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Immigration and income redistribution: A political economy analysis

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Abstract This paper examines the effect of immigration on the extent of income redistribution via majority voting on the income tax. The tax outcome depends on the size of the native majority and the initial amount of redistribution in the economy, which in turn determines the skill composition of immigrants. As a main result, we derive conditions for multiple tax equilibria: if the native majority of either skilled or unskilled is not too strong and immigrants are allowed to vote, both a high-tax and a low-tax outcome is possible. In a referendum, natives will then vote against immigrant voting. At best, natives are indifferent towards immigrant voting.

Keywords Political economy · Immigration · Income redistribution

JEL Classifications: F22, H73, D72

1 Introduction

The importance of the subject of immigration is mirrored in an extensive literature. In particular, an increasing amount of work has been dealing with the redistributive effects of immigration. The primary question there has been to what extent fiscally-induced labour mobility might cause fiscal competition, and to what extent it might even hinder redistribution by national governments.[1] In these theoretical analyses, the political decision-making process is typically disregarded, and government policy is modelled as the optimum decision of a social planner.

More recently however, several studies on the public economics of immigration have begun to refer to more realistic voting models of public policy. They take into account the impact that immigrants might have on redistributive outcomes by adding to the size of different

[1] See for example the classic treatment of Oates (1972) and, more recently, Wildasin (1994).

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interest groups and by thus changing the political constituency of the native population.[2] Along these lines, this paper provides an analysis of the effect of immigrant participation on the voting outcome regarding the extent of income redistribution.

Apart from the question of how immigration changes political decisions, we also consider the reverse causality that has been addressed in the political economy of immigration: what are the incentives for domestic voters to allow immigration?[3] In our case, we determine the outcome of a native referendum on whether to allow immigration as well as on whether to give voting rights to immigrants – given that the native voters have correct expectations of the effect of immigrant voting on the extent of redistribution. The impact of immigrant voting on political outcomes as a possible determinant of natives' preferences towards immigrants' voting rights is an issue that, to the knowledge of the author, has been hardly addressed in the literature so far.

Political economy papers on the redistributive effects of immigration typically show that, in contrast to predictions of tax competition theory, immigration does not have to lead to an erosion of the welfare state.[4] Razin et al. (2002) and Dolmas and Huffman (2003), however, find in median voter models, that the immigration of individuals, who are poorer than the native population, can result in lower taxes and transfers – even when immigrants are permitted to vote over redistribution. This result is essentially due to what Razin et al. (2002) call the 'fiscal leakage' effect, a decrease in the marginal benefit of taxation for the native median voter resulting from the arrival of welfare-dependent immigrants. They conclude that if this effect dominates, the tax rate can decrease with unskilled immigration. They also note, however, that if the number of unskilled immigrant voters was large enough to tilt a skilled native majority, the tax rate would increase.[5]

In our model, we find that the effect of immigration on redistributive outcomes is indeterminate in those cases, where immigration could potentially tilt a native majority. To derive our result, we use a median voter model that determines tax-voting equilibria under endogenous immigration. The migration and taxation equilibria are characterised as follows: immigration is induced by net income differentials between a foreign and a home country for a given tax rate, while the tax rate is (directly) voted upon by the new, enlarged population consisting of natives as well as immigrants. In this set-up, we can explicitly determine the conditions under which immigration can tilt the native majority. More importantly, however, we derive the qualitatively distinct result that under these conditions, the effect of immigrant voting on redistribution is indeterminate. We get this finding by taking account of the fact that immigrants can be both unskilled and skilled. As a consequence, migration incentives can be both: such that immigration is predominately unskilled and such that it is predominately skilled and, accordingly, the equilibrium tax rate can be both high and low. Multiple tax-transfer equilibria arise with immigration.

Building on this result, we determine the conditions under which natives will allow immigration and immigrant voting. Benhabib (1996) shows that majority voting leads to capital and skill requirements for immigrants due to the associated effects on median voter income. We confirm the rather intuitive result that an unskilled native majority will vote for skilled

[2] See for example Mazza and van Winden (1996), Cremer and Pestieau (1998) and Razin et al. (2002).

[3] See for example Lejour and Verbon (1994), Benhabib (1996) and Thum (2004).

[4] For example, Mazza and van Winden (1996) find that transfers and disposable income for mobile workers can increase with immigration. Kemnitz (2002) shows that low-skilled immigration can lead to higher unemployment benefits. For other papers in this line see Haupt and Peters (1996) and Scholten and Thum (1996).

[5] In their model, immigration is exogenous.

immigrants, but against unskilled immigrants.[6] Above that, we also address the issue of the determinants of immigrant voting policies. We find that any native majority will reject immigrant voting rights, as long as the conditions for multiple tax-transfer equilibria are fulfilled. This is because under these conditions, immigrants can potentially tilt the native majority on income redistribution and thereby make it worse off.

The issue of immigration and immigrant voting is of high political interest and relevance. Welfare spending on immigrants ranges among the primary concerns of natives in regard to immigration in Europe[7], and the question of how (or rather, whether) to incorporate foreign citizens in political decision-making remains contentious. Although (legal) residents of foreign citizenship (henceforth called immigrants) are granted the economic rights and duties of working and contributing to and (to varying degrees) receiving welfare benefits, they are generally excluded from political decision-making at both local and national levels and therefore from decisions on how (much) taxes are to be paid and benefits are to be spent. Of the twenty-five countries currently in the EU, only seven countries (Belgium, Denmark, Estonia, Finland, Ireland, the Netherlands and Sweden) deliver voting rights to non-EU immigrants in general[8], usually at the local level, and none does at the national level, where the amount of fiscal redistribution is to a large part determined. This paper shows in a theoretical model that, indeed, there is a case for natives to oppose immigrant voting out of redistributive concerns.

