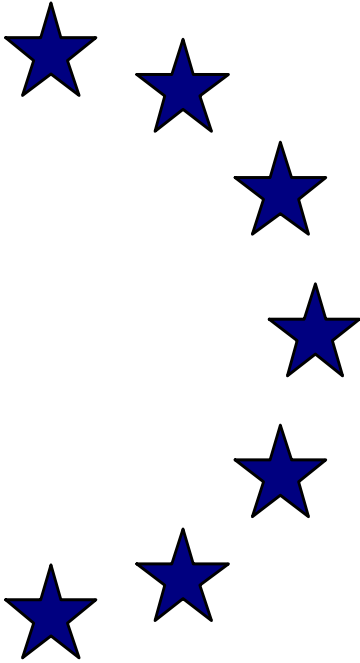


EUROPEAN ECONOMY

EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR ECONOMIC
AND FINANCIAL AFFAIRS

ECONOMIC PAPERS



ISSN 1725-3187

http://ec.europa.eu/economy_finance/index_en.htm

N° 265

December 2006

**Reforming the taxation of multijurisdictional
enterprises in Europe: a tentative appraisal**

by

Marcel Gérard

Catholic University of Mons

Economic Papers are written by the Staff of the Directorate-General for Economic and Financial Affairs, or by experts working in association with them. The “Papers” are intended to increase awareness of the technical work being done by the staff and to seek comments and suggestions for further analyses. Views expressed represent exclusively the positions of the author and do not necessarily correspond to those of the European Commission. Comments and enquiries should be addressed to the:

European Commission
Directorate-General for Economic and Financial Affairs
Publications
BU1 - -1/13
B - 1049 Brussels, Belgium

ISBN 92-79-03841-9

KC-AI-06-265-EN-C

©European Communities, 2006

REFORMING THE TAXATION OF MULTIJURISDICTIONAL ENTERPRISES IN EUROPE, A TENTATIVE APPRAISAL

Marcel GERARD*
ARPEGE / FUCaM
Catholic University of Mons, Belgium
Ucl, Cesifo and Idep

This paper was presented at the Commission of the European Communities Directorate-General on Economic Affairs Workshop on Corporation Income Tax Competition and Coordination in the European Union, held in Brussels September 25, 2006

Summary

In 2001, the European Commission proposed replacing the current system of taxation of multinational companies by the taxation of a consolidated base, computed at the level of all the European entities of a multijurisdictional enterprise, and then distributed for taxation purposes between the various jurisdictions in which these entities operate, according to pre-established criteria. In this paper, we propose a tentative appraisal of that reform based on a case study and an analytical exercise. We especially focus on two related issues, the choice of the formula and the composition of the consolidating area – either the entire EU or some Member States within an Enhanced Cooperation Agreement –, and on their impact on the size and interjurisdictional distribution of tax revenue and social welfare, and on the intensity of tax competition. Our tentative policy conclusion is that this paper supports the reform provided that (1) the formula puts emphasis on criteria that the firm may not too easily manipulate, (2) the activities of the multijurisdictional enterprise are enough mobile, (3) the consolidation is made compulsory within the consolidating area, and (4) the consolidating area protects its capacity to actually levy tax by adopting a crediting system vis-à-vis the rest of the world.

JEL: H32, H73, H87

Keywords: multinational enterprises, multinational companies, multijurisdictional enterprises, European taxation, tax consolidation, tax competition.

* Professor of economics and taxation at Fucam, the Catholic University of Mons, Belgium, and the Louvain School of Management, Louvain-la-Neuve, CESifo Fellow and member of IDEP. This text is based on a research started in the fall of 2004 at the Office of Tax Policy Research of the University of Michigan and completed during stays at Queen's University, Kingston, Ont., and CESifo, Munich, made possible of a grant from the Belgian *Fonds National de la Recherche Scientifique* and the generosity of CESifo. The stimulating hospitality of Robin Boadway as well as valuable suggestions and comments by Thiess Buettner, Carola Maggiuli, Alexander Klemm, Matthias Mors, Nicole Prieur, Jean-Pierre Vidal and Frans van Istendael are gratefully acknowledged. Address for correspondence: gerard@fucam.ac.be

1. Introduction

In our increasingly global economy, the taxation of multijurisdictional¹ enterprises, in short MJE's, has become a key challenge for tax designers. They are confronted with a twofold reality. On the one hand the organisation of the tax system has to secure the capacity for sovereign jurisdictions to levy taxes at rates and on bases determined by them, though possibly coordinated through a network of bilateral tax treaties or multilateral tax arrangements. On the other hand, more and more mobile firms, willing to settle branches or subsidiaries all over the world, complain against the complexity and diversity of tax systems, and simultaneously develop a capacity to reduce their tax liabilities through the more and more extensive use of sophisticated tax planning strategies. And indeed the present organisation of interjurisdictional taxation, primarily based on a model proposed by the Oecd (see Oecd, 1996) and thereafter called Separate Accounting or SA, provides the various jurisdictions with, apparently, the power to make sovereign decision on taxation, but however it has at least two undesirable outcomes: first, it forces the companies willing to operate in many jurisdictions to learn as many tax codes, and second, it allows those companies to undertake various tax shifting strategies in order to minimise their tax liabilities.

Those undesirable outcomes are especially present in the European Union. The first one is even considered as a main tax obstacle to the operation of the Single Market (European Commission, 2001). The second one is, in the EU, often exacerbated by the principle decision that no EU jurisdiction may be considered as a tax haven by other European jurisdictions provided its tax system applies in a non discriminatory way to every EU taxpayer. The issue for EU tax designers is then, more than elsewhere, to find out a system which simultaneously removes the tax obstacle mentioned above and is compatible with the principle of subsidiarity – leave as much power as possible to national authorities – and the tax sovereignty of national parliaments.

Therefore, in the fall of 2001, the European Commission (2001, 2003) suggested replacing the current system of taxation of MJE's, based on separate taxation of different national entities in a group, by the taxation of a consolidated base calculated at the level of all the European entities in a group, and then distributed for taxation purposes between the different jurisdictions in which these entities operate, according to pre-established criteria. In so doing, it proposed replacing a typical system of tax relations between sovereign states with a mechanism that is more characteristic of tax relations within a federation; such a system is, e.g. applied in the United States to tax companies operating in several States, and in Canada to tax a given company operating in more than a single province, thus without consolidation across companies – for lessons for Europe from the US and Canadian experiences see Hellerstein and McLure (2004), Weiner (2005) and Martens-Weiner (2006); on the US application of the system, see also Goolsbee and Maydew (2000).

This system, which has in the meantime been examined and discussed by experts and by the parties concerned, certainly has the great advantage, providing it is sufficiently widespread, of putting an end to a certain number of tax strategies which MJE's find it in their interest to practice. As shown in the seminal work of Gordon and Wilson (1986) and the studies

¹ Throughout this paper we use the word “multijurisdictional” instead of “multinational” basically because the concept behind the former encompasses that in the latter, like “jurisdiction” encompasses “nation”. Since our main application is to the European Union, we think that its appellation makes especially sense: the EU today is more integrated than just an economic union of sovereign states though it is not a true Federation which could justified the use of the term “multi-state”.

motivated by the planned reform in Europe – see e.g. Sorensen (2004) – that reform could, however, and under some conditions, increase tax competition between States.

More specifically, one can show that the effect of this change on tax competition is ambiguous, with the intensification of tax competition being all the less (viz. more) probable if the formula adopted for the distribution of the consolidated taxable base between the jurisdictions concerned gives less (viz. more) emphasis to a criterion over which MJE's have control, such as the geographic distribution of investment, production or employment, and more (viz. less) emphasis to a criterion over which those firms have no or little control, such as the distribution of demand, and thus of sales destinations – see e.g. Gérard (2005a). Therefore the selection of the formula is a key political decision.

The EU Commission also proposed, as an intermediate step in the way to consolidation and formulary apportionment, in short C&FA in the sequel of this paper, to allow for international compensation of losses between companies operating in the EU and belonging to the same MJE – for an analysis see Gérard and Weiner (2003, 2005) and Weiner and Gérard (2004).

In this article, we propose a tentative appraisal of the move from separate accounting based taxation, SA, to consolidation and formulary apportionment, C&FA. We especially focus on two related issues, the choice of the formula and the composition of the consolidating area – either the entire EU or some Member States within an Enhanced Cooperation Agreement –, and on their impact on the size and interjurisdictional distribution of tax revenue and social welfare, and on the intensity of tax competition.

Our tentative policy conclusion is that this paper supports the reform provided that (1) the formula puts emphasis on criteria that the firm may not too easily manipulates, (2) the activities of the MJE are enough mobile, (3) the consolidation is made compulsory within the consolidating area, and (4) the consolidating area protects its capacity to actually levy tax by adopting a crediting system, possibly extended to accrued capital gains through anti-CFC rules, *vis-à-vis* the rest of the world.

For the ease of the exposition, we build up a case study of interjurisdictional investment², that we use in sections 2 to 4. In section 5, we repeat and extend the discussion using an analytical model.³ We suggest that the reader suspicious with respect to a presentation based on a case study, reads section 5 first or simultaneously.

In both the case study and the analytical exercise, our approach can be regarded as the use of a multi-step game. In that game, there is a single MJE and three jurisdictions. The single MJE has to distribute a fixed amount of investment between the only two jurisdictions able to host “real” activities, in order to satisfy a final demand, exclusively located in those two jurisdictions and whose size and distribution is fixed. The third jurisdiction hosts a financial centre and offers a relatively low tax rate. The three jurisdictions are located within the European Union and none can be considered by another as a tax haven. Depending on the economic environment, the MJE may decide to manage various forms of intra-firm trade and to channel financing and profits through the third jurisdiction, possibly using intermodal finance.

² This example expands that in Gérard (2005b).

³ A complete version of the model may be found in Gérard (2006).

Steps 1 to 3 characterize the part of the game played under the SA system, steps 4 and further the part of the game played under the C&FA hypothesis. The reader can easily relate those steps to the history and development of the European Union.

In step 1, governments observe the initial distribution of the activities of the MJE and that of the demand for its product, as well as the economic environment and the institutional arrangements. In step 2 they play non-cooperatively in order to determine tax rates which maximise the welfare of their own jurisdiction, anticipating correctly the behaviour of the MJE. In step 3 the MJE adapts to the new set of tax rates. Then, in step 4, all or some jurisdictions may decide for adopting C&FA and those who adopt that reform decide cooperatively on the formula to be used to apportion the common tax base – in that respect our hypothesis differs from Wellisch (2004); that difference is justified by the decision process in tax matters within the EU: unanimity prevails except when an Enhanced Cooperation Agreement is set up by some Member States. Next, in step 5, governments revise their tax rates, again non-cooperatively; we call that stage – maybe improperly – tax competition: actually it is a stage where jurisdictions revise their tax rates egoistically, in the sole best interest of their own residents, and for the sake of simplicity we assume that steps 4 and 5 occur simultaneously. In step 6 the MJE adapts its behaviour to the new setting.

Economic environment is primarily characterized by the degree of mobility of the MJE. We consider two such environments. In the first one, the MJE is deemed to be “one-degree mobile”, by which is meant that it only decides on the distribution of its investment, which implies that of production and employment – thus it takes only a “real” decision. Then only two jurisdictions are concerned. In that setting, if the distribution of investment chosen by the MJE is such that production in one jurisdiction exceeds demand in that jurisdiction, intra-firm trade is conducted using an exogenous at arm’s length transfer price.

