality systems.

Our findings also draw the attention on the role of non-decisive voters, who are disregarded by the policymaker: These voters are $1/2$ of the population in proportional systems and $3/4$ of the population in plurality systems. They are hurt by immigration, but do not receive any compensation. Thus, the incentives created by the electoral systems contribute to explain the pervasive opposition to immigration. This is all the more so under plurality rules, that can exacerbate the territorial impact of immigration.

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Appendix

Cross-sectional results

The economic variables included in the regressors are the PPP adjusted GDP per-capita, the tax revenues in terms of the GDP, and the trade over GDP ratio. They are labeled *gdp_per_head*, *tax*, and *openness*, respectively. The dummies for plurality electoral systems, EU membership, and colonial empires are labeled *plurality*, *EU*, and *empire*. The demographic variables (log of total population, percentage of working-age population, percentage of the elderly) are labeled *pop1*, *pop2*, and *pop3*.

Results are shown in Table 3. Columns 1 and 2 report the estimated coefficients and the p-values, respectively. Columns 3 and 4 report the estimated coefficients and the p-values when non-significant variables are excluded. GDP and total population are significant at the 1% level with the expected sign (positive and negative, respectively³⁶). The "plurality" dummy is positive and significant at the 5% level. The percentage of the elderly is weakly significant (10%) with a somewhat unexpected negative sign. However, although in principle immigration benefits the older population by sustaining the welfare system and by providing domestic care workers, it is well-known that the elderly show more pronounced anti-immigration attitudes (Card et al., 2005; O' Rourke and Sinnott, 2006; Mayda, 2006). The dummy for the presence of colonial empires is also weakly significant (10%) with the expected positive sign, while EU membership does not have any effect. The non-significant effect of taxes suggests that high taxation does not discourage immigration. Finally, the non-significant but positive effect of working-age population (*pop2*) is in line with the findings by Ottaviano and Peri (2012), who challenge the idea that natives and immigrants are substitutes.

Robustness

Our specification is necessarily scarce because of the sample size; thus, we try to improve the analysis as much as possible by taking into account some omitted variables that might be correlated with both electoral systems and openness to immigration. Bertocchi and Strozzi (2010, 2008) argue that laws determining citizenship³⁷ can affect openness to immigration in the long run. For example, *jus soli* legislation may cause restrictive immigration policies because it makes naturalization easier. In addition, ethnic and linguistic fragmentation can affect voting rules and favor proportional voting systems, which assure a better representation of minorities. Moreover, fragmentation increases public spending in order to secure the consensus of different groups (Alesina and Spolaore, 2003).

³⁶Recall from section 2.1 that highly populated countries are usually less developed (Persson and Tabellini, 2003, 2004).

³⁷Rules governing citizenship acquisition can be traced basically to *jus soli* and *jus sanguinis*. In the first case, citizenship is attributed according to birthplace. In the second case, children receive their parents' citizenship.

These issues are addressed by adding to our regressors dummy variables for *jus soli* and for ethnolinguistic fragmentation (we use the index developed by Alesina et al., 1999).³⁸ The estimated coefficient for these variables is not significant, and the overall results of the regression are unchanged.³⁹

We perform another check by controlling for the presence of outliers, which can be very important in small-sample analyses. When one country per time is excluded, the p-value of the estimated coefficient for plurality is always significant at the 5% level. The other significant coefficients are unaffected. Finally we tried to account for other possible pull factors by including in the regressors the business freedom index provided by the Heritage Society (average 1996-2014). The coefficient was positive but not statistically significant.

Proof of Lemma 1)

Proportional System. The policymaker has to satisfy $1/2$ voters. Suppose that he satisfies *all* voters by setting $\sigma = 1$. Then, he can increase his rent and still be reappointed by reducing σ to $1/2$. If he reduces σ below $1/2$, he will not be reappointed. Thus, $\sigma = 1/2$.

Plurality System. The policymaker has to satisfy $1/2$ voters in $1/2$ constituencies, thus $1/4$ voters distributed in $C/2$ districts. However he cannot target the districts by using transfers, and if he sets $\sigma = 1/4$, he receives $1/4$ votes in each district, which is not sufficient to win any seat, thus $\sigma = 1/2$.

