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Immigration and Majority Voting on Income Redistribution - Is there a Case for Opposition from Natives?

by

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Immigration and Majority Voting on Income Redistribution - Is there a Case for Opposition from Natives?[1]

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Abstract

This paper examines the effect of immigration on the level of income redistribution via majority voting on the income tax. As a main result, we derive multiple tax equilibria if immigrants are allowed to vote and the skill composition of natives is not too homogeneous. In this case, the outcome of a native referendum on giving immigrants the right to vote would be negative, since immigrants could overthrow the native majority and change the tax rate that is utility-maximising for natives. It is found that at best, natives are indifferent towards immigrant voting, and the outcome of a corresponding referendum would be indeterminate.

Keywords: Political Economy; Immigration; Income Redistribution

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Non-technical summary

The importance of immigration into industrialised countries is mirrored in an extensive literature. Part of the economic migration research - and a very hotly debated one in politics - is dealing with the question of 'Is immigration - and how much of it and of which type - good or bad for the host (destination) country?' Apart from the labour market, the most prominent economic costs and benefits of immigration are likely to occur in the public finance sector. For example, the amount of net (welfare) spending on immigrants is an often raised issue in discussions on immigration policies in Western Europe. Besides, the issue of immigrant participation in political decision-making remains contentious: in the current European Union only five of all fifteen countries, namely Denmark, Finland, Ireland, Netherlands, and Sweden, automatically deliver voting rights to non-EU citizens, usually at the local level, and none does at the national level, where the level of redistribution is to a large part determined. A reason for this could be natives' concern over the power of immigrants' votes to tilt the political majority for a certain amount of redistribution, and attain an outcome that is unfavourable (non-optimal) for natives.

This paper determines the possible effects of immigration and immigrant voting on the level of redistribution in the destination country and, in consequence, derives the likely outcome of a native referendum on these two policy issues. As in other studies on public finance effects of immigration (see for example Cremer and Pestieau (1998), Mazza and van Winden (1996) and Razin and Sadka (1997)), a political economy (voting) model is used. It is assumed that immigration and the level of redistribution are interrelated in the following way: first, net income differentials between the destination and the source country induce immigration, and second, the new, enlarged population votes upon the new income tax rate. In a world where immigration is induced by net income differentials, the level and the skill composition of immigrants will depend upon the income tax rate prevailing in the destination country. At the same time, in a direct democracy where natives vote on the income tax rate together with non-citizen immigrants, the tax rate chosen will depend upon the level and skill composition of those immigrants.

Given these and other assumptions, we determine the equilibrium income tax rate (the equilibrium level of redistribution) under immigration. We derive the interesting result of multiple equilibria for homogeneous skill compositions of natives. This means that if the native population is neither predominantly skilled nor unskilled, immigration could (but does not have to) be such that the outcome of the tax vote will be different from what it would be in the absence of immigration.

From there, we can determine the outcome of a referendum on immigrant voting among natives who are trying to maximise their net incomes: they would vote against it if immigrant voting might lead to a change in their preferred tax rate. Otherwise, they will be indifferent. Besides, an unskilled native majority will always vote for (against) immigration that increases (decreases) the proportion of skilled.

It is therefore shown that if natives are not heterogeneous enough in their skills, there is a case for native opposition against immigrant voting. It is also found that there is actually a case where a native majority might vote for immigration and immigrant voting, namely if 1) the native majority is unskilled and the immigrant population is relatively more skilled than the native population and 2) the native majority is strong enough to retain their preferred tax rate.

1 Introduction

The importance of immigration, in particular in the course of increasing economic integration, is mirrored in an extensive literature. Within the last decade, an increasing amount of work has been dealing with the redistributive effects of immigration. The primary question there has been to what extent labour mobility might cause fiscal externalities arising with fiscal competition, and to what extent it might even hinder redistribution by national governments.[2] In these theoretical analyses, the political decision-making process is typically disregarded, and government policy is modelled with the help of interdependent utility functions of altruistic individuals or social-planner considerations.

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 interest groups and by thus changing the political constituency of the native population.[3] Along these lines, this paper provides an analysis of the possible impact of immigrant participation on the voting outcome regarding the level of income redistribution. It is related to Razin and Sadka (1997) in that it derives tax-voting equilibria under endogenous immigration within a median voter model. At the core of the model is the following interrelatedness between immigration and the income tax rate: firstly, immigration is induced by net income differentials between a foreign and a home country, and thus the tax rate, and secondly, the tax rate is (directly) voted upon by the new, enlarged population consisting of natives as well as immigrants. The paper most importantly differs from Razin and Sadka (1997) by allowing for immigrants to be both skilled and unskilled, and by deriving tax-voting equilibria under immigration analytically. Also, it addresses a closely related policy issue that, to the knowledge of the author, has not been taken up in earlier studies so far: the impact of immigrant voting on political outcomes as a possible determinant of natives'

[2]See for example Brown and Oates (1987), Schwab and Oates (1991) and Wildasin (1991).
[3]See for example Mazza and van Winden (1996), Cremer and Pestieau (1998) and Razin and Sadka (1997).

preferences towards immigrant voting rights.

As a main result, we derive that with immigrant voting, multiple tax-transfer equilibria arise. That is, immigrants' votes can either increase or decrease the income tax rate - namely if natives are not homogeneous enough in their skills. Then, the majority of natives would be against immigrant voting since it could alter voting outcomes and tilt the political balance to what would be to them an unfavourable (a non-optimal) level of redistribution. In a referendum, natives would therefore vote against giving immigrants the vote.

The model is a purely redistributive one and thus does not take into account possible welfare effects of immigration via different channels, for example public goods, social insurance[4] or the labour market[5]. Also, we had to restrict ourselves to the case of exogenous wages[6][7] in order to be able to derive equilibrium values analytically. Extensions in these directions pose a challenge for future research.

A further, rather straightforward result in this model is that unskilled natives will vote for (against) immigration if it increases (decreases) the overall percentage of skilled and thereby the net income of the unskilled[8], while skilled natives will be indifferent towards immigration.[9] We derive the according result in a normative analysis of tax outcomes: the (utilitarian) social welfare of natives is maximised under a high (low) level of redistribution if mean income increases (decreases) with immigration.

[4]For example on pay-as-you-go financed pension systems via a favourable age distribution of immigrants (see for example OECD (1998a,b) and Razin and Sadka (1998, 1999a,b)).

[5]For example via the so-called 'immigration surplus' (see Borjas (1994, 1999)), assuming that wages are decreasing in immigration.

[6]In their model with endogenous education cost and resulting endogenous wages, Razin and Sadka (1997) resort to a numerical computation of voting equilibria.

[7]The assumption of exogenous wages does not seem so distressing the light of the fact that the effect of immigration on local labour market outcomes has been found to be, if at all, modest in empirical studies (see for example Altonji and Card (1991), Borjas, Freeman and Katz (1996), Card (1990, 2001), Kuhn and Wooton (1991), Lalonde and Topel (1991) for the US, Pischke and Velling (1994), de New and Zimmermann (1994, 1999) for Germany, Hunt (1992) for France, Winter-Ebmer and Zweimueller (1996, 1999) for Austria, Angrist and Kugler (2001) for Western Europe in general and, most recently, Dustmann et al. (2003) for the UK). Of course, this still abstracts from a possible labour supply adjustment taking place for example via the education decision (see for example Razin and Sadka (1997) and Casarico and Devillanova (2001)).

[8]This corresponds with the general empirical finding that the fiscal contribution of immigrants depends positively on their level of educational achievement (see for example OECD (1997)).

[9]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).

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[10], 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 fifteen countries currently in the EU, only five countries (Denmark, Finland, Ireland, Netherlands, Sweden) automatically deliver voting rights to non-EU immigrants, 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 undertakes to determine whether there is a case for natives to oppose or support immigrant voting for redistributive reasons.

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. Besides, the open economy analysis is extended for the case of two periods (3.3) and endogenous labour supply (3.4). In Section 4, we address the issue of a referendum among natives on immigration and on immigrant voting rights. A normative analysis of our results is discussed in Section 5. Section 6 looks at the related literature and Section 7 concludes.