In the second environment, the firm becomes “two-degree mobile” or even “ n -degree mobile”. A two-degree mobile MJE decides on two variables, the distribution of its real activities on the one hand, and another variable, called a “paper” variable, on the other hand. That other variable may be e.g. the transfer price or the fraction of the investment and repatriated profit which is channelled through the third jurisdiction – on that last issue see also Mintz and Smart (2004). In any case, that second variable might be a source of “paper profits”. Combining the distribution of real investment with more than one such additional variable, we produce an “ n -degree mobile firm” and actually we will investigate up to a “three-degree mobile” MJE.

Moving to C&FA when the MJE is “one-degree mobile” enables to find out the “best” formula for apportioning the common tax base between the two concerned jurisdictions. We set forth that they want to maximise the welfare of the residents of their jurisdiction. That welfare depends on both the consumption of public goods financed through tax revenue and on that of private goods made possible by the location of real investment on the territory – a question behind is: are the governments primarily interested by attracting tax bases or are they also by attracting real investments?

However, when the MJE is more than “one-degree mobile” one can cope with more advanced issues including political economy issues related to decision taking mechanism in Europe. Especially, such questions like the adoption of the reform at unanimity by all the EU Member States *vs* its adoption by some within an Enhanced Cooperation Agreement, are on the agenda – on that latter topic see also Bordignon and Busco (2006).

We should add that while C&FA does not make taxation neutral as regards decisions by a MJE (only complete harmonisation of effective tax rates could achieve this), it does, however, form part of the solution of eliminating tax obstacles to economic activity, notably because of its implications in terms of common rules on constituting the tax base and, upstream, on accounting (see for instance Jacobs *et al.*, 2005). Moreover, it can easily be combined with subsidiarity, a principle that is at the heart of the whole organization of the European Union.

Also the introduction of a third country, possibly remaining outside the consolidation area, paves the way for thinking about the most efficient geographic area to consider MJE tax coordination.

The organisation of the paper is as follows. After this introductory section, we consider an economy where the MJE is “one-degree mobile” and thus only allowed to take real decisions, in a SA setting – section 2; then only two jurisdictions are concerned. In section 3, the MJE still operates under SA but it is allowed to make “paper profits”, being successively “two-” and then “three-degree mobile”; in that latter case, three jurisdictions are concerned, due to a possible lucrative detour. In section 4 we investigate the move from SA to C&FA in the different settings considered so far. Though sections 2 to 4 are based on a case study, section 5 proposes a discussion of the reform using an analytical model; that section first reconsiders the case of the “one-degree mobile” MJE, then that of the “two-degree mobile” MJE. A short summary of the investigation and policy-oriented conclusions are proposed in section 6.

In addition to the contributions already mentioned, interesting papers on related topics are numerous. Let us mention Eggert and Schjelderup (2003), Nielsen et al. (2003), Pethig and Wagener (2003), Eichner and Runkel (2006) and Riedl and Runkel (2006), and in French Gérard (2003).

2. “Real” decisions under separate accounting

In this section we assume that the MJE is “one-degree mobile”. It operates in a situation of separate accounting and it adopts “real” strategies only, by which is meant strategies that imply changes in the location of real investment or activities, as opposed to decisions aimed at getting “paper profits”. Governments have observed the initial distribution of investment and the distribution of demand – all the investment and production is initially located in the home jurisdiction and demand is equally distributed the two jurisdictions –, they know the economic environment and the institutional arrangement, SA, and they have chosen the tax rates. Now the MJE is in search of the distribution of its investment and production activities that provides it with the largest possible value. We are thus at step 3 of the game.

Following a pattern made popular by Devereux and Griffith (1998), when the company realises that it has a foreign market, two options are open to it: exporting to this market and establishing a local facility there. This facility will initially be a permanent establishment, and will then become a subsidiary. In the latter case, the parent company will finance it either by buying new shares issued by the subsidiary or making a loan to that company. In that subsidiary, the MJE will first produce for the sole foreign market, then for both markets, keeping however a distribution entity at home, then conducting intra-firm trade between the production foreign subsidiary and that entity, at regular transfer price. We assume that the two countries only differ in tax rates and initial endowment in production capacity.

2.1. Producing at home and exporting

Once the company realises that it can produce not only for its home market but also for a foreign market, it can decide to produce in its home country and to export to the foreign country. Let us assume, then, that the firm builds two factories side by side, each one representing an investment I of one million euro, capable of producing each year 100,000 boxes at a unitary cost of $c=1$ euro, and that it will sell these boxes directly to final consumers at a retail price of two euro, $p=2$, on each one of these markets. Let us assume that the corporate tax rate in the home country is 34 per cent, $\tau_h = .34$.

Both investment projects are obviously equally profitable. With a discount rate r of five per cent, a long time span and the hypothesis of the absence of any inflation and risk, the following net present values are obtained

$$NPV = NPV^* = (1 - .34) \frac{2-1}{.05} 100,000 - 1,000,000 = 320,000 \quad (1)$$

$$NPV^M = 640,000 = 2 \left\{ (1 - \tau^h) \frac{p-c}{r} q - I \right\}$$

where the * designates the plant operating for the foreign market, and superscript M refers to the MJE. The first line of Table 1 below first reports the discounted flows of before- and after-tax profit for the firm, obtained from summing up the NPV and the amount of investment. Then it gives the amount of tax revenue for the home country government, or jurisdiction.

The after-tax discounted flow of profits of the MJE is deemed to measure its Value. The statistics under the figure of the after-tax profit of the MJE is the standard average effective tax rate,

$$t = \frac{(NPV_{bt}^M + I) - (NPV^M + I)}{NPV_{bt}^M + I} \quad (2)$$

where subscript bt refers to a situation before taxation and the absence of subscript to a situation after taxation.⁴

The figure in the penultimate column of Table 1 gives the tax revenue of the home country. Such a figure provides the value of the objective function of the government of that jurisdiction if it is Leviathan. Unlike that, if it is committed to maximising the welfare of the residents of its jurisdiction, assumed to depend on the consumption of public goods financed through the amount of tax revenue, and on the consumption of private goods made possible by the real activities located in the jurisdiction, we need to compute the value of a social welfare function. For that purposes, suppose that 60 percent of the production cost consists of wage cost and use that amount as a proxy for the consumption of private goods permitted by the investment. Adding that latter amount to that of tax revenue provides us with a measure of the social welfare effect of the investment.⁵ That value is indicated between brackets under the amount of tax revenue while we figure out in italics the amount of private consumption.

⁴ E.g. $(4,000,000 - 2,640,000)$ divided by $4,000,000$ is $.34$.

⁵ In the analytical development in section 5, we will explicitly introduce a cost of public funds and a shadow wage, on that matter see Boadway and Bruce, 1984.

Table 1 – A single legal facility

	After-tax profit of the MJE	Home country tax revenue (social welfare) <i>priv. cons</i>	Foreign country tax revenue (social welfare) <i>priv. cons</i>	Aggregate tax revenue (social welfare) <i>priv. cons</i>
Producing at home and exporting	2,640,000 $t = .34$	1,360,000 (3,760,000) <i>2,400,000</i>	0 (0) <i>0</i>	1,360,000 (3,760,000)
Permanent foreign production est.	2,720,000 $t = .32$	680,000 (1,880,000) <i>1,200,000</i>	600,000 (1,800,000) <i>1,200,000</i>	1,280,000 (3,680,000) <i>2,400,000</i>

In this table, and in the whole exercise conducted in this paper, we identify the taxable profit and the value of the sales less the costs of production and distribution, thus the before-tax profit. That means that depreciation allowances and other tax shields are not explicitly introduced. We do not ignore however that they can play a key role in the corporate decision when based on tax comparisons; a simple way to introduce them in this exercise is to reinterpret the tax rates as effective rather than statutory rates.

2.2. A permanent establishment abroad

Now let us add the hypothesis that the tax rate chosen by the government of the foreign country is lower, say $\tau_f = .30$. This derives from the fact that, being initially poorer in investment and employment since all the production of the MJE is concentrated in the other jurisdiction, that jurisdiction is more aggressive in the tax competition game – this is in some respect a New Economic Geography argument. For the MJE, the question of how to benefit from this rate is raised.

A permanent establishment is a dependent facility which does not have its own legal status, and which therefore operates under the legal cover of the company established in the home country. However, it does have a sufficiently stable and permanent activity to be taxed in the country in which it is established.⁶ If the conditions governing a permanent establishment are satisfied, the profits obtained by it shall be taxed there, with no possibility of double taxation in the home country.

The MJE will transfer to that foreign country the production of goods destined for that country – no cost is associated to that operation here, but such a cost will be introduced in the analytic part of the paper. That is the case illustrated by the second line in Table 2. Given the difference in tax rates between the two countries, the company's value, measured by its after-tax profit, will improve. The last column of the Table gives now the aggregate amount of tax revenue over the two jurisdictions and, in parentheses, the total amount of social welfare. The differences in the company's value observed in the above table may be reflected in differences in the average effective tax rate.

2.3. A foreign subsidiary

The next step is to turn the permanent establishment into a subsidiary. Unlike a permanent establishment, a subsidiary has its own legal status, most often that of a company resident in

⁶ The concept is explained in international tax law, notably in Article 5 of the international model tax convention aimed at preventing double taxation proposed by the OECD (OECD, 1996).

the country where it is established, in this case the foreign country. It is therefore taxed in this country.

Two ways for the parent company financing its subsidiary abroad are considered thereafter, buying new shares issued by the subsidiary or making a loan to that company. In the first case dividends are repatriated, in the second one, interests and, possibly, dividends too. We disregard accumulating profits in the affiliate. In case of dividends we need to examine the two mechanisms designed to avoid their so-called economic double taxation – one taxation at the level of the paying affiliate, another taxation at that of the parent company.

We will end up that sub-section by also locating abroad the production facility that produces goods for the home market; in this case, we suppose that the MJE maintains a distribution facility at home to which the production facility sells its products at an at arm's length internal price.

2.3.1. Repatriating dividends: exemption

The Directive of 23 July 1990 governing the circulation of dividends between parent companies in the European Union first states that, under conditions which we assume to be satisfied, *dividends cannot be subjected to a withholding tax in the country in which they are paid.*

Additionally the Directive provides Member States with two options. One is *exemption*: at most five per cent of the cross border dividends can be taxed in the country of residence of the company receiving them (the parent company). In this case, given the hypothesis of maximum distribution of profits – as mentioned we intentionally discard the idea of the accumulation of profits in the subsidiary – we get, assuming that the 95 per cent exemption rule applies,

$$NPV = (1 - .34) \frac{2-1}{.05} 100,000 - 1,000,000 = 320,000$$

$$NPV^* = (1 - .05(.34))(1 - .30) \frac{2-1}{.05} 100,000 - 1,000,000 = 376,200 \quad (3)$$

$$NPV^M = 696,200 ; t = .3260$$

As a result of that limited additional taxation in the country of residence of the parent company, the taxable profit can be slightly larger than the before-tax one and the average effective tax rate, slightly higher. This additional tax may be regarded as a tax on the “privilege” that consists of the subsidiary being incorporated in its own country, hence reducing the risk for the parent company because of the legal independence of its subsidiary.

This system has an economic property, known as *capital import neutrality*: *if the rate of additional taxation is zero, the value of the subsidiary is independent of the origin of the capital financing it.* An immediate corollary is that *in such a system, the location of subsidiaries is what is important, not that of the parent company.* Consequently, *tax competition between countries will focus on attracting subsidiaries.*

2.3.2. Repatriating dividends: crediting

The other option provided by the Directive (and outside the EU this is the practice in countries such as the U.S. but also Australia, Canada, U.K., New Zealand and many other) is crediting: the parent company shall be taxed on the group's global profits, but taxes levied

outside the borders, within the European Union, shall be credited to its tax liability up to the amount owed to its country of residence. Consequently, equation (3) is as follows

$$NPV = (1 - .34) \frac{2-1}{.05} 100,000 - 1,000,000 = 320,000$$

$$NPV^* = (1 - \max(.34, .30)) \frac{2-1}{.05} 100,000 - 1,000,000 = 320,000 \quad (4)$$

$$NPV^M = 640,000 ; t = .34$$

and in this case, since the foreign tax rate is lower than the national rate, we are back in the initial tax situation.

