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THE EFFECTIVE TAX RATES IN THE EU COMMISSION STUDY ON CORPORATE TAXATION: METHODOLOGICAL ASPECTS, MAIN RESULTS AND POLICY IMPLICATIONS

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Abstract

The paper has three aims. First, it presents the specific forward-looking methodology applied in the quantitative analysis undertaken in the Commission study, and discusses how it is able to overcome some of the most important limitations of the traditional King Fullerton approach. Second, it compares the results obtained by two different indicators, the traditional effective *marginal* tax rate and the effective *average* tax rate, the latter being particularly important to explain location decisions of multinational companies. Third, it discusses the usefulness of these indicators for policy makers, by summarising the overall results of the Commission study and their policy implications. All in all, these results show that the EU tax systems are very far from representing a level playing field for both domestic and international firms and that the size of the observed disparities in effective tax rates between Member States are mainly due to the differences in statutory tax rates. The picture arising from the quantitative analysis seems to point out the urgent need for a greater co-ordination in the EU, with a view to reducing the existing distortions and contributing to other important EU objectives.

JEL Classification: H25, H32.

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1 Introduction

The ECOFIN Council in December 1998 asked the Commission to carry out an analytical and comprehensive study on company taxation in the EU. This study should, among other things, "illuminate existing differences in effective corporate taxation in the Community" in view of their "effects on the location of economic activity and investments"[1].

Differences in effective tax burdens amongst national jurisdictions within the EU and subsequent possible tax competition may give rise to two different behaviours of firms. On the one hand, effective tax rates differentials may create incentives to locate new production or to relocate existing ones in certain countries thus impacting on resource allocation, employment and economic activity in general. On the other hand, tax differentials may induce tax optimisation processes by location of the taxable base with a subsequent loss of tax revenues for some jurisdictions, without much incidence on the actual production location and economic activity. The mandate given to the Commission clearly refers to the effects of corporate tax differentials on resource allocation.

Policy makers have long been aware of the possible impediments to investment and savings created by capital income taxation. Indeed, one of the main recurrent objectives of tax reforms undertaken in the EU countries during the last twenty years, as well as in the OECD countries in general, has been a reduction of possible tax induced distortions to the allocation of resources to both domestic and international investments mainly by a reduction of the statutory tax rate[2]. At the same time, preferential tax regimes and special investment tax regimes have been introduced. It is therefore not by chance that, in a moment when the EU is undertaking a profound analysis of the (harmful) effects of the working of preferential regimes of Member States[3], the question of the impact of general tax regimes on resource allocation is raised.

The mandate received by the Commission is quite clear concerning the scope of the analysis of effective tax rates. In broad terms it demands a quantitative assessment of how the general criteria of efficiency of company tax system is satisfied at the EU level, taking into

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[1] See EEC (2001a).

[2] The reduction of the statutory rate decreases, but does not eliminate, distortions. The reason for which policy makers preferred policies of tax-rate-cut-cum-base-broadening, rather than tax reforms which are more neutral with respect to domestic investment and financing choices, has mainly to do with the increasing mobility of capital. See, for example, Haufler and Shjelderup (2000), Bordignon et al. (2001).

[3] See Council of the European Union (1999).

account the existence -and therefore the features- of 15 different general tax regimes. This paper describes the methodology chosen by the Commission services, following the advice of a panel of academic experts, in order to compute the corporate effective tax rates to comply with the mandate of the ECOFIN Council[4]. It describes also the pros and cons of the applied methodology and the way in which the methodological limitations have been managed. Finally, it discusses the usefulness of these indicators for policy-makers and suggests the principal policy implications of the quantitative results presented in the Commission services study.

2 Different possible approaches to compute the effective tax rates

When policy makers or economic agents want to evaluate the impact of taxation on economic activity and understand the usefulness and likely effects of their decisions, they need to assess tax burdens and the impact of taxes on economic activity. In the framework of company taxation, although statutory corporate tax rates give some information, this is rather limited. In fact, statutory tax rates do not evaluate the tax burdens really suffered, the diversity of the elements composing the tax base or, in international comparisons, the interrelations of different tax regimes. Effective corporate tax rates are measures designed to assess tax burdens and the impact of taxes on the economic activity. They are the result of the statutory tax rate applied to the tax base. The tax base is the profit expressed in accordance with tax legislation - accounting profit is often subject to a series of adjustments to arrive at the taxable profit or base.

In assessing effective corporate tax burdens, two types of framework can be distinguished. One approach measures effective tax rates on the basis of current data arising from aggregate macroeconomic accounts or from accounts of existing firms. By referring to the observation of ex-post data it is called a "backward-looking" -macro or micro- approach. Effective tax rates based on macro backward-looking methodologies are often referred to as "implicit tax rates". The second framework refers to "ex-ante" indicators involving the calculation of effective tax burdens, for a hypothetical prospective investment project or company, over the assumed life of the project. Being based on future hypothetical behaviour these indicators are defined as "forward-looking".

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[4] The experts who assisted the Commission in this work were Ms. S. Giannini and Messrs. K. Andersson, M. Devereux, J. Le Cacheux, C. Spengel, J.M. Tirard, F. Vanistendael.

The existence of different indicators is not, per se, a shortcoming of this kind of analysis, but simply reflects the fact that each indicator measures different things. Different indicators can be appropriate depending on different policy questions[5]. Therefore, it is worth emphasising that it is impossible to compute "the universally valid" effective tax rate. Moreover, this measure not only depends on the chosen approach, but also on the particular way in which the approach is applied.

When policy makers are concerned with the effects of increasing mobility of capital in terms of a gradual shifting of the tax burden away from capital to labour or consumption, or are interested in knowing the actual tax burden on small versus large firms or the tax burden on different industries or types of economic activity located in their country, compared with others and over time, then the use of backward-looking indicators may be a useful policy tool. Generally, this approach is useful to address issues concerning the distribution of the tax burden and the effects of tax legislation and possible changes of the tax code on the cash flow of companies. They also permit a better understanding of the sensitivity of tax revenues to the economic cycle. While these indicators may possibly give an accurate picture of the tax position of a particular company, they cannot give an accurate picture of the incentives generated by a particular tax regime for a number of reasons. In particular, tax payments in any period may depend crucially on the past history of the company and hence may vary between companies which are currently otherwise identical. When the analysis of the impact of taxation on investment behaviour is the objective, and therefore the effects of tax legislation on future choices has to be captured, then only perspective indicators can illustrate the structure of the incentives (and disincentives) given by taxation systems to the investment choices of companies. Forward-looking indicators are tailored to answer this kind of question and, therefore, are a useful policy tool when efficiency and competitiveness concerns paramount.

Taking into account the scope of the analysis of the effective corporate tax rate in the study, the Commission services and the panel of experts agreed on the need to compute micro forward-looking indicators. In fact, these indicators permit one to "isolate" the structure of incentives and disincentives given by the different tax systems to undertake a specific investment, and to take into account the interrelations of different tax systems. Therefore, they permit one to compare international tax regimes and to identify the most important tax

[5] See OECD (2001).

drivers influencing the effective tax rates. Nevertheless, mainly due to their hypothetical nature, forward-looking indicators suffer from specific shortcomings (see below) and the quantitative results therefore have to be interpreted whilst keeping in mind these methodological constraints.