Proof of Lemma 2)

The policymaker wants to reduce expenditures as much as possible in order to maximize his rents, subject to the constraint of giving the decisive voters their reservation utility. For any voter, and for a given g_{jk} , immigration generates the following loss:

$$\frac{\partial \omega_{ijk}}{\partial m} = h_m(g_{jk}, m) \Delta m < 0. \quad (30)$$

Although the policymaker does not care about non-decisive voters, he must keep the decisive voters on their reservation utility; thus, they must be compensated. He has to compute whether to do so by distributing transfers or public goods. In the plurality system, there are $C/2$ decisive districts. Compensation through public goods works as follows. The policymaker first computes the increase of g_{jk} that offsets the loss of a single voter:

$$\underbrace{h_g(g_{jk}, m) \Delta g_{jk}}_{\text{utility from } \Delta g_{jk}} = \underbrace{|h_m(g_{jk}, m)| \Delta m}_{\text{loss from } \Delta m}. \quad (31)$$

By solving the previous condition for Δg_{jk} he determines the increase in public goods that offsets the loss due to immigration, namely,

$$\Delta g_{jk} = \frac{|h_m(g_{jk}, m)| \Delta m}{h_g(g_{jk}, m)}. \quad (32)$$

³⁸This index of ethnolinguistic fractionalization measures the probability that two randomly selected people from a given country will not belong to the same ethnolinguistic group.

³⁹These results are available upon request.

This compensation has to be provided to $(C/2)$ districts; thus, the marginal cost of compensating these districts is

$$MCC_{Mg} = \frac{|h_m(g_{jk}, m)| \Delta m}{h_g(g_{jk}, m)} \left(\frac{C}{2} \right). \quad (33)$$

Consider now what happens if the policymaker uses transfers. In this case, the transfer that offsets the individual loss is simply

$$\Delta f = |h_m(g_{jk}, m)| \Delta m.$$

To win the election, this transfer must be provided to $1/2$ voters (see Lemma 1) and to $1/2$ immigrants. In this case, the marginal cost of compensating decisive voters is

$$MCC_{Mf} = |h_m(g_{jk}, m)| \Delta m \frac{1}{2} (n + m). \quad (34)$$

Assumption (11) assures that the marginal cost of compensation is lower when public goods are used. In fact, the condition $MCC_{Mg} \leq MCC_{Mf}$

$$\frac{|h_m(g_{jk}, m)| \Delta m}{h_g(g_{jk}, m)} \left(\frac{C}{2} \right) \leq |h_m(g_{jk}, m)| \Delta m \frac{1}{2} (n + m) \quad (35)$$

can be rearranged as

$$C \leq (n + m) h_g(g_{jk}, m). \quad (36)$$

It is straightforward to verify that condition (36) coincides with assumption (11), namely,

$$h_g(g_{jk}, m) \geq \frac{C}{n + m} \quad \text{for any } g_{jk} \text{ and any } m \in [0, \bar{m}].$$

Thus, in equilibrium, the policymaker compensates the decisive districts through g_{jk} and does not use transfers ($f = 0$).

Proof of Lemma 3)

The proof proceeds as for Lemma 2: The policymaker wants to reduce expenditures for non-decisive voters and keep the decisive voters on their reservation utility. Under proportional representation, there are $n/2$ decisive voters. If the policymaker distributes compensation through f , the marginal cost of compensating $n/2$ voters is still given by equation (34). However, if he uses g_{jk} , to satisfy $n/2$ voters, he has to provide with public goods C districts rather than $C/2$. The marginal cost of compensation in this case is

$$MCC_{Pg} = \frac{|h_m(g_{jk}, m)| \Delta m}{h_g(g_{jk}, m)} (C). \quad (37)$$

Transfers are used if $MCC_{Pf} \leq MCC_{Pg}$, i. e.,

$$|h_m(g_{jk}, m)| \Delta m (n + m) \frac{1}{2} \leq \frac{|h_m(g_{jk}, m)| \Delta m}{h_g(g_{jk}, m)} (C). \quad (38)$$

