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Migration Incentives and Taxation:
Do Marginal Taxes Matter?

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Abstract

Faced with ageing populations many European countries may be tempted to attract immigrants. One way to do this is to offer tax incentives. Since the decision to migrate is a discrete choice it should be average taxes that are important for the migration decision. If, however, the supply of working hours is endogenous it is shown that marginal taxes are also important for the migration decision, even after controlling for average taxes. Hence, countries interested in attracting immigrants can do so even without reducing average taxes by having less progressive tax systems than other countries.

Keywords: Migration, average taxes, marginal taxes, labor supply, population ageing.

JEL: F22, H24

1 Introduction

In many European countries the current demographic development caused by falling birthrates and increased life expectancy is predicted to put strain on the welfare systems in place in these countries as a declining work force makes it difficult to keep up with the demand for welfare expenditures from an increasing proportion of elderly citizens. Since birthrates may be difficult to influence through economic policy an alternative option could be to attract

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(young and skilled) immigrants. One of the factors influencing migration decisions is the tax system, and since migration is a discrete choice it should be differences in average and not marginal taxes that matter for the incentives to migrate.[1] Obviously, a country can attract immigrants by offering low average taxes but given that one of the problems facing these countries is a high demand for public expenditures this may not be a viable option. If other changes in the tax system - leaving average taxes unaffected - were capable of attracting immigrants that should be of interest to these governments.

This is our point of departure. Considering a simple two country model it is analyzed how changes in marginal taxes - holding average taxes constant - can affect the incentives to migrate. Migration is basically a choice of labor supply at the extensive level.[2] The argument stated above that conditional on the average tax rate the marginal tax rate is unimportant for the incentive to migrate is, however, implicitly taking the supply of labor at the intensive margin - the supply of working hours - to be exogenously given. It is well-known that for the supply of hours worked the main disincentive effects from the tax system stem from high marginal tax rates (since if leisure is a normal good high average taxes will in fact induce a higher level of hours supplied) so the degree of tax progression is important for labor supply choices at the intensive margin. Hence, when it is taken into account that the decision to migrate involves simultaneous decisions at the extensive and the intensive level of labor supply both the average and the marginal tax rates will matter for the incentives to migrate. In particular, our results reveal that a general tax bias exists in the sense that for two countries with exactly the same average tax rate a worker will prefer to reside and work in the country with the lowest marginal tax rate, i.e. with the least progressive tax system. This holds for preferences with standard properties and does neither require absence nor presence of backward-bending labor supply curves.

The paper is organized as follows. Section 2 presents the basic modelling assumptions while section 3 considers what determines the incentives to migrate in case of exogenous labor supply. In section 4 the labor supply decision is endogenized while section 5 makes some concluding remarks.

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[1]Of course, marginal tax rates matter for migration incentives to the extent they influence average tax levels, but once average tax rates have been controlled for there should be no independent role for marginal tax rates relating to the migration decision.

[2]Of course, there is another and quantitatively more important extensive margin concerning labor force participation, but to simplify we assume that labor force participation is 100%.

2   The Model

Consider a two-country framework with a home (H) and a foreign (F) country both producing a homogenous tradable good. To focus on the case where the only incentive to migrate stems from differences in taxation it is assumed that the gross wage conditional on the ability of a worker is the same in both countries. Furthermore, to allow for differences in marginal tax rates having different incentive effects at the intensive labor supply margin without giving rise to independent incentive effects at the extensive labor supply margin - due to differences in average tax rates - all individuals are assumed to be equally productive (and hence constant labor productivity is assumed).[3] To simplify, the productivity of a worker is set at unity (implying that one unit of labor produces one unit of the tradable good). Then, under perfect competition the gross wage equals unity.

Utility is derived from consumption of goods and leisure,[4]

$$u^j = u(c^j, l^j), \ j = H, F,$$

where c^j denotes consumption of goods and l^j is consumption of leisure. Setting the endowment of time equal to unity the supply of labor, z^j , becomes equal to $z^j = 1 - l^j$. Since labor productivity is equal to unity, z^j also denotes pre-tax labor income. The utility function is assumed to be increasing in both its arguments, $u_c > 0$ and $u_l > 0$, and strictly quasi-concave. Labor income is taxed according to the tax function $T^j = T^j(z^j)$ where the j superscript on the tax function indicates that the tax functions of the two countries may differ. After-tax income for a resident in country $j = H, F$ is then equal to

$$\omega^j = z^j - T^j(z^j), \ j = H, F,$$

which is also equal to the consumption of goods, $c^j = \omega^j = z^j - T^j(z^j)$.