Data arising from the application of forward-looking methodologies illustrate how taxation can influence the incentive structure of investors. To what extent taxation has an impact on actual economic decisions, depends, however, on other economic factors and on to what extent taxes offset or reinforce other distortions in the economy. Therefore the simple analysis of tax differentials does not permit one to precisely quantify the welfare implications and the efficiency losses arising from particular incentive structures of the tax systems.

Traditional analysis of the taxation of income from capital has focused on the impact of tax on marginal investment decisions in the framework of the model developed by King and Fullerton (1984): the principal impact of tax on investment is through the cost of capital and is generally measured by an effective marginal tax rate. The effective marginal tax rate measures the present value of expected taxes from a hypothetical marginal investment, identical for each country considered, relative to the expected income. Therefore this approach computes directly the tax wedge between the rate of return on investment of a series of hypothetical investments and a given rate of return on savings. The size of the tax wedge depends upon the characteristics of each tax regime, the assumptions concerning the hypothetical investment in terms of assets and sources of finance and the assumptions concerning the economic context in which the investment takes place. Considering that the assumptions related to the economic context and the structure of the investment are identical for each country considered, the application of this methodology enables one to "isolate" the impact of taxation and therefore to make international comparisons.

The King and Fullerton methodology was originally conceived to compare the effective tax rates levied on capital income from domestic investments in the non financial corporate sector. Subsequently, the analysis has been extended in order to take into account and compare the cost of capital for transnational investments and therefore to capture the effects of the interactions of the international tax system. An OECD study (1991) and the "Ruding" report (EEC, 1992) presented the first extensions of the King and Fullerton (K&F) methodology to international investments. It is worth noting that the mandate of the Council explicitly asks the Commission "to take into account, inter alia, the results of the report of the Ruding Committee".

2.1 Pros and cons of the King and Fullerton approach

When deciding to apply a forward-looking methodology in order to comply with the request of the Council, the Commission services and the panel of experts were well aware of the advantages and disadvantages of the traditional K&F approach. The choice of the specific forward-looking methodology applied in the Commission study, as well as the structure of the analysis, were carefully considered, as were the specific methodological shortcomings linked to the K&F methodology. This section briefly summarises the advantages and the disadvantages of the K&F model. The next section presents the way in which the limitations of this methodology have been overcome in the Commission services study.

The most striking advantage of the K&F methodology is that it is a simple approach which provides a common framework for analysis that permits accurate comparisons of tax systems. It therefore enables one to build summary indicators which summarise and quantify the essential features of the tax systems thus permitting a comparison of different tax regimes across countries and over time. In this way the interactions among the most important aspects of the corporate tax regimes are highlighted and the weight of specific features of taxation systems in determining the effective tax burdens is captured. Moreover, this methodology has the advantage of being the most familiar internationally. It is evident that these characteristics are particularly useful for policy makers.

But, mainly due to its hypothetical nature and to the simplicity of the approach, the K&F methodology also has a number of limitations and characteristics, which have to be carefully considered:

a) This approach does not take into consideration a situation in which losses occur. In fact, by definition, the model is constructed on the basis of a marginal investment whose expected rate of return has to be no less than the cost of capital. Moreover it is considered that the company is not "tax exhausted" and can fully make use of the benefits of the tax legislation. In addition to carrying (back or forward) of losses, a number of other detailed features of actual tax systems are not incorporated into the model, such as, for instance, different kinds of provisions in the different countries. In principle, it would usually be possible to incorporate all the details of the tax legislation in the calculation of effective tax rates, but this will increasingly complicate the underlying model and multiply the number of possible cases to be analysed, with the risk of making the results less general and just as difficult to interpret as the tax codes themselves.

b) The quantitative results highly depend on the assumptions underlying the definition of the hypothetical investment considered and the economic framework in which the investment takes place. As far as the economic context is concerned, the most important hypotheses concern the rate of inflation, the interest rate and the exchange rate (if any). Concerning the definition of the hypothetical investment, assumptions have to be made on the weight of the assets composing the investment, as well as the weight of the different sources of finance.

c) The quantitative results depend also on the assumption concerning capital market integration and therefore capital market equilibrium conditions in the observed countries and zone. This assumption is particular relevant when assessing the role and weight of personal taxation - the taxation of the shareholders - on effective corporate tax rates. Moreover, in the K&F model two rates of return are alternatively used to compute the impact of taxation on the cost of capital: the pre-tax rate of return (p) and the post rate of return (r = real interest rate). In order to compute the tax wedge one of these two variables has to be fixed. The assumption in terms of capital market equilibrium is relevant when choosing a "fixed r" case or a "fixed p" case. In the Commission study the decision was taken to use a "fixed r".

d) The K&F model does not derive the possible optimal financial policy for a company, given the incentives of the tax regime and the legal constraints to financial and dividend policy. Therefore, the weights of the sources of finance are exogenous to the model and are not the results of a maximisation function derived by the model itself.

e) The K&F methodology focuses on the impact of taxation on a marginal investment, that is an investment whose expected pre-tax rate of return just equalises the net cost of the project with the present value of its after-tax profit. However, in many circumstances, when competition on the product markets is not perfect, investment choices do not correspond to this framework and the investor faces a choice between two or more exclusive projects that are expected to earn more than the minimum required rate of return.

f) The K&F methodology considers that the decision to invest and locate somewhere is influenced only by capital taxation and that the incidence of the other elements of taxation is borne by other economic agents. However, in practice, company decisions in terms of location may depend on other non profit related taxes and charges. These other taxes, such as trade taxes, payroll taxes or energy taxes may act as incentives (or disincentives) when companies take investment decisions.

Some other fundamental limitations relate to the K&F methodology. In particular it is assumed that current investment decisions are made on the basis of the current tax rules and

the current economic framework. The K&F tax wedges are the appropriate parameters for simulating business decisions only if the current situation forms an unbiased guide to future. Therefore, risk and uncertainty are not considered and the results generated by this model form the basis on which firms would make marginal investment decisions, if they expect no further changes. Moreover investment is a reversible choice. These last limitations were not even discussed in the context of the Commission's panel. In fact, introducing greater complexities into the model would have detracted from more important issues, without much benefit for the scope of the analysis.

3 The methodology applied in the Commission study

The methodology suggested by the panel's experts and chosen by the Commission is based on the traditional K&F approach, but has taken into account the different arguments discussed above in order to manage some methodological shortages of this approach. The questions raised in the previous section were addressed as follows:

a) Considering that the K&F model, based on the notion of cost of capital of a hypothetical investment, does not incorporate losses and other elements of the tax base, it was decided to complement the analysis in two ways. First, by a qualitative assessment of the major structural features of the tax regimes of each Member State to enable a comparison between more of the structural elements and assist in the identification of similarities and differences between Member States' approach to company taxation. However, the qualitative analysis in the Commission study suggests that, although there are differences in the tax treatment of structural elements of the tax regimes among Member States, such differences are largely compensatory. Therefore it is rather difficult, simply on the basis of a qualitative assessment, to infer the impact of such differences on effective tax rates. This result seems to reinforce, in turn, the need for a quantitative analysis.

It was therefore decided to complement the main computation with the application of another forward-looking methodology, the "European Tax Analyser" model designed by the University of Mannheim and ZEW (Spengel, 1999), which includes a large majority of the relevant tax provisions and, in particular the carry-over of losses. The purpose being to test whether the results of the application of a different approach, which includes more features of the tax systems, confirm the general results arising from the main computation. The conceptual framework of the "European Tax Analyser" model is significantly different from the traditional framework of the K&F approach and involves calculating and comparing the effective tax burden for hypothetical future model firm behaviours, using the statutory

features of the tax regimes. The calculations are based on an industry-specific mix of assets and liabilities taking as a base case a typical medium-sized manufacturing company. Based on this existing capital stock, the future pre-tax profits are derived on the basis of hypothetical developments of future cash receipts and cash expenses associated with this initial capital stock. The tax liabilities are then derived by taking into account the tax bases according to the national rules, and then applying the national tax rates. This model computes effective average tax rates which measure the effective tax burden of projects that earn more than the capital cost.

