

## TAX COMPETITION AND BRAIN DRAIN IN THE EUROPEAN UNION MEMBERS

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### 1. Introduction

The present paper aims to study the correlation between the brain drain phenomenon and tax competition, phenomena which, for a long time, have been handled and studied in a separate manner by the authors.

Although the brain drain concepts and the tax competition are connected by means of the migration phenomenon, still, for a long time, the literature studied them separately due to the complexity of joint analysis. Therefore, a series of previous elaborated studies (Kurien, C.T., 1999; Robinson, Viki, 2003; Ferro, A., 2004; Fagan, Frank, 2004; Mitchell, D, 2004; Jeff, C., 2004; Lien, Donald, 2005; Wildasin, D., 2005; Pierpaolo, G., 2006;) have developed two separate branches for the brain drain and tax competition phenomena.

The first is focused on the brain drain phenomenon from a macroeconomic approach and studies its impact upon the economic raise in different analysed economies.

The second analyses the tax competition from the microeconomic perspective, being focused on the interaction between the migration phenomenon and the destination states.

Regarding the unitary handling of these two phenomena, two studies draw our attention in a special manner: „Brain drain and fiscal competition. A theoretical model for Europe” (Pierpaolo Giannoccolo, 2006) and „Brain drain, fiscal competition and public education expenditure” (Hartmut Egger, Josef Falkinger, Volker Grossman, 2007). The

authors drew the attention upon the danger generated by tax competition, which displays inside the community space, upon the migration phenomenon. The performed analyses were grounded on building some analysis models of the opportunities and risks generated by policy in the education field.

The model presented in the paper is an adaptation of the so-called “Model of the Brain Drain and Human Capital Formation” elaborated by Mountford (1997), by which there are described the different researched variables: brain gain, brain drain, migration competition and tax competition.

Obviously, the scenarios may be different from country to country depending on the different values of the two key factors taken into account: migration probability ( $\pi$ ) and considerable differences of technological capacity ( $\eta$ ).

### 2. Concepts and definitions

**Brain drain** or “human capital flight” is the emigration phenomenon of the educated or talented persons due to various accounts: conflicts, lack of opportunities, and so on. The investment in education is lost along with the person's departure, who usually doesn't come back in his/her country of origin. Within Royal Society of London the term of brain drain was used for the first time in order to describe the leaving of scientists and technicians for USA or Canada at the beginning of the 50's in the past century. The phenomenon

known as brain drain is still present nowadays and it is also defined as a constant transfer (drain) of personnel with high skills (brain) from certain countries, generally less developed, towards others which are more developed from the economical point of view, if it is taken into account the fact that main reason of the phenomenon is an economic one.

Therefore, the brain drain is the part of the emigration which comprises the persons with high skills, university education.

It arises from here that the difficulty of quantifying the phenomenon, as the majority of the states dispose of general statistical data concerning emigration, but do not dispose of distributed statistics which would quantify the education level of the emigrants.

The phenomenon is associated with the "capital flight" term, which refers to the capital flight which is not invested in the country where its holder lives and where it was created. The exodus is voluntary, braked by the countries of origin and encouraged by the receiving countries.

In the OECD report (1987) there are other definitions of the brain drain phenomenon: "Brain drain implies a flow of specialists with two directions between the country which sends and the one which receives. However, the net flow is in a decisive manner favoured in only one direction, the terms used in this case being "brain gain" (benefit for the country of origin and the source country) or "brain drain" (vital loss of human resource for the country of origin). A subsequent term "brain waste" describes the wasting of abilities which takes place when the very well trained specialists migrate towards certain work places which don't require the abilities and experience applied to the previous work place.

**Tax competition** arises because the member states of the European Union are in competition in order either to attract a mobile taxation basis or to reject the mobile taxation beneficiaries.

Generally, the work force is less mobile than the capital and a work force with low skills is less mobile than a work force with high skills. As a consequence, the tax competition leads to an essential change regarding the taxation structure. Thus, the governments of the member states are forced to reduce the taxation level for the factors having a high mobility and to increase the tax burden on less mobile sources, in order to protect the revenues. If there is a tax competition, the tax rates shall move, as a consequence, from the corporate revenues to the personal ones, from the capital revenues to the ones from the work force, from the high revenue to the low one generated by the work force and generally from the revenues and welfare taxation to consumption's taxation.

The main results of the evolution of taxation level within the European Union during the last decades confirms exactly the fact that this thing happened.