Inequality (38) boils down to the following implicit equation:

$$h_g(g_{jk}, m)(n + m) \leq 2C. \quad (39)$$

To understand the properties of condition (39), it is useful to start from $m = 0$ and see what happens as immigration grows. When $m = 0$, the condition is $h_g(g_{jk}, 0)n \leq 2C$. We assume this holds, as otherwise compensation would occur through public goods under all electoral systems. As m grows away from zero, the term $h_g(g_{jk}, m)$ decreases,⁴⁰ and the term $(n + m)$ increases. Assumption (11) implies that the latter term dominates the former (see footnote 21); thus, the left-hand side of inequality (39) is increasing in m . As condition (39) holds for $m = 0$ and the function $h_g(g_{jk}, m)(n + m)$ is increasing in m , by continuity there exists \tilde{m} such that $h_g(g_{jk}, m)(n + m) = 2C$. For $m \leq \tilde{m}$, the marginal cost of compensating the decisive voters through public goods is higher. The opposite occurs when $m > \tilde{m}$. This means that the curves that describe the marginal costs (equations 34 and 37) cross at $m = \tilde{m}$.⁴¹

Optimal immigration in the proportional system (stage 2)

The marginal costs of compensation associated with public goods and transfers are defined by equations (34) and (37), respectively. Assumptions (3), (4), and (5) assure that the absolute value of the marginal compensation cost is increasing with m in both cases. From Lemma 3, we know that their curves cross at $m = \tilde{m}$. For $m < \tilde{m}$, the marginal cost of compensation through g_{jk} is higher, and vice versa for $m > \tilde{m}$. Optimization requires that the policymaker equals the marginal benefit t (namely, the tax base increase caused by a single immigrant) to the marginal cost of compensation. As there are two curves of marginal cost, there exist two potentially optimal immigration levels. The policymaker chooses the one that provides the higher total benefit. At this level of generality, we cannot know whether this happens with transfers or public goods. However, in Figure A.1, we show intuitively the condition that determines his choice. In Figure A.1, t is the marginal fiscal base produced by one immigrant. The curve MCC_{Pf} is the marginal cost of compensation through transfers, and the curve MCC_{Pg} is the marginal cost of compensation through public goods. The difference between t and the marginal cost of compensation is the net marginal benefit from each immigrant. The area between t and the marginal cost is the net total benefit. The policymaker chooses the instrument that gives him the highest net total benefit. This depends on the difference between the areas A and B : if he compensates through public goods, he loses A and gains B . If $A > B$ it is optimal to use transfers, and viceversa. In the case $A = B$ we assume that transfers are used.

⁴⁰Equation (5) states that the marginal utility of the public good decreases with immigration.

⁴¹If (39) holds with equality for $m = 0$, even a single immigrant is sufficient to reverse the bias toward transfers, and $\tilde{m} = 1$.

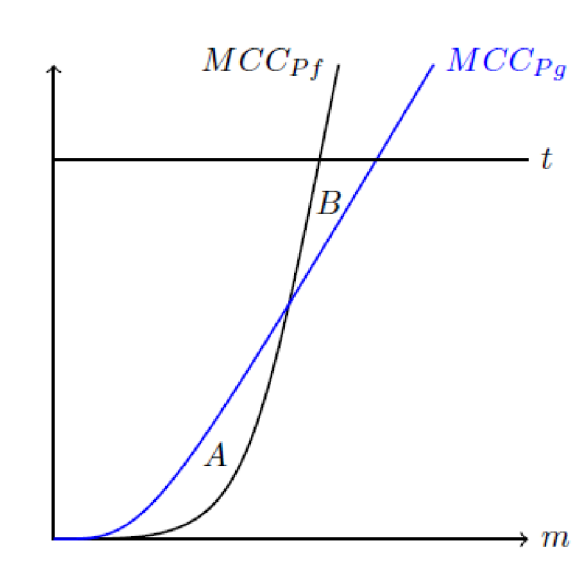


Figure A.1

Proof of Proposition 5)

Conditions (13), (20), and (21) state that immigration is allowed until the marginal fiscal base t equals the marginal cost of compensating the decisive voters (as is shown in Figure 2). It is easy to show that the marginal cost of compensation is always lower under the plurality system.