This approach does not represent the optimal investment behaviour of companies, and it relies heavily on the particular characteristic of the model firm, in particular the initial capital stock and the expected development of the capital stock over the simulation period. No explicit assumptions are made about the competitive situation of production factor markets and therefore the incidence of factors other than capital taxation, but implicitly the reasoning is based on the assumption that some elements of the non-corporate tax system (for instance some payroll taxes) are in fact born by companies.

The set of assumptions underlying this model may be questionable on economic grounds and different opinions emerged in the discussion among the members of the panel. But, as the Commission study clearly states, the data arising from the application of the "Tax Analyser" model are presented only with the purpose to test and, possibly, confirm the general picture arising from the application of the "hypothetical investment" approach. In fact, the application of the "Tax Analyser model - which is limited to the analysis of the effective rate of taxation of domestic investment for 6 countries (Germany, France, the Netherlands, the UK, Ireland and the USA) - although producing different numerical data, confirms the general picture and the principal results arising from the main computation (see section 4.2 below).

b) As in every perspective analysis, the quantitative results are based on a set of very specific hypothetical investments under specific economic conditions. It is therefore essential to examine the effects of altering these assumptions, thereby illustrating the sensitivity of the results to the assumptions made. It is important to stress again that the data arising from the application of a forward-looking methodology should not be regarded as the universally valid values for the effective tax burdens in different countries. But, even if there are no universally valid values, it is important to check whether it is possible to make generally valid statements regarding differences in the effective tax burdens. The Commission study therefore contains a wide sensitivity analysis, which recalculates the

effective tax rates several times, each time varying the main parameters of the model. These changes concern both the economic variables and the way in which the hypothetical investment is defined. All in all, the sensitivity analysis in the Commission study demonstrates that in most cases the parameters used in the model tend to have little effect on the overall EU values of the effective tax burden. However, as expected, the exact value of the effective tax burden is rather sensitive to changes in the value of economic parameters, notably the interest rate. The analysis shows also that there is considerable stability in the rankings of countries across the different element of the sensitivity analysis and suggests that the base case does give a reasonable indication of the relative position of Member States.

c) The original K&F approach refers to a closed economy and computes the overall tax wedge between the before-tax and post-tax rate of return by including corporate as well as personal taxation. As is well known from the economic literature, in open economies with international mobile capital, the role of personal taxation on investment decisions raises much more complex issues than in a closed economy. First of all, one should consider the possibility that the saver holds domestic as well as international portfolio assets and that bulk of domestic and international allocation of saving occurs through some intermediary, rather than by direct holding. Moreover, some assumption must be made concerning the arbitrage conditions on the international capital markets, the identity of the "marginal" shareholder and its tax status. All these important topics were discussed in the panel and, even allowing for some individual different points of view, it was considered that the more relevant case was the one in which personal taxation is absent. In short, this is coherent with the assumption that the tax rate of the marginal investor is zero (e.g. a tax exempt intermediary) or, alternatively, that the amount of domestic saving lets unaffected the world interest rate and taxes are residence based. In both situations the investment decisions of the domestic corporate sector will tend to be unaffected by the amount of domestic saving, in so far as companies will be generally able to obtain finance at the prevailing world rate of interest (fixed-r). The taxation of the shareholder or, more generally, of the supplier of finance, is unlikely to affect the international allocation of capital. For the above reasons the Commission study limits the computations which do take into account personal taxation to only some cases, which are of particular relevance to the behaviour of SMEs, as they may have more difficulties accessing the international financial market.

d) In response to the question related to the possible optimal financial policy for a company, it was decided not to try to implement complex (and somewhat questionable) maximisation

models. But, at the same time, to add realism to the analysis, it was decided to take into account the possible optimisation of the financing policy of a company by means of supplementary sets of computations. It was considered realistic that parent companies would try to minimise their global tax burdens either by choosing the most convenient source of finance for the subsidiary, or by making use of more complex financial arrangements. Therefore, the study presents on the one hand, a "tax minimisation approach", which considers how the international tax regime affects the effective tax burden faced by a company willing to invest abroad when it chooses the most tax-efficient means of financing the subsidiary and, on the other hand, some selected examples of the effects of tax optimisation by means of financial intermediaries.

e) In many circumstances investment choices do not correspond to the framework developed by K&F, based on the effects of corporate income taxes on investments that are "marginal" or only just worth undertaking for investors. In fact, when investors are interested in measuring the impact of corporate income taxes on relatively profitable investment opportunities, they are interested in the share of the pre-tax value of a profitable investment project that is taken away by corporate tax income. The effective average tax rate is a measure of this share. This effective average tax rate is particularly relevant in context where firms are choosing an investment from a set of mutually exclusive and otherwise similar profitable investments. Taking into account the empirical relevance of these kinds of choices, the panel of experts strongly suggested the computation of effective average tax rates in order to correctly and exhaustively reply to the mandate given by the Council. For this purpose, it was decided to apply a revised and extended methodology based on the King and Fullerton approach, set out by Devereux and Griffith (1998a). The next section illustrates the main characteristics of this approach, which represents the most interesting methodological extension of the quantitative analysis presented in the Commission study. It is worth noting that, as said before, the "Tax Analyser" model, which was used as a complementary tool, also computes effective average tax rates.

f) The mandate clearly stated that the study should focus on corporate taxation only. Nevertheless a number of experts in the panel agreed that the relation between other types of taxes and location decisions is an important one and should be the object of carefully consideration in the future. This issue is highly dependent on the assumption made in terms of incidence of these non-profit taxes, considering that such incidence may change over time depending also on the growing importance of these non-profit taxes in the EU.

3.1 The Devereux-Griffith approach to compute effective tax rates

As anticipated in the previous section, one of the most interesting extensions of the quantitative analysis presented in the Commission study, with respect to other studies, is the computation of the effective average tax rates, that is to say effective tax rates on investment projects generating extra-profits or economic rents.

There is a growing economic literature underlying the importance of the effective average tax rates for international investment decision[6]. For example, Devereux and Griffith (1998b) found that the effective average tax rate is an important variable to explain the choice by US multinational of where to locate in the EU, subject to the primary decision to invest in the Common EU Market, which is highly driven by other non tax factors.

To compute the effective average tax rates the Commission study mainly relies on the methodology developed by Devereux and Griffith (D&G), and applied also in Bond and Chennels (2000). This approach, that can be considered a sort of extension of the K&F methodology and as such relies on the same economic logic, has the advantage of allowing the computation of both effective marginal tax rate and effective average tax rate under a unique framework.

In practice, the D&G model computes what we may simply call an "effective tax rate" for alternative hypothetical investment projects with different rates of profitability, which illustrates respectively:

a) the effective marginal tax rate, if the real before-tax return is the minimum rate required to undertake the investment, that is to say, is equal to the cost of capital;
b) the whole series of the effective average tax rates, if the project is not marginal, i.e. it generates economic rents.

