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# Common Consolidated Corporate Tax Base: Effects of Formulary Apportionment on Corporate Group Entities

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FWF

# Common Consolidated Corporate Tax Base:
# Effects of Formulary Apportionment on Corporate Group Entities


## Abstract

The European Commission is currently working on a legislative draft to harmonise the corporate income tax provisions for multinational groups of companies throughout the European Union. For that purpose the European Commission has installed a working group with the mission to draft a Common Consolidated Corporate Tax Base (CCCTB) applicable for multinational companies. As the EU member states are not willing to surrender their taxing power to the supranational level of the EU each group entity's tax base would be determined by apportionment of the group's overall taxable income according to a predefined micro-economic factor based formula whereas the group income will be calculated by consolidating earnings beforehand separately determined by each group entity (pre-consolidation income). The situs state of the particular group entity would then apply its statutory corporate tax rate on the apportioned tax base. This paper evaluates the effects of this prospective apportionment procedure on any given corporate group entity and finds that the share of the group's income allocated to a particular entity using the apportionment formula does regularly not equal the pre-consolidation income of the respective group entity. The reasons for this regular observable deviation can be found on the one hand in the concept of the apportionment formula and on the other hand in the specifics of the definitions of the apportionment factors.



**Keywords:** *CCCTB, Formulary Apportionment, Group Taxation*



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## 1. Introduction

In October 2001, the European Commission communicated its plans for the coming years for company taxation in the European Union (COM(2001) 582 of 23/10/2001) based on a detailed study (see press release IP/01/1468). The communication identified several steps which should be taken to remove individual tax obstacles to cross-border trade in the Internal Market. Among others the Commission concluded that in the longer term member states should agree to allow EU companies to use a single consolidated base for computing tax on their EU-wide profits.

In 2004, the European Commission established a Working Group to examine from a technical perspective the definition of a common consolidated tax base for companies operating in the EU, to discuss the basic tax principles, the fundamental structural elements of a common consolidated tax base and other necessities such as a mechanism for 'sharing' a consolidated tax base between Member States. The so called Working Group Common Consolidated Corporate Tax Base (WG CCCTB) was thus instructed to develop and discuss recommendations and eventually draft a legislative proposal for an EU-wide corporate tax base by the end of 2008 that would entitle multi-national groups of companies to consolidate profits and losses and that would solve the problems companies and member states are facing due to transfer pricing. The Working Group has published on its website[1] more than 60 discussion papers on a variety of aspects and issues as yet. However the work on the legislative proposal seems to be somewhat on hold as Commissioner László Kovács publicly announced that he *"would rather present a perfectly elaborated and well justified product at the appropriate time than present an incomplete one just to meet an artificial deadline"* (Kovács, 2008).

The basic outline of the proposed EU-wide cross-border corporate tax system will, according to the published discussion papers, contain of a three step determination of the taxable income of any given group member. At first each group entity separately calculates its income based on its financial accounting by adjusting the financial accounting income to the provisions of the CCCTB. This separately accounted preliminary taxable income of the group entity may then be corrected to eliminate the income derived from intra-group trade ("push-down accounting") to form a (semi-)separately accounted pre-consolidation income of every member of the CCCTB-group. These (semi-)separately accounted pre-consolidation profits or losses of every group entity will then be consolidated to form the Common Consolidated Corporate Tax Base of the group which will in a last step be allocated to the group entities using a predefined micro-economic factor based apportionment formula. As it is currently not

[1] http://ec.europa.eu/taxation_customs/taxation/company_tax/common_tax_base/index_en.htm.

proposed that the consolidated group is subject to a supranational corporate income tax levied by the EU every group entity will then be taxed separately by its situs state based on the apportioned income at the situs state's statutory tax rate.

