Electoral Systems and Immigration*

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Abstract

Stylized facts on OECD countries suggest that plurality electoral systems are associated with increased openness to immigration. We study this issue through a retrospective voting model in which a policymaker extracts rents from immigration, but voters are hurt by congestion of local public goods. 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 for any immigration level. This implies that 1) non-decisive voters receive no compensation, thus under both electoral systems there is an excess of immigration; 2) plurality systems allow higher immigration and compensate less voters with respect to proportional systems. This explains why governments are more pro-immigration than voters, and why anti-immigration sentiment is increasing. Our model also suggests that proportional systems may incentivize policymakers to enfranchise immigrants with voting rights. Consistent with this prediction, we verify that in OECD countries enfranchisement occurs in 74% of countries with proportional systems and 36% of countries with plurality systems.

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

JEL codes: D72, D78, F22, H00, H40.

1 Introduction

A broad theoretical and empirical literature, in economics and political science, has examined the effects of electoral systems since the pioneering contributions

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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, 2014). 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 (Figure 1). This striking difference increased during the 1996/2013 period.

[1] Immigration 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).

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

[3] Source: 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.

[4] For 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".

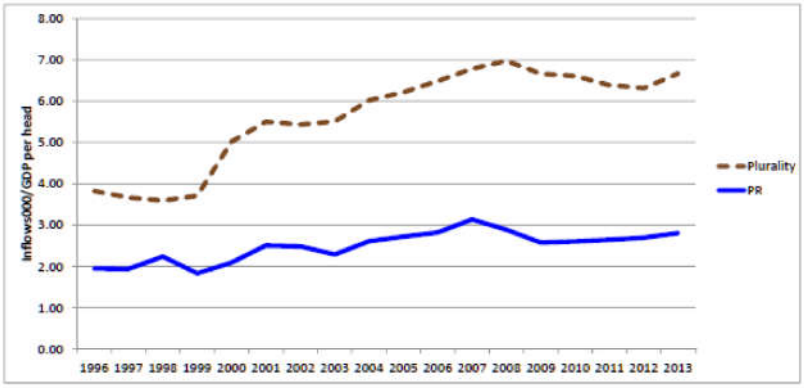

Figure 1: Immigration and electoral systems

What makes these figures so different? Simple cross-country regressions based on OECD countries during the 1998/2013 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 focus 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

[5] Our 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.

[6] Note that for the purposes of our model it is indifferent whether rents come from tax appropriation or from lobbying activities.

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

system, where decisive districts are smaller than in a proportional system.

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, that 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 discusses the differences between plurality systems and proportional systems and describes the policymaker's and voters' utility. Section 4 presents the results of the retrospective voting model, and section 5 our conclusions. The proofs are shown in the Appendix.

[8] Although 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 1996/2013 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), the total population is important as a proxy of development: Highly populated countries are usually less developed and less attractive to immigrants. Working-age population is a measure of labor supply; thus, this population 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 1996/2013 per-capita average inflow of immigrants in OECD countries.[13] We are left with a small sample of 34 obser-

[9] Trade is defined as exports plus imports.

[10] Trade openness matters because it could substitute immigration in perfect competition models via Stolper-Samuelson effects but it could be complementary in models based on agglomeration externalities.

[11] Note 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.

[12] Source: OECD Online Statistics (2011). Working-age population is aged 20-64, and the elderly are aged 65 and older.

[13] Source: OECD Online Statistics (2011). For our purposes, immigration flows are better than stocks because flows reduce the potential bias due to historical reasons, such as 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

$$m_i = c + \eta z_i + \alpha x_i + \beta s_i + u_i, \tag{1}$$

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 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. The model we present sheds some light on this issue.

3 Electoral systems

In this 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 consituency 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 $\frac{n}{C}\left(\frac{1}{2}\right)$ 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.

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former presence of colonial empires. Table 2 shows the cross-sectional 1996/2008 average, the standard deviation, the minimum and the maximum for each variable of the sample.

[14] We 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.

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 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 of individual characteristics and cannot be geographically targeted.[15] However, 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:

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

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

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 need only that immigration hurts the natives' utility, and 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 aso footnote 3).

We can 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:

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

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

Derivative (3) can be considered the marginal cost of immigration in terms of utility. It indicates that population inflows tend to jeopardize the provision

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

[16] For our argument, it is crucial that public goods can be targeted precisely. 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. In practice, it is easy to decide the location of goods such as school or a hospital.

of services such as education, public transportation, health care and so on.[17] Derivative (4) assures that this marginal cost is increasing.

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

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

$$h_{gmm}(g_{jk}, m) < 0. \tag{6}$$

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 an increasing 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:

$$E(U) = \gamma r + p_v R \tag{7}$$

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

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

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

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

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

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

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

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.