The tax systems may be non-linear and are characterized by the average and marginal tax rates, $T_A^j \equiv \frac{T^j(z^j)}{z^j}$ and $T_M^j \equiv \frac{\partial T^j(z^j)}{\partial z^j}$. Notice, that this specification generally requires that the tax authorities in the two countries can control average and marginal tax rates independently of each other.[5] The

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[3]See Wilson (1980, 1982) for analyses of the optimal labor income tax when migration is possible and workers differ in productivities, in which case a progressive labor income tax gives rise to different migration incentives at the various levels of productivity.

[4]The provision of public goods may enter household preferences as well, but if it does we assume that it enters in an additively separate way.

[5]As long as there only exists a single income level in each country this is administratively a simple task for the tax authorities to perform. In more realistic cases where a range of income levels exists the complexity of the income tax function may become prohibitively

progressiveness of the income tax systems is measured by the coefficient of residual income progression, ρ^j (see e.g. Musgrave and Musgrave (1976)):

$$\rho^j = \frac{1 - T_M^j}{1 - T_A^j}, \ j = H, F.$$

A value of ρ^j below unity indicates that the tax system is progressive. An increase in the marginal tax rate holding the average tax rate constant represents an increase in tax progression.

3   Exogenous Labor Supply

To emphasize when marginal taxes may play an independent role for migration incentives, consider first the very simple case where labor supply is exogenously determined[6] $z^j = \overline{z}^j$. In this case the only relevant choice to be made by agents is the choice of residence. Assuming for simplicity that migration is costless[7] the choice of residence is fully determined by the arbitrage condition (stating preference for emigrating to country F from country H)

$$\overline{z}^F - T^F(\overline{z}^F) > \overline{z}^H - T^H(\overline{z}^H). \tag{1}$$

Obviously, given the absence of heterogeneity in ability among workers only one-way migration is possible. More importantly, it is the average tax rates and not the marginal tax rates in the two countries that determines the incentive to migrate since equation 1 can be written as

$$\overline{z}^F \left(1 - T_A^F\right) > \overline{z}^H \left(1 - T_A^H\right). \tag{2}$$

Thus, in this very simple case the only aspects of the tax systems that matters for the migration decision are average tax rates. Marginal taxes are unimportant for the migration decisions once the average tax rates have been controlled for. Put differently, for given average tax rates the degrees of income tax progression will not matter for the migration decisions.

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high if the tax authorities are supposed to be able to control average and marginal tax rates independently of each other at all income levels (see Andersen and Rasmussen (1999) and Rasmussen (2002) in a somewhat related context).

[6]Here we do not restrict the exogenously determined labor supplies to be identical in the two countries to emphasize that the result does not hinge on any of the symmetry assumptions made.

[7]This assumption is actually used in much of the analysis of optimal income taxation in the presence of migration, see e.g. Mirrlees (1982) and Wilson (1980, 1982).

4 Endogenous Labor Supply

Allowing for an endogenous choice of working hours, the main new aspect is that the supply of labor will be a function of the tax rates.[8] The representative agent in country j solves the optimization problem:

$$\max_{z^j} u^j = u(z^j - T^j(z^j), 1 - z^j).$$

The first-order condition is the standard condition of equality of the marginal rate of substitution between consumption and leisure and the marginal after-tax wage rate:

$$\frac{\partial u^j}{\partial z^j} \equiv \varphi(z^j, T_A^j, T_M^j) = u_c(c^j, 1 - z^j) \cdot (1 - T_M^j) - u_l(c^j, 1 - z^j) = 0, \quad (3)$$

defining labor supply as an implicit function of the average and the marginal tax rates (since the pre-tax wage rate is constant it can be suppressed):

$$z^j = z(T_A^j, T_M^j).$$

The derivatives of the labor supply function can easily be found using implicit differentiation of equation 3:[9]

$$\frac{\partial z^j}{\partial T_A^j} = -\frac{\frac{\partial \varphi}{\partial T_A^j}}{\frac{\partial \varphi}{\partial z^j}} = \frac{-u_{cc} \cdot z^j \cdot (1 - T_M^j) + u_{cl} \cdot z^j}{-\frac{\partial \varphi}{\partial z^j}} \lessgtr 0$$

$$\frac{\partial z^j}{\partial T_M^j} = -\frac{\frac{\partial \varphi}{\partial T_M^j}}{\frac{\partial \varphi}{\partial z^j}} = \frac{-u_c}{-\frac{\partial \varphi}{\partial z^j}} < 0,$$

where $-\frac{\partial \varphi}{\partial z^j} > 0$ by the second-order condition (being satisfied due to the assumption of a strictly quasi-concave utility function).