The effective tax rate (ETR) is measured as the ratio between the present value of taxes and the present value of pre tax income expected by a company from alternative new investment projects that can be either marginal (effective marginal tax rate) or infra-marginal (effective average tax rate) in their post-tax returns. More precisely, the numerator is the difference between the present value of the rent of the investment before tax (R*) and after tax (R), and the denominator by which these taxes are scaled down is the net present value of the pre-tax income stream, net of depreciation (Y*):

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[6] See, for example, Hines (1996), Devereux and Griffith (1998a, 1998b), Bond (2000), Bond and Chennels (2000).

$$(1)\ ETR_t = \frac{R_t^* - R_t}{Y_t^*}$$

We will not enter here into the details of the model, but briefly explain its major assumptions. The implications of the model will be discussed, and more clearly understood, when commenting on the results, in the next section.

The D&G analytical framework is very simple as it is based on a one-period perturbation of the capital stock: an hypothetical investment undertaken in period t, and providing a real return equal to p, is reversed in period t+1. The financial policy of the company strictly follows this one period perturbation of the capital stock. The value of the firm is derived from a standard capital market equilibrium condition, according to which a representative shareholder (a domestic resident) will hold equity shares only up to the point where their net return is equal to the net return from selling the company and investing the assets in the best alternative investment available (say, Treasury bonds).

If the value of the firm does not change, as a consequence of this perturbation policy, this means that the before tax return of the investment undertaken in period t is just equal to the cost of capital and the investment is marginal. If, on the contrary, the one-period change in the capital stock increases the value of the company, then the investment project is earning economic rents.

Given the real market interest rate r, and recalling that p is real return on the investment, the net present value of the pre tax economic rent (R*) is simply:

$$(2)\ R_t^* = \frac{p - r}{(1 + r)}$$

and the present value of the pre tax net income Y* is:

$$(3)\quad Y_t^* = \frac{p}{(1 + r)}$$

The post tax economic rent (R_t in equation (1)), which we do not replicate here for simplicity, is a much more complex expression containing all tax parameters, the economic depreciation rate, the rate of return on investment, the rate of inflation. Moreover, it is differently defined depending on the financing choices of the company.

The effective marginal tax rate is computed by setting the post tax economic rents (R_t in equation (1)) equal to zero and solving for the rate of return p. The latter, denoted by $\tilde{p}$, is the minimum return the company must earn, net of depreciation, in order to cover the costs of the investment, including the cost of finance, and given the real market interest rate r. In the D&G

model the effective marginal tax rate is therefore computed, using the K&F terminology, according to the fixed-r case.

The effective average tax rate is computed for a given value of the real market interest rate (r), as well as for different hypothetical before-tax rates of return on the investments (p), higher than the cost of capital ($\tilde{p}$). Hence, for each particular investment project defined as the acquisition of a specific asset financed with debt, new equity or retained earnings, it is possible to compute the effective marginal tax rate and the whole range of the effective average tax rates, for all the possible values of the real return higher than the cost of capital.

The D&G model is extended to international direct investment too, using an approach similar to that used in OECD (1991). It considers a parent company resident in country j which undertakes an investment in country i through a fully owned subsidiary. The parent company, in turn, is owned by shareholders located in country j, so that the equilibrium condition defining the value of the firm does not change with respect to the domestic case. The subsidiary finances the increase in investment through retained earnings, new shares issued to the parent company and borrowing from the parent.

The DG model's assumptions differ somewhat from those of the traditional K&F and OCD models, but the effect of these differences on results are of minor importance and the two approaches are highly consistent in the effective marginal tax rate they can generate.

4. Do effective marginal tax rates and effective average tax rates provide a different picture of tax distortions?

In this section we will start presenting some of the most interesting results of the Commission study. The major objective, here, is to focus on the relationship between the effective marginal rates, the effective average tax rate and the statutory rate. More precisely, we are interested in showing whether the effective average tax rate can provide a different picture from the one based on the traditional effective marginal tax rate indicator, and therefore be a useful complementary indicator to the analysis of the effective tax burden on companies.

Three elements emerge as particularly important in explaining the observed differences between the effective marginal tax rate and the effective average tax rates and their relation with the statutory rate. These are, in brief:

a) the amount of the deductions allowed from the tax base, notably for interest payments and depreciation;
b) the source used to finance investment (equity or debt);
c) the rate of profitability assumed to compute the effective average tax rate.

To provide a preliminary general picture of how these factors interact, Table 1 takes as an example some of the most general results of the Commission study, relative to the EU as a whole. Effective average tax rates are computed for two different rates of profitability: 20% and 40%. The results are illustrated separately for the different sources of finance considered in the study, and refer to the base case of a domestic investment without personal taxes. Similar considerations could be made, however, using the results for the international case.

Table 1 Effective marginal tax rates (EMTR) and effective average tax rates (EATR) in the EU (1999)
- **domestic investment**
- **only corporation taxes**

Source of finance	EMTR	EATR (20%)	EATR (40%)
Retained earnings	32.6	33.5	33.5
New equity	31.6	33.1	33.3
Debt	- 24.6	22.3	28
Mean	20.2	29.5	31.6

Table 1 shows, first of all, that the effective tax rate increases with profitability. Considering the overall mean for the different sources of finance, the effective tax rate is 20.2% for a marginal investment and grows to 29.5% and to 31.6% if the investment project generates a real return equal to 20% and 40% respectively. The average statutory rate (including surcharges and local taxes) in the EU is 34.7%[7]. Hence, for the EU as a whole, the effective marginal tax rate is lower than the effective average tax rate and the latter increases as profit grows approaching progressively the nominal rate.

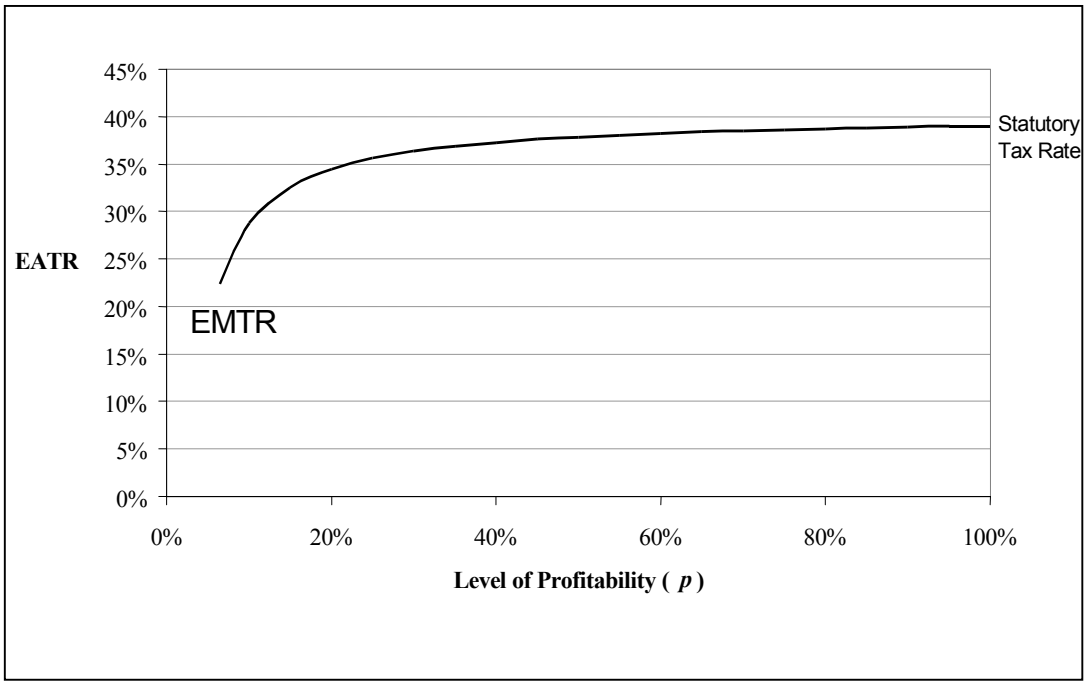
In the absence of personal and capital taxes, the typical relation between the effective marginal tax rate and the whole range of the effective average tax rates for different rates of profitability can be illustrated by the graph in Figure 1, which refers to the Belgium case.