While the proposed income determination aims at respecting the corporate group as *one* single economic unit the income allocation procedure and the taxation of the group income takes the corporate structure of the group in consideration and taxes the group income at the level of the group entities not at the level of the group. The impact of this taxation as *one* single economic unit on the corporate entities forming the corporate group remains currently widely disregarded. This paper analyses this impact on a given corporate entity against the background of the group companies' separate legal entity. While the proposed income determination regards the corporate group as one economic unit for tax purposes the national legal systems of a number of EU member states e.g. of Austria or Germany do not disregard the separate legal entities of the group companies for company law purposes, bankruptcy law purposes and purposes of creditor protection. Therefore the paper analyses the proposed income determination and apportionment procedure and compares its outcome with the result of the beforehand calculated pre-consolidation income of any given group entity.
This analysis is conducted at two levels. Firstly a rather basic equilibrium condition is used to analyse the allocation results of the *Formulary Apportionment* (FA) compared with the respective group entity's pre-consolidation income. To effectively demonstrate and analyse the FA results and to contrast it with the pre-consolidation income it is assumed that no differences in the details of the definitions of the apportionment factors and the determination factors of the taxable income exist. It is further assumed that all intra-group trade in goods and services is cancelled out already at the level of the respective group-entity as it is regularly done in group financial accounting ("push-down-accounting"). This analysis of rather structural differences between the determination of the pre-consolidation income and the following consolidation and apportionment is then followed by an analysis of the *WG CCCTB'*s proposals for the definitions of the apportionment factors that could also cause differences between the pre-consolidation income and the apportioned taxable income.

Section 1.1 of the paper gives a brief overview of related literature that has evaluated formulary apportionment systems and the CCCTB working papers. Section 1.2 displays the currently discussed CCCTB apportionment formula. Section 2 shows the allocation results using the apportionment formula and contrasts them with the beforehand (semi-)separately determined pre-consolidation income assuming that every income producing factor is represented in the apportionment procedure and that the definition of every apportionment

factor equals the definition of the respective income producing factor. In section 3 these two basic assumptions of section 2 are withdrawn as the actual proposed definitions of the apportionment factors are analysed. The paper concludes in section 4 with an interpretation and a summary of the results.

### 1.1. Related Literature

The scope of the discussion papers is wide and the discussed issues are numerous. From the beginning of the Working Group's existence it has spent much of its time discussing every issue in a very detailed way. This includes various definitional aspects of the Common Consolidated Corporate Tax Base such as depreciation rates and the treatment of accruals and deferrals. Lang, Pistone, Schuch, and Staringer, 2008 give a comprehensive notion of issues that should be considered and that have already been discussed. Although many aspects have already been thoroughly debated some issues still remain widely undiscussed.

Using *Formulary Apportionment* to allocate income to parts of a company is well known in some jurisdictions but it is currently not used to allocate group income to group entities located in different nation states. Hellerstein and McLure, 2004, Martens-Weiner, 2002 and Martens-Weiner, 2006 analyse the Canadian and the US experience of using FA to allocate corporate income to various permanent establishments and/or provinces or states respectively. They show that the interaction of different formulas or different factor weightings respectively leads to distortions of the allocation results and to over taxation or under taxation of the corporate income. McLure, 1980, Gordon and Wilson, 1986 and Anand and Sansing, 2000 each with different approaches and with respect to different apportionment factors show that formulary apportionment changes the corporate income tax into a tax of the income producing factors used for apportionment. Agúndez-Garcia, 2006 and Weninger, 2009 evaluate different FA-systems and different apportionment factors showing that every apportionment formula (no matter if macro-economic or micro-economic factors are used or if the allocation uses a value added approach) would lead to discretionary distortions and the choice of an optimal apportionment system depends heavily on the basic priorities sought from its outcome.

Oestreicher, 2000 discusses three different systems of determining corporate income: separate accounting, formulary apportionment and a process oriented system of income determination and finds that every system has its advantages and shortcomings and that there is no such thing as an optimal income determination system that fits each and every need.

Shackelford and Slemrod, 1998 discuss the revenue effects of a unilateral introduction of FA at the federal level in the United States. They find that the tax liability of US multinational companies would increase. Fuest, Hemmelgarn and Ramb, 2006 discuss the revenue effects

of introducing FA in the EU including a system of cross-border loss relief finding as expected a decrease in the tax revenues of the EU member states concerned.