As far as economic properties are concerned, this system may be *capital export neutral*: *if the foreign tax rate does not exceed the rate in the parent company's country of residence, the group's value does not depend on the geographical distribution of its subsidiaries*. An immediate corollary of this observation is that *in such a system, the location of the parent company in the country of lower taxation is, all things being equal, likely to raise the value of the MJE*. Consequently, *tax competition will focus on attracting parent companies or, where appropriate, intermediate holding companies*.

On the contrary – if the tax rate in the subsidiary's country exceeds that of the parent company – there may be capital import neutrality according to the definition in the preceding point.

2.3.3. Repatriating interest

If the investment in the subsidiary was financed by a loan from the parent company, the latter may receive interest that, in most tax systems, is deductible by the company that pays it and taxed in the case of the company receiving it.

Two comments must be made, however. First, most countries apply a withholding tax on the payment of interest. As it is generally lower than the corporate tax rate and tax treaties' provisions provide for its crediting, it can be ignored. In fact it will be ignored all the more readily since European Union legislative developments provide for its disappearance within multinational groups. Second, financing by loans is limited by measures aimed at averting thin capitalisation of companies – we assume that we are not in this situation here (if we introduce this aspect, we would have to resort to mixed financing, and we would not learn anything new from this) – and use of non at arm's length interest rate; due to that latter condition we limit the interest to five per cent of the investment, the excess of profit over that amount being repatriated as dividends, assuming that exemption is at work as it is mostly the case in Europe now.

Therefore,

$$\begin{aligned}
 NPV &= (1 - .34) \frac{2-1}{.05} 100,000 - 1,000,000 = 320,000 \\
 NPV^* &= (1 - .34) \frac{.05}{.05} 1,000,000 \\
 &\quad + (1 - .05(.34))(1 - .30) \left[\frac{2-1}{.05} 100,000 - \frac{.05}{.05} 1,000,000 \right] \\
 &\quad - 1,000,000 = 348,100 \\
 NPV^M &= 668,100; t = .333
 \end{aligned} \tag{5}$$

2.3.4. Producing abroad for the home market

The MJE discovered that producing goods abroad was fiscally more advantageous than producing goods on its home territory. It will quite naturally consider locating abroad the production facility that also produces goods for its home market. In this case, let us suppose that it maintains a distribution facility at home to which the production facility sells its products at an internal price.

In this case Article 9.1 of the OECD's international model tax convention binding the two countries (there is also a European treaty along the same lines) obliges it to practise arm's length (wholesale) prices for intra-group transactions between the foreign production facility and the home country distribution facility. Let us set this price at $P^w = 1.6$ and split the unit costs and the investment between .8 for the production and .2 for the distribution.

This concentration of production abroad improves the company's value and lowers the effective tax rate it must pay, as can be seen from the equations below and the last line in Table 2 further on, calculated on the basis of a hypothesis of financing by shares in a situation of 95 per cent exemption,

$$\begin{aligned}
 NPV &= (1 - .34) \frac{2-1.6-.2}{.05} 100,000 - 200,000 = 64,000 \\
 NPV^* &= (1 - .05(.34))(1 - .30) \left[\frac{2-1}{.05} + \frac{1.6-.8}{.05} \right] 100,000 - 1,800,000 = 677,160 \\
 NPV^M &= 741,160; t = .3147
 \end{aligned} \tag{6}$$

The four situations looked at above can be compared by revisiting Table 1; they replace the second line – see Table 2.

This clearly shows that (1) the decision regarding the method of financing, and hence of repatriation of profits, is not independent of the location of the entities concerned and hence of the geographic distribution of tax rates; (2) this decision has an impact on the distribution of the tax revenue of the countries concerned; (3) the decision of relocating the entire production abroad also increases the value of the MJE and impacts on the distribution of tax revenues between the jurisdictions; and (4) the level of private consumption in the home jurisdiction – the figures in italics – amounts to 2,400,000 in the first line, then it is equally distributed between the two jurisdictions, 1,200,000 in each, till the last line, but relocating the production in the foreign country limits however that component of the social welfare to 240,000 in the home country while it goes up till 2,160,000 in the foreign country.

Table 2 – A subsidiary abroad

	After-tax profit of the MJE	Home country tax revenue (social welfare) <i>priv. cons</i>	Foreign country tax revenue (social welfare) <i>priv. cons</i>	Aggregate tax revenue (social welfare) <i>priv. cons</i>
Producing at home and exp.	2,640,000 <i>t=.3400</i>	1,360,000 (3,760,000) <i>2,400,000</i>	0 (0) <i>0</i>	1,360,000 (3,760,000) <i>2,400,000</i>
For. Subsid. shares/exemption	2,696,200 <i>t=.3260</i>	703,800 (1,903,800) <i>1,200,000</i>	600,000 (1,800,000) <i>1,200,000</i>	1,303,800 (3,703,800) <i>2,400,000</i>
For. Subsid. shares / crediting	2,640,000 <i>t=.3400</i>	760,000 (1,960,000) <i>1,200,000</i>	600,000 (1,800,000) <i>1,200,000</i>	1,360,000 (3,760,000) <i>2,400,000</i>
For. Subsid.– Loan	2,668,100 <i>t=.3330</i>	1,031,900 (2,231,900) <i>1,200,000</i>	300,000 (1,500,000) <i>1,200,000</i>	1,331,900 (3,731,900) <i>2,400,000</i>
Total production abroad	2,741,160 <i>t=.3147</i>	178,840 (418,840) <i>240,000</i>	1,080,000 (3,240,000) <i>2,160,000</i>	1,258,840 (3,658,840) <i>2,400,000</i>

Once again, an immediate corollary emerges from the inspection of that Table: only the equalisation of effective tax rates can ensure neutrality of taxation in terms of the location of subsidiaries and of parent companies, and hence in terms of the distribution of tax revenue between the countries concerned. Various combinations of tax parameters may obtain that equalisation of effective tax rates, but the simplest way of doing this is to use identical methods of composing the tax base and to equalise the statutory tax rates.

Most studies in literature stop at this lesson – see Bénassy et al. (2000, 2005), Grubert and Mutti (1991, 2000), de Mooij et Ederveen (2003) –, forgetting that MJE’s often pursue more complex strategies and are established simultaneously in more than two countries – a contrario, Grubert (2004) and Gérard and Gillard (2004) explicitly consider tax planning strategies.⁷ In the next section, we will try to go beyond this limit by examining transfer pricing strategies, and then financial detour strategies.

At this stage of the paper, the reader interested by an analytical investigation of the issue examined so far will now go to section 5.1.1, and then come back to this point.

3. From “real” to “paper” profits in a system of separate accounting

Two ways at least are available to add “papers profits” to the value of the MJE obtained so far. In the first one, the MJE engages in internal transactions involving its entities and implying either internal trade at a price chosen by it for strategic reasons, which must then be justified, or management fees and related instruments, which are often easier to use. In terms of the game described in the introduction, we are again in step 3 but with a “two-degree mobile” firm.

⁷ Mintz and Weichenrieder (2005) and Weichenrieder (2006a, b) propose an empirical investigation of the use of profitable detours by German firms; related studies include Klassen *et al.* (1993) and Mintz (2004).

In the second situation, the MJE replaces the direct investment and revenue flow circulation with an indirect circulation involving a third, low-tax, jurisdiction, but located in the territory of the EU, and intermodal finance, by which is meant e.g. that a flow of interests is turned into a flow of dividends within a passive entity located in the third jurisdiction. In terms of the game, the MJE is “two-degree mobile” if we consider channelling profits through a third jurisdiction only, or “three-degree mobile” if we combine manipulating the transfer price and channelling profits through a third, low-tax, jurisdiction.

3.1. Manipulation of transfer prices

The company – remember that it is supposed to produce abroad including for the home market – could then take the risk of distancing its internal transfer price from the arm’s length price in order to boost its taxable profit in the jurisdiction with the lowest tax rate, in this case the foreign country. Suppose that it raises this price from 1.60 to 1.79, a value which minimises the overall MJE tax liabilities though it keeps the tax bases positive in both jurisdictions – we then speak about “optimised” transfer price. In this case, equation (6) becomes

$$NPV = (1 - .34) \frac{2 - 1.79 - .2}{.05} 100,000 - 200,000 = -186,800$$

$$NPV^* = (1 - .05(.34))(1 - .30) \left[\frac{2 - 1}{.05} + \frac{1.79 - .8}{.05} \right] 100,000 - 1,800,000 = 938,638$$

$$NPV^M = 751,838; t = .3120 \tag{7}$$

which is used to produce the figures of the fourth (penultimate) line of Table 3.

One important comment is that the extra profit the MJE obtains in this way – and this will be the case through all this section – is pure “paper profit” since it arises from a change in the sole company’s financial strategy without real investment behind it.

However, this gain is not without risk. The country of residence of the distribution unit, in this case merged with the parent company, could reject this difference compared with the arm’s length or full competition price and carry out what is called a primary adjustment, in other words re-calculate the taxable base on its fiscal territory using the arm’s length price as the purchase price for the product. The foreign jurisdiction, which the company will then ask to carry out a correlative or secondary adjustment – re-calculating in turn its taxable base using the arm’s length price – will either agree to this or refuse depending on whether or not Article 9.2 of the OECD’s international model tax convention is included in the convention between the two countries. In the event of the application of the European treaty on transfer pricing, a negotiated solution will have to be found.

3.2. A lucrative detour

We can now suppose that the MJE discovers that there is a jurisdiction within the EU that taxes corporate profits at a very modest rate of, say, 14 per cent. This country does not constitute a market for the company’s product or a place where it could produce it, but it will certainly host a passive facility owned by this group, say a financial centre.

It must be noted that this third country must belong to the European Union, otherwise the passage of a financial flow through its territory could be said to be a detour via a tax haven, depriving the parent company of the benefit of the exemption on the taxation of dividends.⁸

The detour which the MJE then comes up with is as follows: rather than subscribe to new shares in its foreign production subsidiary, it will subscribe in the same amount to shares in a passive subsidiary in the third country which, in turn, will lend the amount collected to the production subsidiary. As already mentioned, financing by loans is limited by measures aimed at averting thin capitalisation of companies and we assume that we are not in this situation here; however interest payments are limited to 5 per cent of the investment, since the market rate of interest is deemed to be of 5 per cent. The profit in excess over interest payment is directly channelled to the parent company as dividends, again with application of the 95 per cent exemption rule. That detour can be named intermodal financing.