Case 1): Compensation in the proportional system works through transfers. The marginal cost of compensation is lower in the plurality system when $MCC_{Mg} < MCC_{Pf}$, namely,

$$\frac{|h_m(g_{jk}, m)| \Delta m}{h_g(g_{jk}, m)} \left(\frac{C}{2} \right) < |h_m(g_{jk}, m)| \Delta m \left(\frac{n+m}{2} \right). \quad (40)$$

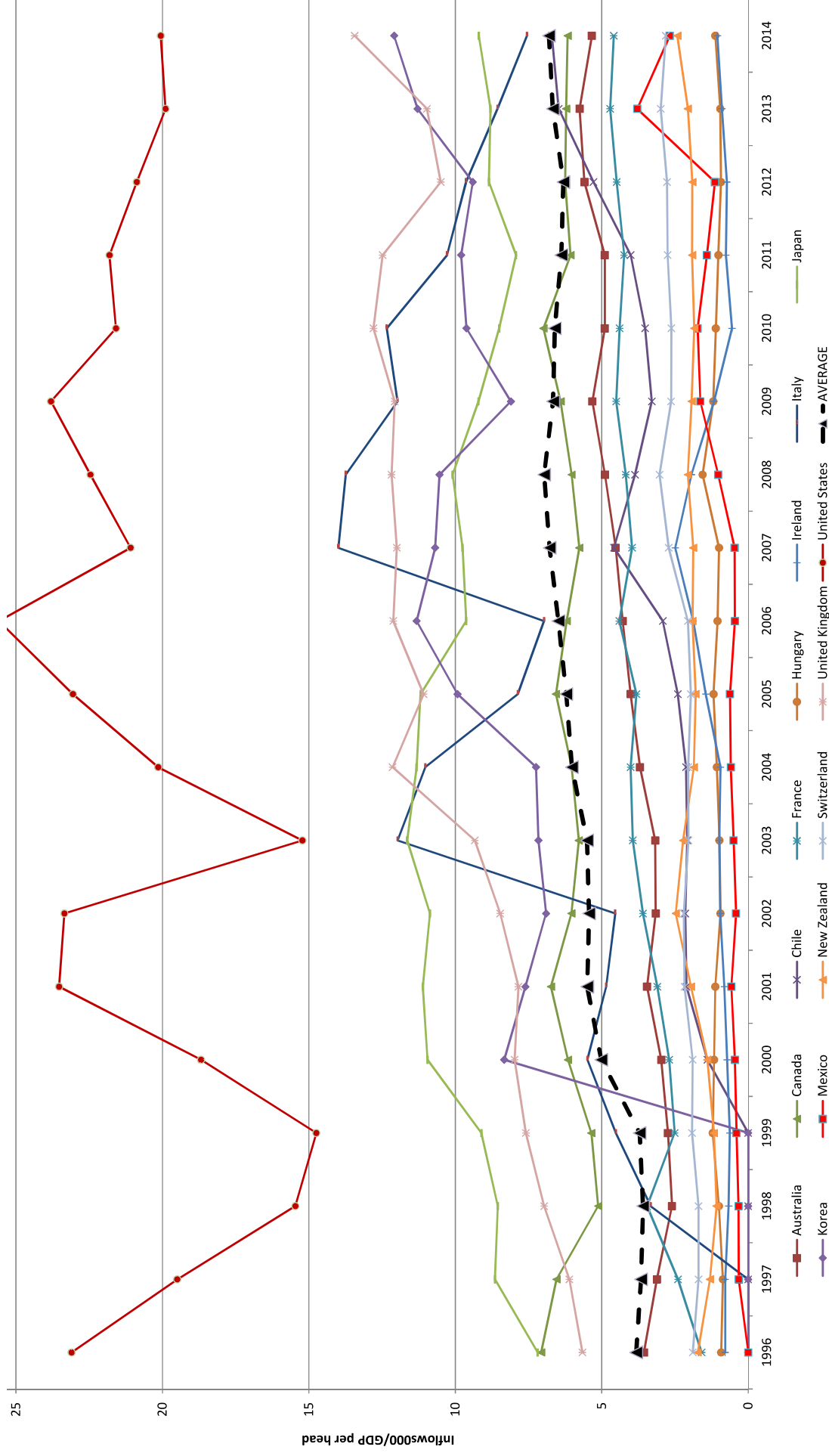
Condition (40) simplifies to assumption (11).