Concerning the citizens of the European Union, these choose their residence in a state which would offer them an optimal combination between the tax burden and the public assets of which they can take advantage for free. In the context of the European Union, the mobility of the citizens is free of any kind of institutional constraints so that the cultural integration increases the probability of migrating within the Union. Especially for that reason, the flow of specialists reached a relevant position in the research agenda of the European Union.

As a consequence, studying the brain drain phenomenon is closely connected to the election of the specialists' education. If public education is good, the skilled specialists may migrate, and as a secondary effect, the tax competition is accentuating. Moreover, if the governments of the member states don't coordinate the taxation systems and the quality of public services (teaching system, especially), a series of negative economic effects may arise up to the standard of the states.

In this context, it is necessary to redefine the brain drain phenomenon up to the standard of the member states of the European Union, as the tax competition may be used as a "new tool of public interest" (Pierpaolo Giannoccolo, 2007). Furthermore, when the expanded European Union is analysed, two types of states may be distinguished: old states, with a powerful economic development and the new member states, with less solid economies and low productivity. Implicitly, the old member states may compete to one another in order to attract skilled specialists which belong to the countries in Central Europe and Eastern Europe, thus arising the "migration competition" phenomenon.

### 3. Model description

The model represents a more simpler version of the Brain drain model and Mountford's human capital formation (1997). Through the model, we study the specific case of the European Union in which the mobility of the specialists is freely allowed, in order to identify the possible negative effect generated by the interaction between the tax competition and brain drain phenomenon.

The model analyses an opened economy, with only one good product constantly analysed by means of work efficiency unit ( $L$ ):  $Y_t = X_t L_t$ . We suppose that the education decision is each person's free will, and the citizens of each state may choose to be educated or not. At the same time, we suppose that the rate of the wage on work efficiency units is independent of the work force in time  $t$  and independent of work productivity or technology level  $\lambda_t$ , which is given:  $w_t = \lambda_t w$ .

**Concerning the distribution of abilities**, the persons own different latent ability models, where  $e$  to  $t$  indicate the latent ability of person  $i$ . We suppose that all generations have latent abilities which are chosen from the same distribution

and that the children's abilities are independent of their parents' abilities.

**Education.** We suppose that all citizens have the same preferences and access to the same technology, although they don't have the same latent ability levels.

The citizens who invest in education obtain  $e$  to  $t$  work efficiency units, where  $e$  to  $t$  is the latent ability level of the agent  $i$ . Furthermore, let's suppose that the citizens who don't invest in education have a single work efficiency unit and that the costs of education may be settled to  $c$  exit units

The government shall influence the education decisions of the citizens by taxing the skilled ones, covering a part of their education costs. Thus, by granting the subventions for education, the education cost becomes  $c - \gamma t$ , where  $\gamma t$  is the subvention for education.

Let's define  $T_t$  as the marginal rate of the specialists' taxes in  $t$  generation. Introducing the tax, the wage rate for the work efficiency unit becomes:

$$w_t^i = \lambda_t w e^i (1 - T_t)$$

**Migration ( $\pi$ ).** Let's suppose that emigration is allowed only for the specialists (skilled persons). Let's suppose that the probability of a successful emigration for the skilled citizens born in  $J$  country,  $\pi_J$ , is independent of the number of potential citizens for emigration. Let's suppose that the emigration policy is completely anticipated.

At the same time, we suppose that in the model there aren't mobility costs, so that the skilled specialists decide if they migrate or not, as an answer to the different wages which they receive. Their future wage is connected to the taxing policy of the states and to the difference of technology between countries. Therefore, the skilled citizens shall rather stay in the  $J$  country if:

$$T_{j,t} \leq \eta + (1 - \eta) T_{i,t},$$

$$\text{Where: } \eta = \frac{a_j - a_i}{a_j}$$

and  $I$  is the country which offers to the skilled specialists a better wage.

So, we may differentiate three different stages:

Case (1): all educated persons wish to migrate in the  $J$  region:

$$T_i^J > \eta + (1 - \eta)T_i^I$$

Case (2): all educated persons wish to migrate in the  $I$  region:

$$T_i^J < \eta + (1 - \eta)T_i^I$$

Case (3): is not migration:

$$T_i^J = \eta + (1 - \eta)T_i^I$$

#### 4. Brain drain or brain gain?

As we have shown above, the brain drain phenomenon represents the specialists' migration from a country to another, without the source country having any benefit of it. The brain gain phenomenon arises also from the bidirectional movement between the member states, but here there is a benefit from the emigration. Thus, in order to better understand the role of emigration in the raising and development of the member states, it is necessary to perform an analysis from which to grow out the existence or voidness of the situations when the emigration increases the number of specialists in both states (bidirectional movement), thus increasing the development of the states. Below we shall analyse only the first case previously presented and namely the case in which all specialists wish to migrate in the  $J$  country.