If this detour is applied to the previous situation, equations (6) and (7) become, respectively:

$$\begin{aligned}
 NPV &= (1 - .34) \frac{2 - 1.6 - .2}{.05} 100,000 - 200,000 = 64,000 \\
 NPV^* &= (1 - .05(.34))(1 - .14) \frac{.05}{.05} 1,800,000 \\
 &+ (1 - .05(.34))(1 - .30) \left\{ \left[\frac{2 - 1}{.05} + \frac{1.6 - .8}{.05} \right] 100,000 - \frac{.05}{.05} 1,800,000 \right\} \quad (8) \\
 &- 1,800,000 = 960,264 \\
 NPV^M &= 1,024,264 ; t = .2439
 \end{aligned}$$

and

$$\begin{aligned}
 NPV &= (1 - .34) \frac{2 - 1.79 - .2}{.05} 100,000 - 200,000 = -186,800 \\
 NPV^* &= (1 - .05(.34))(1 - .14) \frac{.05}{.05} 1,800,000 \\
 &+ (1 - .05(.34))(1 - .30) \left\{ \left[\frac{2 - 1}{.05} + \frac{1.79 - .8}{.05} \right] 100,000 - \frac{.05}{.05} 1,800,000 \right\} \\
 &- 1,800,000 = 1,221,742 \\
 NPV^M &= 1,034,942 ; t = .2413 \quad (9)
 \end{aligned}$$

We can even apply the detour strategy to the financing of the production investment in the home jurisdiction. Then equation (8) becomes

⁸ On the economics of tax havens, interested reader will see Mongrain, Marceau and Wilson (2006) and Slemrod and Wilson (2006).

$$\begin{aligned}
NPV &= (1 - .05(.34))(1 - .14) \frac{.05}{.05} 200,000 \\
&+ (1 - .34) \left[\frac{2 - 1.6 - .2}{.05} 100,000 - \frac{.05}{.05} 200,000 \right] \\
&- 200,000 = 101,076 \\
NPV^* &= (1 - .05(.34))(1 - .14) \frac{.05}{.05} 1,800,000 \\
&+ (1 - .05(.34))(1 - .30) \left\{ \left[\frac{2 - 1}{.05} + \frac{1.6 - .8}{.05} \right] 100,000 - \frac{.05}{.05} 1,800,000 \right\} \\
&- 1,800,000 = 960,264 \\
NPV^M &= 1,061,340 ; t = .2347
\end{aligned} \tag{10}$$

which is still better for the MJE. In that case the manipulation of transfer price will not be used still it generates no further gain. Only that last strategy is reported in Table 3, last line.

Table 3 – A MJE engaging in tax strategies

	After-tax profit of the MJE	Home country tax revenue (soc. welf.) <i>priv. cons</i>	Foreign country tax revenue (soc. welf.) <i>priv. cons</i>	Third country tax revenue (soc. welf.) <i>priv. cons</i>	Aggregate tax revenue (soc. welf.) <i>priv. cons</i>
Producing at home and exp.	2,640,000 <i>t=.3400</i>	1,360,000 (3,760,000) <i>2,400,000</i>	0 (0) <i>0</i>	0 (0) <i>0</i>	1,360,000 (3,760,000) <i>2,400,000</i>
For. Subsid. shares/exemption	2,696,200 <i>t=.3260</i>	703,800 (1,903,800) <i>1,200,000</i>	600,000 (1,800,000) <i>1,200,000</i>	0 (0) <i>0</i>	1,303,800 (3,703,800) <i>2,400,000</i>
Arm's length price	2,741,160 <i>t=.3147</i>	178,840 (418,840) <i>240,000</i>	1,080,000 (3,240,000) <i>2,160,000</i>	0 (0) <i>0</i>	1,258,840 (3,658,840) <i>2,400,000</i>
Optimised transfer price	2,751,838 <i>t=.3120</i>	54,162 (294,162) <i>240,000</i>	1,194,000 (3,354,000) <i>2,160,000</i>	0 (0) <i>0</i>	1,248,162 (3,648,162) <i>2,400,000</i>
Arm's length price and detour	3,061,340 <i>t=.2347</i>	68,000 (308,000) <i>240,000</i>	540,000 (2,700,000) <i>2,160,000</i>	280,000 (280,000) <i>0</i>	888,000 (3,288,000) <i>2,400,000</i>

Three observations can be made when examining Table 3, where the first three lines come from Table 2, the third one (Arm's length price) reproducing the last line of that Table (Total production abroad), especially when comparing the last line with the third one. First, *without making any new real investment, both the MJE and the passive facility's country obtain a substantial gain* (especially the MJE effective tax rate sharply declines). Second, the *geographic (re)distribution of the private and public components of the social welfare is changed differently: the country of the foreign active facility is deprived of half of its tax revenue but not at all of its private consumption*. Third, and this is a consequence of the second observation, *a distinction must be made between competition between jurisdictions to attract real investments (active facilities) and competition to only attract tax bases, including "paper profits"*.

The latter has a corollary of prime significance: the tax sacrifice to which a country consents in order to attract a real investment can be infinitely expanded simply by the existence of a jurisdiction that is attractive for tax bases. In this case, the foreign country attracted the active facility by offering a tax rate of .30 instead of .34, but the advent of a third jurisdiction has had the effect that the tax rate is effectively much smaller: .15 instead of .30.

Of course, these tax strategies, the effects of which are shown clearly in Table 3, would be irrelevant if the effective tax rates were identical across jurisdictions. Finally, let us still notice that the MJE could decide not to repatriate its profits to the parent entity in the home jurisdiction, but instead to use the entity in the third jurisdiction as a base for accumulating profits and re-investing them in other affiliates of the group. In that latter case, the MJE will save the .05(.34) taxation of dividends in the home jurisdictions; then its value will grow and the tax revenue and welfare level in the home jurisdiction decrease accordingly.

What happens to these observations if taxation based on a separate accounting mechanism is replaced by tax consolidation accompanied by the distribution of the consolidated tax base between the jurisdictions concerned, according to a pre-established formula, is the topic of the next section. Prior to reading section 4, the model-oriented reader can go to section 5.2.1.

4. Moving to Consolidation and Formulary Apportionment

As stated in the introduction, in the autumn of 2001, the European Commission proposed a substantial modification as regards the manner of taxing MJE's operating on its territory, justifying this change by the need to put an end to tax obstacles to economic activity in Europe. The proposed system, similar to the one practised in the United States and in other federal countries, for the taxation by the federation members of companies operating on several of the members' territories, consists of two stages. First, a consolidated base is calculated using common rules applicable in all the federation members; adapted to the EU, that may mean either using the rules applicable in the Member State of the parent jurisdiction or a set of rules specifically determined at EU level for MJE's.⁹ Second, this common base is distributed between the members concerned according to a pre-established formula, with each member taxing its share at the rate it intends to practise. In the United States, the distribution formula is based on properties, payroll and gross receipts from sales. In Canada, which does not apply consolidation, apportionment is based on payroll and gross revenue. It should be noted that criteria that are completely independent of the company might be chosen, such as the respective relative area or population of the States, or even their share in the common value added.

The changeover to consolidation and formulary apportionment discussed below corresponds to step 4 of the game presented in the introduction. However we do not explicitly consider steps 5 and 6 in this main part of the paper, but well in the model developed in section 5. Eliminating step 5 turns out to decide – at step 4 – for a formula, which rules out any new race to the bottom for the tax rates, and to assume rate increases politically infeasible. In such a framework there is no reason to reconsider location decisions and disregarding step 6 is the relevant. Again we relax some of those restrictions in the mathematical model in section 5.

Thereafter, and more importantly, we first assume that all the jurisdictions consider entering the consolidation area. Then we suppose that the third jurisdiction remains outside that area,

⁹ It seems that the EU experts will propose the first solution for small- and medium-sized enterprises and the second one for large enterprises.

either because it decides not to participate or because the MJE has the option to keep the entity located in that jurisdiction outside the consolidation perimeter.

4.1. All the jurisdictions enter the consolidation area

In the last situation encountered in the previous section, the one combining a manipulated transfer price with a lucrative detour, there were three taxable bases, one in each jurisdiction, which we denote respectively as B_h , that of the parent company's country of residence, B_f , that of the country of the foreign active unit, and B_k , that of the third country

$$\begin{aligned}
 B_h &= \frac{2-1.79-.2}{.05}100,000 + 0,05(1-.14)\frac{.05}{.05}1,800,000 \\
 &+ 0,05(1-.30)\left\{\left[\frac{2-1}{.05} + \frac{1.79-.8}{.05}\right]100,000 - \frac{.05}{.05}1,800,000\right\} \\
 B_f &= \left\{\left[\frac{2-1}{.05} + \frac{1.79-.8}{.05}\right]100,000 - \frac{.05}{.05}1,800,000\right\} \\
 B_k &= \frac{.05}{.05}1,800,000
 \end{aligned} \tag{11}$$

C&FA implies first moving from three to a single tax base, then apportioning that single tax base.

4.1.1. Consolidation

When consolidation is conducted, not only tax bases are summed up, but also all intra-firm flows are cancelled out¹⁰. As a consequence neither the value of the transfer price used for intra-firm trade nor the detour still have any effect on the consolidated tax base, which here amounts to

$$B^{FA3} = 2\frac{2-1}{.05}100,000 = 4,000,000 \tag{12}$$

thus again 4,000,000 if discounted at a 5 per cent rate over the long run.

The property obtained is that *consolidation erases the interest of adopting strategies relating to the manipulation of transfer prices and detours via third units*. One comment must be made, however: *as we will see later, this important argument in favour of consolidation does not hold unless consolidation is compulsory and adopted by all the Member States of the European Union*. If a facility, for instance the third country facility, remains outside the consolidation perimeter, then all the strategies remain possible. That comment is especially important for the case where some EU Member States should want to adopt Consolidation and Formulary Apportionment within the framework of an Enhanced Cooperation Agreement – this is not a reason *per se* to reject such an Agreement, but it shows the need to be careful about its consequences.

4.1.2. Formulary Apportionment

The criteria of formulary apportionment can generate weights that the company will find more or less difficult to control or manipulate. We will consider four possibilities here.

¹⁰ Actually it is so only in case of complete or full consolidation, what we assume here. Diversity however is observed among EU Member States since some of them which already apply interjurisdictional consolidation actually do not cancel e.g. intra-firm flows of dividends.

First, the *investment criterion* involving 90 per cent – 1,800,000 out of 2,000,000 – in the State of the foreign active facility and the balance in the State of the distribution facility, which is also that of the parent company. Since investment decisions are in the company’s power, it can be said that this is a criterion controlled by the MJE. If this criterion prevails, the company will continue to decide on the location of its investments on the basis of taxation. Not only will tax competition continue, but also *maybe it will increase since the attraction of investments will again mean the attraction of a taxable base*. The same occurs if the criterion is *payroll*, especially here where payroll is strictly proportional to investment; therefore we will disregard that criterion in this paper.

Next, the *criterion of final sales* – understood as sales to outside the company and in line with the principle of destination – involving 50 per cent in the parent company’s jurisdiction and 50 per cent in that of the foreign market. It can be supposed that since the distribution of sales is partly or totally driven by that of demand, the company does not control this criterion or in any case controls it less. Then, *for a jurisdiction, attracting the company to its territory has no implications for tax revenue provided that sales are not affected – of course it is quite a different story if attracting investment stimulates local sales – and the effect on tax competition might be reduced* – see the analytical section below for a formal analysis.

A third rule consists of taking an *average of investment and sales*. Since payroll is strictly proportional to investment here, that criterion is equivalent to the average of payroll and sales uses e.g. in Canada – on the properties of the Canadian formula, see Weiner (2005) and Martens-Weiner (2006).

Lastly, we will take a *quite arbitrary criterion*: since the company is established in three jurisdictions, each one of them has the right to tax one-third of the consolidated base. Notice that criteria exogenous to the firm like the distribution of the population or that of GDP are, in this discussion, encompassed by that of final sales assumed to be not controlled by the firm.

Table 4 illustrates the impact of each one of these criteria. To produce that Table, the after-tax Net Present Value of the MJE is computed according to the equations below,

$$\begin{aligned}
 NPV^M &= NPV_{bt}^M - [.34(.10) - .30(.90)] B^{FA3}, \text{ investment} \\
 &= NPV_{bt}^M - [.34(.50) - .30(.50)] B^{FA3}, \text{ sales} \\
 &= NPV_{bt}^M - [.34(.30) - .30(.70)] B^{FA3}, \text{ average} \\
 &= NPV_{bt}^M - [.34(1/3) - .30(1/3) - .14(1/3)] B^{FA3}, \text{ equal}
 \end{aligned}
 \tag{13}$$

Several comments must be made in this respect in relation with the MJE and from the point of view of the jurisdictions.