The paper is organised as follows: Section 2 describes the model and Section 3 carries out the analysis of voting equilibria both for a closed (3.1) and an open economy (3.2) when immigrants either can or cannot vote on the tax rate. In Section 4, we address the outcome of a referendum among natives on immigration and on immigrant voting rights. Section 5 concludes.

2 The model

2.1 The economy

There are two countries, home and foreign, with possible migration from the foreign to the home country. The time horizon considered is either one or two periods – a more detailed discussion follows in the next section. In each country, a single consumption good is produced only from labour input. In both countries, there are two types of workers: skilled and unskilled.[9]

In the home country, high- and low-productivity workers differ in gross incomes y_s and y_u, respectively (with $y_s > y_u$), which result from a utility-maximising choice of labour supply and pre-tax hourly wage rates w_s and w_u, which are exogenous.[10] Similarly, in the foreign country, skilled and unskilled workers earn (given) net incomes $\tilde{y}_s$ and $\tilde{y}_u$

[6] In our case, this is for purely redistributive reasons, whereas in Benhabib (1996), it is due to factor income effects.

[7] Compare the results of a quantitative analysis of parliamentary debates in European countries by Wodak (2000).

[8] See Bauer (2004). Some countries (Great Britain, Portugal and Spain), however, provide voting rights to specific groups of foreigners, who usually share some colonial or common language ties with the host country.

[9] Results remain qualitatively unchanged, if there are more than two types.

[10] Results remain qualitatively unchanged, if wages are endogenous. Details are given in the analysis in Section 3 below.

(with $\tilde{y}_s > \tilde{y}_u$).[11] Wages of a given type of worker are lower in the foreign country than in the home country. We consider an economy with perfect competition, wages are expressed in units of the consumption good and equal the marginal product of one unit of labour.

Because wages are lower in the foreign country, there is potential migration to the home country. The migration decision of immigrants is endogenous, depending on international present value net-income differentials and moving costs. Immigrants have heterogeneous moving costs c, and c is assumed to be uniformly distributed in the (foreign) population over $[0, \bar{c}]$. The timing of migration is discussed in Section 2.2 below.

The government is redistributing income by levying a flat rate income tax (t) and granting a lump-sum cash benefit (b). We assume that the government's budget must be balanced in each period. Natives and immigrants are treated alike fiscally: the tax revenue from the income tax t levied on unskilled and skilled labour income of both natives and immigrants is redistributed evenly through the lump-sum transfer b, which is granted to unskilled and skilled natives as well as immigrants. It is assumed that $0 \leq t \leq 1$: a negative tax rate that is effectively redistributing income from the poor to the rich is viewed to be socially unacceptable and implausible, whereas a tax rate $t > 1$ can be ruled out because people cannot be taxed by more than their total income.

2.2 Scenarios and timing of events

In the following analysis of the equilibrium tax rate, we consider two scenarios:

1. A closed economy, that is one in which no immigration is possible. It is therefore only natives who vote upon the tax rate. This scenario serves as a base case scenario. In comparing outcomes between this one and the open-economy scenario, we can determine whether immigration makes redistribution more or less likely.
2. An open economy in a one-period time frame with immigration at the beginning of the period. We analyse tax equilibria for both the cases when immigrants are and when they are not allowed to vote on the tax rate.

Below, we will now determine our two endogenous variables, the immigration rate and the tax rate. Assumptions are such that the tax rate is determined in a direct democracy process by the median voter (that is, the voter with median pre-tax income). It will be the one maximising the median voter's net income. Median voter income, however, will change with immigration, which is taking place according to international present value net-income differentials and moving costs, as mentioned above.

3 Analysis

3.1 Closed economy

The proportion of skilled and unskilled natives is λ_s^n, λ_u^n, respectively, with

$$\lambda_s^n + \lambda_u^n = 1. \tag{1}$$

[11] We take both the equilibrium tax rate and benefit transfer as well as pre-tax hourly wage rates $\tilde{w}_s$ and $\tilde{w}_u$ in the foreign country as given.

To determine the optimal income tax t for individuals with endogenous labour supply $L(t)$, we maximise individuals' utility, which we assume to be of the form

$$u(c, l) = c + l - l^2/2, \tag{2}$$

where c is consumption and l is leisure time. From there, we derive indirect utility $v(t, b)$:[12]

$$v_i(t, b) = 0.5 + b + 0.5(1 - t)y_i, \quad i = s, u. \tag{3}$$

The government budget constraint requires that total expenditure via lump-sum grants is equal to total tax revenue – or, equivalently, that per capita grant equals average tax payment:

$$b = t\left(\lambda_s^n y_s + \lambda_u^n y_u\right)\cdot \tag{4}$$

Inserting (4) into (3) yields the following expression for the optimal income tax $t \geq 0$:[13]

$$t_i^* = \frac{\left(\lambda_s^n y_s + \lambda_u^n y_u\right) - y_i}{2\left(\lambda_s^n y_s + \lambda_u^n y_u\right) + y_i}, \quad i = s, u. \tag{5}$$

We can see that individuals' optimal level of the tax rate depends on the difference between their income and mean income. The lower their own income relative to mean income, the higher the tax rate that they prefer. However, the optimal tax rate will always be lower than 1 because too high a tax exerts a negative incentive effect on the provision of labour. Adversely, with increasing income individuals' preferred tax rate decreases, until it is zero when their income is equal to mean income. Due to the restriction that $t \geq 0$, individuals' preferred tax rate will be zero if their income is equal to or higher than mean income.

