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**The challenge of a rising skill premium
for redistributive taxation**

by

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The challenge of a rising skill premium for redistributive taxation

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Abstract

The present paper analyses the challenge to redistribution programs posed by an increase in skill premium. The increase in skill premium, which we observe in most OECD countries, affects taxation through its effect on education and migration incentives. We demonstrate that in countries with a relatively egalitarian wage distribution, the response to an increased gap in wages is likely to be increased redistributive taxation, whereas the response in countries with a more inegalitarian pre-tax income distribution, is likely to be a reduction in taxation and redistribution.

JEL codes: F21, H2

Keywords: Education; Skill premium; Migration; Tax competition

1 Introduction

Income inequality has increased in most OECD countries during the last decades, as documented by for instance Atkinson (2003) and Gottschalk and Smeeding (1997). The rise in inequality is primarily due to increased wage dispersion (Saez and Veall, 2005). Economic integration and technological change are important reasons for this development. Economic integration, in the form of increased competition from low-wage countries, and technological advances in information and communication technology, have raised the demand for skilled workers relative to unskilled workers in developed economies

and increased the skill premium.¹ The combined effect of technological advances and reduced market barriers has paved the way for “superstars”, individuals with the highest abilities whose economic outreach has expanded at the expense of the somewhat less talented individuals (Rosen, 1981).

These developments also pose a challenge to national taxation and redistribution programs. The ambition of the present paper is to analyze the effect of an increase in skill premium on redistributive taxation. In our analysis, the unskilled are the decisive voters and thereby determine the tax rate. The skilled individuals can choose whether or not to develop their talents by taking an education, and whether to stay in their native country or to relocate. An increase in the skill premium makes it more attractive for talented people to take an education. In this way, an increase in the skill premium increases the potential for raising the tax level without discouraging skill formation in the economy. On the other hand, an increase in the skill premium also reduces the relative importance of fixed migration costs, and thus increases the mobility of skilled workers. This intensifies tax competition between countries, and may thus reduce taxation and redistribution. Unskilled workers wish to maximize the tax base, and therefore would like the skilled to take an education and stay in the country. Education and migration thus constitute two constraints on the tax policy.²

Migration as a constraint on taxation is an important element in our model. While actual migration flows may appear to be too small to represent a real challenge to policies of taxation and redistribution, the *potential* relocation of a relatively small group of *highly paid* professionals may indeed pose a serious challenge for policies of redistribution, as emphasised by for instance Wildasin (2003). By choosing residency, a worker can often choose where to pay taxes. Since the taxation of highly-compensated workers accounts for a very large fraction of tax revenues, the fiscal implications of such relocation can be very high. The importance of high-income tax payers for the total tax income in developed countries can be illustrated by some numbers from the United States. In 1999, one-fifth of personal income taxes were paid by only 0.16 percent of the taxpayers; the top 2 percent of the taxpayers paid over 40 percent of all personal income taxes. Wildasin (2003: 6) stresses that “the presence of absence of these high-income taxpayers is a

¹Feenstra and Hanson (1999) show that technological change is the main cause of rising inequality in market incomes in the United States.

²In a related paper, we investigate equilibrium taxation in the face of efficiency costs and tax avoidance, see BJORVATN and CAPPLEN (2005).

matter of great importance for the US tax system.” Indeed, it is not necessarily the case that a person has to move in order to avoid paying taxes in a particular jurisdiction. Globalisation has led to a sharp increase in foreign direct investment. Large corporations typically have production plants and distribution networks in a number of countries. Working in a multinational company gives the opportunity for upper-level employees to choose country of residency without leaving the firm.

The rest of the paper is organized as follows. In Section 2 we present the model and Section 3 contains the analysis. We start the analysis by studying the education constraint and the migration constraint separately, before we conclude the analysis by combining the two constraints. The final section concludes.

2 Model

There are two equally sized countries, a and b . In each country there are two types of people, unskilled workers and skilled workers. Prior to any relocation, the number of unskilled workers, n_u , and skilled workers, n_s , is assumed to be the same in both countries. Our focus is on tax motivated migration, and we therefore abstract from migration of the unskilled. Furthermore, we normalize the size of the unskilled group in each country to unity. The skilled are, however, mobile, and hence the number of skilled residing in country $i = a, b$, n_{si} , may be different from the number of skilled born in that country, n_s . The population in country i , n_i , is therefore $n_i = 1 + n_{si}$. We assume that $n_{si} < 1$, so that the unskilled always are in majority.