In relation to the MJE, it can be seen that that (1) regardless of the formulary apportionment criterion used, the MJE is in a more favourable situation in the new system than when one-degree mobile and taxation based on separate accounting – second line – but it is in a less favourable situation than if when more than one-degree mobile under cover of separate accounting – third line;¹¹ (2) the more weight given by the criterion to a lower rate of

¹¹ That the after-tax profit of the MJE under C&FA, sales – antepenultimate line – is larger than its after-tax profit under SA – second line – is entirely due to the 95 per cent upper limit to the exemption mechanism introduced in the computation; in case of full exemption, the two numbers are equal.

taxation, the lower the average effective tax rate to which the enterprise is subjected. Thus, recourse to the sole criterion of investment, giving precedence to the active country where the tax rate is low (the attractive country for real investment), leads to lower effective taxation of the MJE than the sole criterion of sales, which gives equal weight to the two jurisdictions where active facilities are established. And the last line lowers the effective tax rate by bringing in a jurisdiction with a particularly low rate.

From the point of view of the jurisdictions, it can be seen that (1) the tax revenue of the jurisdictions is affected considerably by the formulary apportionment criteria used, while private consumption is not (as long as distribution of real activity is not revised) – generally speaking, looking at the situation with the detour via a third country, the changeover to a C&FA system produces two tax revenue winners (except for the last line) and one tax revenue loser among the States concerned –; (2) but however, global tax revenue is higher so that it may be supposed that compensation between jurisdictions could be organised and consist of side payments likely to induce the third country to become involved if unanimity is required.

Table 4 – Changeover to consolidation with formulary apportionment, compulsory C&FA

	After-tax profit of the MJE	Home country tax revenue (soc. welf.) <i>priv. cons.</i>	Foreign country tax revenue (soc. welf.) <i>priv. cons.</i>	Third country tax revenue (soc. welf.) <i>priv. cons.</i>	Aggregate tax revenue (soc. welf.) <i>priv. cons.</i>
Producing at home and exp.	2,640,000 <i>t</i> =.3400	1,360,000 (3,760,000) 2,400,000	0 (0) 0	0 (0) 0	1,360,000 (3,760,000) 2,400,000
For. subsid. shares/exemption	2,696,200 <i>t</i> =.3260	703,800 (1,903,800) 1,200,000	600,000 (1,800,000) 1,200,000	0 (0) 0	1,303,800 (3,703,800) 2,400,000
Arm's length price and detour	3,061,340 <i>t</i> =.2347	68,000 (308,000) 240,000	540,000 (2,700,000) 2,160,000	280,000 (280,000) 0	888,000 (3,288,000) 2,400,000
C&FA, investment	2,784,000 <i>t</i> =.3040	136,000 (376,000) 240,000	1,080,000 (3,240,000) 2,160,000	0 (0) 0	1,216,000 (3,616,000) 2,400,000
C&FA, Sales	2,720,000 <i>t</i> =.3200	680,000 (920,000) 240,000	600,000 (2,760,000) 2,160,000	0 (0) 0	1,280,000 (3,680,000) 2,400,000
C&FA, invest. and sales	2,752,000 <i>t</i> =.3120	408,000 (648,000) 240,000	840,000 (3,000,000) 2,160,000	0 (0) 0	1,248,000 (3,648,000) 2,400,000
C&FA, equal distribution	2,960,000 <i>t</i> =.2600	453,333 (693,333) 240,000	400,000 (2,560,000) 2,160,000	186,667 (186,667) 0	1,040,000 (3,440,000) 2,400,000

4.2. The low tax jurisdiction remains outside a consolidating area decided within an Enhanced Cooperation Agreement

So far we have assumed that C&FA applied to the whole MJE. However, we have issued the comment that, if a facility, for instance the third country facility, remains outside the consolidation perimeter, and then all the strategies remain possible. And we have stressed that this is an especially important remark for the case where some EU Member States should

want to adopt Consolidation and Formulary Apportionment within the framework of an Enhanced Cooperation Agreement. This is also an important case for the relationship between the EU and the rest of the world.

Let us now, first, illustrate that, assuming that the passive entity in the third jurisdiction is not included in the consolidation perimeter either because consolidation is not compulsory or because the third country does not participate the C&FA Agreement supposed to be signed by the countries of the two active entities – this is the case of an Enhanced Cooperation Agreement. We show that in such circumstances, the MJE is better off while the two jurisdictions of the consolidation area are worse off and in some case worse off than under Separate Accounting combined with lucrative detour. Then we examine two replies that those two jurisdictions can set up in order to protect their tax revenue.

Notice that the welfare changes, which appear thereafter, are only due to a revenue effect; nothing is changed in terms of ability-to-consume of the residents, as long as that ability only depends on the location of real investment.

4.2.1. The low tax jurisdiction outside the consolidation area

Then the MJE continues to make use of the lucrative detour through the third jurisdiction, and the tax bases are respectively,

$$\begin{aligned}
 B^{FA2} &= 2 \frac{2-1}{.05} 100,000 - \frac{.05}{.05} 2,000,000 + 0,05(1-.14) \frac{.05}{.05} 2,000,000 \\
 &= 1,914,000 \\
 B^k &= \frac{.05}{.05} 2,000,000 = 2,000,000
 \end{aligned}
 \tag{14}$$

so that the consolidated tax base reduces from 4,000,000 to 1,914,000 in discounted value, while that in the third jurisdiction remains equal to 2,000,000, also in discounted value. Notice that the consolidated tax base now includes 5 per cent of the flow of dividends paid out to its parent company by the passive entity in the third jurisdiction since that latter entity is no longer included in the consolidation perimeter (we assume that the Directive on the taxation of dividends paid by a subsidiary to its parent company still applies).

Table 4 is then replaced by Table 5 below, computed using

$$\begin{aligned}
 NPV^M &= NPV_{bt}^M - [.34(.10) - .30(.90)] B^{FA2} - .14 B^k, \text{ investment} \\
 &= NPV_{bt}^M - [.34(.50) - .30(.50)] B^{FA2} - .14 B^k, \text{ sales, equal} \\
 &= NPV_{bt}^M - [.34(.30) - .30(.70)] B^{FA2} - .14 B^k, \text{ average}
 \end{aligned}
 \tag{15}$$

Comparison of Tables 4 and 5 immediately reveals that the partial adoption of Consolidation and Formulary Apportionment turns out to imply that (1) the third country has the same tax revenue as before the partial introduction of C&FA – since that amount is presumably the side payment it should have requested to adhere to a compulsory C&FA system, that country is deemed to be as well off –; (2) aggregate tax revenue is smaller than in Table 4, so that tax revenue obtained by the countries where the active entities are located is small and in some case, even smaller than under Separate Accounting combined with lucrative detour – the reason is that the five per cent of the flow of dividends paid out by the entity in the third jurisdiction, which was previously taxed at the 34 per cent rate of the parent jurisdiction, is

now taxed at a weighted average of the 30 and 34 per cent rates of the active entities jurisdictions, depending on the apportionment formula – and therefore those two countries are worse off in terms of tax revenue, and thus of social welfare; (3) since its aggregate tax liabilities are smaller, the MJE firm is better off, which is illustrated by its reduced effective tax rates.

Table 5 – Changeover to consolidation with formulary apportionment,
non-compulsory C&FA

	After-tax profit of the MJE	Home country tax revenue (soc. welf.) <i>priv. cons.</i>	Foreign country tax revenue (soc. welf.) <i>priv. cons.</i>	Third country tax revenue (soc. welf.) <i>priv. cons.</i>	Aggregate tax revenue (soc. welf.) <i>priv. cons.</i>
Producing at home and exp.	2,640,000 <i>t=.3400</i>	1,360,000 (3,760,000) <i>2,400,000</i>	0 (0) <i>0</i>	0 (0) <i>0</i>	1,360,000 (3,760,000) <i>2,400,000</i>
For. subsid. shares/exemption	2,696,200 <i>t=.3260</i>	703,800 (1,903,800) <i>1,200,000</i>	600,000 (1,800,000) <i>1,200,000</i>	0 (0) <i>0</i>	1,303,800 (3,703,800) <i>2,400,000</i>
Arm's length price and detour	3,061,340 <i>t=.2347</i>	68,000 (308,000) <i>240,000</i>	540,000 (2,700,000) <i>2,160,000</i>	280,000 (280,000) <i>0</i>	888,000 (3,288,000) <i>2,400,000</i>
C&FA, investment	3,138,144 <i>t=.2155</i>	65,076 (305,076) <i>240,000</i>	516,780 (2,676,780) <i>2,160,000</i>	280,000 (280,000) <i>0</i>	861,856 (3,261,856) <i>2,400,000</i>
C&FA, sales	3,107,520 <i>t=.2231</i>	325,380 (565,380) <i>240,000</i>	287,100 (2,447,100) <i>2,160,000</i>	280,000 (280,000) <i>0</i>	892,480 (3,292,480) <i>2,400,000</i>
C&FA, invest. and sales	3,122,832 <i>t=.2193</i>	195,228 (435,228) <i>240,000</i>	401,940 (2,661,940) <i>2,160,000</i>	280,000 (280,000) <i>0</i>	871,168 (3,277,168) <i>2,400,000</i>
C&FA, equal distribution	3,107,520 <i>t=.2231</i>	325,380 (565,380) <i>240,000</i>	287,100 (2,447,100) <i>2,160,000</i>	280,000 (280,000) <i>0</i>	892,480 (3,292,480) <i>2,400,000</i>

4.2.2. A reply: (extended) crediting instead of exemption and possible use of anti-CFC rule

Now, observing that their revenue outflow has not been stopped at all by their joint move to C&FA through an Enhanced Cooperation Agreement, the tax authorities of the two active jurisdictions can decide to protect their tax base by changing their tax system with respect to incoming dividends and possibly to earnings not repatriated but accumulated in the passive entity.

Indeed the jurisdictions participating the C&FA area could decide to apply crediting instead of exemption *vis-à-vis* the other EU Member States and other foreign countries as well. The main consequence of that decision is that now the profit behind dividends paid out by the passive entity in the third country will be effectively taxed at the consolidation area tax rate. Thus any euro channelled through that jurisdiction and then repatriated to the home country is entitled to pay to the consolidating area tax authorities an amount of tax equal to

$\max(\tau^{C\&FA} - .14, .0)$ which is larger than $\tau^{C\&FA} \cdot .05(1 - .14)$ due when the exemption principle applies. Table 6 illustrates that new situation.

The table especially shows that, *but for the last line, figures in the first column of Table 6 are identical to those of Table 4, so that the MJE has no longer an incentive to use a detour through a passive entity in the third, low tax, jurisdiction.*

As a consequence, in case of adoption of C&FA within an Enhanced Cooperation Agreement, EU Member States concerned should be advised to simultaneously decide for applying crediting instead of exemption vis-à-vis other Member States and other foreign countries as well. Therefore, that case provides a useful guideline for an application of the reform by the entire EU as long as the EU is not unconnected with the rest of the world.

Notice that this system could be, or should be, *extended to profits not repatriated* but, instead, accumulated into the third country passive entity, through a similar taxation of capital gains accrued in the parent company. That system looks like, but is larger than, anti-CFC rules.¹²

¹² A Controlled Foreign Company, or CFC, is a company controlled by the group and located in a low tax jurisdiction for tax purposes only. In that case, the tax authorities of the active entities will include the profit located in the third country into the consolidated tax base, and grant a credit for the tax paid in the low tax country.