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):

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

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 similar to natives, namely, that $\sigma = \rho = 1/2$. Although by no means necessary, this assumption remarkably simplifies our exposition. The budget constraint finally becomes

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

We can now introduce the model.

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

[20] In 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.

[21] Because 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. British 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).

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 few 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 of, 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 the marginal utility of public goods 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:

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

Assumption (11) makes the model very tractable and is not restrictive: C/n is the number of seats per voter; thus, the lower bound $C/(n+m)$ is close to zero even for $m = 0$. This assumption 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

[22] In 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.

[23] Assumption (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 (recall that $h_{gm}(g_{jk}, m) < 0$), the assumption imposes that the left-hand side decreases more slowly than the right-hand side.

summarize this result in the following lemma:

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

Proof. See the Appendix. ■

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 again 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.

However, transfers can be convenient in proportional systems, where a single district exists, and the policymaker has to satisfy $n/2$ voters. Persson (2002, 2004), Persson and Tabellini, (2002); Milesi-Ferretti et al., (2002) identify a bias of proportional systems toward transfers. We also find this bias, but we bring to light that the bias can be reversed by immigration. This may occur because the leakage of transfers toward immigrants adds to the marginal cost of compensating the decisive voters. We summarize this outcome in the following 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 f is lower. The opposite occurs for high immigration levels ($m > \tilde{m}$), because too much expenditure for transfers flows to immigrants. Thus, the policymaker may be better off using public goods instead of transfers even in a proportional system.[24]

However, a switch from transfers to public goods entails high political costs, as any radical reform of the social security system. To circumvent these problems, the policymaker could simply extend the voting franchise to immigrants. Although extending the voting franchise does not increase the policymaker's rent, at least this system yields electoral returns by turning public spending into political consensus by immigrants. We discuss this important issue in section 4.4. For the moment, we show the solution to the model.

4.1 Plurality system

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

[24] In addition, a policymaker can further discriminate their provision by pinpointing districts with fewer immigrants. This has interesting consequences for empirical analyses.

4.1.1 Stage 3: loss compensation and rent appropriation

In the third stage, the policymaker collects tax revenues,[25] secures decisive voters by compensating their loss due to immigration, and retains his (residual) rent. To maximize his rent, he has to find the cheapest method of compensation. From lemma 2, we know that he will do so by using public goods. Finally, the policymaker gives full compensation for immigration to the 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.[26]

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

$$\Delta TB = t\Delta m. \tag{12}$$

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

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

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.[27] We do so for the corresponding conditions in a proportional system, 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

$$U_E = \gamma r + R. \tag{14}$$

[25] Note that in stage 3 the immigration level is given, because it is determined in stage 2.

[26] We can generalize the model and obtain some public good provision in non-decisive districts. The generalization works through spillovers caused by public goods. These spillovers are well-known in the literature (see Williams, 1966; Brainard and Dolbaer, 1967; Boskin, 1973; Besley and Coate, 2003; Bloch and Zenginobuz, 2007). Because we focus on immigration, we prefer to preserve the simplicity.

[27] Corner 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 freedom of 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

$$U_{NE} = \gamma t(n + m^*_{PL}). \tag{15}$$

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

$$r^*_M = t(n + m^*_{PL}) - \frac{R}{\gamma}. \tag{16}$$

We substitute $f = 0$ and r^*_M into the budget constraint (9) and find the aggregate expenditure for public goods $g^* = R/\gamma$.[28] Because g^* has to be shared among $C/2$ decisive districts, each one finally receives

$$g^*_{jk} = \frac{R2}{\gamma C}. \tag{17}$$

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

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

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

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

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 Lemma 3, he may be reappointed through either transfers or public goods. In the proof of Lemma 3, we show the condition that determines his optimal choice.

4.2.2 Stage 2: immigration

As in section 4.1.3, the policymaker finds the optimal inflow of immigrants by allowing entries 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

[28] The budget constraint becomes $t(n + m^*_{PL}) = g + r^*_M$. We solve the constraint for g and find the aggregate expenditures in equilibrium: $g^* = \frac{R}{\gamma}$.

$$t\Delta m \geq \mid h_m(g_{jk}, m) \mid (1-t)\Delta m \left(\frac{n}{2} + m\right) \qquad \textit{(transfers)} \tag{20}$$

and

$$t\Delta m \geq \frac{\mid h_m(g_{jk}, m) \mid (1-t)\Delta m}{h_g(g_{jk}, m)} (C) \qquad \textit{(public goods)}, \tag{21}$$

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 optimal immigration levels m^*_{P1} and m^*_{P2} in a proportional electoral system.