Figure 1 Effective Average Tax Rate and Profitability in Belgium

- only corporation taxes

[7]In 1999, Germany had a different rate on distributed and retained earnings. To compute the average statutory rate for the EU, we considered the rate on retained earnings.

- **average across all forms of investments.**



The effective marginal tax rate is usually lower than the effective average tax rate because of the benefits of tax allowances from the tax base, for depreciation and interest payments, that are more powerful in reducing the tax burden on marginal investments. As profits grow above the minimum required rate, these allowances become relatively less important and the effective tax burden is increasingly affected by the statutory rate. This explains also the different behaviour of the effective tax rate with respect to the different sources of finance considered. As Table 1 illustrates, there is not much difference between the effective marginal tax rate and the effective average tax rate, when the source of finance is equity, whereas in the case of debt the effective tax rate switches from a negative value (-24.6) to a positive value and the jump in consistent. For a 20% rate of profitability the effective average tax rate is 22.3% and rises further to 28% if the rate of return doubles to 40%. At the margin, the effective tax rate is negative, because in addition to depreciation allowances (that are on average in the EU slightly higher than the assumed economic depreciation rate), the company has the advantage of deducting nominal interest payments from the tax base. It is a well known conclusion of the economic literature that when depreciation allowances are greater than true economic ones and are associated with interest payments deductibility, the corporation tax transforms into a subsidy, at the margin. However, with the increase in profits above the minimum rate required to pay out interest payments, the subsidy at the margin rapidly disappears. The statutory rate on

profits increasingly affects the effective average tax rate, which becomes positive and rises with profits towards the statutory rate.

Table 1 and Figure 1 also show that starting from the minimum required rate of return, the effective tax rate increases rapidly with profitability up to the 20% rate, whereas the increase is lower afterwards. Even if there are differences across countries, the assumption of a 20% rate of profitability underlying the basic calculations of the Commission study, is on average able to capture most of the changes of the effective tax rate from the effective marginal tax rate to the statutory rate, that is to say, from the marginal case to the most profitable investment project.

4.1 A more detailed analysis for the EU Member States

As it is stressed in the Commission study, this aggregate picture hides noticeable differences across the EU countries. Again as a representative example, Figures 2, 3 and 4 disaggregate the data of Table 1 for each member state, and respectively for equity[8], debt financing, and overall mean. The Figures only show the effective average tax rates computed assuming a 20% rate of profitability, but in addition the statutory rates, towards which the effective average tax rates tend, are included.

In the case of equity finance (Figure 2), the effective marginal tax rate is positive in all countries. However, even though in most countries the effective marginal tax rate is lower than the statutory rate and the effective tax rate increases towards it with profitability, for other Member States (Ireland, France, Denmark, Finland, and the UK) the effective tax rate for an equity financed investment is slightly greater than the statutory rate and decreases with the increase in profitability. The reason is the presence of relatively high real property taxes, like real estates taxes in Ireland and the UK, that impose a greater effective tax burden on marginal investments than on most profitable ones. This effect more than compensate, at the margin, the benefits of the deductions from the tax base.

Owing to these differences in the tax legislation, it may happen that by comparing countries like, for example, Belgium and the UK, the difference is wider when looking at the effective average tax rate rather than at the effective marginal tax rate.

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[8] Equity finance is not distinguished here between new equity and retained earnings, in so far as in the absence of personal taxes the two are equal for all countries but Germany, where in 1999 a two rate system was in force. In this case the rate shown in the figure is an average using relative weights as used in the Report for these two sources of finance.

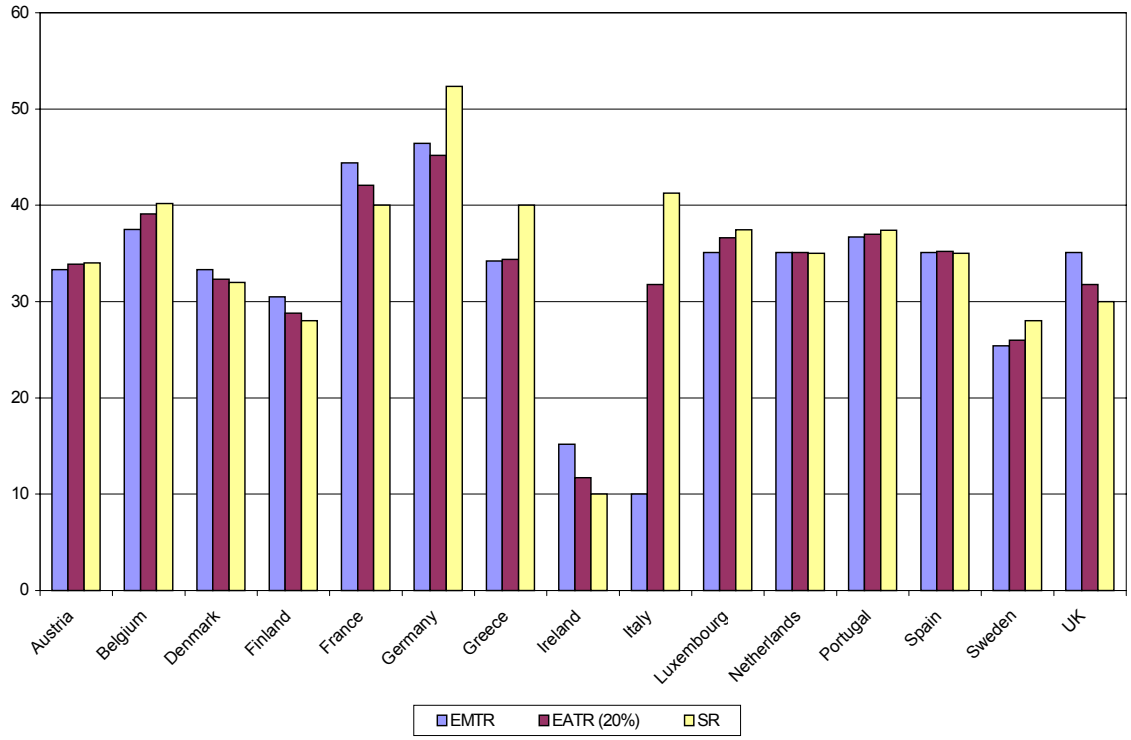
Figure 2 also shows that there are countries, like Spain or the Netherlands, where the three indicators provide substantially the same picture, whereas in other situations the picture is very different, as is it the case for Italy.

The peculiar situation of the Italian case, which shows a very low effective marginal tax rate (10%) compared to the statutory rate (41.25%) is explained by the presence of accelerated depreciation allowances and of a new equity allowance introduced in 1997. According to the latter, an imputed component of profits, representing the opportunity cost of equity capital (new equity and retained earnings) is taxed at a preferential rate (19%) rather than the statutory 37% corporate tax rate. This allowance has a powerful effects at the margin. So, if we compare for example the effective marginal tax rate for Italy and Ireland, the former country appears to be even less taxed than the latter, notwithstanding a much higher statutory rate (41.25%, in Italy, including local taxes, vis-à-vis 10% in Ireland, used in this calculation). But the picture is very different if one compares the effective average tax rate, which more closely reflects the statutory rate.