Case 2): Compensation in the proportional system works through public goods. The marginal cost of compensation is lower in the plurality system when $MCC_{Mg} < MCC_{Pg}$, namely,

$$\frac{|h_m(g_{jk}, m)| \Delta m}{h_g(g_{jk}, m)} \left(\frac{C}{2} \right) < \frac{|h_m(g_{jk}, m)| \Delta m}{h_g(g_{jk}, m)} (C), \quad (41)$$

which is also true. We conclude that the marginal cost of compensation is always lower under the plurality system, which, therefore, in equilibrium, generates higher immigration.

Figure 2: immigration in plurality systems



(the series of Germany and Spain are out of scale and the chart has been cropped to make the figure readable)

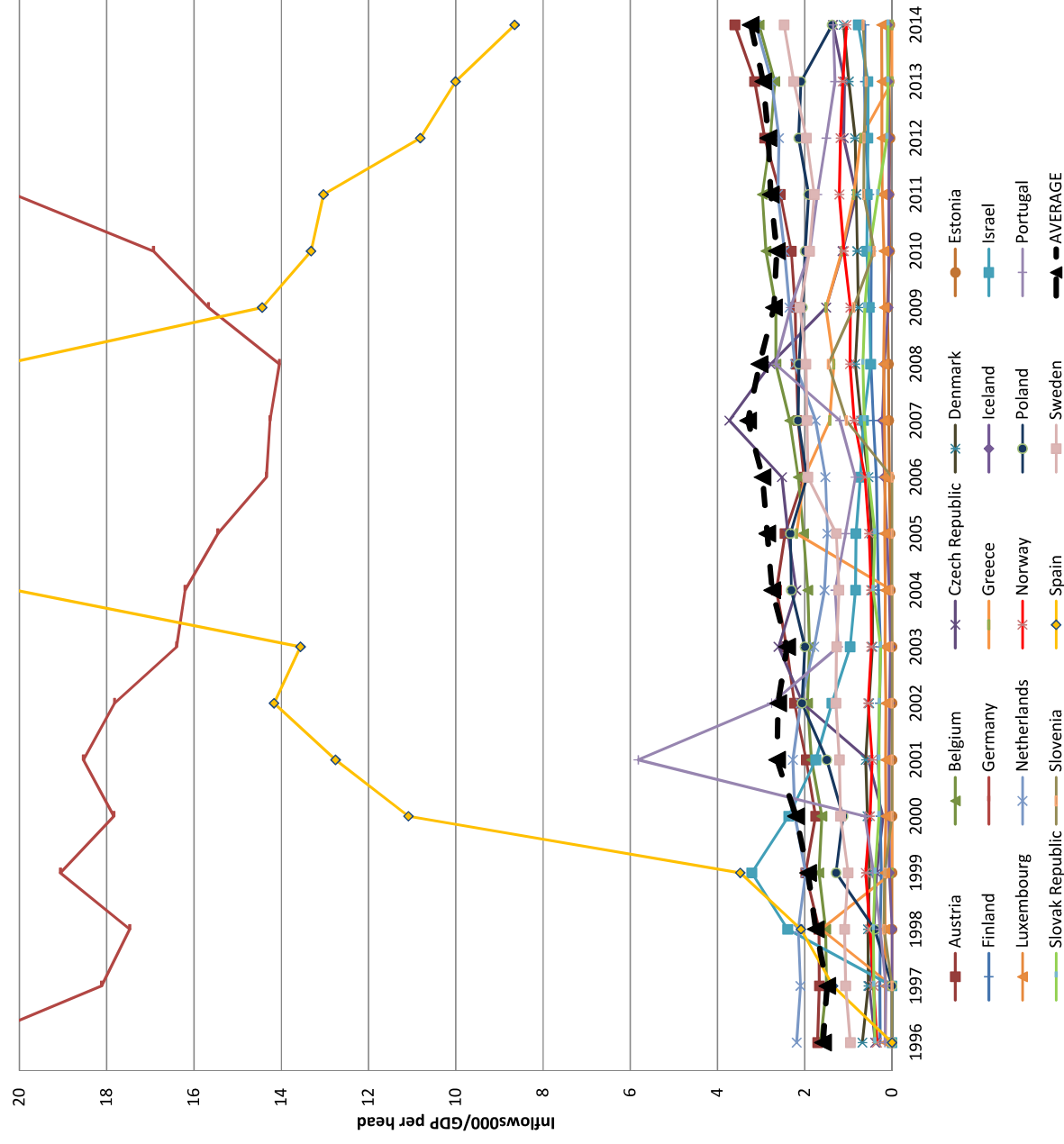


TABLE 1

country	Electoral system
Australia	plurality
Austria	proportional
Belgium	proportional
Canada	plurality
Chile	plurality
Czech Republic	proportional
Denmark	proportional
Estonia	proportional
Finland	proportional
France	plurality
Germany	proportional
Greece	proportional
Hungary	plurality
Iceland	proportional
Ireland	proportional
Israel	proportional
Italy	plurality
Japan	proportional
Korea	plurality
Luxembourg	proportional
Mexico	plurality
Netherlands	proportional
New Zealand	plurality
Norway	proportional