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

$$r^*_{P1} = t(n + m^*_{P1}) - \frac{R}{\gamma}. \tag{22}$$

We find the highest expenditure for transfers compatible with the policymaker's incentive constraintby 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,

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

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

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

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

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

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,

$$r^*_{P2} = t(n + m^*_{P2}) - \frac{R}{\gamma}. \tag{26}$$

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 then[29]

$$g^*_{jk} = \frac{R}{\gamma C}. \tag{27}$$

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

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

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

The utility of non-decisive voters is

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

4.3 Electoral systems and immigration inflows

Conditions (13), (20), and (21) 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.

It is easy to show that m^*_{PL} is larger than m^*_{P2} and m^*_{P1}. This is summarized in the following proposition:

Proposition 4 *(Electoral systems and barriers to immigration): Plurality electoral systems produce a higher equilibrium level of immigration.*

Proof. See the Appendix ■

This outcome occurs essentially because in a plurality system the policymaker has to compensate $n/4$ voters in $C/2$ districts, whereas in the proportional system he has to compensate $n/2$ voters in C districts. This makes the marginal cost of compensation always higher in the proportional system, either because the extra fiscal base produced by immigration flows toward immigrants (compensation through transfers) or because compensation must be distributed to C districts instead of $C/2$ (compensation through public goods).[30]

Lemma 3 has interesting implications for the analysis of proportional systems: The policymaker may find it profitable to switch from transfers to public goods because transfers to non-voting immigrants do not sustain his re-election or his rents. However, this switch is hard to implement in practice, because radical reforms of public expenditures face fierce political opposition. In these contingencies, enfranchising immigrants with voting rights could be a way to turn transfer leakage into political consensus. This could be important especially in local elections, where the vote of immigrants can be pivotal.

We checked the existence of voting rights for immigrants in the OECD. We report in the Appendix the type of elections and the requirements needed for voting. 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 the evidence does not contradict our predictions and is in line with the Glaeser and Shleifer's (2005) Curley effect.

[30] This is easily shown in the proof of Proposition 4.

In the next section, we report the analysis of the first stage, namely, the determination of the reservation utility under 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 is associated with higher rents.[31] We remark that the resources left to the voters once the policymaker's incentive constraint is satisfied are the same (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, and the policymaker collects the benefits of immigration.

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. Thus, the immigration level is the only difference in the non-decisive voters' utilities. 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. This brings to light that there exist an excess of immigration under both electoral systems. However, the share of voters who are not compensated is quite larger in the plurality system, confirming that plurality rules can magnify territorial imbalances even with respect to immigration.[33]

Summarizing, we validate 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 policymakers to extend the voting franchise to immigrants; 4) from the voters' perspective, immigration is excessive in both systems, and particularly under plurality rules. This result has a testable implication, namely that opposition to immigration should be more territorially dispersed within plurality systems. In fact, 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

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

[32] On 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).

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

system, attitudes to immigration should change swiftly among compensated and non-compensated districts within the different constituencies.

We have checked this prediction by using both World Value Survey (WVS) and European Social Survey (ESS) data.[34] 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).

5 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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[34] Both 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.

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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, respectively[35]). 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 citizenship[36] 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).

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

[36] Rules 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).[37] The estimated coefficient for these variables is not significant, and the overall results of the regression are unchanged.[38]

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 1996-2013). 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 costituencies, 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, immigration generates the loss given by

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

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:

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

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

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

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

[38] These results are available upon request.

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

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

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

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

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

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

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

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

can be rearranged as

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

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

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

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

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

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

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

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

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

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,[39] 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 $m = \tilde{m}$.[40]

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 equal 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 optimal immigration levels. The policymaker chooses the one that provides the higher total benefit. At this level of generality, we cannot know wheter this happens with transfers or public goods. However, in Figure 2, we show intuitively the condition that determines the choice. In Figure 2, 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 areas A and B: The former depicts the benefits lost when the policymaker uses public goods, and the latter the benefits lost when he uses transfers.

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

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

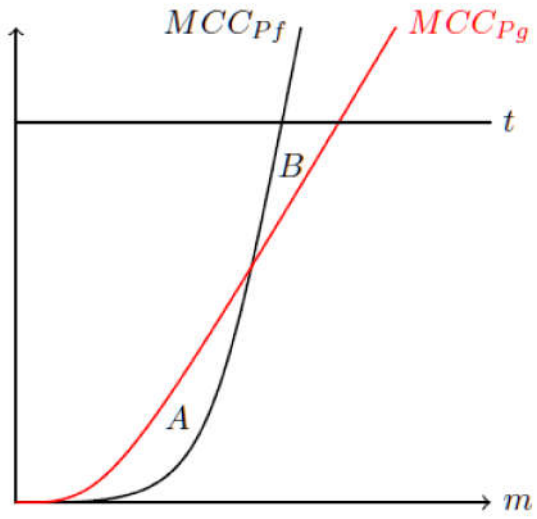

Figure 2

Proof of Proposition 4)

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,

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

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,

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

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