Figure 2 Effective marginal tax rates, effective average tax rates (20% profitability) and statutory rate in the case of equity finance (1999).

- **domestic investment**
- **only corporation taxes**

The analysis disaggregated by countries clearly confirms that the discrepancy between the

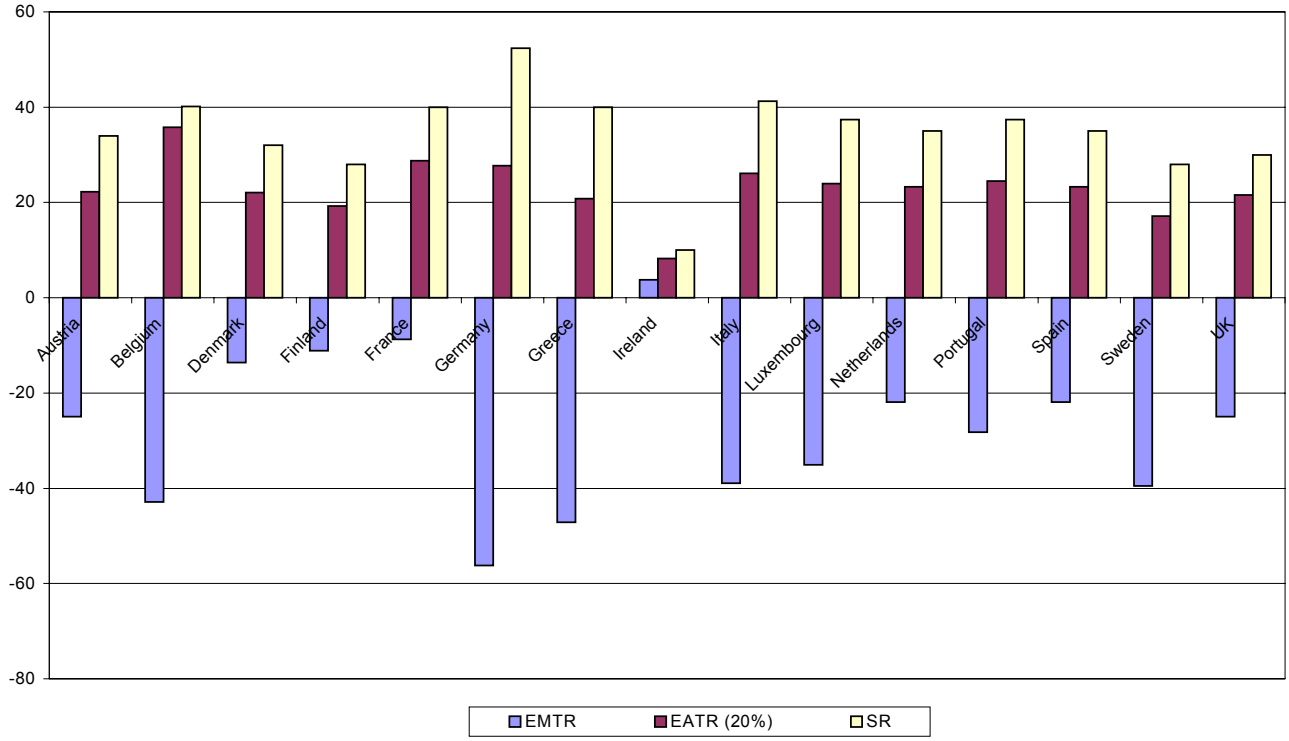


effective marginal tax rate and the effective average tax rate is wider when the source of finance is debt (Figure 3).

In all countries, except Ireland, the effective marginal tax rate is negative when the investment is debt financed. As mentioned before, this depends on the interaction between interest payments deductibility and tax allowances for depreciation in excess to economic depreciation. The subsidy is greater the more depreciation allowances are accelerated with respect to economic depreciation, and the higher the statutory tax rate is. Sometimes, also countries with fairly low statutory rate show the presence of a high subsidy (e.g. Sweden). As it is underlined in the Commission study, the existence of an inverse relationship between the level of the statutory tax rates and the wideness of the tax base cannot be generalised.

The effective average tax rate is positive in all member states, but the jump is particularly high for high tax rate – narrow base countries like Germany (in 1999), Greece, Belgium and Italy.

Figure 3 Effective marginal tax rate, effective average tax rate (20% profitability) and statutory rate in the case of debt finance (1999).
- domestic investment
- only corporation taxes

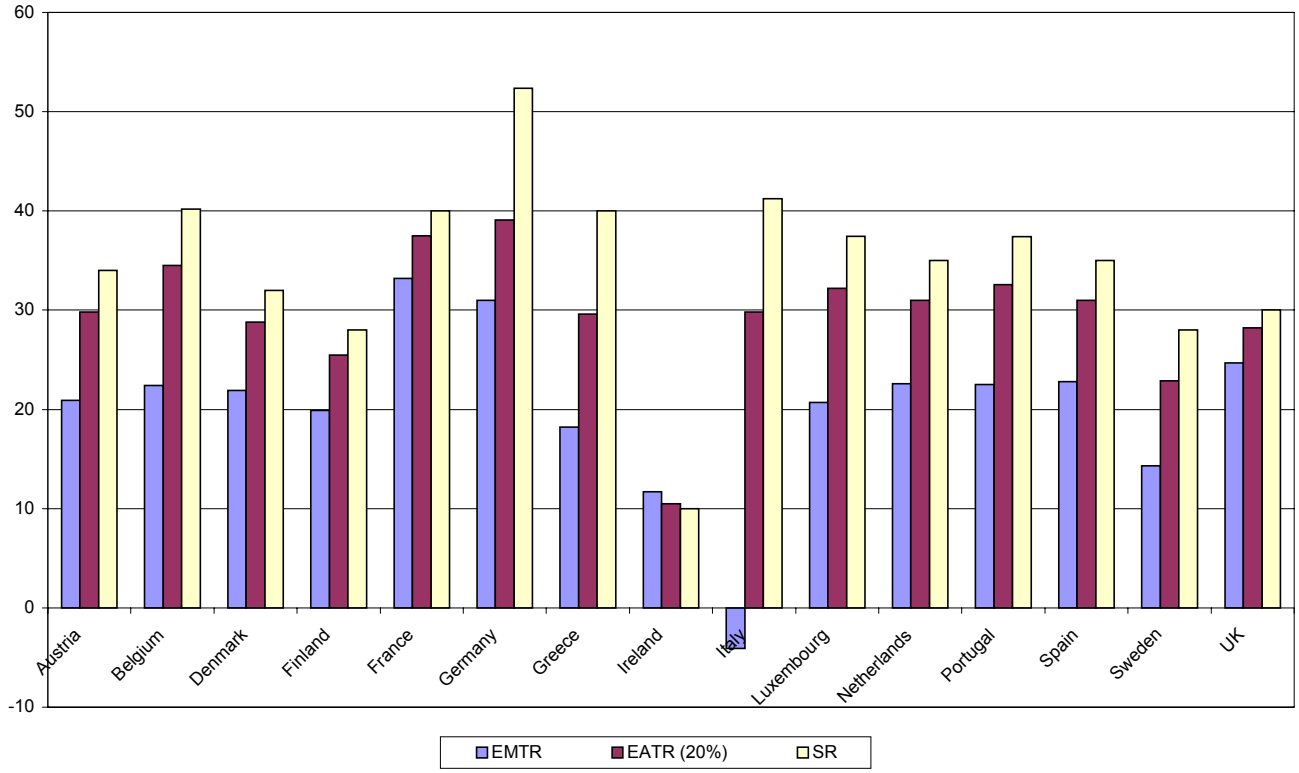


The overall mean results are illustrated in figure 4. Given the weights attributed to the sources of finance, the effective marginal tax rate turns out to be always lower than the effective average tax rate, except for Ireland, because of the relatively high real estate tax accompanied by the low profit tax rate. It is also positive in all cases but Italy. As we have seen in commenting Figures 2 and 3, this result is due to the tax legislation in force in Italy in 1999 which gave to equity financing a preferential tax treatment similar to the one usually reserved to debt finance. As far as debt financing is concerned, Italy is not much different from the other countries.