Table 6 – Changeover to consolidation with formulary apportionment, non-compulsory C&FA but crediting instead of exemption and possible use anti-CFC rule

	After-tax profit of the MJE	Home country tax revenue (soc. welf.) <i>priv. cons.</i>	Foreign country tax revenue (soc. welf.) <i>priv. cons.</i>	Third country tax revenue (soc. welf.) <i>priv. cons.</i>	Aggregate tax revenue (soc. welf.)
Producing at home and exp.	2,640,000 $t=.3400$	1,360,000 (3,760,000) <i>2,400,000</i>	0 (0) <i>0</i>	0 (0) <i>0</i>	1,360,000 (3,760,000) <i>2,400,000</i>
For. subsid. shares/exemption	2,696,200 $t=.3260$	703,800 (1,903,800) <i>1,200,000</i>	600,000 (1,800,000) <i>1,200,000</i>	0 (0) <i>0</i>	1,303,800 (3,703,800) <i>2,400,000</i>
Arm's length price and detour	3,061,340 $t=.2347$	68,000 (308,000) <i>240,000</i>	540,000 (2,700,000) <i>2,160,000</i>	280,000 (280,000) <i>0</i>	888,000 (3,288,000) <i>2,400,000</i>
C&FA, investment	2,784,000 $t=.3040$	108,000 (348,000) <i>240,000</i>	828,000 (2,988,200) <i>2,160,000</i>	280,000 (280,000) <i>0</i>	1,216,000 (3,616,000) <i>2,400,000</i>
C&FA, sales	2,720,000 $t=.3200$	540,000 (780,000) <i>240,000</i>	460,000 (2,620,000) <i>2,160,000</i>	280,000 (280,000) <i>0</i>	1,280,000 (3,680,000) <i>2,400,000</i>
C&FA, invest. and sales	2,752,000 $t=.3120$	324,000 (564,000) <i>240,000</i>	644,000 (2,804,000) <i>2,160,000</i>	280,000 (280,000) <i>0</i>	1,248,000 (3,648,000) <i>2,400,000</i>
C&FA, equal distribution	2,720,000 $t=.3200$	540,000 (780,000) <i>240,000</i>	460,000 (2,620,000) <i>2,160,000</i>	280,000 (280,000) <i>0</i>	1,280,000 (3,680,000) <i>2,400,000</i>

5. Formal analysis

In this section we complete the case study developed along sections 2 to 4, by an analytical investigation. That latter is a simplification of Gérard (2006) where a more general model is proposed and a detailed presentation and discussion of the results can be found. We consider first a one-degree mobile MJE, then a more mobile one.

5.1. A one-degree mobile MJE

Here, the only decision to be taken by a one-degree mobile MJE is to distribute a given real unitary investment as a fraction α in its active entity in jurisdiction h and a fraction $1-\alpha$ in its active entity in jurisdiction f . We use h and f to designate both the jurisdiction and the entity of the MJE located in the jurisdiction and, to be as close as possible to the case study, we assume that jurisdiction h is that of the parent company of the MJE, thus where initially the entire investment is located and the whole production performed. One unit of investment produces annually one unit of a consumption good. The MJE has to serve a fraction q of that unit to final consumers of market h and a fraction $1-q$ to the other market, in both cases at net retail price p , by which is meant a retail price net of operating costs. The difference between α and q is traded within the firm at arm's length net wholesale price $p^w < p$. The two jurisdictions are identical except for the demand for goods – we assume $q \geq .5$ –, the initial distribution of investment and production – we assume $\alpha_0 = 1 > q$ – and possibly for tax rates.

We deliberately disregard the case where the affiliate is a branch so that f is a subsidiary; its profits are first taxed locally, then they are repatriated to the parent company under the form of dividends which are not taxed in that country based on the exemption principle – we assume full exemption. Accordingly, under SA, we define profit in a given jurisdiction as the value of sales to final consumers (net price multiplied by the amount of goods) minus the cost of acquiring goods from the other entity or plus the value of the goods sold to the other entity. This means that we require that sales to final consumers be made through the local entity.

Under Consolidation and Formulary Apportionment, C&FA, a single consolidated tax base is computed for the two entities together, which is then distributed between the two jurisdictions in line with a predetermined formula, here a linear combination of the distribution of investments and sales, measured on a destination basis.

As in the case study part of the paper, we assume that there are no depreciation allowances and that the time span can be approximated by infinity. Also, there is no room for change in the total amount of investment, but only for a substitution effect between alternative locations of fractions of a total amount of investment deemed to be equal to unity. Finally since the MJE takes only real decisions, the Third jurisdiction does not intervene in this sub-section and we have a two-jurisdiction game.

Let us add that we assume shareholders non resident of either h or f owns the MJE.

5.1.1. Separate Accounting

Suppose that tax authorities of the two jurisdictions have observed the initial distribution of investment and demand (sales) characterised by $\alpha_0 = 1$ and $q \geq 1/2$, the fractions invested and sold in jurisdiction h , respectively – step 1 of the game. Then they set their respective tax rates, τ_h and τ_f , in order to maximise their own individual welfare – step 2; since then $\tau_h > \tau_f$, we call jurisdictions h and f the high tax and low tax jurisdictions respectively. Finally the MJE revises the distribution of its investment in line with the incentive provided by the jurisdictions – step 3. Let us now solve that game backward.

a) The MJE under SA

The one-degree mobile firm maximises its long run value with respect to the variable under its control – step 3 of the game –, thus

$$\max_{\alpha} V(\alpha) = \frac{p}{r} - \tau_h B_h - \tau_f B_f - c(\alpha) \quad (16)$$

where p/r is the discounted flow of gross receipts, r being a discounting rate, $\tau_h B_h$ and $\tau_f B_f$ are tax liabilities in jurisdictions h and f respectively, and $c(\alpha)$ the cost of departing the distribution of real investment from its initial distribution.

Furthermore, we define the tax bases as

$$B_h = q \frac{p}{r} + (\alpha - q) \frac{p^w}{r}, B_f = (1 - q) \frac{p}{r} - (\alpha - q) \frac{p^w}{r} \quad (17)$$

and the cost of departing real investment from its initial distribution $\alpha_0 = 1$

$$c(\alpha) = \frac{\gamma}{2}(\alpha - 1)^2 \quad (18)$$

It turns out from the first order condition of the maximisation of equation (16) with respect to α that the equilibrium value of that variable is

$$\alpha^q = 1 - \frac{\tau_h - \tau_f}{\gamma} \frac{p^w}{r} \quad (19)$$

The sensitivity of firm to tax changes is then

$$\frac{d\alpha^q}{d\tau_h} = -\frac{p^w}{\gamma r}, \quad \frac{d\alpha^q}{d\tau_f} = \frac{p^w}{\gamma r} \quad (20)$$

b) The jurisdictions under SA

Each government maximises a Social Welfare Function – step 2 of the game – defined on the welfare of its own residents deemed to depend on the effect of the investment on local employment, say $w\alpha/r$ in jurisdiction h where w is the shadow price of hiring a worker (see Boadway and Bruce, 1984), and on the amount of public goods available to the residents, $u\tau_h B_h$ in jurisdiction h , $u > 1$ -, thus, for jurisdiction h ,

$$W_h = \frac{w\alpha}{r} + u\tau_h B_h \quad (21)$$

to be maximised with respect to tax rate τ_h .

The first order condition of that maximisation implies a reaction function

$$\tau_h = \frac{1}{2} \left[\frac{qp + (1-q)p^w}{(p^w)^2} \gamma r - \frac{w}{up^w} + \tau_f \right] \quad (22)$$

whose slope is positive and smaller than one. We assume that the intercept is positive for any value of q , in order to have positive tax rates at Nash equilibrium; we also assume that parameters are calibrated in such a way that $\tau_h < 1$.

Notice that, similarly,

$$\tau_f = \frac{1}{2} \left[\frac{(1-q)p - (1-q)p^w}{(p^w)^2} \gamma r - \frac{w}{up^w} + \tau_h \right] \quad (23)$$

and $\tau_h > \tau_f > 0$ if $1 > q \geq 1/2$; then, unsurprisingly, the initially poorer jurisdiction is more aggressive in terms of tax competition.

5.1.2. Consolidation and Formulary Apportionment

If we move to Consolidation and Formulary Apportionment, C&FA, a consolidated tax base B is first calculated, using equation (17) and cancelling out all intra MJE flows, which is then distributed, or apportioned, between the two jurisdiction using a given formula, cooperatively determined by the two jurisdictions at step 4 of the game. Simultaneously jurisdictions determine non-cooperatively the tax rate they will apply under the new setting – step 5 – possibly entering a new round of tax competition. MJE responds in step 6.

We suppose here that the formula is a linear combination of real investment and gross receipts from final sales, with weights λ and $1-\lambda$ respectively. Since wage cost is strictly proportional to investment in this model, we disregard that criterion but the reader can also see our formula as a combination of sales (destination) and wage costs. What is important for the purposes of this investigation is that the distribution of one criterion, here real investment, is under control of the firm, and the distribution of the other is not. It turns out than we now have a consolidated tax base as well as two local tax bases

$$\begin{aligned} B &= \frac{P}{r} \\ B_h^{FA} &= [\lambda\alpha + (1-\lambda)q]B \\ B_f^{FA} &= [\lambda(1-\alpha) + (1-\lambda)(1-q)]B \end{aligned} \quad (24)$$

Again we look at the game backward.

a) The MJE under C&FA

Now, substituting the last two lines of (24) for (17) into (16), (19) and (20) are replaced by

$$\alpha^{FA} = 1 - \frac{\tau_h - \tau_f}{\gamma} \frac{\lambda p}{r} \quad (25)$$

and

$$\frac{d\alpha^{FA}}{d\tau_h} = -\frac{\lambda p}{\gamma r}; \quad \frac{d\alpha^{FA}}{d\tau_f} = \frac{\lambda p}{\gamma r} \quad (26)$$

Then, comparison of λp and p^w will command the relative effects of the tax change on the distribution of real investment and its sensitivity to tax differential: investment in jurisdiction h is smaller (viz. larger) and the sensitivity to tax rates is higher (viz. smaller) under C&FA if $\lambda p > p^w$ (viz $\lambda p < p^w$).

Let us add that, at given tax rates, and beyond the argument of saving in terms of knowledge of (too) many tax systems, the MJE can gain from the tax change if $\Delta V = V^{FA} - V^q \geq 0$. More precisely, it can be shown that, *a one degree mobile MJE is more likely to lobby for apportionment be based exclusively on the distribution of investment, the variable under its control.*

b) *The jurisdictions under C&FA, tax competition again?*

Does the reform attenuate or boost tax competition, or, more precisely, if the governments revise their tax rates in the sole best interest of their residents, will we observe higher or lower rates than under SA? To answer that question, imagine that, though they have selected the apportionment formula cooperatively, jurisdictions keep the right to simultaneously engage in competition on the tax rates – this is step 5 of the game. In that case, assuming that each jurisdiction again maximises the social welfare of its sole own residents, we can derive new reaction functions. Specifically for jurisdiction h , we then have that

$$\tau_h^{FA} = \frac{1}{2} \left[\frac{\lambda p + (1-\lambda)qp}{(\lambda p)^2} \gamma r - \frac{1}{u} \frac{w}{\lambda p} + \tau_f \right] \quad (27)$$

Comparison of that reaction function with its counterpart under SA, equation (22), immediately reveals that the slope is identical while the intercept is either larger or smaller. More precisely, the intercept is larger under C&FA if

$$\left\{ \lambda p^w \left[\gamma r - \frac{w}{u} \right] + \left[p^w + \lambda(p - p^w) \right] q \gamma r \right\} (p^w - \lambda p) > 0 \quad (28)$$

The first term, that into brackets in the right hand side, of (28) is positive¹³, so that the inequality will hold if the last term is also positive, thus if $p^w > \lambda p$ which is the condition for the investment being less sensitive to tax changes after the reform.