Poland	proportional
Portugal	proportional
Slovakia	proportional
Slovenia	proportional
Spain	proportional
Sweden	proportional
Switzerland	proportional
Turkey	proportional
United Kingdom	plurality
United States	plurality

TABLE 2

Variable	Obs	Mean	Std. Dev.	Min	Max
Inflow	34	0.0062	0.0053	0.0001	0.0286
migr_open	34	0.0102	0.0081	0.0004	0.0436
pop2	34	0.6032	0.0261	0.5253	0.6469
pop3	34	0.1428	0.0348	0.0563	0.1995
pop	34	16.513	1.4187	13.044	19.498
exp	34	42.431	8.4999	21.112	55.511
tax	34	25.517	6.5682	15.875	47.623
gdp_per_head	34	28295.83	11006.99	11080.28	63503.17
trade_open	34	88.495	50.043	24.277	274.720
eu	34	0.6363	0.4885	0	1
plurality	34	0.4884	0.5075	0	1
housesys	34	0.3333	0.4787	0	1
empire	34	0.2424	0.4351	0	1

TABLE 3: OLS REGRESSION

Dependent variable: per capita inflow

	(1)	(2)		(3)	(4)	
	Coeff	p-value		Coeff	p-value	
pop2	0.0191	0.435		-----		
pop3	-0.0377	0.085 *		-0.0340	0.055 **	
pop	-0.0022	0.000 ***		-0.0022	0.000 ***	
tax	-0.0001	0.205		-----		
gdp_per_head	3.65e-07	0.000 ***		3.41e-07	0.000 ***	
eu	0.0001	0.953		-----		
plurality	0.0026	0.052 **		0.0029	0.021 **	
empire	0.0019	0.108 *		0.0023	0.119	
constant	0.0274	0.125		0.0356	0.000 ***	
obs.	34			34		
Adj R-squared	0.732			0.727		