What we are interested in is whether differences in marginal tax rates between countries can give rise to migration incentives even when the average tax rates are identical. To this end define the expenditure function as the minimum lump sum income needed to obtain a given level of utility,

$$e^j = e(T_A^j, T_M^j, u_0^j) \equiv \min \left\{ c^j - z^j + T^j(z^j) \right\} \ s.t. \ u(c^j, 1 - z^j) \geq u_0^j.$$

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[8] Wilson (1980, 1982) also have endogenous labor supply, but he does not distinguish explicitly between average and marginal tax rates.

[9] Since the average tax rate and the marginal tax rate enter as separate arguments in the labor supply function changes in the average (marginal) tax rate give rise to income (substitution) effects, only. Thus, without restricting leisure to be a normal good the income effect cannot be signed. If leisure is assumed to be normal labor supply will be an increasing function of the average tax rate, $\frac{\partial z^j}{\partial T_A^j} > 0$.

This expenditure function has the property

$$\frac{\partial e^j}{\partial T_M^j} = \widetilde{z}^j > 0,$$

where $\widetilde{z}^j = \widetilde{z}(T_A^j, T_M^j, u_0^j)$ is the compensated labor supply function. Notice then that

$$e(T_A, T_M^1, u_0) > e(T_A, T_M^0, u_0) \text{ for } T_M^1 > T_M^0, \tag{4}$$

such that an increase in the marginal tax rate - for an unchanged average tax rate - requires an increase in lump sum income for the agent to be unharmed. To measure the welfare effect of a change in the marginal tax rate from T_M^0 to T_M^1 we use the equivalent variation measure:

$$EV = e(T_A, T_M^0, u_1) - e(T_A, T_M^0, u_0),$$

where u_1 is the welfare level when the marginal tax rate is T_M^1, such that $EV > 0$ implies that $u_1 > u_0$.

Assume now that the home country has the highest degree of tax progression while average tax rates are the same in the two countries, $T_A^H = T_A^F = T_A$ (implying that the home country must have the highest marginal tax rate, $T_M^H > T_M^F$). Let the utility levels obtained in the two countries be denoted u^H and u^F, respectively. Then, by definition

$$e(T_A, T_M^H, u^H) = e(T_A, T_M^F, u^F) = 0.$$

Using the result given by the inequality in 4 we get that

$$e(T_A, T_M^H, u^F) > 0,$$

such that the equivalent variation of moving from country H to country F is[10]

$$EV = e(T_A, T_M^H, u^F) - e(T_A, T_M^H, u^H) > 0.$$

This implies that $u^F > u^H$ and our main result has been established: For the same average tax rates in the two countries the welfare level is highest in the country with the lowest marginal tax rate, since that provides better incentives for labor supply. Put differently, there exists an incentive for

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[10]If migration involves a fixed migration cost the equivalent variation is the size of the migration cost that makes a resident in the home country indifferent between staying at home and emigrating to the foreign country.

residents in the home country to emigrate to the foreign country even though the average tax rates are identical in the two countries.[11]

<center>* * * figure 1 about here * * *</center>

As an illustration of this result, see figure 1. To simplify the figure country F is assumed to use a proportional income tax with $T_A^F = T_M^F$, whereas country H uses a progressive income tax with an increasing marginal tax rate. The indifference curves u^F and u^H capture the utilities derived in the two countries from consumption of private goods and leisure. By construction the average tax rates are the same in the two countries (at the equilibrium level of labor supply in country H since the average tax rate in country H generally varies with the supply of labor), while the higher marginal tax rate in the home country implies that the budget constraint is flatter in country H than in country F. By offering the lowest marginal tax rate the foreign country provides better incentives for labor supply than the home country, so if the average tax rates are the same a worker will prefer to live and work in country F. Furthermore, with identical average tax rates and a higher supply of labor in the foreign country tax revenues - and hence the supply of public goods - will be higher in the foreign country. However, even without taking the public goods effect into account utility is higher in the foreign country, creating an economic incentive for a home country worker to emigrate to the foreign country.