### 1.2. The CCCTB Apportionment Formula

The WG CCCTB proposes in its Working Document "CCCTB: possible elements of the sharing mechanism" WG CCCTB, 2007a a predefined apportionment formula based on universally applied microeconomic factors. In addition an application of firm specific factors is also announced to be discussed for specific industries such as the banking sector. The formula will be used to apportion the consolidated income of the group to every group member and simultaneously to every EU member state in which a group entity is located. The proposed sharing mechanism *"itself is not the purpose of the comprehensive tax reform, but a necessary and unavoidable consequence of the consolidation"* WG CCCTB, 2007a. The sharing mechanism and the proposed apportionment formula is aimed at being *"as simple as possible to apply"* and *"difficult to manipulate"* by the taxpayers by shifting of the factors to artificially relocate (parts of) the consolidated tax base and subsequently to artificially shift taxable income to low tax states. Additionally the sharing mechanism aims *"to distribute the tax base among the various entities concerned in a way that can be considered fair and equitable"* and therefore the sharing mechanism aims *"not to lead to undesirable effects in terms of tax competition"* WG CCCTB, 2007a. The proposed apportionment formula is intended to achieve these aims by using three factors, *Sales (S), Labour (L)* and *Assets (A)*. The factor *Labour* is divided into two part-factors: the labour costs *Payroll (P)* and the *Number of Employees (NE)*. Hence the tax base of a particular group member ($\Pi^i$) would be calculated as follows:

$$\Pi^i = \left(\frac{1}{m}\frac{S^i}{S^{grp}} + \frac{1}{n} * \left(\frac{1}{2}\frac{P^i}{P^{grp}} + \frac{1}{2}\frac{NE^i}{NE^{grp}}\right) + \frac{1}{o}\frac{A^i}{A^{grp}}\right) * CCCTB$$

with $\frac{1}{m} + \frac{1}{n} + \frac{1}{o} = 1$ , but the exact relative weighting not yet determined.

## 2. Analysis of the Sharing Mechanism

### 2.1. The Model

The adoption of a Common Consolidated Corporate Tax Base and a sharing mechanism using a predefined microeconomic factor based formula would be a major change in corporate income taxation for every EU member state as well as for every group of companies and every particular corporate entity concerned. Formulary apportionment of corporate income for tax purposes between sovereign nation states is currently nowhere in place (Weninger, 2009). Currently each member state of the European Union uses *Separate Accounting* with a dealing at arm's length approach to determine the taxable income of corporations trading with affiliated companies. However formula apportionment is used by a number of countries to allocate corporate income between provinces, states and municipalities or townships (Kobetzky, 2008; Martens-Weiner, 2005; Weninger, 2009). As the implementation of a consolidation with subsequent *Formulary Apportionment* is a fundamental change in corporate income taxation throughout Europe, this paper aims to evaluate the possible impacts of this change to the tax burden of any given group entity concerned but not of the group of companies as a whole.

The question arises under which circumstances this allocated taxable income of a particular group entity ($\Pi^i$) matches the pre-consolidation income of that particular group entity especially if the consolidation itself has no effect as income resulting from intra-group trade is already excluded at the level of the respective group entity ("push-down-accounting") and as every group entity is profitable and thus no intra-group cross-border loss offset occurs as such a loss offset would overlap the effects of the formulary apportionment. Under such assumptions the pre-consolidation income of the group entity relative to the group income should equal the share of group income apportioned to the respective group entity after the consolidation of the taxable income. Therefore an equilibrium condition could be stated as follows:

(1.1)

$$\frac{\Pi^i_{PRE}}{\Pi^{grp}} = \frac{\Pi^i_{AFTER}}{\Pi^{grp}}$$

$\Pi^i_{PRE}$ Pre-consolidation income of group entity *i*

$\Pi^i_{AFTER}$ Taxable income of group entity *i* after consolidation and apportionment

$\Pi^{grp}$ Taxable consolidated group income

## 2.2. Hypothesis

The two phases of the determination and allocation of the group's income differ in the way the income producing factors (income determination factors) and income apportionment factors are combined. The economic combination of the income producing factors at the group entity is represented in the determination of the pre-consolidation income as revenues minus expenditures. The apportionment formula subsequently relates the income producing factors of the group entity to the income producing factors of the whole group. The allocation factors of the two phases of the income determination and allocation procedure are basically the same (ie *Sales, Labour, Assets*) but the way these allocation factors are assembled and used in the allocation process differs between the two phases. Thus the following hypothesis can be stated:

(hyp 1) *The proportion of overall group income allocated to a particular group entity i (group-to-group-entity-ratio$_{AFTER}$) by using Formulary Apportionment can only be equal to the proportion of overall group income calculated by a particular group entity i before the consolidation (group-to-group-entity-ratio$_{PRE}$) if every used apportionment factor and income producing factor respectively is uniformly distributed between group entity i and the whole group.*

## 2.3. Evidence

The hypothesis is tested with the two Apportionment Formulas serving as role models for the *CCCTB-Formula*, the Canadian Apportionment Formula and the US *Massachusetts*-Formula, starting with the Canadian Formula that contains of only two factors: *Sales (S)* and *Payroll (P)*.