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

2 The Model

2.1 The Economic Environment

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. Initially, we assume that each type of worker supplies one unit of labour at a reservation wage of zero. This assumption is relaxed when we consider endogenous labour supply in Section 3.4.

In the home country, high- and low-productivity workers differ in gross wages y_s and y_u, respectively (with $y_s > y_u$), which are exogenous. Similarly, in the foreign country, skilled and unskilled workers earn (given) net wages $\widetilde{y_s}$ and $\widetilde{y_u}$ (with $\widetilde{y_s} > \widetilde{y_u}$). 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 (and, in our case of perfectly inelastic labour supply, also the average) 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 $[0, \overline{c}]$. 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. Until Section 3.4 we effectively assume individual labour supply to be fixed, therefore the income tax does not distort individual labour supply decisions.

2.2 Scenarios and Timing of Events

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

1) A closed economy, that is one in which there is no immigration 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 scenarios, 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.

3) An open economy in a two-period time frame with again possible immigration at the beginning of the first period. Immigrants are not allowed to participate in voting on the tax rate of the first period, but are only allowed to vote on the tax rate of the second period. We are interested in the effect that delayed voting rights have on the tax outcome. The idea is that immigration incentives and therefore equilibrium results might change if immigrants cannot participate in voting from the beginning of their arrival.[11] We will see that the basic results of scenario 2) stay unchanged.

Below, we will now determine our two endogenous variables, the immigration rate and the tax rate.

[11] Compare the demand for delayed participation of immigrants in welfare schemes, which is sometimes raised (see for example Sinn (2002)).

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

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

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:

$$b = t\left(\lambda_s^n y_s + \lambda_u^n y_u\right). \tag{2}$$

Individuals seek to maximise their utility given by their net income:

$$v_i(t) = (1-t)y_i + b,\ i = s, u,$$

or, after substituting in for b:

$$v_s(t) = y_s - t\lambda_u^n(y_s - y_u), \tag{3}$$

$$v_u(t) = y_u + t\lambda_s^n(y_s - y_u). \tag{4}$$

One can now see that the skilled prefer a tax rate of 0 (assuming that $t \geq 0$), whereas the unskilled prefer a tax rate of 1. Depending on whether there is a majority of skilled or unskilled in the population, the outcome of majority voting on the tax rate will be 0 or 1:

$$t^* = \begin{cases} 0 \\ 1 \end{cases} if \begin{matrix} \lambda_u^n \leq 0.5 \\ \lambda_u^n > 0.5 \end{matrix}. \tag{5}$$

It is worth noting that the tax rate of 1 is an extreme consequence of the assumption of exogenous labour supply together with zero cost of taxation. Only then, an unskilled majority would vote for the total taxation of income and redistribution that results in an equalisation of net income across the whole population.[12]

3.2 One-Period 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 country. So, there exists a cut-off level of moving cost c for skilled and unskilled migrants, $\widetilde{c_s}$ and $\widetilde{c_u}$, respectively, such that all those with moving cost below $\widetilde{c_s}$ or $\widetilde{c_u}$ 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 $\widetilde{c_s}$ and $\widetilde{c_u}$ are uniformly distributed over $[0, \overline{c_s}]$ and $[0, \overline{c_u}]$, respectively):

$$\lambda_s^m = \frac{\widetilde{c_s}}{\overline{c_s}}, \tag{6}$$

$$\lambda_u^m = \frac{\widetilde{c_u}}{\overline{c_u}}. \tag{7}$$

[12] As soon as we relax the assumption of exogenous labour supply, we will find an upper limitation of the tax rate $\overline{t} < 1$. For more on this case see Section 3.4.

To simplify notation, we will set $\overline{c_s} = \overline{c_u} \equiv 1$ from now on.[13]

The cut-offs $\widetilde{c_s}$ and $\widetilde{c_u}$ 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.

$$\widetilde{c_s} \equiv (1 - t^*)\, y_s + b^* - \widetilde{y_s}, \tag{8}$$

$$\widetilde{c_u} \equiv (1 - t^*)\, y_u + b^* - \widetilde{y_u}. \tag{9}$$

Hence,

$$\lambda_s^m \equiv (1 - t^*)\, y_s + b^* - \widetilde{y_s}, \tag{10}$$

$$\lambda_u^m \equiv (1 - t^*)\, y_u + b^* - \widetilde{y_u}. \tag{11}$$

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. In contrast, in a case of free migration and no migration costs, arbitrage would reduce net income differentials to zero and immigrant income would always be the equal to given foreign net income $\widetilde{y_s}$ and $\widetilde{y_u}$, regardless of the tax rate t and the implied transfer b prevailing in the home country. Immigrants would therefore not care about participating in the political process of the home country.[14]

[13] 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 remain unchanged, see the Appendix.

[14] See Razin and Sadka (1997).

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:

$$b^* = t^* \left[(\lambda_s^n + \lambda_s^m) \, y_s + (\lambda_u^n + \lambda_u^m) y_u \right] / (1 + \lambda_s^m + \lambda_u^m). \tag{12}$$

Individuals' utility is again given by their net income:

$$v_i(t) = (1-t)y_i + b, \; i = s, u.$$

After inserting the budget constraint and restructuring, we get

$$v_s(t) = y_s - t \frac{(\lambda_u^n + \lambda_u^m)}{(1 + \lambda_s^m + \lambda_u^m)} (y_s - y_u), \tag{13}$$

$$v_u(t) = y_u + t \frac{(\lambda_s^n + \lambda_s^m)}{(1 + \lambda_s^m + \lambda_u^m)} (y_s - y_u). \tag{14}$$

Individuals prefer the tax rate that maximises their utility, so as in the closed-economy case, the skilled prefer a tax rate of 0 (assuming that $t \geq 0$), whereas the unskilled prefer a tax rate of 1. Depending on whether there is a majority of skilled or unskilled in the population, the outcome of majority voting on the tax rate will thus be either 0 or 1.

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

$$\lambda_u^n < 0.5,$$

the unskilled will be in majority if

$$\lambda_u^n > 0.5,$$

and the conditions for the outcome of the tax vote to be 0 or 1 are:

$$t^* = \begin{cases} 0 \\ 1 \end{cases} if \begin{array}{c} \lambda_u^n \leq 0.5 \\ \lambda_u^n > 0.5 \end{array}. \tag{15}$$

This is the same outcome as in the closed economy. Again, this is a consequence of our assumption of exogenous labour supply, since with the introduction of tax distortion where we have a diminishing labour supply and tax base, the optimal tax rate will not only be upper-limited at some $\bar{t} < 1$, but will also depend upon the relation between mean and median income, which might change with immigration even if immigrants are not allowed to vote, because mean income in the population can change. In this case, therefore, immigrants, through their impact on the labour market, might still change the optimal level of redistribution and the outcome of the tax vote.[15]

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

$$\lambda_u^n + \lambda_u^m < 0.5(1 + \lambda_s^m + \lambda_u^m),$$

and the unskilled will be in majority if

$$\lambda_u^n + \lambda_u^m > 0.5(1 + \lambda_s^m + \lambda_u^m).$$

The conditions for the outcome of the tax vote to be 0 or 1 therefore are :

$$t^* = \begin{cases} 0 \\ 1 \end{cases} if \begin{array}{c} \lambda_u^n + \lambda_u^m \leq 0.5(1 + \lambda_s^m + \lambda_u^m) \\ \lambda_u^n + \lambda_u^m > 0.5(1 + \lambda_s^m + \lambda_u^m) \end{array}. \tag{16}$$

[15] See Section 3.4.

Proposition 1. *If migrants can vote, there is a political equilibrium with no redistribution* ($t = 0$) *if* $\lambda_u^n \leq 0.5\left[1 + (y_s - y_u) - (\widetilde{y_s} - \widetilde{y_u})\right] \equiv \lambda_u^n(0)$ *and one with redistribution* ($t = 1$) *if* $\lambda_u^n > 0.5\left[1 - (\widetilde{y_s} - \widetilde{y_u})\right] \equiv \lambda_u^n(1)$. *Therefore, we always have multiple political equilibria when* $\lambda_u^n(1) < \lambda_u^n \leq \lambda_u^n(0)$.