The unskilled have a pre-tax wage normalized to unity, i.e., $w_u = 1$ and the skilled earn $w_{si} = 1 + e_i s$, where s is the skill premium and e_i is a binary variable for education, taking the value zero or one depending on whether or not the skilled in country i choose to develop their talent. The unskilled have no talent to develop, and hence never take an education. For a skilled person, developing his or her talent by taking an education involves a fixed cost c . This education cost can be interpreted as tuition fees and forgone income during years of education. We assume that $c < s$ so that it is always profitable for the skilled to develop their talent in the absence of taxation.

The redistribution program is determined by majority vote, which in the present setup means according to the preferences of the unskilled worker. The vote determines the level of the linear income tax, $t_i \in (0, 1)$. Tax

revenues are spent on a uniform transfer, θ_i , that is received by all residents in the country. In a symmetric equilibrium all the skilled workers make the same educational decision. Transfers can then be expressed as

$$\theta_i = \frac{t_i \omega_i}{1 + n_{si}}, \quad (1)$$

where

$$\omega_i = \begin{cases} 1 + (1 + s) n_{si} & \text{for } e_i = 1 \\ 1 + n_{si} & \text{for } e_i = 0 \end{cases} \quad (2)$$

is the total income generated in country i . The disposable income of the unskilled median voter in country i , including transfers, is given by $I_{ui} = 1 - t_i + \theta_i$ which can be expressed as:

$$I_{ui} = 1 + t_i \left[\frac{\omega_i - (1 + n_{si})}{1 + n_{si}} \right], \quad (3)$$

where the second term is the net gain to the unskilled from the tax and redistribution program. Similarly, the income of the skilled is:

$$I_{si} = 1 + t_i \left[\frac{\omega_i - (1 + n_{si})}{1 + n_{si}} \right] + e_i (s(1 - t_i) - c), \quad (4)$$

where the last term captures the net gain from education. Clearly, from (3) we see that for $e_i = 1$, the unskilled median voter benefits from higher taxes. But she also has an interest in the skilled taking an education, and in attracting as many educated people as possible to the country (or at least avoid emigration of its native skilled). Since high taxes may reduce the incentive of the skilled to take an education, and may reduce the number of skilled, there is a trade-off between the benefits of higher taxation and the possible reduction in the tax base that may follow from high taxes. We can thus view education and migration as two constraints on tax policy.

2.1 Analysis

We start the analysis by focusing on the education constraint, and assume that workers are perfectly immobile. We then focus on the migration constraint, by assuming that the skilled are educated. Finally, we combine the two constraints, and derive the main results of the paper.

2.2 The education constraint

In the absence of mobility, i.e., in autarky, we have that $n_{sa} = n_{sb} = n_s$. The skilled workers in this case make a single choice, namely whether or not to develop their talent. Each agent behaves atomistically, taking the tax base in his or her country, ω_i , and thereby the transfers θ_i , as given, and unaffected by the individual educational decision. The skilled workers in country i choose to take an education if the net gain of doing so is positive, i.e., if $e_i(s(1-t_i) - c) \geq 0$. The optimal educational choice is thus given by:

$$e_i^* = \begin{cases} 1 & \text{if } t_i \leq (s-c)/s \\ 0 & \text{if } t_i > (s-c)/s \end{cases} . \quad (5)$$

Using (5) in (2) and then substituting into (3), we find the autarky income of the unskilled median voter as:

$$I_{ui}^A = \begin{cases} 1 + \frac{st_in_s}{1+n_s} & \text{if } t_i \leq (s-c)/s \\ 1 & \text{if } t_i > (s-c)/s \end{cases} .$$

Clearly, the median voter will set a tax rate that is sufficiently low to induce the skilled to take an education and thereby develop their skills and expand the tax base. Given that the tax rate provides the skilled with an incentive to take an education, however, the unskilled have an incentive to set the tax rate at the maximum level, since they are net beneficiaries from the tax and redistribution program. Hence, the tax rate in autarky will in both countries be set such that the education constraint binds, i.e., $e(s(1-t) - c) = 0$, which can be expressed as.

$$t^A = \frac{s-c}{s},$$

which applies for $s \geq c$, i.e., given that it is profitable for a skilled to take an education, prior to taxation. The equilibrium autarky tax rate is increasing in the skill premium and decreasing in the cost of education.