Even if with less intensity than in Italy, other countries too show remarkable differences between the three indicators considered in Figure 4. For these countries, mostly characterised by narrow tax bases and relatively high statutory rates, the information provided by the traditional effective marginal tax rate indicator are limited and might be highly confusing, if used as the unique measure to study the impact of taxation on investment and their location decision.

When looking at the effective marginal tax rate, countries like Italy and Greece appear very attractive, more than say UK and Sweden or, for Italy, even Ireland. But the picture changes considerably when looking at the effective average tax rate or at the statutory rate.

Figure 4 Effective marginal tax rate, effective average tax rate (20% profitability) and statutory rate. Overall mean (1999)
- domestic investment
- only corporation taxes



5. The usefulness of effective tax rate indicators for policy makers

The extensive calculations presented in the Commission study provide a detailed and fairly clear picture of the potential distortions introduced by the 15 different tax systems in the allocation of capital within the EU and highlight the most important elements of the tax legislation accounting for these distortions.

In this section we will try to summarise the most important results, focusing the attention on the usefulness of these indicators for policy makers with respect to both positive and normative issues. In so doing we will sometime go beyond the comments of the study, or be more explicit in assessing the policy implications that might be derived from these quantitative results.

1. First of all, the study shows that, notwithstanding the increased economic and monetary integration, there are wide differences among the effective tax rates of the various countries and this regards both domestic and international investment. The dispersion appears to be even greater when looking at effective average, rather than marginal, tax rates. The effective average tax rates computed by using the European Tax Analyser model provide comparable results, notwithstanding the different approach adopted, as outlined above.

It is not easy to make comparisons with other studies and see whether there has been an improvement in neutrality and a convergence of the 15 EU systems over time. Undoubtedly, the general reduction in nominal tax rates, often accompanied by an enlargement in the tax base, had the positive effect of reducing distortions and made the residual differences in tax allowances less important. However, independently of the progress eventually and spontaneously achieved, the differences remain particularly high: the ranges is around 37 points for a marginal domestic investment and 30 points in the case of a more profitable investment; for transnational investment the difference between the effective tax burden of subsidiaries located abroad can rise above 30 points.

The 15 EU tax systems are very far from the benchmark of neutrality under many different dimensions of this concept: across types of investment, sources of finances and specific location.

From these quantitative results, accompanied by the observation that the effects of tax distortions are likely to have increased over time, along with the closer integration of the EU market and the increase in capital mobility, it seems possible to conclude that the existing tax systems may potentially bring about significant welfare losses.

Two types of distortions deserve particular attention.

In most countries there is still a wide discrimination between debt and equity financing, notwithstanding the favourable effects of the reduction in the statutory rates, which reduced the tax gap between these two sources of finance. The existence of this tax discrimination, favouring debt financing, is repeatedly underlined in the Commission study, but it is not the principal focus of the analysis, and possible remedial measures are not examined or even suggested. The issue, which is widely discussed in the economic literature[9], should be given more attention in the future policy debate on the EU tax policy for several reasons. On the one hand, it is well known that in increasingly sophisticated financial markets, differences in the

[9] With reference to policy options in the EU see for example, Cnossen (1998).

tax treatment of debt and equity finance open wide arbitrage opportunities to decrease the tax burden. On the other, the existence of a wide distortion in favour of debt finance conflicts with the Commission's goal of promoting equity capital to boost growth and job creation[10] and exacerbates the concern expressed by the Commission about the risk of EU enterprises being over-dependent on debt finance[11].

Concerning international distortions on investment location, which is the focus of the study, the results show that both Capital Export Neutrality (CEN) and Capital Import neutrality (CIN) are violated. In general, the tax systems tend to be closer to CEN if the subsidiary is debt financed and to CIN if it is equity financed. The main reasons are that interest from the subsidiary to the parent is primarily taxed in the home country (according to the residence principle), whereas profits are primarily taxed in the host country (source principle) either because of deferral or because of exemption of dividends in the home country of the parent.

The study is very clear in underlying that neutrality is not the only legitimate goal of tax policy and that policy makers have to carefully balance efficiency with other, often conflicting, goals. Member States, under the subsidiary principle, have fiscal autonomy and therefore this "balancing" takes place at the Member States' level, and not at the EU level. Nevertheless there is no doubt that the results of the Commission study clearly demonstrate that the Internal Market is very far from representing a level playing field for both domestic and international firms, and that there is a urgent need to improve both dimensions of neutrality, domestic and international, to reach the goal set out in the Lisbon European Council of March, 2000 " to become the most competitive and dynamic-knowledge based economy in the world".

2. A well known finding in both the OECD study (1991) and the "Ruding" Report (EEC, 1992) was that inbound and outbound investment were more heavily taxed than otherwise identical domestic investment. This general result is confirmed by the present study, when looking at EU averages (p.6), but does not hold for every country. Usually, for countries with higher cost of capital and particularly with high statutory rates outbound investment are less taxed than

[10] EEC (1998).

[11] EEC (1999).

domestic investment whereas the opposite is true for the countries with lower cost of capital and particularly lower statutory rates[12].

All countries, except Germany, show an effective tax rate greater on inbound investment than on domestic investment.

Two major conclusions can be drawn from these results. First, outbound investment is particularly attractive for countries with a high statutory rate. For the other countries, there are obstacles to full integration, which take the form of additional taxation in the case of transnational investment. Second, in all countries, except Germany, the tax system tends to provide a competitive advantage to domestic companies over subsidiaries located in the same country.

It is worth recalling that these results refer to 1999, and thus do not take into account the recent German tax reform. By considering the effects of this reform, the position of Germany changes slightly: for example "post-reform inbound investment will have a very slightly higher cost of capital than domestic investment (instead of a slightly lower cost of capital)" (p. 145), thus making Germany more similar to the other countries. But on overall, the changes brought about by the German tax reform to effective tax rates are not large enough to alter significantly the relative tax position of this country within the EU.

3. The extension of the study to effective tax rates on infra-marginal investment allows a clearer interpretation of the impact of taxation on location decision. In most cases the two indicators do not tell a very different story, concerning the ranking of the different countries according to their effective tax burden, but as we have seen, in some cases the picture is quite different. The effective average tax rates are more strongly dependent upon the statutory rate of the host country than the effective marginal tax rate. A country with a high statutory tax rate may well have a very low or even negative effective marginal tax rate, but the effective average tax rate will rapidly increase with profits if the statutory rate is high. Focusing on effective average tax rate could explain why tax competition among the EU countries appears to have taken the form of a reduction in the level of the statutory rate, and why countries with the lower statutory rates (like Ireland) rather than lower cost of capital (like Italy) are likely to attract the greatest bulk of foreign investment, particularly from outside the EU.