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

$$\lambda_u^n + \lambda_u^m \leq 0.5(1 + \lambda_s^m + \lambda_u^m), \tag{17}$$

or, after restructuring:

$$\lambda_u^n \leq 0.5(1 + \lambda_s^m - \lambda_u^m). \tag{17'}$$

Using (8) (after inserting (6)) and (9) (after inserting (7)) as well as the fact that $t = 0$ (and $b = 0$, using (12)), the equilibrium conditions determining the migration rate of skilled and unskilled immigrants, respectively, are the following:

$$y_s - \widetilde{y_s} = \lambda_s^m, \tag{18}$$

$$y_u - \widetilde{y_u} = \lambda_u^m. \tag{19}$$

The condition for the tax rate to be zero therefore is

$$\lambda_u^n \leq 0.5\left[1 + (y_s - y_u) - (\widetilde{y_s} - \widetilde{y_u})\right] \equiv \lambda_u^n(0). \tag{20}$$

For $t^* = 1$, it has to be true that

$$\lambda_u^n + \lambda_u^m > 0.5(1 + \lambda_s^m + \lambda_u^m), \tag{21}$$

or, after restructuring:

$$\lambda_u^n > 0.5(1 + \lambda_s^m - \lambda_u^m). \tag{21'}$$

As above, immigration is determined by net income differentials between the foreign and the home country.

If $t^* = 1$, tax revenue is equal to total income in the population (taxation is assumed to be costless) and is then distributed equally through lump-sum transfers, so that wages in the destination country will be equalised, and arbitrage conditions are the following:

$$\left[(\lambda_s^n + \lambda_s^m)y_s + (\lambda_u^n + \lambda_u^m)y_u\right]/(1 + \lambda_s^m + \lambda_u^m) - \widetilde{y_s} = \lambda_s^m, \tag{22}$$

$$[(\lambda_s^n + \lambda_s^m) y_s + (\lambda_u^n + \lambda_u^m) y_u] / (1 + \lambda_s^m + \lambda_u^m) - \widetilde{y_u} = \lambda_u^m. \quad (23)$$

Therefore,

$$\lambda_u^m - \lambda_s^m = \widetilde{y_s} - \widetilde{y_u}, \quad (24)$$

and we get the following condition for the tax rate to be one:

$$\lambda_u^n > 0.5 \left[1 - (\widetilde{y_s} - \widetilde{y_u})\right] \equiv \lambda_u^n(1). \quad (25)$$

QED.

These multiple equilibria arise because immigration will always be such that the tax rate that immigrants are taking as given when deciding to migrate will be the one preferred by the (new) majority. There are two possibilities: either immigrants believe in a tax rate of 0 - then immigration will indeed be such that a majority of immigrants and natives will vote for a tax rate of 0; or immigrants believe in tax rate of 1 - then immigration will be such that a majority will vote for a tax rate of 1. Since immigrants make up part of the new majority, both a tax rate of zero and one is compatible with immigration - if the skill composition of natives is not too homogeneous and their majority there is not too strong.

In comparing the open-economy values of required majorities $\lambda_u^n(0)$ and $\lambda_u^n(1)$ with their closed-economy equivalents, we can answer the question of whether allowing migration makes a redistribution outcome more likely or less likely.

If $(y_s - y_u) < (\widetilde{y_s} - \widetilde{y_u})$, we have $\lambda_u^n(0) < 0.5$. The gross income advantage is smaller for the skilled, and it is predominantly unskilled immigrants who join the native population and vote for a tax rate of 1 together with unskilled natives. The minimum proportion of unskilled natives necessary for a pro tax vote is now smaller than in the closed economy, and redistribution becomes more likely.

3.3 Two-Period Open Economy

In our third scenario, we evaluate voting equilibria with immigration and two periods, when immigrants are allowed to vote in the second, but not in the first period. They take the first-period tax rate (which is voted upon by natives only) as given and take into account the present value of net income in both periods, when deciding on migration. Thus, we seek to determine whether it makes a difference for natives, if immigrants are allowed to vote at once or only after a first period.

For this case of two periods, we have to review the relevant cut-offs determing immigration. As before, they are determined by aggregate present value net income differentials, whereby the first-period tax-transfer scheme t_1^*, b_1^* is taken as given:

$$\widetilde{c_s} \equiv \left\{ \left[(1-t_1^*)\, y_s + b_1^* \right] + \left[\frac{(1-t_2^*) y_s + b_2^*}{(1+r)} \right] \right\} - \left[\widetilde{y_s} + \frac{\widetilde{y_s}}{(1+r)} \right], \tag{26}$$

$$\widetilde{c_u} \equiv \left\{ \left[(1-t_1^*)\, y_u + b_1^* \right] + \left[\frac{(1-t_2^*) y_u + b_2^*}{(1+r)} \right] \right\} - \left[\widetilde{y_u} + \frac{\widetilde{y_u}}{(1+r)} \right]. \tag{27}$$

In the following, we assume $r = 0$.

Tax preferences and majority requirements will be as before, and we can determine the *political equilibrium* analogously, to derive the following

Proposition 2. *If migrants can vote after one period, there is a political equilibrium with no redistribution* ($t_2^* = 0$) *if* $\lambda_u^n \leq 0.5\left[1 - 2(\widetilde{y_s} - \widetilde{y_u}) + (2 - t_1^*)(y_s - y_u)\right] \equiv \lambda_u^n(0)$ *and one with redistribution* ($t_2^* = 1$) *if* $\lambda_u^n > 0.5\left[1 - 2(\widetilde{y_s} - \widetilde{y_u}) + (1 - t_1^*)(y_s - y_u)\right] \equiv \lambda_u^n(1)$. *Therefore, we always have multiple political equilibria when* $\lambda_u^n(1) < \lambda_u^n \leq \lambda_u^n(0)$.

Proof. Recall that, for $t_2^* = 0$, it has to be true that

$$\lambda_u^n \leq 0.5(1 + \lambda_s^m - \lambda_u^m). \tag{17'}$$

Using (26) and (27) as well as the fact that $t_2^* = 0$, we get the following equilibrium conditions for immigration:

$$[(1 - t_1^*)y_s + b_1^*] + y_s - 2\widetilde{y_s} = \lambda_s^m, \tag{28}$$

$$[(1 - t_1^*)y_u + b_1^*] + y_u - 2\widetilde{y_u} = \lambda_u^m. \tag{29}$$

It therefore has to be true that

$$\lambda_u^n \leq 0.5\,[1 - 2(\widetilde{y_s} - \widetilde{y_u}) + (2 - t_1^*)(y_s - y_u)] \equiv \lambda_u^n(0). \tag{30}$$

For $t_2^* = 1$, it has to be true that

$$\lambda_u^n > 0.5(1 + \lambda_s^m - \lambda_u^m). \tag{21'}$$

Cut-offs and therefore immigration are determined as follows:

$$[(1 - t_1^*)y_s + b_1^*] + [(\lambda_s^n + \lambda_s^m)y_s + (\lambda_u^n + \lambda_u^m)y_u]\,/(1 + \lambda_s^m + \lambda_u^m) - 2\widetilde{y_s} = \lambda_s^m, \tag{31}$$

$$[(1 - t_1^*)y_u + b_1^*] + [(\lambda_s^n + \lambda_s^m)y_s + (\lambda_u^n + \lambda_u^m)y_u]\,/(1 + \lambda_s^m + \lambda_u^m) - 2\widetilde{y_u} = \lambda_u^m. \tag{32}$$

It therefore has to be true that

$$\lambda_u^n > 0.5\,[1 - 2(\widetilde{y_s} - \widetilde{y_u}) + (1 - t_1^*)(y_s - y_u)] \equiv \lambda_u^n(1). \tag{33}$$

The rationale for the multiple equilibria outcome is the same as above.