Accordingly, the skilled prefer a tax rate of 0, whereas the unskilled prefer a positive tax rate smaller than 1. Depending on whether the majority of the population is skilled or unskilled, the outcome of majority voting on the tax rate will be:

$$t^* = \begin{cases} 0 & \text{if } \lambda_u^n \leq 0.5 \\ \dfrac{\left(\lambda_s^n y_s + \lambda_u^n y_u\right) - y_u}{2\left(\lambda_s^n y_s + \lambda_u^n y_u\right) + y_u} & \text{if } \lambda_u^n > 0.5 \end{cases} \tag{6}$$

3.2 Open economy

3.2.1 Migration

In the open economy, we now allow for immigration to take place – so let us first have a look at how migration decisions are determined.

Immigration is induced by the income gap between the net present value of income in the foreign country (net of moving cost) and the net present value of income in the home

[12] See Appendix A.1 for derivation.

[13] See Appendix A.1 for derivation.

country.[14] So, there exists a cut-off level of moving cost c for skilled and unskilled migrants, $\tilde{c}_s$ and $\tilde{c}_u$, respectively, such that all those with moving cost below $\tilde{c}_s$ or $\tilde{c}_u$ migrate, and all the others remain in their country of origin.

Given the cut-offs, the amount of skilled immigration λ_s^m and unskilled immigration λ_u^m is therefore determined by migration costs in the following way (remember that the moving costs $\tilde{c}_s$ and $\tilde{c}_u$ are uniformly distributed over $[0, \overline{c_s}\,]$ and $[0, \overline{c_u}\,]$, respectively):

$$\lambda_s^m = \frac{\tilde{c}_s}{\overline{c_s}}, \tag{7}$$

$$\lambda_u^m = \frac{\tilde{c}_u}{\overline{c_u}}. \tag{8}$$

To simplify notation, we will set $\overline{c_s} = \overline{c_u} \equiv 1$ from now on.[15]

The cut-offs $\tilde{c}_s$ and $\tilde{c}_u$ are defined to equal net income differentials. This is because given free mobility, migrants are indifferent between moving or not when the net income gain from moving is equal to their moving cost.

$$\tilde{c}_s \equiv (1 - t^*)y_s + b^* - \tilde{y}_s, \tag{9}$$

$$\tilde{c}_u \equiv (1 - t^*)y_u + b^* - \tilde{y}_u. \tag{10}$$

Using (7) and (8) as well as (31), we get

$$\lambda_s^m \equiv (1 - t^*)^2 w_s^2 + b^* - \tilde{y}_s, \tag{11}$$

$$\lambda_u^m \equiv (1 - t^*)^2 w_u^2 + b^* - \tilde{y}_u. \tag{12}$$

Note that the cut-offs, and therefore immigration, depend on taxes and benefits in the foreign country. When immigrants find the net income difference to outweigh their migration cost, they migrate, otherwise they do not.

It can be seen that in this case, where migration costs are introduced, migrants do care about the tax rate even when there is free migration.[16] This is in contrast to models without migration costs, where net income differentials are reduced to zero by skilled migrants moving to relative low-tax countries and unskilled migrants moving to relative high-tax countries, where they decrease the tax base, until net incomes in the foreign country, $\tilde{y}_s$ and $\tilde{y}_u$, equal net incomes in the home country. Then, immigrants do not care about participating in the political process of the home country.

[14] Note that substituting this income gap by a utility gap using (3) does not qualitatively change results.

[15] Note that in doing so, we implicitly assume that the skilled and the unskilled subpopulations in the foreign country are of the same size and equal to 1, respectively. For a derivation of results in the case of different foreign subpopulation sizes, which do not change qualitatively given a certain restriction, see Appendix B.

[16] Note that one could relax the assumption of free migration by thinking of immigration policy as a determinant of migration cost, raising it when restrictive and lowering it when expansive. An analysis, which could even account for differing policies on the immigration of skilled and unskilled, would run in essentially the same way as for a variation in foreign subpopulation sizes, which leaves results qualitatively unchanged, as can be seen in Appendix B.

3.2.2 Preferences over taxes

With immigration, the skill composition of the population is likely to change. The proportion of skilled and unskilled in the home country after immigration is now $\lambda_s^n + \lambda_s^m$ and $\lambda_u^n + \lambda_u^m$, respectively, with a total population of $1 + \lambda_s^m + \lambda_u^m$.

As in the closed economy scenario above, we require the government budget to be balanced and therefore per capita grant to equal average tax payment:

$$b^* = t^* \left[\left(\lambda_s^n + \lambda_s^m \right) y_s + \left(\lambda_u^n + \lambda_u^m \right) y_u \right] / \left(1 + \lambda_s^m + \lambda_u^m \right) \cdot \tag{13}$$

After inserting the budget constraint in (3), we derive the optimal tax rate t_i^*:[17]

$$t_i^* \left(\lambda_s^m, \lambda_u^m \right) = \frac{\left[\left(\lambda_s^n + \lambda_s^m \right) y_s + \left(\lambda_u^n + \lambda_u^m \right) y_u \right] / \left(1 + \lambda_s^m + \lambda_u^m \right) - y_i}{2 \left[\left(\lambda_s^n + \lambda_s^m \right) y_s + \left(\lambda_u^n + \lambda_u^m \right) y_u \right] / \left(1 + \lambda_s^m + \lambda_u^m \right) + y_i} \tag{14}$$

or, using (31):

$$t_i^* \left(\lambda_s^m, \lambda_u^m \right) = \frac{\left[\left(\lambda_s^n + \lambda_s^m \right) w_s^2 + \left(\lambda_u^n + \lambda_u^m \right) w_u^2 \right] / \left(1 + \lambda_s^m + \lambda_u^m \right) - w_i^2}{2 \left[\left(\lambda_s^n + \lambda_s^m \right) w_s^2 + \left(\lambda_u^n + \lambda_u^m \right) w_u^2 \right] / \left(1 + \lambda_s^m + \lambda_u^m \right) + w_i^2}. \tag{15}$$

Again, the optimal tax rate will depend upon the relation of mean to median wage and will be upper-limited at some $\bar{t} < 1$ due to the tax distortion which causes a diminishing labour supply and tax base.