(2.1)
$$\Pi^{i}_{AFTER} = \left(\frac{1}{2}\frac{S^{i}}{S^{grp}} + \frac{1}{2}\frac{P^{i}}{P^{grp}}\right) * \Pi^{grp}$$

To control for bias caused by differences in income determination procedures it is assumed that the group entity also uses only the two factors *sales* and *payroll* to produce and determine its income:

(2.2)
$$\Pi^{i}_{PRE} = S^{i} - P^{i}$$

(2.3)
$$\Pi^{grp} = S^{grp} - P^{grp}$$

Hypothesis (hyp 1) reads with respect to the Canadian Formula as follows:

(2.4)

$$\frac{S^i}{S^{grp}} = \frac{P^i}{P^{grp}}$$

Entering equations (2.1), (2.2) and (2.3) into the equilibrium condition (1.1) equals to:

(2.5)

$$\frac{S^i - P^i}{S^{grp} - P^{grp}} = \frac{(\frac{1}{2} * \frac{S^i}{S^{grp}} + \frac{1}{2} * \frac{P^i}{P^{grp}}) * (S^{grp} - P^{grp})}{S^{grp} - P^{grp}}$$

Equation (2.5) is solved as follows:

$$2 * (S^i - P^i) = \left(\frac{S^i}{S^{grp}} + \frac{P^i}{P^{grp}}\right) * (S^{grp} - P^{grp})$$

$$S^i - P^i = -\frac{S^i * P^{grp}}{S^{grp}} + \frac{P^i * S^{grp}}{P^{grp}}$$

$$S^i + P^{grp}\frac{S^i}{S^{grp}} = P^i + S^{grp}\frac{P^i}{P^{grp}}$$

$$S^i * \left(1 + \frac{P^{grp}}{S^{grp}}\right) = P^i * \left(1 + \frac{S^{grp}}{P^{grp}}\right)$$

$$\frac{S^i}{P^i} = \frac{\left(1 + \frac{S^{grp}}{P^{grp}}\right)}{\left(1 + \frac{P^{grp}}{S^{grp}}\right)}$$

$$\frac{S^i}{P^i} = \frac{S^{grp}}{P^{grp}} * \frac{\left(\frac{P^{grp}}{S^{grp}} + 1\right)}{\left(1 + \frac{P^{grp}}{S^{grp}}\right)}$$

$$\frac{S^i}{P^i} = \frac{S^{grp}}{P^{grp}}$$

$$\frac{S^i}{S^{grp}} = \frac{P^i}{P^{grp}}$$

The proof shows that equation (2.5) which represents the equilibrium condition (1.1) for the Canadian Apportionment Formula can only be solved if $\frac{S^i}{S^{grp}}$ equals $\frac{P^i}{P^{grp}}$. For the Canadian Apportionment Formula the equilibrium condition (1.1) can therefore be extended to:

(2.6)

$$\frac{\Pi^i_{PRE}}{\Pi^{grp}} = \frac{S^i - P^i}{S^{grp} - P^{grp}} = \frac{S^i}{S^{grp}} = \frac{P^i}{P^{grp}} = \frac{\Pi^i_{AFTER}}{\Pi^{grp}}$$

The second role model for the *CCCTB-Formula* is one of the first apportionment formulas that had been developed: the so called *Massachusetts-Formula*. It is used by a number of US states and it also serves as a role model to the various other formulas currently used by US states. The main difference to the Canadian Formula is the use of three factors as *Assets* (*A*) represents the third apportionment factor:

(3.1)

$$\Pi^i = \left(\frac{1}{3}\frac{S^i}{S^{grp}} + \frac{1}{3}\frac{P^i}{P^{grp}} + \frac{1}{3}\frac{A^i}{A^{grp}}\right) * \Pi^{grp}$$

Adding the factor *Assets* to the apportionment formula adds a further level of complexity to the analysis as the factor *Assets* influences the outcome of the income determination and allocation process in a twofold manner. On the one hand the factor *Assets* influences the income of the group as the cost of usage of the assets is deducted as amortization (*amo*). On the other hand the factor *Assets* influences the apportionment of the beforehand determined income as the book value of the assets at the balance sheet date is used to allocate the income to every group entity.