Again, we can determine conditions under which a redistribution outcome becomes more or less likely:

Redistribution becomes less likely if $(1 - t_1)(y_s - y_u) > 2(\widetilde{y_s} - \widetilde{y_u})$, since then we have $\lambda_u^n(1) > 0.5$, and the minimum proportion of unskilled natives necessary for a pro tax vote increases.

Redistribution becomes less likely if $(2 - t_1)(y_s - y_u) < 2(\widetilde{y_s} - \widetilde{y_u})$, since then we have $\lambda_u^n(0) < 0.5$, and the minimum proportion of unskilled natives for a pro tax vote decreases.

Next, we want to relax the assumption of exogenous labour supply and see whether our basic conclusions still hold.

3.4 Endogenous labour supply and the open economy

With labour supply being endogenous, that is, dependent on the tax rate, the optimal tax rate will be lower than 1 because too high a tax exerts a negative incentive effect on the provision of labour. To determine the optimal income tax t for individuals with endogenous labour supply $L(t)$, we again maximise individuals' indirect utility $v(t, b)$:[16]

$$v_i(t, b) = 0.5 + b + 0.5(1 - t)^2 w_i^2,$$

with respect to the same budget constraint $b(t)$:

$$b^*(\lambda_u^m, \lambda_s^m) = t^* \left[(\lambda_s^n + \lambda_s^m) y_s + (\lambda_u^n + \lambda_u^m) y_u\right] / (1 + \lambda_s^m + \lambda_u^m). \tag{34}$$

This yields the following expression for the optimal income tax $t(\lambda_s^m, \lambda_u^m)$:[17]

$$t_i^* = \frac{\left[(\lambda_s^n + \lambda_s^m) y_s + (\lambda_u^n + \lambda_u^m) y_u\right] / (1 + \lambda_s^m + \lambda_u^m) - y_i}{2\left[(\lambda_s^n + \lambda_s^m) y_s + (\lambda_u^n + \lambda_u^m) y_u\right] / (1 + \lambda_s^m + \lambda_u^m) + y_i}, \ i = s, u. \tag{35}$$

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 they prefer. Adversely, with increasing income individuals' preferred tax rate decreases to zero when their income is equal to mean income. Imposing the restriction that $t \geq 0$, individuals' preferred tax rate will be zero if their income is equal to or higher than mean income.

3.4.1 Equilibrium

As before, with majority voting the tax rate will be determined by the median voter, who chooses the one which maximises his or her utility. Depending on whether the median voter is skilled or unskilled, the outcome of majority voting on the tax rate will be 0 or positive but smaller than 1.

[16] See the Appendix for derivation.
[17] See the derivation of (67) and (**??**) in the Appendix.

If migrants cannot vote, the median voter will be skilled if

$$\lambda_u^n < 0.5,$$

and the median voter will be unskilled if

$$\lambda_u^n > 0.5.$$

Hence, again assuming that $y_s > y_u$ and $t \geq 0$, the tax outcome will be:

$$t^*(\lambda_u^m, \lambda_s^m) = \begin{cases} 0 \\ \frac{[(\lambda_u^n+\lambda_u^m)y_u+(1-\lambda_u^n+\lambda_s^m)y_s]/(1+\lambda_s^m+\lambda_u^m)-y_u}{2[(\lambda_u^n+\lambda_u^m)y_u+(1-\lambda_u^n+\lambda_s^m)y_s]/(1+\lambda_s^m+\lambda_u^m)+y_u} \end{cases} if \begin{matrix} \lambda_u^n \leq 0.5 \\ \lambda_u^n > 0.5 \end{matrix}. \tag{36}$$

If migrants can vote, the median voter will be skilled if

$$\lambda_u^n + \lambda_u^m < 0.5(1 + \lambda_s^m + \lambda_u^m),$$

and the median voter will be unskilled if

$$\lambda_u^n + \lambda_u^m > 0.5(1 + \lambda_s^m + \lambda_u^m).$$

The tax outcome then will be:

$$t^*(\lambda_u^m, \lambda_s^m) = \begin{cases} 0 \\ \frac{[(\lambda_u^n+\lambda_u^m)y_u+(1-\lambda_u^n+\lambda_s^m)y_s]/(1+\lambda_s^m+\lambda_u^m)-y_u}{2[(\lambda_u^n+\lambda_u^m)y_u+(1-\lambda_u^n+\lambda_s^m)y_s]/(1+\lambda_s^m+\lambda_u^m)+y_u} \end{cases} if \begin{matrix} \lambda_u^n + \lambda_u^m \leq 0.5(1 + \lambda_s^m + \lambda_u^m) \\ \lambda_u^n + \lambda_u^m > 0.5(1 + \lambda_s^m + \lambda_u^m) \end{matrix}. \tag{37}$$

We see that now, unlike in the case of exogenous labour supply, immigration might not only change the equilibrium lump-sum grant, but also the tax voting outcome, even if immigrants are not allowed to vote: the preferred tax rate of the unskilled is increasing in mean income and decreasing in median income: if mean income increases by more than median income, the preferred tax rate increases, if mean income decreases by more than median income, the preferred tax rate decreases.[18]

Proposition 3. *With endogenous labour supply, if migrants can vote, there is a political equilibrium with no redistribution* $(t = 0)$ *if* $\lambda_u^n \leq 0.5\,[1 + (y_s - y_u) - (\widetilde{y_s} - \widetilde{y_u})] \equiv \lambda_u^n(0)$ *and one with positive redistribution* $(0 < t < 1)$ *if* $\lambda_u^n > 0.5\,[1 + (1-t)(y_s - y_u) - (\widetilde{y_s} - \widetilde{y_u})] \equiv \lambda_u^n(+)$. *Therefore, we always have multiple political equilibria when* $\lambda_u^n(+) < \lambda_u^n \leq \lambda_u^n(0)$.

[18] In a model with exogenous labour supply but endogenous skill acquisition, Razin and Sadka (1997) find the mean income effect dominating: the optimal level of the tax rate is found to be decreasing with unskilled immigration.

Proof. As before, for $t^* = 0$, the skilled have to be in majority:

$$\lambda_u^n + 0.5(\lambda_u^m - \lambda_s^m) \leq 0.5.$$

To determine the equilibrium levels of immigration, we need to proceed in the same way as above, using (37) and (34) and solving (10) and (11) for t^*, b^*, λ_s^m and λ_u^m. The only difference to be kept in mind is that now, the optimal tax rate depends not only on median, but also on mean income and therefore on immigration, we write $t^*(\lambda_u^m, \lambda_s^m)$:

$$(1 - t^*(\lambda_u^m, \lambda_s^m))y_s + b^*(\lambda_u^m, \lambda_s^m) - \widetilde{y_s} = \lambda_s^m, \tag{38}$$

$$(1 - t^*(\lambda_u^m, \lambda_s^m))y_u + b^*(\lambda_u^m, \lambda_s^m) - \widetilde{y_u} = \lambda_u^m. \tag{39}$$

For $t = 0$, nothing changes, and equilibrium migration levels are again:

$$y_s - \widetilde{y_s} = \lambda_s^m,$$

and

$$y_u - \widetilde{y_u} = \lambda_u^m.$$

As before, the condition for the tax rate to be zero therefore is:

$$\lambda_u^n \leq 0.5\left[1 + (y_s - y_u) - (\widetilde{y_s} - \widetilde{y_u})\right] \quad \equiv \lambda_u^n(0). \tag{20}$$

For $0 < t^* < 1$, the unskilled have to be in majority:

$$\lambda_u^n + 0.5(\lambda_u^m - \lambda_s^m) > 0.5.$$

Now, from looking at (38) and (39) we can see that we cannot 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 whether we have multiple political equilibria or not:

From (38) and (39), we get the following:

$$\lambda_s^m - \lambda_u^m = (1 - t^*(\lambda_u^m, \lambda_s^m))(y_s - y_u) - (\widetilde{y_s} - \widetilde{y_u}). \tag{40}$$

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

$$\lambda_u^n > 0.5\,[1 + (1 - t^*(\lambda_u^m, \lambda_s^m))(y_s - y_u) - (\widetilde{y_s} - \widetilde{y_u})] \equiv \lambda_u^n(+). \tag{41}$$

Since we know that $0 < t^*(\lambda_u^m, \lambda_s^m) < 1$, we have $\lambda_u^n(+) < \lambda_u^n(0)$.

