# Optimal income tax under the threat of migration by top-income earners

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## A R T I C L E   I N F O

## A B S T R A C T

We examine how allowing individuals to emigrate to pay lower taxes changes the optimal nonlinear income tax scheme in a Mirrleesian economy. An individual emigrates if his domestic utility is less than his utility abroad, net of migration costs — utilities and costs both depending on productivity. A simple formula, that complements Saez's formula obtained in closed economy, is derived for the marginal tax rates faced by top-income earners. It depends on the labour elasticity, the tax rate abroad and the migration costs expressed as a fraction of the utility obtained abroad. The Rawlsian marginal tax rates, obtained for the whole population, illustrate a curse of the middle-skilled. Simulations are provided for the French economy.

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## 1. Introduction

In his 1971 seminal article, Mirrlees assumes that migrations are impossible but emphasizes that "since the threat of migration is a major influence on the degree of progression in actual tax systems, at any rate outside the United States, this is [an] assumption one would rather not make" (Mirrlees, 1971, p. 176). This threat of migration is certainly even more topical after four decades of increasing globalization. We focus on the international mobility of highly skilled: in 2000, the latter were 6 times more likely to emigrate than low-skilled (Docquier and Marfouk, 2005). In the OECD, many governments are actually worried about the departure of highly-skilled individuals for tax havens (OECD, 2002, 2008) and less redistributive countries. For example, about 34 000 income taxpayers have left France each year since 2000 to relocate to countries with lower income taxes, like the UK, Luxembourg, Switzerland or North America (DGI, 2005). Before emigrating, these individuals paid three times more taxes than the average French taxpayer. According to the German Chamber of Commerce, the same story applies to Germany,

which was left by 145 000 income taxpayers in 2005. The possibility that highly skilled vote with their feet with a view to paying lower taxes appears therefore as a new constraint on the design of the optimal income tax. A specific conflict thus arises between the desire to maintain national income per capita in keeping taxes down and the aim to sustain the redistribution programme.[2]

This article studies the optimal nonlinear income tax in a Mirrleesian economy with a continuum of citizens who have type-dependent outside options consisting in emigrating to a less redistributive country whose tax policy is given. The home government wants to redistribute incomes from the more to the less productive individuals as in Mirrlees model, but also takes account of participation constraints for the individuals it wants to keep at home. An individual chooses to emigrate if his indirect utility at home is lower than his best outside option.[3] Because many empirical studies have shown that the propensity to migrate increases with the skill level, it is sensible to assume that more productive individuals have more

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[2] Governments have a more limited set of instruments than when they face tax evasion (see Chander and Wilde (1998), Sandmo (1981), Slemrod and Kopczuk (2002)). They have indeed few alternatives but to reduce taxes to prevent the departure of highly skilled: they can use "carrots" but no "sticks".

[3] This is in accordance with Hicks's idea that migration decisions are based on the comparison of earnings opportunities across countries, net of moving costs, which is the cornerstone of practically all modern economic studies of migration (Borjas, 1999, Sjaastad, 1962).

attractive outside options.[4] In this case, the reservation utility, i.e., the minimum utility the domestic government should give to keep an individual at home, is increasing in productivity. We ensure this is the case by assuming that the cost of migration, expressed in terms of utility, depends on productivity and does not increase faster than the indirect utility abroad. Productivity is thus the only parameter of heterogeneity within the population. Because individuals have type-dependent outside options, the optimal income tax scheme in the home country must satisfy type-dependent participation constraints. We borrow these constraints from recent papers in contract theory (see Lewis and Sappington (1989), Maggi and Rodriguez-Clare (1995), and Jullien (2000)) and introduce them in Mirrlees problem.

We model an asymmetric situation in which the tax policy of a highly redistributive country is challenged by the low-tax or no-tax policy of one of its neighbours. There is no competition in taxes in the sense that the foreign country does not modify its tax policy depending on the domestic tax schedule. The model is designed to cast light on the main forces of highly skilled emigration caused by a significant asymmetry in tax levels between home and abroad. Hence, it is considered that foreigners do not emigrate to the home country. Also, both countries have the same production function because we do not want individual productivities, and thus pre-tax wages, to depend on the residence country.[5]

In order to highlight the main economic effects and intuitions, we choose to restrict attention to the case where there is no income effect on labour supply. Individual preferences over consumption and leisure are thus represented by a quasilinear-in-consumption utility function. Since most of the empirical studies give credence to small income effects relative to substitution effects as regards labour supply (Blundell, 1992, Blundell and MaCurdy, 1999), this case provides a relevant benchmark, which has been extensively used in the literature since the influential work by Diamond (1998).[6] In addition, we concentrate on the situation where the home country's policymaker maximises the well-being of its worst-off citizens (maximin).[7] Hence, we look at the most progressive tax scheme in the home country and examine to which extent it is altered in response to the tax policy abroad.[8]