3.2.3 Equilibrium

A *political equilibrium* is a vector $(t^*, b^*, \lambda_u^m, \lambda_s^m)$ such that (i) t^* is the choice of the median voter, given λ_u^m, λ_s^m, (ii) b^* is satisfying the government budget constraint, given $t^*, \lambda_u^m, \lambda_s^m$ and (iii) λ_u^m, λ_s^m are determined as described in the section on migration above, given t^*, b^*. The identity of the median voter will depend upon whether migrants can vote or not.

Migrants cannot vote.

If migrants cannot vote, the skilled will be in majority if

$$\lambda_u^n < 0.5,$$

and the unskilled will be in majority if

$$\lambda_u^n > 0.5.$$

The conditions for the outcome of the tax vote to be 0 or positive are:

$$t^* \left(\lambda_s^m, \lambda_u^m \right) = \begin{cases} 0 & \text{if } \lambda_u^n \leq 0.5 \\ \dfrac{\left[\left(\lambda_s^n + \lambda_s^m \right) y_s + \left(\lambda_u^n + \lambda_u^m \right) y_u \right] / \left(1 + \lambda_s^m + \lambda_u^m \right) - y_u}{2 \left[\left(\lambda_s^n + \lambda_s^m \right) y_s + \left(\lambda_u^n + \lambda_u^m \right) y_u \right] / \left(1 + \lambda_s^m + \lambda_u^m \right) + y_u} & \text{if } \lambda_u^n > 0.5 \end{cases} \tag{16}$$

[17] See Appendix A.2 for derivation.

As in the closed economy, the skilled will vote for a tax rate of 0 and the unskilled will vote for a positive tax rate depending on mean wage. Since with immigration the mean wage is likely to change, the tax outcome can change even if immigrants are not allowed to vote. More exactly, under a majority of native unskilled, mean income and the preferred tax rate will increase, if immigrants are relatively more skilled than natives ($\frac{\lambda_s^m}{\lambda_u^m} > \frac{\lambda_s^n}{\lambda_u^n}$), while they will decrease, if immigrants are relatively less skilled than natives ($\frac{\lambda_s^m}{\lambda_u^m} < \frac{\lambda_s^n}{\lambda_u^n}$). Here, we have what Razin et al. (2002) call the 'fiscal leakage effect', a possible contracting effect of unskilled immigration on fiscal policies.[18] Note that this effect can also occur, if immigrants are allowed to vote – provided that they do not tilt the governing native majority. Whether this can happen, and under which conditions, will be explored in the following.

Migrants can vote.

If migrants can vote, the skilled will be in majority if

$$\lambda_u^n + \lambda_u^m \leq 0.5\left(1 + \lambda_s^m + \lambda_u^m\right),$$

and the unskilled will be in majority if

$$\lambda_u^n + \lambda_u^m > 0.5\left(1 + \lambda_s^m + \lambda_u^m\right)\cdot$$

The conditions for the outcome of the tax vote to be 0 or positive therefore are:

$$t^*\left(\lambda_s^m, \lambda_u^m\right) = \begin{cases} 0 & \text{if } \lambda_u^n + \lambda_u^m \leq 0.5\left(1 + \lambda_s^m + \lambda_u^m\right) \\ \frac{\left[\left(\lambda_s^n + \lambda_s^m\right) y_s + \left(\lambda_u^n + \lambda_u^m\right) y_u\right] / \left(1 + \lambda_s^m + \lambda_u^m\right) - y_u}{2\left[\left(\lambda_s^n + \lambda_s^m\right) y_s + \left(\lambda_u^n + \lambda_u^m\right) y_u\right] / \left(1 + \lambda_s^m + \lambda_u^m\right) + y_u} & \text{if } \lambda_u^n + \lambda_u^m > 0.5\left(1 + \lambda_s^m + \lambda_u^m\right) \end{cases} \quad (17)$$

As before, the majority (now consisting of natives as well as immigrants) will vote for a tax rate of 0, if it is skilled and for a positive tax rate, if it is unskilled.

Proposition 1. *If migrants can vote, there is a political equilibrium with no redistribution* ($t^* = 0$) *if* $\lambda_u^n \leq 0.5[1 + (w_s^2 - w_u^2) - (\tilde{y}_s - \tilde{y}_u)] \equiv \lambda_u^n$ *(0) and one with positive redistribution* ($0 < t^* < 1$) *if* $\lambda_u^n > 0.5[1 + (1 - t^*)^2 (w_s^2 - w_u^2) - (\tilde{y}_s - \tilde{y}_u)] \equiv \lambda_u^n(+)$. *Therefore, we always have multiple political equilibria when* $\lambda_u^n(+) < \lambda_u^n \leq \lambda_u^n(0)$.