Q.E.D.

4 Is Immigration and Immigrant Voting Desirable for Natives?

In the analyses above, we derived two main results: firstly, with immigrant voting, multiple voting equilibria arise with respect to the tax-transfer policy, and secondly, immigrant voting can change native majority requirements to a level above or below the ones in a closed economy and thus make redistribution more or less likely.

Next, we can determine whether the majority of natives gains or loses from immigration and immigrant voting and whether therefore, in a referendum, they would vote for or against it:

Proposition 4. *In a native referendum by majority rule on whether to give immigrants the vote, natives vote 'no' if 1) $\lambda_u^n(1) < \lambda_u^n < \lambda_u^n(0)$ or 2) $\lambda_u^n(0) < \lambda_u^n < 0.5$. The outcome of the referendum is indeterminate in all other cases.*

Proof. The tax rate can change with immigrant voting given any of the three conditions above: in 1) the tax outcome is indeterminate due to multiple equilibria, and in 2) the majority required for a zero tax rate increases so that the voting outcome will change if the skilled majority is not strong enough.If immigrant voting changes the tax rate, then by definition, the majority of natives will be worse off.

Given immigration, the majority of natives will be worse off, if immigrant voting changes the tax rate.[19] Assuming that natives are not only against a definite but also against a - due to multiple voting equilibria - possible change in the tax rate, natives would therefore vote against immigrant voting rights in each of the two cases above. If the tax rate is not changed, natives will be indifferent, and the referendum outcome would be indeterminate.

Proposition 5. *In a native referendum by majority rule on whether to allow immigration, the outcome is indeterminate for* $\lambda_u^n < 0.5$*. For* $\lambda_u^n > 0.5$*, natives vote 'yes' if* $\frac{\lambda_s^m}{\lambda_u^m} > \frac{\lambda_s^n}{\lambda_u^n}$ *and 'no' if* $\frac{\lambda_s^m}{\lambda_u^m} < \frac{\lambda_s^n}{\lambda_u^n}$*, the outcome is indeterminate if* $\frac{\lambda_s^m}{\lambda_u^m} = \frac{\lambda_s^n}{\lambda_u^n}$*.*

Proof. Natives' utility is affected by immigration, even if immigrants are not allowed to vote on the tax rate, via a change in mean income, which affects the lump-sum transfer b^*.

According to the skill composition of the native population, we can distinguish the following two cases:

1) For $\lambda_u^n < 0.5$, there is no redistribution ($t^* = 0$ and $b^* = 0$), and the native (skilled) majority is indifferent.

2) For $\lambda_u^n > 0.5$, there is redistribution ($t^* = 1$), and the native (unskilled) majority will be against (in favour) of immigration, if b^* goes down (up). From looking at the government budget constraints of the open and the closed economy, (12) and (2), we can see that this is the case if with immigration, the aggregate proportion of skilled decreases (increases), that is iff $\frac{\lambda_s^n + \lambda_s^m}{1+\lambda_s^m+\lambda_u^m} < \lambda_s^n$ ($\frac{\lambda_s^n + \lambda_s^m}{1+\lambda_s^m+\lambda_u^m} > \lambda_s^n$) or, equivalently, iff $\frac{\lambda_s^m}{\lambda_u^m} < \frac{\lambda_s^n}{\lambda_u^n}$ ($\frac{\lambda_s^m}{\lambda_u^m} > \frac{\lambda_s^n}{\lambda_u^n}$). The lump-sum transfer b^* will stay constant if immigration is such that $\frac{\lambda_s^m}{\lambda_u^m} = \frac{\lambda_s^n}{\lambda_u^n}$; in this case, the native majority will be indifferent.

[19] This is because the prevailing tax rate is utility-maximising for the median voter and therefore the majority of natives.

Proposition 4'. *With endogenous labour supply, in a native referendum by majority rule on whether to give immigrants the vote, natives vote 'no' if 1)* $\lambda_u^n(+) < \lambda_u^n < \lambda_u^n(0)$ *or 2)* $0.5 < \lambda_u^n < \lambda_u^n(+)$ *or 3)* $\lambda_u^n(0) < \lambda_u^n < 0.5$*. They are indifferent in all other cases.*

Proof. As in Proposition 4 above, given immigration, the majority of natives will be worse off, if immigrant voting changes the tax rate. Although now, the optimal tax rate can change with immigration[20], a skilled (unskilled) majority will still always prefer a zero (positive) tax rate[21] and will oppose any according change in the voting outcome.

Proposition 5'. *With endogenous labour supply, in a native referendum by majority rule on whether to allow immigration, the outcome is indeterminate for* $\lambda_u^n < 0.5$*. For* $\lambda_u^n > 0.5$*, natives vote 'yes' if* $\frac{\lambda_s^m}{\lambda_u^m} > \frac{\lambda_s^n}{\lambda_u^n}$ *and 'no' if* $\frac{\lambda_s^m}{\lambda_u^m} < \frac{\lambda_s^n}{\lambda_u^n}$*; the outcome is indeterminate if* $\frac{\lambda_s^m}{\lambda_u^m} = \frac{\lambda_s^n}{\lambda_u^n}$*.*

Proof. Natives' utility is affected by immigration even in the absence of immigrant voting rights via a change in mean income, which affects the tax level optimal for natives t^* as well as the lump-sum transfer b^*.[22]

According to the skill composition of the native population, we can distinguish between the following two cases:

1) For $\lambda_u^n < 0.5$, there is no redistribution ($t^* = 0$ and $b^* = 0$), and the native (skilled) majority is indifferent. It does not care about the skill mix of immigrants.[23]

2) For $\lambda_u^n > 0.5$, immigration does not change mean income and the tax rate if $\frac{\lambda_s^m}{\lambda_u^m} = \frac{\lambda_s^n}{\lambda_u^n}$. In this

[20] Compare the formula for the optimal tax rate in (35).

[21] This is because mean income will always be below (above) median income of $y_s(y_u)$ with a skilled (unskilled) native majority.

[22] Note that, since wages are exogenous and immigrants are not allowed to vote, immigration has no impact on median voter income, and changes in the optimal level of the tax rate are solely due to changes in mean income.

[23] Note that as immigration has no impact on median voter income, it cannot change the preferred level of the tax rate from zero to positive. For this to happen, mean income would have to rise from below to above median income which is constant at y_s. (see Proof of Proposition 4' above)

case, the native (unskilled) majority is indifferent because immigration does not change the skill mix. Immigration changes the preferred level of a positive tax rate of natives if mean income changes. The unskilled native majority will vote for immigration if $\frac{\lambda_s^m}{\lambda_u^m} > \frac{\lambda_s^n}{\lambda_u^n}$ and mean income, and thus t^* and b^*, increase. Similarly, it will be against immigration if $\frac{\lambda_s^m}{\lambda_u^m} < \frac{\lambda_s^n}{\lambda_u^n}$ and mean income, and thus t^* and b^*, decrease.[24]

To sum up, both in the case of exogenous and endogenous labour supply, 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 majority will be indifferent towards immigration. If, however, immigrants' voting power might alter the outcome of the tax vote t, natives will always be against immigrant voting.

5 Normative analysis

We might be interested in judging upon the social desirability of equilibrium tax-transfer policies from a welfare point of view. In our direct-democracy model, equilibrium tax choices are always efficient in a Pareto sense, since they maximise median voter utility. In changing the tax rate, nobody can be made better off without making at least the median voter worse off.[25] This welfare criterion, however, does not allow the comparison of different levels of utility or gains and losses that arise from changes in the tax rate. To achieve this objective, a stronger welfare criterion is necessary, where some interpersonal utility comparison has to be made. As the welfare criterion over t, we employ the sum of individual utilities in the standard utilitarian form $W(t) = \sum_{i=1}^{I} U^i(t)$. Any tax-transfer policy for which $W(t^*) \geq W(t)$, $t \neq t^*$

[24] For the same reason as above, immigrants cannot change the preferred level of the tax rate from positive to zero. For this to happen, mean income would have to fall from above to below median income which is constant at y_u. (see Proof of Proposition 4' above)

[25] See Besley and Coate (1998).

is potentially pareto-efficient, since in changing the tax rate from any t to t^*, all losers could be fully compensated by some lump-sum transfers while the gainers are left strictly better off.