Therefore, inequality (28), and more specifically $p^w > \lambda p$, defines a *no race-to-the-bottom* condition: moving to C&FA will not boost tax competition as long as the key parameter of the apportionment formula, λ is smaller than p^w / p . Especially, if the formula is such that the distribution of the consolidated tax base does not depend at all on that of investment and production, $\lambda = 0$, the reform will generate no incentive for tax competition. On the contrary, if $\lambda = 1$ then tax competition is boosted for sure: the distribution of the tax base depends entirely on a decision variable of the MJE. We will see that, fortunately, the no-race-to-the-bottom condition is compatible with the optimal expression for the apportionment formula.

c) *The jurisdictions under C&FA, deciding on the reform and selecting the formula*

The determination of the formula is thus of primary importance and we assume that it is decided cooperatively, in line with the requested unanimity in tax matters provided by EU treaties, at the same time as the jurisdictions decide whether or not to adopt the reform – step 4 of the game.

The two jurisdictions now jointly maximise $W = W_h + W_f$ with respect to λ given the above definition of the consolidated tax base and the apportionment formula. From the first order condition of that maximisation, and using equation (27) as well as its counterpart for the other jurisdiction, we obtain the equilibrium value of the formula, characterised by,

$$\lambda^w = 2 \frac{1-2q}{1-q} \quad (29)$$

¹³ This derives from the assumption that the intercept of the reaction function is positive.

which needs to be comprised between 0 and 1. As a consequence, since the numerator of that fraction is not positive ($q \geq 1/2$), the equilibrium value of the formula is characterised by $\lambda = 0$: *the formula only depends on the distribution of demand and sales*, a parameter which escapes the control of the MJE.

Therefore *the equilibrium value of the formula is compatible with the no-race-to-the-bottom condition*.

A last issue is still unresolved however. The decision to undertake the reform not only needs that the formula maximises the joints welfare but also that the jurisdiction together are made better off or at least not worse off by the reform.

The two jurisdictions together are not worse off if $W^{FA} \geq W^{SA}$, or, for $\lambda = 0$

$$(\tau_h^{FA} - \tau_h)q \frac{p}{r} + (\tau_f^{FA} - \tau_f)(1-q) \frac{p}{r} \geq (\tau_h - \tau_f)(\alpha^q - q) \frac{p^w}{r} \quad (30)$$

where the two terms on the left hand side of (30) are non negative by the no-race-to-the-bottom condition; then, a sufficient condition for (30) to hold is that

$$q - \alpha^q = q - 1 + \frac{\tau_h - \tau_f}{\gamma} \frac{p^w}{r} \geq 0 \quad (31)$$

We know that $\alpha_0 = 1 > q > 1/2$ and that $\tau_h - \tau_f > 0$. Then condition (31) will be satisfied and the two jurisdictions will gain together from the reform *if the real investment of the MJE is "enough mobile" by which we mean that in response to the observation that $\tau_f < \tau_h$ the MJE is able to move from $\alpha_0 > q$ to $\alpha < q$* . Since q can be as small as $1/2$, that involves that, under SA, at least one half of the investment and production is located in the low tax jurisdiction f .

That the two jurisdictions are not worse off together does not mean that no jurisdiction, individually, is worse off. However *the overall welfare gain enables the jurisdiction which gains to compensate that which loses through a side payment*. It turns out that *the reform can be adopted by the two jurisdictions unanimously provided that a side payment is possible from the higher taxing jurisdiction to the lower taxing one*.

Now we will see if those results still hold when more sophisticated strategies are permitted to the MJE.

5.2. A two-degree mobile MJE

This sub-section completes sections 3 and 4. However, we limit our analysis to the profitable detour characterised by equation (10), a strategy which generates "paper profits", at least under SA. That strategy will also allow us to compare the adoption of the reform by the three concerned jurisdictions vs by only two of them.

5.2.1. Separate Accounting

We now introduce a third and passive jurisdiction k as in the corresponding point of section 3. That jurisdiction offers a still lower tax rate, $\tau_k < \min(\tau_h, \tau_f)$, and is only used for the purposes of the taxation of income, through a lucrative detour and intermodal financing. Profits of both active entities are channelled to jurisdiction k to be taxed there, up to a fraction $c = \bar{c}$ due to the upper limit imposed by the law and the necessity of avoiding thin capitalisation. We assume that using intermodal financing and lucrative detour has a cost; however to avoid unnecessary complication in the exposition, we suppose that cost being either zero, for $c \leq \bar{c}$, or infinity, for $c > \bar{c}$; indeed, beyond the threshold \bar{c} , interests are considered as hidden dividends and no longer allowed to be deductible against the tax base in the paying jurisdiction so that the cost of the detour becomes infinite (the detour is no longer interesting).

a) The MJE under SA

The tax bases in the three jurisdictions now respectively are

$$\begin{aligned} B_h^c &= (1-c) \left[q \frac{p}{r} + (\alpha - q) \frac{p^w}{r} \right] \\ B_f^c &= (1-c) \left[(1-q) \frac{p}{r} - (\alpha - q) \frac{p^w}{r} \right] \\ B_k &= c \frac{p}{r} \end{aligned} \quad (32)$$

and, at step 3 of the game, maximising the value of the firm provides us with a new expression for the fraction of the real investment in h

$$\alpha^c = 1 - \frac{\tau_h - \tau_f}{\gamma} (1-c) \frac{p^w}{r} \quad (33)$$

Comparing with (19) we immediately see that the sensitivity of investment location is reduced, limited to the fraction not taxed in the active entities. In the extreme case where c has no upper limit, $c = 1$ and the firm will not relocate its real investment for tax purposes.

b) The jurisdictions under SA

At step 2, individual jurisdictions decide on tax rates in order to maximise the social welfare of their residents. Since the selected tax rates must be relevant for the setting investigated, an incentive compatibility constraint needs to be introduced, i.e. that the value of the MJE is not reduced by the opportunity to use a detour. Let μ the Lagrange multiplier related to that constraint, then the reaction functions are of the type,

$$\tau_h^c = \frac{u - \mu}{2u - \mu} \left[\frac{qp + (1-q)p^w}{(1-c)(p^w)^2} \gamma r - \frac{1}{u - \mu} \frac{w}{(1-c)p^w} + \tau_f^c \right] \quad (34)$$

and the intercept of the reaction function, and thus the value of the tax rates at Nash equilibrium, decrease when the multiplier goes up.

Two cases deserve a particular interest. First, the *unconstrained* case, $\mu = 0$. Then,

$$\tau_h^c = \frac{\tau_h}{1-c} = \frac{1}{2} \left[\frac{qp + (1-q)p^w}{(1-c)(p^w)^2} \gamma r - \frac{1}{u} \frac{w}{(1-c)p^w} + \tau_f^c \right] \quad (35)$$

to be compared with equation (22); then we note that tax competition is less severe: the intercept is higher and so will be the values of the tax rates at Nash equilibrium. However equation (35) not only implies that $\alpha^c = \alpha^q$ but also involves that $\tau_h^c B_h^c = \tau_h B_h$ and similarly for jurisdiction f , so that any tax due to jurisdiction k reduces the value of the MJE and the incentive compatibility constraint is not satisfied. Moreover, though $\tau_h < 1$, there is no guarantee that $\tau_h^c < 1$ and similarly for τ_f^c .

Second – let us call it the *constrained* case – tax rates selected using equations (22) and (23) satisfy those constraints – the value of the MJE is not reduced, the tax rates are smaller than one, the Lagrange multiplier is positive – and might be justified on economic grounds – see Gérard (2006) for details. Therefore we keep the tax rates unchanged with respect to the case investigated in section 5.1.

5.2.2. C&FA is applied by the three jurisdictions – FA3

The first and main implication of the adoption of C&FA by all the jurisdictions is that B_k vanishes since the inflow in the entity located in that jurisdiction is cancelled by the corresponding outflow. Then $c = 0$ under C&FA and the distribution of investment between the two active jurisdictions is again given by (25).

This implies that *the extension of the consolidation perimeter makes the firm more sensitive to the tax differential between the two jurisdictions that can host real investment, h and f .*

Three questions then arise. First, is *the no-race-to-the-bottom condition* affected by the new setting? In the *unconstrained* case ($\mu = 0$), the answer is positive and one can show that it becomes, from equation (28)

$$\begin{aligned} & \lambda p^w \left[\gamma r - \frac{w}{u} \right] (p^w (1-c) - \lambda p) \\ & + \left[p^w \sqrt{1-c} + \lambda (p - p^w) \right] q \gamma r (p^w \sqrt{1-c} - \lambda p) > 0 \end{aligned} \quad (36)$$

a condition satisfied if $\lambda < (1-c)p^w / p$. Compared with its counterpart in 5.1, this condition is more demanding but still compatible with $\lambda = 0$. In the *constrained* case ($\mu > 0, \tau_i^c = \tau_i, i = h, f$), that condition is unchanged, remaining $\lambda < p^w / p$ satisfied when $\lambda = 0$.

Second, is *the equilibrium value of the apportionment formula* still $\lambda = 0$? The answer is positive too so that the no-race-to-the-bottom is compatible with the equilibrium value of the apportionment formula.

Third, does the reform involve *a welfare gain for the three jurisdictions together*, and thus does it generate the capacity to compensate the jurisdiction k for the disappearance of its tax revenue? In the constrained case – the most relevant one –, that condition – cfr (30) above – holds *a fortiori* being now

$$\begin{aligned} & (\tau_h^{FA} - \tau_h)q \frac{P}{r} + u(\tau_f^{FA} - \tau_f)(1-q) \frac{P}{r} \\ & \geq (\tau_h - \tau_f)(\alpha^c - q)(1-c) \frac{P^w}{r} - c(q\tau_h + (1-q)\tau_f - \tau_k) \frac{P}{r} \end{aligned} \quad (37)$$

and again a sufficient condition for (37) is $q - \alpha^c > 0$.

Notice that the tax incentive for the MJE to move its investment under SA is smaller than in the case of a one-degree mobile firm so that $q - \alpha^c$ is less likely to be negative – in other words “enough mobile” is a stronger assumption; but the last term in parentheses in the right hand side of the inequality is positive since the average tax rates over the active jurisdictions exceeds that of the passive one so that its negation is negative. That the condition is *a fortiori* satisfied comes from the fact that cp/r is now included in the tax base of the consolidating area, therefore taxed at a rate higher than τ_k and the difference between that levy and $\tau_k cp/r$, which needs to be transferred to jurisdiction k as a side payment, remains to the active jurisdictions.

5.2.3. Under C&FA applied by the sole active entities – FA2

Suppose now that jurisdictions h and f decide for C&FA, e.g. through an Enhanced Cooperation Agreement, while k remains outside the consolidation perimeter. Then the tax bases under that design are

$$\begin{aligned} B_h^{FA2} &= [\lambda\alpha + (1-\lambda)q](1-c) \frac{P}{r} \\ B_f^{FA2} &= [\lambda(1-\alpha) + (1-\lambda)(1-q)](1-c) \frac{P}{r} \\ B_k &= c \frac{P}{r} \end{aligned} \quad (38)$$

and

$$\alpha^{FA2} = 1 - \frac{\tau_h^{FA2} - \tau_f^{FA2}}{\gamma} (1-c) \frac{\lambda p}{r} \quad (39)$$

As under 5.2.1 we need to introduce an incentive compatibility constraint to ensure that the case under investigation remains relevant, i.e. that the MJE is actually tempted to use the detour. Therefore the equilibrium tax rates are such that

$$\tau_h^{FA2} = \frac{u - \mu}{2u - \mu} \left[\frac{\lambda + (1-\lambda)q}{\lambda^2 (1-c) p} \gamma r - \frac{1}{u - \mu} \frac{w}{\lambda (1-c) p} + \tau_f^{FA2} \right] \quad (40)$$

and a distinction can be made between an *unconstrained* case and a *constrained* case. In the former $\tau_h^{FA2} = \tau_h^{FA3} / (1-c)$ while in the latter $\tau_h^{FA2} = \tau_h^{FA3}$. Unfortunately, again, the *unconstrained* case does not ensure that the MJE will use neither the detour nor that $\tau_h^{FA2} < 1$.