Proof: Recall that for $t^* = 0$, it has to be true that

$$\lambda_u^n + \lambda_u^m \leq 0.5\left(1 + \lambda_s^m + \lambda_u^m\right),$$

or, after restructuring:

$$\lambda_u^n \leq 0.5\left(1 + \lambda_s^m - \lambda_u^m\right)\cdot$$

[18] Note that, unlike in their model, the skills of natives are not endogenous here.

To determine the equilibrium levels of immigration, we use (17) and (13) and solve (11) and (12) for t^*, b^*, λ_s^m and λ_u^m:

$$\left(1 - t^*\left(\lambda_s^m, \lambda_u^m\right)\right)^2 w_s^2 + b^*\left(\lambda_u^m, \lambda_s^m\right) - \tilde{y}_s = \lambda_s^m, \tag{18}$$

$$\left(1 - t^*\left(\lambda_s^m, \lambda_u^m\right)\right)^2 w_u^2 + b^*\left(\lambda_u^m, \lambda_s^m\right) - \tilde{y}_u = \lambda_u^m \cdot \tag{19}$$

For $t^* = 0$, equilibrium migration levels are:

$$w_s^2 - \tilde{y}_s = \lambda_s^m,$$

and

$$w_u^2 - \tilde{y}_u = \lambda_u^m \cdot$$

The condition for the tax rate to be zero therefore is:

$$\lambda_u^n \leq 0.5\left[1 + \left(w_s^2 - w_u^2\right) - \left(\tilde{y}_s - \tilde{y}_u\right)\right] \equiv \lambda_u^n(0) \cdot \tag{20}$$

We call λ_u^n (0) the maximum share of native unskilled that leads to zero redistribution. Now, for $0 < t^* < 1$, the unskilled have to be in majority:

$$\lambda_u^n > 0.5\left(1 + \lambda_s^m - \lambda_u^m\right) \cdot$$

For the unskilled, the optimal tax rate $t^*(\lambda_u^m, \lambda_s^m)$ depends not only on median, but also on mean income and therefore on immigration. From looking at (18) and (19) we can see that it is not possible to solve for equilibrium levels analytically in this case, since t^* and therefore b^* depend on λ_s^m and λ_u^m and vice versa. However, we can still determine the condition for the tax rate to be positive:

From (18) and (19), we get the following:

$$\lambda_s^m - \lambda_u^m = \left(1 - t^*\left(\lambda_s^m, \lambda_u^m\right)\right)^2 \left(w_s^2 - w_u^2\right) - \left(\tilde{y}_s - \tilde{y}_u\right) \cdot \tag{21}$$

The condition for the tax rate to be positive (but smaller than one) therefore is:

$$\lambda_u^n > 0.5\left[1 + \left(1 - t^*\left(\lambda_s^m, \lambda_u^m\right)\right)^2 \left(w_s^2 - w_u^2\right) - \left(\tilde{y}_s - \tilde{y}_u\right)\right] \equiv \lambda_u^n(+) \cdot \tag{22}$$

We call λ_u^n (+) the minimum share of native unskilled that leads to positive redistribution. Since we know that $0 < t^*(\lambda_s^m, \lambda_u^m) < 1$, we have $\lambda_u^n(+) < \lambda_u^n(0)$. □

As can be easily verified, results remain qualitatively unchanged even if wages are endogenous and depend on the level of skilled and unskilled immigration: $w_i(\lambda_s^m, \lambda_u^m)$. This is because the decision on redistribution remains unchanged.[19]

[19] The decision on redistribution depends on the relation of mean to median wage (see (15)). Now, for median wage $w_s(\lambda_s^m, \lambda_u^m)(w_u(\lambda_s^m, \lambda_u^m))$, mean wage will always be lower (higher) as long as $w_s(\lambda_s^m, \lambda_u^m) > w_u(\lambda_s^m, \lambda_u^m)$, due to the assumed difference in productivity by skill. A skilled (unskilled) median voter will therefore always prefer a tax rate of zero (a positive tax rate). The preferred extent of positive redistribution, however, is likely to change.

We can draw two major conclusions from the result in Proposition 1. First, we have seen that voting immigrants can tilt a native majority, if this majority is not too strong. This is because immigration changes the conditions on how to get a majority of skilled/unskilled[20]: the minimum share of native unskilled that leads to positive redistribution $\lambda_u^n(+)$ changes to a level different from the former level of 0.5. So does the maximum share of native unskilled that leads to zero redistribution $\lambda_u^n(0)$. Native unskilled majorities that are bigger than the new maximum share and native unskilled minorities that are smaller than the new minimum share, however, will not be overthrown by immigration.[21]

Second, we find that for those share values of native unskilled λ_u^n that are potentially subject to an overthrow by immigration (namely for $\lambda_u^n(+) < \lambda_u^n \leq \lambda_u^n(0)$), the outcome of a tax vote cannot be determined unambiguously. The minimum share of native unskilled that leads to positive redistribution $\lambda_u^n(+)$ is smaller than the maximum share of native unskilled that leads to zero redistribution $\lambda_u^n(0)$.

How can we interpret this finding? In contrast to the case where migrants cannot vote, the case where migrants can vote exhibits a feed-back effect of the tax rate that migrants vote upon on the number of the migrants.[22] In other words, when immigrants make their decisions to migrate, they do so according to their expectations on the outcome of the tax vote. The tax outcome in turn depends on natives' votes, but also on the votes of migrants, and can be zero or positive. In equilibrium, migrants' expectations on the tax rate prove to be correct. Immigrants' votes are crucial to the voting outcome in cases where the native majority is not strong enough, and in those cases, both a tax rate of zero and a positive tax rate are compatible with immigration (multiple equilibria).