In the following, we compute the socially optimal tax rate t^{**} in a closed and in an open economy - in turn for the case of exogenous and endogenous labour supply.

5.1 Exogenous labour supply

Proposition 6. *If labour supply is exogenous, any tax rate $0 \leq t^{**} \leq 1$ is socially efficient for natives. Therefore, any tax vote by majority rule is efficient for natives in a closed economy. In an open economy, the efficient tax rate $t^{**} = 1$ if $\frac{\lambda_s^m}{\lambda_u^m} > \frac{\lambda_s^n}{\lambda_u^n}$ and $t^{**} = 0$ if $\frac{\lambda_s^m}{\lambda_u^m} < \frac{\lambda_s^n}{\lambda_u^n}$. Therefore, immigrant voting can change an efficient tax vote into an inefficient one and vice versa when $\lambda_u^n(1) < \lambda_u^n < \lambda_u^n(0)$.*

Proof.

Closed economy[26]

In a closed economy where labour supply is exogenous and preferences are linear, social welfare does not depend on the income tax at all. This is intuitively plausible since any amount of tax revenue is redistributed among the native population without any cost in aggregate utility. Any tax rate would therefore be efficient.

First, with quasi-linear preferences for all individuals i, no individual can gain more than another by a given increase in the lump-sum transfer b. The increase in individual utility arising from any given increase in b is independent of income.

Second, with fixed labour supply, the tax base is constant in t. This guarantees that there is no work disincentive effect from taxation, and no efficiency loss.

[26] **See the Appendix for derivation.**

Open economy[27]

For an open economy, we get the following result:

A tax rate of 1 is efficient if

$$\lambda_s^n y_s + \lambda_u^n y_u < \left[(\lambda_s^n + \lambda_s^m) y_s + (\lambda_u^n + \lambda_u^m) y_u\right] / (1 + \lambda_s^m + \lambda_u^m), \tag{42}$$

and a tax rate of 0 is efficient if

$$\lambda_s^n y_s + \lambda_u^n y_u > \left[(\lambda_s^n + \lambda_s^m) y_s + (\lambda_u^n + \lambda_u^m) y_u\right] / (1 + \lambda_s^m + \lambda_u^m). \tag{43}$$

That is, in an open economy, utilitarian social welfare of natives is maximised under a tax rate of 1 if mean income increases with immigration. It is maximised under a tax rate of 0 if mean income decreases with immigration. QED.

This result is intuitively plausible since with an increase in mean income, per capita tax revenue increases for any given t, and every native is better off due to a higher lump-sum benefit b. There is a net redistribution of income from immigrants to natives. A tax rate of 1 maximises aggregate native utility.

With a decrease in mean income, it is the other way around: for any given t, per capita tax revenue and therefore b decreases. Income is effectively redistributed away from natives to immigrants. A tax rate of 0 therefore maximises aggregate native utility.

Now, does majority voting among natives yield the socially efficient tax rate for natives in an open economy? For this, recall our results from Section 3.2 and Section 4:

1) A native unskilled majority $\lambda_u^n > \lambda_u^n(0) > 0.5$ votes for a tax rate of 1. It votes for immigration only if it increases mean income. The tax vote is efficient.

2) A native skilled majority, given for $\lambda_u^n < \lambda_u^n(1) < 0.5$, votes for a tax rate of 0. It is indifferent towards immigration. Therefore, if immigration is such that mean income increases, the tax vote is not efficient; if mean income decreases, it is.

[27] **See the Appendix for derivation.**

3) If the proportion of native unskilled λ_u^n is such that $\lambda_u^n(1) < \lambda_u^n < \lambda_u^n(0)$, natives will oppose immigration. If immigration does take place, whether or not a native tax vote is efficient again depends on the skill composition of immigrants - as derived above, a tax rate of 1 (0) is efficient if mean income increases (decreases) with immigration.

Do these efficiency results of majority voting change when immigrants are allowed to vote together with natives? Let us reconsider briefly the relevant cases above:

If the native population is relatively homogeneous, as in 1) and 2), results stay the same, since immigrants' voting does not change the voting outcome.

If the native population is relatively heterogeneous, as in 3), the outcome of the tax vote becomes indeterminate with immigration. If immigrant voting changes the tax outcome, it changes an efficient tax rate into an inefficient one and vice versa.

5.2 Endogenous labour supply

Proposition 6'. *For the socially efficient tax rate for natives t^{**} it is true that $t^{**} < t^*$, if t^* is positive, and that $t^{**} > t^*$, if t^* is zero, both in a closed and in an open economy, if labour supply is endogenous. Therefore, any tax vote by majority rule is inefficient for natives, whether immigrants are allowed to vote or not.*

Proof.

Closed economy

Using individual utility, which is now given by[28]

$$v_i(t, b) = 0.5 + b + 0.5(1 - t)^2 w_i^2,$$

[28] See (63) in the Appendix.

and inserting the budget constraint

$$b = t(\lambda_s^n y_s + \lambda_u^n y_u),$$

we get the following individual utility function

$$u_i(t) = 0.5 + t(\lambda_s^n y_s + \lambda_u^n y_u) + 0.5(1-t)^2 w_i^2,$$

or, after substituting for y_s and y_u

$$u_i(t) = 0.5 + t(1-t)(\lambda_s^n w_s^2 + \lambda_u^n w_u^2) + 0.5(1-t)^2 w_i^2.$$

Using a utilitarian welfare function for natives of the form

$$W(t) = \lambda_s^n u_s(t) + \lambda_u^n u_u(t),$$

and substituting in, we get

$$W(t) = 0.5 + t(1-t)(\lambda_s^n w_s^2 + \lambda_u^n w_u^2) + 0.5(1-t)^2(w_s^2 + w_u^2).$$

From the first derivative

$$W'(t) = (1-2t)(\lambda_s^n w_s^2 + \lambda_u^n w_u^2) - t(w_s^2 + w_u^2),$$

we derive the welfare-maximising tax rate

$$t^{**} = \frac{\lambda_s^n w_s^2 + \lambda_u^n w_u^2}{2(\lambda_s^n w_s^2 + \lambda_u^n w_u^2) + (w_s^2 + w_u^2)},$$

or

$$t^{**} = \frac{\lambda_s^n y_s + \lambda_u^n y_u}{2(\lambda_s^n y_s + \lambda_u^n y_u) + (y_s + y_u)}. \tag{44}$$

Compare the equilibrium tax rate in a closed economy[29]:

$$t^* = \begin{cases} 0 \\ \frac{\lambda_s^n y_s + \lambda_u^n y_u - y_u}{2(\lambda_s^n y_s + \lambda_u^n y_u) + y_u} \end{cases} if \begin{matrix} \lambda_u^n \leq 0.5 \\ \lambda_u^n > 0.5 \end{matrix}. \tag{62}$$

[29]See (69) in the Appendix.