Let us then focus on the *constrained* case. The same three issues as in the previous case – FA3 – arise. First, the issue of *the no-race-to-the-bottom condition*: that condition is again $\lambda < p^w / p$. Second comes the issue of *the equilibrium value of the apportionment formula*: this is again $\lambda = 0$. Third, there is the question of the *collective gain for the country participating the Agreement*; unfortunately here the gain is smaller and the condition less likely to hold. Compared to (30) and (37) it is now

$$(\tau_h^{FA} - \tau_h)q \frac{P}{r} + (\tau_f^{FA} - \tau_f)(1-q) \frac{P}{r} \geq (\tau_h - \tau_f)(\alpha^q - q) \frac{P^w}{r} \quad (41)$$

where, among the three cases examined, the right hand side is the least likely to be negative. That difference reveals that the outflow of funds to jurisdiction k , in order to escape taxation in either h or f , will continue and is not affected by the reform.

Of course if jurisdictions h and f can manage in such a way that they can include cp/r in the consolidated tax base through a measure aiming at protecting their tax base, we are in a situation equivalent to FA3 for those two jurisdictions, see section 4.2.2. above.

Finally, notice that in Gérard (2006), we relax the assumption that $\alpha_0 = 1$ and use a more general social welfare function; in that enlarged setting the equilibrium value of λ can be non-zero; however the argument is still in favour of a formula which puts the emphasis on the variable that the MJE can hardly manipulate.

6. Conclusion

In this paper, through both a case study and an analytical exercise we have investigated a move from Separate Accounting to Consolidation and Formulary apportionment, with especially in mind the reform suggested by the EU Commission in 2001. In that exercise we have focused our investigation on two related issues, the choice of the formula and the composition of the consolidating area – either the entire EU or some Member States within an Enhanced Cooperation Agreement –, and on their impact on the size and interjurisdictional distribution of tax revenue and social welfare, and on the intensity of tax competition.

The case of an Enhanced Cooperation Agreement especially deserves interest since it not only enables to investigate a possible device within the EU but also what can happen for the relationship between an EU-wide consolidating area and the rest of the world.

Our tentative policy conclusion is that the reform might be supported provided that (1) the formula puts emphasis on criteria that the firm may not too easily manipulate, (2) the real activities of the MJE are enough mobile, (3) the consolidation is made compulsory within the consolidating area, and (4) the consolidating area protects its capacity to actually levy tax by adopting a crediting system, possibly extended to accrued capital gains, vis-à-vis the rest of the world. That recommendation is valid even if the entire EU adopts the reform, as long as the EU is not unconnected with the rest of the world.

In this paper, we have not examined the related question of international compensation of losses within a MJE, a subject particularly close to UNICE's heart (UNICE, 2000), which we can look at in Gérard and Weiner (2003, 2005). It must be noted, however, that while consolidation entails cross border compensation of losses, the latter can also be established in the context of the current system of taxation of separate accounting. In this case, it is one of the targeted measures proposed by the European Commission, forming part of the process of gradually eliminating tax obstacles to economic activity in Europe. If consolidation with formulary apportionment were not adopted, then the introduction of international compensation of losses would be a step in the "right" direction.

This study also paves the way for further investigation. Three directions for further research seem to be especially relevant, one is the analysis of the decision process within a bottom up Federation like the EU, including that of alternative decision rules and coalition formations, another is the determination of the optimal area for tax policy purposes, and a third one is certainly the building process of a EU-like Federation *per se*.

August 2006.

References

- Bénassy-Quéré, A., L. Fontagné and A. Lahrèche-Révil, 2000, “Foreign Direct Investment and the Prospects for Tax Co-Ordination in Europe”, *CEPII WP*, 2000-06.
- Bénassy-Quéré, A., L. Fontagné and A. Lahrèche-Révil, 2005, “How does FDI react to Corporate Taxation?”, *International Tax and Public Finance*, 12, 583-603.
- Boadway, R. and N. Bruce, 1984, *Welfare Economics*, Blackwell.
- Bordignon, M. and S. Busco, 2006, “On Enhanced Cooperation”, *Journal of Public Economics*, in press.
- Cnossen, S., 2002, “Tax Policy in the European Union: A Review of Issues and Options”, *CESifo Working Paper*, 758, Munich.
- European Commission, 2001, *Towards an Internal Market Without Tax Obstacles*, COM(2001) 582 final, Oct. 23, 2001.
- European Commission, 2003, *An Internal Market without Company Tax Obstacles, Achievements, Ongoing Initiatives and Remaining Challenges*, COM(2003)726final, Brussels.
- Devereux, M. and R. Griffith, 1998, “Taxes and the location of production: evidence from a panel of US multinationals”, *Journal of public Economics*, 68, 335-367.
- Eichner, T. and M. Runkel, 2006, “Why the European Union Should Adopt Formula Apportionment with Double Sales?”, mimeo, LM University, Munich.
- Eggert W. and G. Schjelderup, 2003, “Symmetric tax competition under formula apportionment”, *Journal of Public Economic Theory*, 5, 437-444.
- de Mooij, R. et S. Ederveen, 2003, “Taxation and Foreign Direct Investment: A Synthesis of Empirical Research”, *International Tax and Public Finance*, 10, pp. 673–693.
- Gérard, M., 2003, “L’imposition des entreprises multinationales en Europe, à propos d’un rapport de la Commission européenne”, *Revue Economique*, 54 (3), pp. 489-498.
- Gérard, M., 2005a, “Multijurisdictional firms and governments’ strategies under alternative tax designs”, *CESifo WP*, 1527, Munich.
- Gérard, M., 2005b, “The Challenge of Taxing Multijurisdictional Companies in Europe”, *Tax Notes Int’l*, 40 (13), December 26, pp. 1169-1173.
- Gérard, M., 2006, “Reforming the taxation of Multijurisdictional Enterprises in Europe, “coopetition” in a bottom-up Federation”, *CESifo WP*, 1860, CESifo Munich, and *IFIR WP*, 2006-10, University of Kentucky, Lexington, Ky.
- Gérard, M. and M.-F. Gillard, 2004, “Taxation, financial intermodality and the least taxed path for circulating income within a multinational enterprise”, *Annales d’Economie et de Statistique*, 75/76, 89-107.

- Gérard, M. and J. Weiner, 2003, “Cross-border loss offset and formulary apportionment: How do they affect multijurisdictional firm investment spending and interjurisdictional tax competition?”, *CESifo WP*, 1004, Munich.
- Gérard, M. and J. Martens Weiner, 2006, “Comment la compensation internationale des pertes et la répartition proportionnelle des revenus imposables peuvent affecter les choix des multinationales et la concurrence fiscale”, *Economie et Prévision*, 173, 65-77.
- Goolsbee A. and E. Maydew, 2000, “Coveting thy neighbor's manufacturing: the dilemma of state income apportionment”, *Journal of Public Economics*, 75, 125-143.
- Gordon, R. and J. Wilson, 1986, “An examination of multijurisdictional corporate income taxation under formula apportionment”, *Econometrica*, 54, 1357– 1373.
- Grubert, H., 2004, “The Tax Burden on Direct Cross-Border Investment: Company Strategies and Government Responses”, in P.-B. Sorensen, ed., *Measuring the Tax Burden on Capital and Labor*, CESifo Seminar Series, MIT Press, 139-170.
- Grubert, H. and J. Mutti. (1991), “Taxes, Tariffs and Transfer Pricing in Multinational Corporation Decision Making,” *Review of Economics and Statistics* 73, pp. 285–293.
- Grubert, H. and J. Mutti. (2000). “Do Taxes Influence where US Corporations Invest?” *National Tax Journal*, 53, pp. 825–839.
- Hellerstein, W. and C. McLure, 2004, “The European Commission’s Report on Company Income Taxation: What the EU Can Learn from the Experience of the US States”, *International Tax and Public Finance*, 11, 199-220.
- Jacobs, O., C. Spengel, T. Stetter and C. Wendt, 2005, “EU Company Taxation in case of a Common Tax Base”, *ZEW Discussion Paper*, 05-37, Mannheim.
- Klassen, K., M. Lang and M. Wolfson, 1993, “Geographic income shifting by multinational corporations in response to tax rate changes”, *Journal of Accounting Research*, 31, 141-173.
- Kolmar, M. and A. Wagener, 2004, *The Role of the Tax Base in Tax Competition with Formula Apportionment*, University of Vienna, mimeo.
- Martens-Weiner, J., 2006, *Company Tax Reform in the European Union: Guidance from the United States and Canada on Implementing Formulary Apportionment in the EU*, Springer Science + Business Media, New York.
- Mintz, J., 2004, “Conduit entities: Implications of indirect tax-efficient financing structures for real investment”, *International Tax and Public Finance*, 11, 419-431.
- Mintz, J. and M. Smart, 2004, “Income shifting, investment, and tax competition: Theory and evidence from provincial taxation in Canada”, *Journal of Public Economics*, 88, 1149-1168.
- Mintz, J. and A. Weichenrieder, 2005, “Taxation and the Financial Structure of German Outbound FDI”, *CESifo Working Paper*, 1612, Munich.

- Mongrain, S., N. Marceau and J. Wilson, 2006, *Capital Tax Competition and the Emergence of Low Tax Countries*, a paper presented at the Journées Louis-André Gérard-Varet, Marseille.
- Nielsen S., P. Raimondos-Moller P. and G. Schjelderup, 2003, "Formula apportionment and transfer pricing under oligopolistic competition", *Journal of Public Economic Theory*, 5, 419-437.
- OECD, 1996, *Model Tax Convention on Income and on Capital*, condensed version, Oecd, Paris.
- Slemrod, J. and J. Wilson, 2006, "Tax Competition with Parasitic Tax Havens", *NBER Working Paper Series*, 12225.
- Sorensen, P., 2004, "Company tax reform in the European Union", *International Tax and Public Finance*, 11, 91-115.
- Pethig, R. and A. Wagener, 2003, "Profit Tax Competition and Formula Apportionment", *CESifo Working Paper*, 1010, Munich.
- Riedl, N. and M. Runkel, 2006, "Company Tax Reform with a Water's Edge", *CESifo Network meeting in Public Sector Economics*, April.
- UNICE, 2000, "Memorandum on cross border company taxation obstacles in the single market", Unice, Brussels.
- Weichenrieder, A., 2006a, "What determines the Use of Holding Companies and Ownership Chains?", mimeo.
- Weichenrieder, A., 2006b, "Profit shifting in the EU: Evidence from Germany", mimeo.
- Weiner, J., 2005, "Formulary Apportionment and Group Taxation in the European Union: Insights From the United States and Canada", *Taxation Papers*, 8, EU Commission, DG Taxation and Customs Union.
- Weiner, J., and M. Gérard, 2004, "Cross border loss offset, uncertainty, and formulary apportionment: A contribution to the European debate on the taxation of multinationals", *Proceedings of the National Tax Association*, 2003, 360-366.
- Wellisch, D., 2004, "Taxation under Formula Apportionment – Tax Competition, Tax Incidence, and the Choice of Apportionment Factors", *Finanzarchiv*, 60, 24-41