This result shows that even under native majorities that are weak enough to be potentially tilted by immigrants, the outcome of immigration on the level of redistribution is not determined a priori – if we allow for some share of immigrants (however small) to be not unskilled, but skilled.

4 Is immigration and immigrant voting desirable for natives?

In the analysis above, we derived how, with immigrant voting, multiple voting equilibria arise with respect to the tax-transfer policy. Given the conditions for these multiple equilibria, it is indeterminate whether immigrant voting leads to a change in the tax rate. A change can lead both to a higher as well as a lower tax rate.

As a consequence, we can also determine the conditions under which the majority of natives gains or loses from immigration and immigrant voting, and under which therefore, in a referendum, they would vote for or against it. We assume that, in the case of multiple equilibria, the natives attribute some positive probability π and $1 - \pi$ to each of the possible equilibria and then decide according to their expected utility.

Proposition 2. *In a native referendum by majority rule on whether to give immigrants the vote or not, natives vote 'no' if (1)* $0.5 < \lambda_u^n < \lambda_u^n(+)$ *or (2)* $\lambda_u^n(0) < \lambda_u^n < 0.5$ *or (3)* $\lambda_u^n(+) < \lambda_u^n < \lambda_u^n(0)$ *. The outcome of the referendum is indeterminate in all other cases.*

[20] See Equation (17) in comparison with (16).

[21] In fact, in the latter case, it is the native skilled majority which is overthrown by immigration. Note that for convenience and readability we talk about shares of unskilled throughout, which always correspond to the complementary shares of skilled, of course.

[22] See Equations (11) and (12).

Proof: If immigrant voting changes the native majority and thus changes the tax rate from zero to positive or vice versa, then by definition, this majority of natives is worse off. This is because the prevailing tax rate is utility-maximising for the median voter and therefore the majority of natives. As a consequence, natives vote against immigrant voting rights. In cases 1 and 2, immigrant voting overthrows a native unskilled and skilled majority, respectively: in 1, the majority required for a positive tax rate increases and the voting outcome changes, because the unskilled majority is not strong enough; in 2, the analogue is true for a skilled majority. In case 3, immigrant voting can possibly overthrow the native (skilled or unskilled) majority, because the condition for multiple equilibria is fulfilled. In this case, natives do not choose between the current state and a state that makes them strictly worse off, but between the current state and a prospect where either the current state or a worse state occurs, both with positive probability. Obviously, the expected utility of the prospect is lower than that of the current state. □

Proposition 3. *In a native referendum by majority rule on whether to allow immigration or not when immigrants are allowed to vote, the outcome is 'no', if (1)* $0.5 < \lambda_u^n < \lambda_u^n(+)$ *or (2)* $\lambda_u^n(0) < \lambda_u^n < 0.5$ *or (3)* $\lambda_u^n(+) < \lambda_u^n < \lambda_u^n(0)$. *For (4)* $\lambda_u^n < \lambda_u^n(+) < 0.5$, *the outcome is indeterminate. For (5)* $0.5 < \lambda_u^n(0) < \lambda_u^n$, *the outcome is 'yes', if* $\frac{\lambda_s^m}{\lambda_u^m} > \frac{\lambda_s^n}{\lambda_u^n}$, *'no', if* $\frac{\lambda_s^m}{\lambda_u^m} < \frac{\lambda_s^n}{\lambda_u^n}$, *and indeterminate, if* $\frac{\lambda_s^m}{\lambda_u^m} = \frac{\lambda_s^n}{\lambda_u^n}$.

Proof: First, in deciding on whether to allow immigration or not, natives have to take account of the fact that the winning majority might change from skilled to unskilled or vice versa and, therefore, the tax rate might change from zero to positive or vice versa. We know from proposition 2, that in each of the cases 1–3, the winning majority will change with a certain positive probability either equal to (cases 1 and 2) or smaller than (case 3) 1. The (skilled or unskilled) majority of natives will therefore be against immigration in those cases.

Second, even if the winning majority does not change, the tax outcome can change with immigration via a change in mean income, which affects the tax level optimal for natives t^* as well as the lump-sum transfer b^*. For a skilled native majority, which will not be overthrown by immigration (case 4), the optimal tax rate will be zero both with and without immigration. It is therefore indifferent with regard to immigration, and the outcome of the referendum will be indeterminate.

For an unskilled native majority that will not be overthrown by immigration (case 5), the optimal tax rate depends on the skills of immigrants relative to those of natives. If the skilled/unskilled proportion of migrants is larger than that of natives ($\frac{\lambda_s^m}{\lambda_u^m} > \frac{\lambda_s^n}{\lambda_u^n}$), then mean income and, thus, the (positive) tax rate t^* and the lump-sum benefit b^* increase. The unskilled native majority will therefore vote for immigration. Similarly, it will vote against immigration, if the skilled/unskilled proportion of migrants is smaller than that of natives ($\frac{\lambda_s^m}{\lambda_u^m} < \frac{\lambda_s^n}{\lambda_u^n}$) and mean income and, thus, t^* and b^* decrease. The unskilled native majority will be indifferent, and the voting outcome will therefore be indeterminate, if immigration does not change the skill mix ($\frac{\lambda_s^m}{\lambda_u^m} = \frac{\lambda_s^n}{\lambda_u^n}$) and mean income as well as t^* and b^* remain unchanged. □

To sum up, an unskilled native majority will be for (against) immigration, if mean income increases (decreases), that is, if immigrants are relatively more (less) skilled than natives. A skilled native majority will be indifferent towards immigration. This, however, is only true for native majorities that are strong enough to remain winning majorities even after immigration.