Open economy

Again using individual utility of the form

$$v_i(t,b) = 0.5 + b + 0.5(1-t)^2 w_i^2,$$

and inserting the budget constraint for an open economy

$$b = t\left[(\lambda_s^n + \lambda_s^m)\, y_s + (\lambda_u^n + \lambda_u^m) y_u\right]/(1 + \lambda_s^m + \lambda_u^m),$$

we get the following individual utility function

$$u_i(t) = 0.5 + t\left[(\lambda_s^n + \lambda_s^m)\, y_s + (\lambda_u^n + \lambda_u^m) y_u\right]/(1 + \lambda_s^m + \lambda_u^m) + 0.5(1-t)^2 w_i^2,$$

or, after substituting for y_s and y_u

$$u_i(t) = 0.5 + t(1-t)\left[(\lambda_s^n + \lambda_s^m)\, w_s^2 + (\lambda_u^n + \lambda_u^m) w_u^2\right]/(1 + \lambda_s^m + \lambda_u^m) + 0.5(1-t)^2 w_i^2.$$

Using the same utilitarian welfare function for natives

$$W(t) = \lambda_s^n u_s(t) + \lambda_u^n u_u(t),$$

and substituting in, we get

$$W(t) = 0.5 + t(1-t)\left[(\lambda_s^n + \lambda_s^m)\, w_s^2 + (\lambda_u^n + \lambda_u^m) w_u^2\right]/(1 + \lambda_s^m + \lambda_u^m) + 0.5(1-t)^2 (w_s^2 + w_u^2).$$

From the first derivative

$$W'(t) = (1-2t)\left[(\lambda_s^n + \lambda_s^m)\, w_s^2 + (\lambda_u^n + \lambda_u^m) w_u^2\right]/(1 + \lambda_s^m + \lambda_u^m) - t(w_s^2 + w_u^2),$$

we derive the welfare-maximising tax rate

$$t^{**} = \frac{(\lambda_s^n + \lambda_s^m)\, w_s^2 + (\lambda_u^n + \lambda_u^m) w_u^2}{2\left[(\lambda_s^n + \lambda_s^m)\, w_s^2 + (\lambda_u^n + \lambda_u^m) w_u^2\right] + (w_s^2 + w_u^2)(1 + \lambda_s^m + \lambda_u^m)},$$

or

$$t^{**} = \frac{(\lambda_s^n + \lambda_s^m)\, y_s + (\lambda_u^n + \lambda_u^m) y_u}{2\left[(\lambda_s^n + \lambda_s^m)\, y_s + (\lambda_u^n + \lambda_u^m) y_u\right] + (y_s + y_u)(1 + \lambda_s^m + \lambda_u^m)}. \tag{45}$$

Recall that the equilibrium tax rate in an open economy is

$$t^* = \begin{cases} 0 \\ \frac{[(\lambda_u^n+\lambda_u^m)y_u+(1-\lambda_u^n+\lambda_s^m)y_s]/(1+\lambda_s^m+\lambda_u^m)-y_u}{2[(\lambda_u^n+\lambda_u^m)y_u+(1-\lambda_u^n+\lambda_s^m)y_s]/(1+\lambda_s^m+\lambda_u^m)+y_u} \end{cases} if \begin{matrix} \lambda_u^n + \lambda_u^m \leq 0.5(1 + \lambda_s^m + \lambda_u^m) \\ \lambda_u^n + \lambda_u^m > 0.5(1 + \lambda_s^m + \lambda_u^m) \end{matrix}. \tag{61}$$

Both for an open and a closed economy, the socially efficient tax rate is always positive and smaller than 1. This is intuitively plausible since firstly, a tax rate of 1 would cause an efficiency loss via a distortion of labour supply, which would decrease to zero[30], with a total depletion of the tax base. Secondly, a positive tax rate is potentially pareto-superior to a tax rate of 0 because the utility gain of the unskilled from an increase in their net income can more than offset the net utility loss of the skilled from a decrease in their net income. This is because for any given increase in the tax rate, the skilled can make up for part of their utility loss by substituting part of their time away from labour to leisure according to their preferences.

We see that any tax vote is inefficient both in a closed and an open economy, since a tax vote of zero will always be too low and a positive tax vote will always be too high: $t^{**} < t^*$ for $t^* > 0$ and $t^{**} > t^*$ for $t^* = 0$.

6 Related literature

Other studies have also used a political-economy approach to analyse the effect of immigration on public policy variables of the host country. For example, Mazza and van Winden (1996) find that transfers and disposable income for mobile workers can increase with immigration. In an analysis of voting on social insurance contributions, Cremer and Pestieau (1998) find that when the poor (rich) are mobile, the contribution rate decreases (increases) the more strongly benefits are related to earnings. The paper of Razin and Sadka (1997) is perhaps most closely related to the present paper, since it also analyses the interaction between migration and the political-economy equilibrium tax-transfer policy in the host country. There, too, net income differentials and therefore the prevailing tax rate in the destination country induce immigration, which changes the median voter's income and tax preference. They find that unskilled migration may lead to a lower tax and less redistribution than no migration.

The present paper is different in that it allows for both skilled and unskilled immigrants and analyt-

[30] See (61) in the Appendix.

ically derives the conditions for a high-tax and a low-tax equilibrium. It is shown that immigration is compatible with both a high and a low tax rate, depending on the skill composition of natives.

7 Conclusion

The aim of this paper was to determine the effect of immigration on the level of income redistribution via majority voting, given that immigration is endogenous and immigrants can be both skilled and unskilled. The tax outcome depends on the skill composition of natives and the initial amount of redistribution in the economy, which in turn determines the skill composition of immigrants. Accordingly, if immigrants are allowed to vote, they might either join the high-redistribution interest group (the unskilled) or the low-redistribution interest group (the skilled). It is found, firstly, that the probability for redistribution can increase or decrease and secondly, that for certain skill compositions of natives, both a high and a low equilibrium tax rate is compatible with immigration. Immigrant voting can then change the political majority. As a consequence, we can determine the gainers and losers within the native community from an extension of the franchise. If immigrant voting can change the political majority, the majority of natives can end up with a tax rate that makes them worse off. They will then oppose an extension of the franchise to immigrants, and in a referendum, it would be defeated. For a percentage of skilled or unskilled natives above a certain threshold, however, immigrant voting does not matter for the outcome of the vote.

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. As far as immigration itself is concerned, a native majority would gain from it and therefore vote for it, if it itself was unskilled and immigrants were relatively higher skilled than natives.

APPENDIX

Number of the foreign skilled and unskilled

One-period open economy: exogenous labour supply

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

$$\lambda_s^m = \theta \frac{\widetilde{c_s}}{\overline{c_s}}, \tag{46}$$

and

$$\lambda_u^m = \varphi \frac{\widetilde{c_u}}{\overline{c_u}}, \tag{47}$$

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 $\widetilde{c_s}$ and $\widetilde{c_u}$[31], we get

$$\lambda_s^m \equiv \theta \left[(1 - t^*)y_s + b^* - \widetilde{y_s}\right], \tag{48}$$

and

$$\lambda_u^m \equiv \varphi \left[(1 - t^*)y_u + b^* - \widetilde{y_u}\right]. \tag{49}$$

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

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

or, substituting for λ_s^m and λ_u^m,

$$\lambda_u^n \leq 0.5 \left[1 + \theta \left(y_s - \widetilde{y_s}\right) - \varphi(y_u - \widetilde{y_u})\right] \equiv \lambda_u^n(0). \tag{50}$$

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

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

[31] See (8) and (9).

and that therefore

$$\lambda_u^n > 0.5\left[1 + \theta(\overline{y} - \widetilde{y_s}) - \varphi(\overline{y} - \widetilde{y_u})\right] \equiv \lambda_u^n(1), \tag{51}$$

where $\overline{y} \equiv \left[(\lambda_s^n + \lambda_s^m)y_s + (\lambda_u^n + \lambda_u^m)y_u\right]/(1 + \lambda_s^m + \lambda_u^m)$.

Again, it is true that $\lambda_u^n(1) < \lambda_u^n(0)$, and we get the result of multiple political equilibria in an open economy where migrants are allowed to vote when $\lambda_u^n(1) < \lambda_u^n < \lambda_u^n(0)$.