Case (1):  $T_i^J > \eta + (1 - \eta)T_i^I$ : all skilled persons wish to migrate in the  $J$  country.

But the  $J$  country doesn't lose its specialists and attracts only the skilled ones from other countries. Therefore, in order to analyse the possibility of the "benefit" from emigration (Brain gain) we

study the countries from which they come from.

The medium proportion of the skilled persons in the economy  $I$  is given by the following equation :

$$s_{I,t} = \frac{(1 - \pi_I) \int_{e_{I,t}}^E g(e^i) de^i}{1 - \pi_I \int_{e_{I,t}}^E g(e^i) de}$$

If  $\pi = 1$  then the source economy loses all its specialists and  $S_t^N = 0$ .

If  $\pi = 0$  then inside the union the emigration doesn't exist. Therefore, an adequate condition for the existence of a positive level of specialists' transfer so that the economy to take advantage concerning the productivity is

$$\text{that } \frac{ds_{I,t}}{d\pi} > 0 \text{ when } \pi = 0. \text{ The}$$

optimum level of  $\pi$  shall be given when

$$\frac{ds_{I,t}}{d\pi} = 0.$$

Thus, if there are big wage differences on the productivity of the work unit and there is a defective mobility of the skilled specialists then a positive optimum level of emigration arises if  $0 < T_{I,t} \leq T_{I,t}^A$

As a consequence, *the source economy may take advantage of the brain drain if there is an adequate number of persons who would invest in education.* Going further with the correlations, the tax competition displayed by taxation and education valorization implies two different results. Therefore, the successive taxation of the work force reduces a lot the probability that the new-comers to be under "optimal brain drain" conditions. On the other hand, the taxes increase the wage differences between the entrance country and the others and thus it increases the possibility of gaining from the brain drain, exclusive benefit for the destination country.

## 5. Conclusions

**Brain Gain.** When the  $J$  country is less productive than the  $I$  country and the probability of emigration  $\pi$  is low, it means that we find ourselves in the scenario described by Maunford (1997).

Thus, the specialists' migration may raise the productivity and the medium equality in the source economy (brain gain). In the European context, this scenario may be possible when the newcomer of the European Union is less productive than the first (but without existing major differences). In this scenario, the optimal policy of the European Union's institutions is to take no action.

**Brain Drain.** The differences between countries are so big that the country with the highest productivity attracts in an unilateral manner the specialists from other countries. This scenario is usually studied by speciality literature, which often refers to the unidirectional flow of the over-skilled work force from the less developed countries. This literature explained the human capital flight as being a "negative taxation externality" due to immigration. The possibility that the welfare of those who remain in the less developed countries to be reduced by the exodus of the skilled persons was also acknowledged in literature.

From the paper of Grubel and Scott, Berry and Soligo and Harry Johnson in the 60's, the main conclusion was that the welfare of those who didn't emigrate should decrease only if the contribution of the emigrants to the national production was higher than their income. In this scenario (in which our country is included also) the optimal policy of the European Union's

institutions is to introduce a "tax on brain drain" in order to compensate the permanent loss of human resource for the source country.

**Emigration competition.** In this case the states don't have major productivity differences and compete attracting the skilled specialists (emigration competitions), usually from the countries less developed from the economic point of view. The main directions by means of which the specialists may be attracted could be summarized as it follows:

- building a more opened and flexible academic system;
- improving the regulatory conditions, especially upon immigration;
- a better information up to the national standard;
- promoting on a large scale of the scholarships for the foreign researchers;
- homogenizing the wage incomes for similar trainings on the work force market;
- reducing the taxes, especially for the researchers and intellectuals;
- promoting a more active international marketing and support for the international researchers.

**Tax competition.** The emigration probability is high (or very close) and the countries have the same productivity (or almost the same). In this case, the possibility that all skilled specialists to leave suggests the adjustment of investments in education.

In the European context, this scenario is possible within the first member states of the European Union. In this scenario, the optimal policy of the European Union's institutions is to coordinate all member states and to define a common line regarding the investments in education and research.

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