If immigrant voting can change the outcome of the tax vote from zero to positive or vice versa (see proposition 2), a native (skilled or unskilled) majority will always be against immigration. This is intuitively plausible, since those, who would take advantage of a change in the tax rate, are not in the majority.

5 Conclusion

This paper considers the effect of immigration on income redistribution (a flat tax rate and a lump-sum benefit) via majority voting, when immigration is endogenous and depends on income redistribution. There are two types of workers, skilled and unskilled, both among immigrants as well as natives. Skilled workers earn more than unskilled workers, and so the former prefer a tax rate of zero, while the latter prefer a positive tax rate. Accordingly, if immigrants are allowed to vote, they might either join the low-tax interest group (the skilled) or the high-tax interest group (the unskilled). It is found that, if a native majority of either skilled or unskilled is not too strong, both a high and a low equilibrium tax rate and benefit is compatible with immigration (multiple tax/migration equilibria). Thereby, we extend results in earlier studies[23] that show that the tax rate can decrease with unskilled immigrant voting, given that immigrants do not change the political majority.

It is also found that, in a referendum on whether to give immigrants the vote or not, natives will always vote against immigrant voting, if there is no strong native majority of either skilled or unskilled. This is because immigrants can then tilt the political balance to a level of redistribution that is non-optimal for the majority of natives. For a percentage of skilled or unskilled natives above a certain threshold, however, immigrant voting does not matter for the outcome of the vote.

A third result is on the outcome of a native referendum on whether to allow free immigration or not, when immigrants are allowed to vote. It is found that the outcome will always be negative, if immigration changes the winning majority with some probability greater than 0. In cases where immigration does not change the winning majority, the outcome will be positive (negative), if there is a majority of unskilled, and immigration increases (decreases) the overall percentage of skilled;[24] a native majority of skilled, on the other hand, will be indifferent towards immigration.

Non-citizen voting on a national level is currently denied in all European Union countries. According to the findings in this paper, natives will oppose immigrant voting, if their majority on the level of income redistribution is not strong enough. At best, natives are indifferent towards immigrant voting.

Appendices

A Optimal income taxation

A.1 Closed economy

Let individual preferences be described by the following (direct) utility function

$$u(c, l) = c + l - l^2/2, \tag{23}$$

[23] Compare Razin et al. (2002) and Dolmas and Huffman (2003).

[24] In fact, a growing number of OECD countries have stressed the importance of the attraction of skilled immigrants in recent years (compare Coppel et al. (2001), p. 18).

with consumption c and leisure l. The individual time constraint is

$$l + L = 1, \tag{24}$$

with work L, and the individual budget constraint is

$$c = (1-t)w_i L + b, \tag{25}$$

with individual pre-tax hourly wage w_i, a lump sum benefit or grant b or, using (24):

$$c = (1-t)w_i - (1-t)w_i l + b. \tag{26}$$

Substitute c in the utility function to get utility as a function of leisure:

$$u_i(l) = (1-t)w_i - (1-t)w_i l + b + l - l^2/2. \tag{27}$$

Solving the foc, which is

$$u_i'(l) = 1 - (1-t)w_i - l = 0, \tag{28}$$

for l to derive leisure demand,

$$l_i = 1 - (1-t)w_i, \tag{29}$$

labour supply

$$L_i = 1 - l_i = (1-t)w_i, \tag{30}$$

and pre-tax income:

$$y_i = (1-t)w_i^2. \tag{31}$$

Insert (29) in (27) to get indirect utility as a function of the tax rate and the lump sum grant $v_i(t,b)$:

$$v_i(t,b) = 0.5 + b + 0.5(1-t)^2 w_i^2. \tag{32}$$

Feasible redistribution policy must satisfy the government budget constraint (4):

$$b = t\big[\big(\lambda_s^n y_s + \lambda_u^n y_u\big)\big].$$

Inserting (31) in (4) yields:

$$b = t(1-t)\big(\lambda_s^n w_s^2 + \lambda_u^n w_u^2\big). \tag{33}$$

Insert (33) in (32) to get indirect utility as a function of the tax rate $v_i(t)$:

$$v_i(t) = 0.5 + t(1-t)\big(\lambda_s^n w_s^2 + \lambda_u^n w_u^2\big) + 0.5(1-t)^2 w_i^2, \tag{34}$$

with the first order condition:

$$v_i'(t) = (1-2t)\left(\lambda_s^n w_s^2 + \lambda_u^n w_u^2\right) - (1-t)w_i^2 = 0, \quad i = s, u. \tag{35}$$

Solving for t yields the optimal tax rate, that is the one which maximises indirect utility $v_i(t)$:

$$t_i^* = \frac{\left(\lambda_s^n w_s^2 + \lambda_u^n w_u^2\right) - w_i^2}{2\left(\lambda_s^n w_s^2 + \lambda_u^n w_u^2\right) + w_i^2}, \quad i = s, u. \tag{36}$$

or, using (31),

$$t_i^* = \frac{\left(\lambda_s^n y_s + \lambda_u^n y_u\right) - y_i}{2\left(\lambda_s^n y_s + \lambda_u^n y_u\right) + y_i}, \quad i = s, u. \tag{37}$$

A.2 Open economy

In an open economy, the government budget constraint is:

$$b = t\left[\left(\lambda_s^n + \lambda_s^m\right)y_s + \left(\lambda_u^n + \lambda_u^m\right)y_u\right] / \left(1 + \lambda_s^m + \lambda_u^m\right). \tag{38}$$