One-period open economy: endogenous labour supply

Again, the equilibrium tax rate will be zero, if

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

or, substituting for λ_s^m and λ_u^m,

$$\lambda_u^n \leq 0.5\left[1 + (\theta y_s - \varphi y_u) - (\theta\widetilde{y_s} - \varphi\widetilde{y_u})\right] \equiv \lambda_u^n(0). \tag{52}$$

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

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

and that therefore

$$\lambda_u^n > 0.5\left[1 + (1 - t^*)(\theta y_s - \varphi y_u) - (\theta\widetilde{y_s} - \varphi\widetilde{y_u}) + b^*(\theta - \varphi)\right] \equiv \lambda_u^n(+). \tag{53}$$

Again, 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

$$b^*(\theta - \varphi) - t^*(\theta y_s - \varphi y_u) < 0.$$

Using (12) to substitute for b^*, and rearranging, we get:

$$(\theta - \varphi)t^*\left[(\lambda_s^n + \lambda_s^m)y_s + (\lambda_u^n + \lambda_u^m)y_u\right]/(1 + \lambda_s^m + \lambda_u^m) < t^*(\theta y_s - \varphi y_u),$$

or

$$\theta(y_s - \overline{y}) > \varphi(y_u - \overline{y}),$$

where $\overline{y} \equiv [(\lambda_s^n + \lambda_s^m) y_s + (\lambda_u^n + \lambda_u^m) y_u] / (1 + \lambda_s^m + \lambda_u^m)$.
Q.E.D.

Two-period open economy

For a two-period open economy, we derive the same results as above, analogously.

Optimal income taxation with endogenous labour supply[32]

In the following, optimal income taxation is derived for the case of endogenous labour supply in an open economy.

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

$$u(c, l) = c + l - l^2/2, \tag{54}$$

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

$$l + L = 1, \tag{55}$$

with work L, and the individual budget constraint is

$$c = (1 - t) w_i L + b, \tag{56}$$

with individual pre-tax hourly wage w_i, a lump sum benefit or grant b or, using (55):

$$c = (1 - t) w_i - (1 - t) w_i l + b. \tag{57}$$

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

$$u_i(l) = (1 - t) w_i - (1 - t) w_i l + b + l - l^2/2. \tag{58}$$

Solving the foc, which is

$$u_i'(l) = 1 - (1 - t) w_i - l = 0, \tag{59}$$

for l to derive leisure demand,

$$l_i = 1 - (1 - t) w_i, \tag{60}$$

[32] Ben Lockwood, unpublished lecture notes, 2002.

labour supply

$$L_i = 1 - l_i = (1-t)w_i, \tag{61}$$

and pre-tax income:

$$y_i = (1-t)w_i^2. \tag{62}$$

Insert (60) in (58) to get indirect utility as a function of the tax rate and the lump sum grant $v_i(t,b)$:

$$v_i(t,b) = 0.5 + b + 0.5(1-t)^2 w_i^2. \tag{63}$$

Again, feasible redistribution policy must satisfy the government budget constraint:

$$b = t\left[(\lambda_s^n + \lambda_s^m)y_s + (\lambda_u^n + \lambda_u^m)y_u\right]/(1+\lambda_s^m + \lambda_u^m). \tag{12}$$

Inserting (62) in (12) yields:

$$b = t(1-t)\left[(\lambda_s^n + \lambda_s^m)w_s^2 + (\lambda_u^n + \lambda_u^m)w_u^2\right]/(1+\lambda_s^m + \lambda_u^m). \tag{64}$$

Insert (64) in (63) to get indirect utility as a function of the tax rate $v_i(t)$:

$$v_i(t) = 0.5 + t(1-t)\left[(\lambda_s^n + \lambda_s^m)w_s^2 + (\lambda_u^n + \lambda_u^m)w_u^2\right]/(1+\lambda_s^m + \lambda_u^m) + 0.5(1-t)^2 w_i^2, \tag{65}$$

with the first order condition:

$$v_i'(t) = (1-2t)\left[(\lambda_s^n + \lambda_s^m)w_s^2 + (\lambda_u^n + \lambda_u^m)w_u^2\right]/(1+\lambda_s^m + \lambda_u^m) - (1-t)w_i^2 = 0,\ i = s,u. \tag{66}$$

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

$$t_i^* = \frac{\left[(\lambda_s^n + \lambda_s^m)w_s^2 + (\lambda_u^n + \lambda_u^m)w_u^2\right]/(1+\lambda_s^m + \lambda_u^m) - w_i^2}{2\left[(\lambda_s^n + \lambda_s^m)w_s^2 + (\lambda_u^n + \lambda_u^m)w_u^2\right]/(1+\lambda_s^m + \lambda_u^m) + w_i^2},\ i = s,u, \tag{67}$$

or, using (62):

$$t_i^* = \frac{\left[(\lambda_u^n + \lambda_u^m)\,y_u + (1-\lambda_u^n + \lambda_s^m)y_s\right]/(1+\lambda_s^m + \lambda_u^m) - y_i}{2\left[(\lambda_u^n + \lambda_u^m)\,y_u + (1-\lambda_u^n + \lambda_s^m)y_s\right]/(1+\lambda_s^m + \lambda_u^m) + y_i},\ i = s,u. \tag{68}$$

Note that for a closed economy, where $\lambda_s^m, \lambda_u^m = 0$, we would derive analogously:

$$t_i^* = \frac{\lambda_s^n y_s + \lambda_u^n y_u - y_i}{2(\lambda_s^n y_s + \lambda_u^n y_u) + y_i},\ i = s,u. \tag{69}$$

Normative analysis: exogenous labour supply

Closed economy

We have individual utility given by individual net income:

$$v_i(t) = (1-t)y_i + b,\ i = s, u, \tag{70}$$

where the lump-sum grant b has to satisfy the government budget constraint

$$b = t\left(\lambda_s^n y_s + \lambda_u^n y_u\right). \tag{2}$$

Skilled and unskilled utility $U_s(t)$ and $U_u(t)$ therefore is

$$U_s(t) = (1-t)y_s + t\left(\lambda_s^n y_s + \lambda_u^n y_u\right), \tag{71}$$

$$U_u(t) = (1-t)y_u + t\left(\lambda_s^n y_s + \lambda_u^n y_u\right), \tag{72}$$

with $0 \leq t \leq 1$.

If we are interested in native welfare only, our social welfare function $W(t)$ is

$$W(t) = \lambda_s^n U_s(t) + \lambda_u^n U_u(t), \tag{73}$$

or, after substituting,

$$W(t) = \lambda_s^n\left[(1-t)y_s + t\left(\lambda_s^n y_s + \lambda_u^n y_u\right)\right] + \lambda_u^n\left[(1-t)y_u + t\left(\lambda_s^n y_s + \lambda_u^n y_u\right)\right], \tag{74}$$

and restructuring

$$W(t) = (1-t)\left(\lambda_s^n y_s + \lambda_u^n y_u\right) + t\left(\lambda_s^n y_s + \lambda_u^n y_u\right), \tag{75}$$

or, equally

$$W = \lambda_s^n y_s + \lambda_u^n y_u. \tag{76}$$

Therefore, social welfare does not depend upon the tax rate in a closed economy with exogenous labour supply.

Open economy

We take individual utility as given above, assuming exogenous labour supply. The government budget constraint, however, now becomes

$$b = t\left[(\lambda_s^n + \lambda_s^m)y_s + (\lambda_u^n + \lambda_u^m)y_u\right]/(1 + \lambda_s^m + \lambda_u^m). \tag{12}$$

Again, we are interested in native welfare only, so our relevant social welfare function is

$$W(t) = \lambda_s^n U_s(t) + \lambda_u^n U_u(t), \tag{65}$$

or, after substituting and restructuring

$$W(t) = \lambda_s^n y_s + \lambda_u^n y_u - t\left\{(\lambda_s^n y_s + \lambda_u^n y_u) - [(\lambda_s^n + \lambda_s^m)y_s + (\lambda_u^n + \lambda_u^m)y_u/(1 + \lambda_s^m + \lambda_u^m)]\right\}. \tag{77}$$

So, a tax rate of 1 is efficient if

$$\lambda_s^n y_s + \lambda_u^n y_u < \left[(\lambda_s^n + \lambda_s^m)y_s + (\lambda_u^n + \lambda_u^m)y_u\right]/(1 + \lambda_s^m + \lambda_u^m), \tag{42}$$

and a tax rate of 0 is efficient if

$$\lambda_s^n y_s + \lambda_u^n y_u > \left[(\lambda_s^n + \lambda_s^m)y_s + (\lambda_u^n + \lambda_u^m)y_u\right]/(1 + \lambda_s^m + \lambda_u^m). \tag{43}$$

QED.

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