*Note: *, **, *** denote significance at the 10, 5 and 1 % level.*

TABLE 4: Right of immigrants to vote

Country	Electoral System	Voting rights	Type of election	Nationality	Years of residence condition	From
Australia	Plurality	no*				
Austria	Proportional	no by constitution				
Belgium	Proportional	yes	European Parliament elections, municipal elections	All permanent foreign residents	1	2000
Canada	Plurality	no*				
Chile	Plurality	yes	General elections	All permanent foreign residents	5	1994
Czech Republic	Proportional	yes	All local elections, European parliament elections	All permanent foreign residents	1	2001
Denmark	Proportional	yes	Municipal and County elections	All permanent foreign residents	3	1981
Estonia	Proportional	yes by constitution	Municipal elections	All permanent foreign residents	5	1996
Finland	Proportional	yes	Municipal elections	All permanent foreign residents	2	1991
France	Plurality	no by constitution				
Germany	Proportional	no by constitution				
Greece	Proportional	no				
Hungary	Plurality	no				
Iceland	Proportional	yes	Municipal elections	All permanent foreign residents	5	2002
Ireland	Proportional	yes	All local elections (County, City and Town)	All permanent foreign residents	6 months	2002
Israel	Proportional	yes	Municipal elections	All permanent foreign residents	People present at The time of the Census on June 26 1967	1967
Italy	Plurality	no				
Japan	Proportional	no by constitution				
Korea	Plurality	yes	Municipal elections	All permanent foreign residents	3	2005
Luxembourg	Proportional	yes	Municipal elections	All permanent foreign residents	3	2003
Mexico	Plurality	no				
Netherlands	Proportional	yes	Municipal elections	All permanent foreign residents	5	1985
New Zealand	Plurality	yes	General elections, all local elections	All permanent foreign residents	5	1975
Norway	Proportional	yes	Municipal and County elections	All permanent foreign residents	3	1982
Poland	Proportional	no!				
Portugal	Proportional	yes	General elections and Local elections	People from Brazil, Cape Verde, Norway, Uruguay, Venezuela, Chile and Argentina, Iceland	3	2005
Slovakia	Proportional	yes	Local elections	All permanent foreign residents	3	2002
Slovenia	Proportional	yes by constitution	Local elections	All permanent foreign residents	5	2002
Spain	Proportional	yes	Municipal elections	Latino-americans residents	0	1997
Sweden	Proportional	yes	Municipal and County elections, Referendum	All permanent foreign residents	3	1975
Switzerland**	Proportional	yes	Municipal elections	All permanent foreign residents	10	1849
Turkey	Proportional	no				
United Kingdom	Plurality	yes	General elections and Local elections	For people from the Commonwealth countries and Pakistan	0	1949
United States	Plurality	no				

*National voting rights were granted to Commonwealth citizens from 1960 to 1984. In 1984, 1947 legislation which had allowed non-citizen voting was repealed, but voters registered before 1984 remained their voting rights.

**Some voting rights have been granted to non-citizens by subnational governments, the first being Neuchâtel in 1849, then Jura in 1978 and several others afterwards.

Table 5: variance of anti-immigration attitude

proportional (WVS)	variance	plurality (WVS)	variance
Argentina	0,000949843	Armenia	0,026714718
Colombia	0,002032036	Chile	0,000261348
Ecuador	0,051400159	Georgia	0,023412232
Estonia	0,002193539	India	0,0267195
Germany	0,008558199	Mexico	0,005042658
Japan	0,002286265	New Zealand	0,003857523
Netherlands	0,005674305	Pakistan	0,007257982
Peru	0,009192867	South Korea	0,025508625
Poland	0,003388363	Ukraine	0,000600778
Romania	0,012098378	United States	0,001155544
Russia	0,005176373		
Slovenia	0,013070274		
South Africa	0,007883703		
Spain	0,005059356		
Sweden	0,000913951		
Turkey	0,010073113		
Uruguay	0,000654079		
average	0,008270871	average	0,012053091

proportional (ESS)	variance	plurality (ESS)	variance
Estonia	0,001	France	0,00709
Germany	0,0067	Hungary	0,0185
Netherla	0,0023	Italy	0,0234
Poland	0,0065	Ukraine	0,0178
Russia	0,005	United Kingdom	0,0057
Slovenia	0,0063		
Spain	0,0022		
Sweden	0,0013		
Belgium	0,004		
Czech rep	0,00352		
Denmark	0,00076		
Finland	0,00344		
Ireland	0,00075		
Norway	0,0017		
Portugal	0,0299		
Slovakia	0,0066		
Switzerland	0,00124		
Average	0,004894706	Average	0,014498