2.3 The migration constraint

We now consider choice of tax policy when skilled workers are mobile. We abstract from educational choice, and assume that the skilled workers are educated. We also assume that the populations are large, so that each skilled

worker, in deciding whether or not to migrate, ignores the impact of migration on the transfers in the potential destination region. Starting from the symmetric autarky situation, where $n_{si} = n_s$, the net gain from moving from region i to region $j \neq i$, g_i , can be found from (4) as:

$$g_i = \frac{(t_i - t_j) s}{1 + n_s} - m, \quad (6)$$

where m is a fixed cost of migration. A skilled worker in country i emigrates if and only if $g_i > 0$, i.e., if $t_j > t_i + m(1 + n_s)/s$. In order to attract migrants from abroad, country i must implement a low tax strategy such that $g_i < 0$, which from (6) implies $t_i < t_j - m(1 + n_s)/s$. For intermediate tax differentials between country i and the other country, there is no migration. The tax base can then be written as³:

$$\omega_i = \begin{cases} 1 + 2n_s(1 + s) & \text{if } (t_j - t_i) > \frac{m(1+n_s)}{s} \\ 1 + n_s(1 + s) & \text{if } -\frac{m(1+n_s)}{s} \leq (t_j - t_i) \leq \frac{m(1+n_s)}{s} \\ 1 & \text{if } (t_i - t_j) > \frac{m(1+n_s)}{s} \end{cases}. \quad (7)$$

The low tax strategy for country i , t_i^L , is the highest possible tax rate that would still enable it to attract educated workers from abroad. From (7), this tax rate is given by:

$$t_i^L = t_j - \frac{m(1 + n_s)}{s}. \quad (8)$$

In a symmetric equilibrium, no country should find it profitable to implement the low tax strategy t^L . A country is indifferent between choosing a low tax strategy and a common tax t when:

$$I_u(t) = I_u(t^L) \Rightarrow 1 + \frac{tsn_s}{1 + n_s} = 1 + \frac{\left(t - \frac{m(1+n_s)}{s}\right) 2sn_s}{1 + 2n_s}.$$

From this condition, the maximum tax rate that a country can set without triggering a low tax strategy in the other country, which we denote t^C , is given by:

$$t^C = \frac{2m(1 + n_s)^2}{s}.$$

³We assume that m is a psychological cost of migration, and therefore does not affect the tax base in the destination country. Letting m represent a loss of income would not affect the analysis in any qualitative way.

Given that the skilled are educated, this is also the equilibrium tax rate. We observe that t^C is increasing in the mobility cost m and the number of skilled people n_s in the economy, and decreases in the skill premium, s . The reason why t^C increases in n_s is perhaps not obvious. It can be explained as follows. For a given t , I_u is a positive, but concave function of n_s . Hence, attracting skilled workers, starting from a high n_s , yields less additional benefit than attracting these individuals starting from a lower n_s . Intuitively, attracting skilled migrants when the native population of skilled people is low has a much stronger effect on average income, and hence the potential for redistribution, than when the native population of skilled is relatively large. Therefore, a higher level of n_s weakens tax competition, and leads to a higher t^C .

2.4 The education and migration constraint

We now consider equilibrium tax policy when both constraints apply. The tax rate that maximizes the income of the median voter, t^* , takes into account that the median voter will never set the tax rate above t^C or t^A . In other words:

$$t^* = \min(t^A, t^C).$$

This implies that the effect of an increase in the skill premium, s , depends on the initial level of the skill premium. The critical level of s at which $t^A = t^C$ can be found as:

$$\hat{s} = 2m(1 + n_s(2 + n_s)) + c.$$

For $s < \hat{s}$, $t^A < t^C$, implying that education is the binding constraint. An increase in s would then result in an increase in t^* . For $s > \hat{s}$, $t^A > t^C$, so that migration is the binding constraint. An increase in s would then lead to a decrease in t^* . Clearly, an increase in m , c , or n_s increases \hat{s} and thereby increases the range of s for which t is a positive function of s , and vice versa. We illustrate the equilibrium tax rate as a function of the skill premium in Figure 1