Again, we use (31) to substitute for y and insert the budget constraint into (32) to get indirect utility as a function of the tax rate $v_i(t)$:

$$v_i(t) = 0.5 + t(1-t)\left[\left(\lambda_s^n + \lambda_s^m\right)w_s^2 + \left(\lambda_u^n + \lambda_u^m\right)w_u^2\right] / \left(1 + \lambda_s^m + \lambda_u^m\right) + 0.5(1-t)^2 w_i^2. \tag{39}$$

The first order condition is now:

$$v_i'(t) = (1-2t)\left[\left(\lambda_s^n + \lambda_s^m\right)w_s^2 + \left(\lambda_u^n + \lambda_u^m\right)w_u^2\right] / \left(1 + \lambda_s^m + \lambda_u^m\right) - (1-t)w_i^2 = 0, \quad i = s, u. \tag{40}$$

Solving for t, we derive the optimal tax rate t_i^*, that is the one which maximises indirect utility $v_i(t)$:

$$t_i^* = \frac{\left[\left(\lambda_s^n + \lambda_s^m\right)w_s^2 + \left(\lambda_u^n + \lambda_u^m\right)w_u^2\right] / \left(1 + \lambda_s^m + \lambda_u^m\right) - w_i^2}{2\left[\left(\lambda_s^n + \lambda_s^m\right)w_s^2 + \left(\lambda_u^n + \lambda_u^m\right)w_u^2\right] / \left(1 + \lambda_s^m + \lambda_u^m\right) + w_i^2}, \quad i = s, u. \tag{41}$$

or, using (31),

$$t_i^* = \frac{\left[\left(\lambda_s^n + \lambda_s^m\right)y_s + \left(\lambda_u^n + \lambda_u^m\right)y_u\right] / \left(1 + \lambda_s^m + \lambda_u^m\right) - y_i}{2\left[\left(\lambda_s^n + \lambda_s^m\right)y_s + \left(\lambda_u^n + \lambda_u^m\right)y_u\right] / \left(1 + \lambda_s^m + \lambda_u^m\right) + y_i}, \quad i = s, u. \tag{42}$$

B Foreign population size

If we want to allow for a size of the skilled and unskilled foreign subpopulations unequal to 1, our characterization of multiple voting equilibria changes in the following way:

We now have skilled and unskilled immigration of the size

$$\lambda_s^m = \theta \frac{\tilde{c_s}}{\overline{c_s}}, \tag{43}$$

and

$$\lambda_u^m = \varphi \frac{\tilde{c_u}}{\overline{c_u}}, \tag{44}$$

where θ and φ are the factors determining the total number of foreign skilled and unskilled, and $\theta, \varphi, \in R_+$.

Assuming that $\overline{c_s} = \overline{c_u} = 1$, and substituting for $\tilde{c}_s$ and $\tilde{c_u}$,[25] we get

$$\lambda_s^m \equiv \theta\left[(1-t^*)^2 w_s^2 + b^* - \tilde{y}_s\right], \tag{45}$$

and

$$\lambda_u^m \equiv \varphi\left[(1-t^*)^2 w_u^2 + b^* - \tilde{y}_u\right]. \tag{46}$$

If migrants can vote, the equilibrium tax rate will be zero, if

$$\lambda_u^n \leq 0.5\left(1 + \lambda_s^m - \lambda_u^m\right),$$

or, substituting for λ_s^m and λ_u^m.

$$\lambda_u^n \leq 0.5\left[1 + \left(\theta w_s^2 - \varphi w_u^2\right) - (\theta \tilde{y}_s - \varphi \tilde{y}_u)\right] \equiv \lambda_u^n(0). \tag{47}$$

For the equilibrium tax rate to be positive, it must be true that

$$\lambda_u^n > 0.5\left(1 + \lambda_s^m - \lambda_u^m\right),$$

and that therefore

$$\lambda_u^n > 0.5\left[1 + (1+t^*)^2\left(\theta w_s^2 - \varphi w_u^2\right) + b^*(\theta - \varphi) - (\theta \tilde{y}_s - \varphi \tilde{y}_u)\right] \equiv \lambda_u^n(+). \tag{48}$$

Assuming $\theta w_s^2 - \varphi w_u^2 > 0$, it is true that $\lambda_u^n(+) < \lambda_u^n(0)$, and we get the result of multiple political equilibria in an open economy where migrants are allowed to vote, when $\lambda_u^n(+) < \lambda_u^n < \lambda_u^n(0)$.

Proof: For $\lambda_u^n(+) < \lambda_u^n(0)$, it needs to be true that

$$b^*(\theta - \varphi) + (t^{*2} - 2t^*)\left(\theta w_s^2 - \varphi w_u^2\right) < 0.$$

[25] See (9) and (10).

Using (13) to substitute for b^* and (31), we get:

$$(\theta - \varphi)t^*(1 - t^*)\big[\big(\lambda_s^n + \lambda_s^m\big)w_s^2 + \big(\lambda_u^n + \lambda_u^m\big)w_u^2\big]\big/\big(1 + \lambda_s^m + \lambda_u^m\big)$$
$$+ (t^{*2} - 2t^*)\big(\theta w_s^2 - \varphi w_u^2\big) < 0$$

or, rearranging,

$$(1 - t^*)(\theta\overline{w} - \varphi\overline{w}) - (2 - t^*)\big(\theta w_s^2 - \varphi w_u^2\big) < 0,$$

where $\bar{w} = [(\lambda_s^n + \lambda_s^m)w_s^2 + (\lambda_u^n + \lambda_u^m)w_u^2]/(1 + \lambda_s^m + \lambda_u^m)$. This is true since $\bar{w} < w_s^2$ and $\bar{w} > w_u^2$ and, according to our assumption, $\theta w_s^2 - \varphi w_u^2 > 0$. □

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