5   Concluding Remarks

The purpose of our analysis has been to verify that as soon as individual labor supply decisions are important the incentives to migrate are not determined by differences in average tax rates alone, but also by differences in marginal tax rates. What are the implications of our results? As we alluded to in the introduction many European countries are currently faced with problems of sustaining their welfare states due to population ageing. One way of improving the demographic structure of a country is to attract immigrants, and designing the income tax system properly can be an important instrument in this process. If migration decisions are considered to be discrete choices

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[11]Notice, that since labor supply is highest in the foreign country while the average tax rates are the same in the two countries the tax revenue will also be highest in the foreign country, allowing the provision of public goods to be highest in the foreign country. But even without this public goods effect we have shown that utility will be highest in the foreign country.

the policy-makers would believe that they could only influence the migration flows by adjusting the average tax rate. The degree of tax progression would not be regarded as influencing the migration flows. However, since migration may be a joint decision of residence and hours worked the average tax rate is not all that matters for migration flows; the degree of tax progression also has a role to play by affecting the incentives to supply labor at the intensive margin.[12] Therefore, if European policy-makers are looking for ways of attracting immigrants without jeopardizing the financing of their welfare states, reducing the degree of income tax progression may be one way to go. Of course, as long as the different countries are all interested in attracting immigrants from each other such policies are "beggar-thy-neighbour" policies that may lead to a downward spiral of degrees of income tax progression without affecting migration flows to any significant extent. Thus, we may experience a "tax competition" among countries with all countries attempting to attract immigrants by offering income tax systems with less income tax progression than other countries.

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[12]On top of this, with a distribution of labor income a progressive income tax will affect the incentives to migrate differently for low and high income workers. This effect is considered in Wilson (1980, 1982) and Bucovetsky (2003).

Figure 1. Labor Supply Effects of Progressive Taxation

ω

$slope : -(1-T_M^F) = -(1-T_A^F) = -(1-T_A^H)$

u^H u^F

$slope : -(1-T_M^H)$

z^F z^H

$1-z$
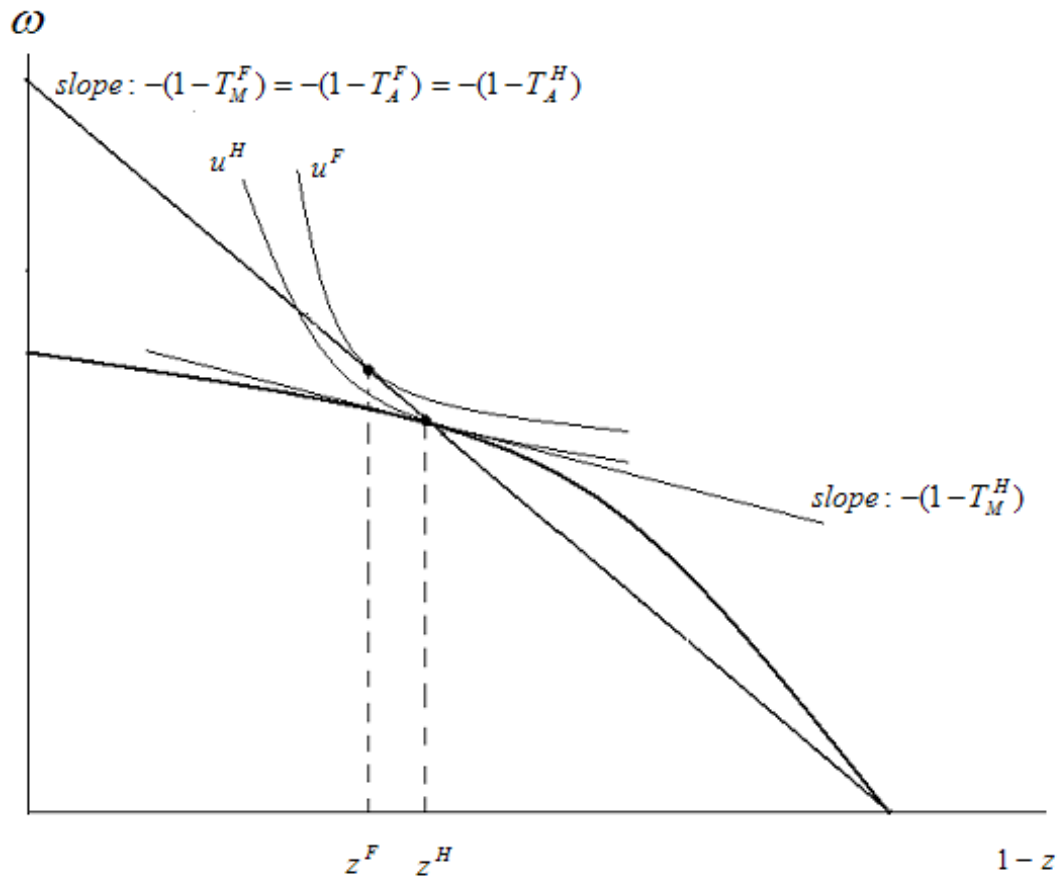
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