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[12] These differences may be exacerbated, or reduced and even reversed, if one considers the possibility that the parent has not enough undistributed profits and has to pay dividends from foreign source income received by the subsidiary (p. 145).

4. The tax differences which emerged in the analysis of cross-border investments indicate that there can be considerable incentives for companies to alter their behaviour in order to minimise their global tax burden. To analyse the potential impact of some of these strategies is another useful use of the effective tax rate indicators. As mentioned in section 3, the study explores this issue in two directions: on the one hand, by assuming that the parent company in all countries can use the most efficient way to finance the subsidiary, on the other hand, by introducing some examples of more sophisticated financial arrangements, which make use of a financial intermediary (a Belgium coordination centre and a Dutch holding company). Under both assumptions the effective tax rate on transnational investment drops remarkably. If the parent company is fully flexible in choosing the most favoured source of finance for the subsidiary, inbound and outbound investments turn out to be less taxed than domestic investment. However dispersion of effective tax rates across countries remains very high. Similar considerations emerge when more complex financial arrangements are examined.

These results suggest two important conclusions for policy makers.

First of all, they show that the possibility of using financial arrangements to reduce the effective tax burden "cannot remove all tax obstacles for cross border investment caused by different tax rates and different tax bases" (p. 192), under the assumption that no other possibility of profit shifting exists.

Secondly, they provide a quantitative indication of how useful these arrangements may be to reduce the effective tax burden for those companies who can relatively easily and with little additional cost implement these tax saving devices. Since such companies are usually the largest ones, it follows that the optimisation of tax strategies, while reducing some real distortions on factor allocation, is likely to contextually introduce new discriminations between companies depending on their size.

This observation is confirmed by the section of the study comparing, for some countries (UK, Germany and Italy), the tax treatment of SME and partnerships with that of large corporations. "The results of this section show that the specific tax rates applied to SMEs in the countries analysed have the effect of lowering the effective tax burden. … But, when comparing the results of this section with those … which examined the tax minimisation approach, it is worth noting that small and medium sized enterprises in Germany, Italy and the UK bear a higher tax burden than multinationals investing abroad" (p. 199).

5. One of the advantages of the effective tax rate methodology used in the study is that it permits one to separate the contribution of the different elements of the tax legislation in explaining differences in the effective tax rates. A general result, widely confirmed by the calculations presented in the study, is that the most important tax driver influencing the effective tax burdens and their differences across countries is the overall nominal or statutory tax rate; the corporate tax rate including surcharges and local rates. Tax rate differentials more than compensate for differences in the tax base and the relative weight of rates in determining the effective tax burden of companies rises along with the growth in the rate of profitability. The results obtained with the European Tax Analyser model confirm the importance of this tax factor.

6. Another important use of the effective tax rate indicators is to assess the efficiency content of alternative tax policy changes. This is done, in the Commission study, by computing the level and dispersion of effective tax rates under some alternative hypothetical tax policy scenarios. The simulations are appositely done in such a way as to be able to evaluate separately the contribution towards neutrality of each alternative tax policy change.

These simulations confirm the importance of the statutory rate in determining the observed differences in effective tax rates across countries. Tax rate harmonisation would be very powerful in reducing dispersions of effective tax rates, above all effective average tax rates, whereas harmonisation of the tax bases would not provide comparable gains in efficiency. Things get even worse, in this case, above all when looking at the effective average tax rate for outbound investment. CEN is even further away.

As far as coordination of the transnational aspects of the tax system is concerned, the simulations show that:

a) abolishing withholding taxes on interest payments has usually no effects;
b) the adoption of full credit would move the system closer to CEN, whereas a generalisation of the exemption system would help moving towards CIN;
c) the adoption of the system called Home State Taxation (HST) would remarkably move the system away from CEN, but this result partly depends on the assumption that all profits are allocated back to the host country. So the home tax base is taxed at the host country rate. Where there is a relationship between the definition of the tax base and the tax rate, applying the tax rate of the host country to the tax base of the home country has the effect of increasing distortions.

The Commission study repeatedly warns that a great deal of caution is necessary in deriving policy implications from the results of these simulations. They provide an important guide, on how to move towards increased neutrality, but to evaluate alternative policy scenarios other important factors must also be taken into consideration. First of all, there is the need to reduce the compliance costs, for both companies and the tax administrations, of having to deal with up to 15 different tax rules and regulations. Secondly, there is the need to preserve the highest fiscal autonomy of Member States which is compatible with the functioning of the internal market and the respect of the four fundamental freedoms of the EC Treaty. Third, there is the need to find a solution ensuring that some progress is made within a reasonable period of time, where "reasonable" should mean the time dictated by the necessities of an increasingly integrated market. How to trade off these often conflicting needs is the object of the proposals made in the other parts of the Commission study, and will not be discussed here. However, in discussing the different options it will be important to keep in mind that the quantitative simulations warn of the distortion that might derive by coordinating the tax base without introducing some limit to the freedom of Member States to set their national tax rates.

6. Concluding remarks

The Commission's primary aim was to satisfy the Council's request to illuminate existing differences in effective corporate taxation in the Community in view of their effects on the location of economic activity and investments. For this purpose, the Commission study applies a model conceived to analyse the incentives (or disincentives) given by taxation systems to the investment choices of company. However, the analysis attempts to manage some of the methodological shortcomings linked to the traditional King and Fullerton forward-looking methodology. First by applying a revised and extended methodology set out by Devereux and Griffith, and secondly by complementing the "base case" analysis with a set of computations aimed at adding more realism to the analysis.

As a consequence, it is the first time that a comprehensive study has analysed such a broad range of indicators of the effective company tax burden, both marginal and average for the Member States of the European Union. One of the most striking features of the quantitative analysis in the study is that, across the range of different situations, the relevant conclusions and interpretations remain relatively constant. Nevertheless, the comparative analysis of effective marginal tax rates and effective average tax rates for individual

countries shows that, even if in most cases the two indicators do not tell a very different story, in some cases the picture is quite different.

The general results of the quantitative analysis seem to confirm that the common concerns regarding corporate taxation expressed by the mandate given by Member States to the Commission is justified. In general, the extensive calculation of the study shows that the potential distortions introduced by the 15 different general tax systems in the allocation of the capital within the EU are high and that the differences in nominal tax rates is the most important factor accounting for these potential distortions. Moreover, the existence of wide tax discrimination in favour of debt financing may conflict with the EU objectives of promoting equity capital to boost economy and growth and exacerbates the risk of EU enterprises becoming over-dependent on debt finance.

All in all, the quantitative results show that the Internal Market is very far from representing a level playing field for both domestic and international firms and that the present significant lack of domestic and international tax neutrality may conflict with the objectives set in the Lisbon European Council.

Therefore, the overall picture arising from the quantitative analysis suggests that the "balancing" between economic efficiency and the other policy goals of taxation policy has to be considered not only at Member States' level but also at the EU level. Indeed the Commission has declared its intention to carefully monitor the trend of the effective levels of corporate taxation in the EU[13]. Furthermore, the full implication of an approach implying a co-ordination of the tax bases could indicate that the present differences of nominal tax rates are unsustainable.

[13] See EEC (2001b), p.9.

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