From Figure 1 we observe that for $s > \hat{s}$, the tax rate is increasing in the skill premium until the skill premium reaches the critical level \hat{s} . Thereafter, it decreases in s . There is in other words a hump shaped relationship between

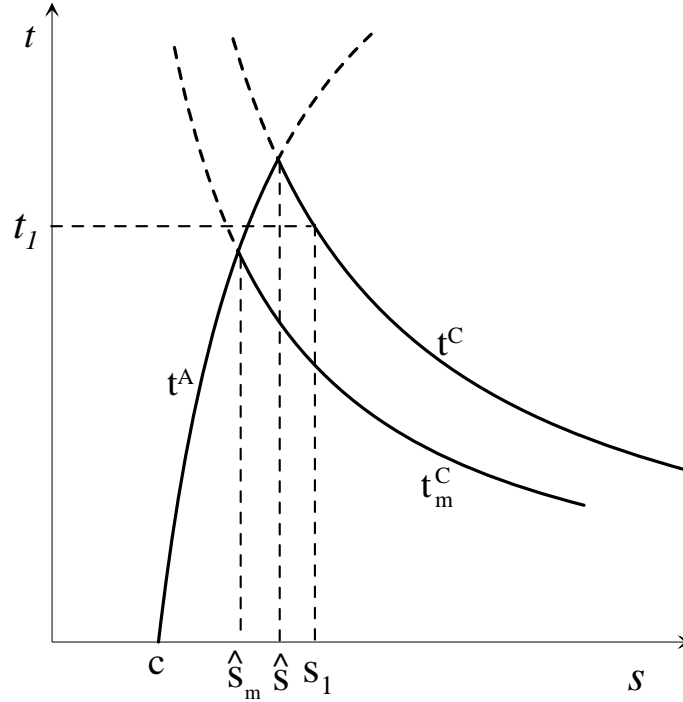


Figure 1: Taxation, mobility, and the skill premium

the skill premium and the tax rate. An implication of this is that an increase in the skill premium will have qualitatively different effects on the tax rate in a country depending on the initial level of the skill premium. The observation that the qualitative effect of increased wage inequality depends on the level of inequality, provides one possible explanation of what is sometimes called the “redistribution puzzle”. This puzzle refers to the lack of empirical support for the hypothesis, generated by standard median voter models, that increased pre-tax income inequality should result in increased redistribution (Perotti, 1996; Bassett et al., 1999).

The figure also illustrates the effect of a reduction in the mobility costs, m . The reduction in m leads to a downward shift in the t^C -curve, to t_m^C . This shift reduces the critical value of s to \hat{s}_m . Clearly, the tax rate goes down for $s > \hat{s}_m$, and remains unchanged for $s < \hat{s}_m$. Hence, the effect of a reduction in the mobility cost depends on the level of the skill premium. Consider three countries, a country with a low skill premium characterized

by $s < \hat{s}_m$, a country with a moderate skill premium $s_m^* < s < \hat{s}$, and a country with a high skill premium, $s = s_1 > \hat{s}$. Assume that initially the two countries with the highest skill premiums have the same tax rate, t_1 , which is higher than the tax rate of the country with the low skill premium. After the reduction in the in the mobility costs, we observe that there has been a divergence in the tax rates of the more inegalitarian countries, due to a sharp fall in the tax rate of the most inegalitarian country and only a moderate fall in the tax rate of the moderately inegalitarian one. On the other hand, there has been a convergence between the tax rates of the moderately inegalitarian country and the most egalitarian one. Hence, depending on the level of pre-tax income inequality, a reduction in mobility costs may lead to a convergence, divergence, or no change at all in international tax rates.

3 Conclusion

Our analysis sheds light on the way in which increased skill premium may affect education and migration incentives, and thereby equilibrium tax policy. The central result of our model is that redistributive tax rates are highest for intermediate levels of the skill premium. Since the skill premium can be seen as a measure of pre-tax income inequality in our model, the analysis thus predicts that for countries starting with a relatively low level of pre-tax income inequality, the policy response to an increase in the skill premium is first to implement more ambitious redistribution programs. If the process of increased inequality in market incomes continues, however, the policy response will at some point be reversed. The combined effect of increased pre-tax inequality and less ambitious redistribution program will then cause disposable income inequalities to rise sharply.

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