Our main findings can be summarized as follows. Very simple formulae are derived for the top optimal marginal tax rates. They are valid for any social welfare function. We show that the top marginal tax rates are constant if and only if the costs of migration are linear, i.e., consist of a fixed cost (transportation costs, moving costs, etc.) and a cost proportional to the indirect utility abroad. The proportional cost corresponds to the income increment that is needed in order to make an individual perfectly indifferent between home and abroad. In this important case, the top marginal tax rates only depend on (i) the migration costs expressed as a fraction of the utility abroad, (ii) the tax rate in the foreign country and (iii) the elasticity of labour supply. This formula is compared to Saez's (2001) one. Moreover, we derive Rawlsian optimal marginal tax rates taking the threat of migration into account. Two qualitative features of the closed-economy optimal marginal tax rates are lost: they can be non-positive at interior points and strictly negative at the top. Consequently, individual mobility does not only render the tax schedule less progressive, but can also make the tax liability decreasing with gross earnings. In fact, participation

constraints favour a decrease in the optimal marginal tax rates even for individuals below the productivity levels where there is an actual threat of migration. This new effect distorts the optimal marginal tax rates in such a way that optimal average tax rates are compatible with the participation constraints of the individuals threatening to emigrate.

Numerical simulations calibrated with French data are provided to quantify to which extent individual mobility alters the whole optimal tax schedule and to examine if the actual top marginal tax rate is optimal. First, they emphasize that the optimal marginal and average tax rates are significantly modified, compared to the closed-economy benchmark, even when there are very few people threatening to emigrate. In particular, the optimal average tax rates can start to decrease far below the income level from which potential mobility occurs. Consequently, when individuals are allowed to vote with their feet, there is a "curse of the middle-skilled" — consisting in them being taxed the most in proportion to gross income.

In addition, our simulations for the optimal top marginal tax rate suggest the actual French marginal tax rate – equal to 40% – might be too high to prevent French top-income earners from emigrating to very close tax havens like Monaco, Andorra, Liechtenstein and the Channel Islands. By contrast, the East-European countries, like Slovakia, Estonia or Lithuania, with a flat income tax schedule and a low marginal tax rate, do not represent a current threat for the sustainability of the French tax policy.

As far as we know, Osmundsen (1999) is the first to examine income taxation with type-dependent participation constraints. This article studies how highly-skilled individuals distribute their working time between two countries. Because it directly uses the model developed by Maggi and Rodriguez-Clare (1995), there is no individual trade-off between consumption and leisure (as in Mirrlees (1982)). Following Mirrlees (1971), our model takes this trade-off into account. In a recent article, Krause (2009) has examined income taxation and education policy when there exist conflicting incentives for individuals to understate and overstate their productivity. Highly-skilled individuals are better educated and can thus benefit from higher outside options when emigrating. Using quasilinear-in-leisure preferences and a two-type model, different possible regimes are identified but no optimal tax scheme is characterized. Moreover, several articles have adopted the viewpoint of tax competition, restricting attention to personalised lump-sum taxes (Leite-Monteiro, 1997), considering a two-type population as in Stiglitz (1982) (Hamilton and Pestieau, 2005, Huber, 1999, Piaser, 2007) or a population with many types (Brett and Weymark, 2008, Morelli et al., 2008).

The article is organized as follows. The next section sets up the model. Section 3 studies the properties of the optimal income tax rates for the individuals threatening to emigrate. Section 4 characterizes the complete optimal tax schedule. In each case, we provide numerical simulations using French data. Section 5 concludes.

## 2. The model

The world consists of two countries, the home country $A$ and the foreign country $B$. All individuals are initially living in country $A$. Country $A$'s government implements a redistributive tax policy and country $B$ is committed to being a laissez-faire country or, more generally, a country with a low constant marginal tax rate, $t_B$.[9] Governments provide no public goods. Both countries have the same production function with constant returns to scale. Hence, productivity levels, equal to pre-tax wage rates, are independent of the country in which an individual is working.

Individuals differ in productivities $\theta$, which are private information. The cumulative distribution function of $\theta$, denoted $F$, is common knowledge. It is defined on $[\underline{\theta}, \overline{\theta}] := \Theta \subseteq \mathbb{R}^+$, where it admits a continuous and strictly positive density $f$.

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[4] See Docquier and Marfouk (2005), Gordon and McCormick (1981), Hanson (2005), Inoki and Surugan (1981), Nakosteen and Zimmer (1980), Sahota (1968), Schwartz (1973).

[5] The mobility of highly skilled for tax purposes induces both losses in taxes and in productive capacities in the left countries. It differs from the "brain drain" (Bhagwati, 1976, Bhagwati and Partington, 1976) because its key parameter is not the change in productivity resulting from emigration.

[6] See Atkinson (1990), Boadway and Pestieau (2007), d'Autume (2000), Piketty (1997), Saez (2001, 2002), Salanié (1998).

[7] See Boadway and Jacquet (2008) for a recent study of the optimal tax scheme under the maximin in the absence of individual mobility.

[8] Simula and Trannoy (2009) distinguish various social objectives to deal with individual mobility and investigate whether governments should design tax schedules to prevent highly-skilled from emigrating.

[9] As in most tax havens, there is no social benefit and, thus, no basic income in country $B$.