For the analysis of the *Massachusetts-Formula* this twofold influence of the factor *Assets* has to be taken into account on the pre-consolidation side of the equation as well as on the *Formulary Apportionment* side. On both sides of equilibrium condition (1.1) the influence of cost of usage of assets has to be added (*amo*):

(3.2)

$$\frac{S^i - P^i - \boldsymbol{amo^i}}{S^{grp} - P^{grp} - \boldsymbol{amo^{grp}}} = \frac{(\frac{1}{3} * \frac{S^i}{S^{grp}} + \frac{1}{3} * \frac{P^i}{P^{grp}} + \frac{1}{3} * \frac{\boldsymbol{A^i}}{\boldsymbol{A^{grp}}}) * (S^{grp} - P^{grp} - \boldsymbol{amo^{grp}})}{S^{grp} - P^{grp} - \boldsymbol{amo^{grp}}}$$

or

(3.3)

$$\frac{S^i - P^i - \boldsymbol{amo^i}}{S^{grp} - P^{grp} - \boldsymbol{amo^{grp}}} = \frac{1}{3} * \frac{S^i}{S^{grp}} + \frac{1}{3} * \frac{P^i}{P^{grp}} + \frac{1}{3} * \frac{\boldsymbol{A^i}}{\boldsymbol{A^{grp}}}$$

If the findings from (2.5) ($\frac{S^i}{S^{grp}} = \frac{P^i}{P^{grp}}$) are entered as a constant into (3.3) the equation finally simplifies to:

$$\frac{amo^i}{amo^{grp}} = \frac{A^i}{A^{grp}}$$

Equation (2.6) can therefore be extended to:

(3.4)

$$\frac{\Pi^i_{PRE}}{\Pi^{grp}} = \frac{S^i - P^i - \boldsymbol{amo^i}}{S^{grp} - P^{grp} - \boldsymbol{amo^{grp}}} = \frac{S^i}{S^{grp}} = \frac{P^i}{P^{grp}} = \frac{\boldsymbol{A^i}}{\boldsymbol{A^{grp}}} = \frac{\boldsymbol{amo^i}}{\boldsymbol{amo^{grp}}} = \frac{\Pi^i_{AFTER}}{\Pi^{grp}}$$

The *CCCTB-Formula* divides the factor *Labour* into two equally weighted part factors *Payroll* and *Number of Employees (NE)*. The split of the labour factor actually introduces an additional apportionment factor. This fourth apportionment factor is solely an apportionment factor and has no direct influence on the determination of income as the working papers of the WG CCCTB do not provide for specific provisions linking the deductibility of personnel costs to the numbers of employees producing these costs. Entering the *CCCTB-Formula* into the equilibrium condition (1.1) results into:

(3.5)

$$\frac{S^i - P^i - amo^i}{S^{grp} - P^{grp} - amo^{grp}} = \frac{(\frac{1}{m}\frac{S^i}{S^{grp}} + \frac{1}{n}\left(\frac{1}{2}\frac{P^i}{P^{grp}} + \frac{1}{2}\frac{\boldsymbol{NE^i}}{\boldsymbol{NE^{grp}}}\right) + \frac{1}{o}\frac{A^i}{A^{grp}}) * (S^{grp} - P^{grp} - amo^{grp})}{S^{grp} - P^{grp} - amo^{grp}}$$

or

(3.6)

$$\frac{S^i - P^i - amo^i}{S^{grp} - P^{grp} - amo^{grp}} = \frac{1}{m} * \frac{S^i}{S^{grp}} + \frac{1}{n}(\frac{1}{2}\frac{P^i}{P^{grp}} + \frac{1}{2}\frac{\boldsymbol{NE^i}}{\boldsymbol{NE^{grp}}}) + \frac{1}{o} * \frac{A^i}{A^{grp}}$$

Following the approach used to analyse the *Canadian Formula* and the *Massachusetts Formula* the equilibrium condition (1.1) could only hold true if the group-to-group-entity ratio of the factor *Numbers of Employees* also equals the group-to-group-entity ratio of every other apportionment factor:

(3.7)

$$\frac{\Pi^i_{PRE}}{\Pi^{grp}} = \frac{S^i - P^i - amo^i}{S^{grp} - P^{grp} - amo^{grp}} = \frac{S^i}{S^{grp}} = \frac{P^i}{P^{grp}} = \frac{\boldsymbol{NE^i}}{\boldsymbol{NE^{grp}}} = \frac{A^i}{A^{grp}} = \frac{amo^i}{amo^{grp}} = \frac{\Pi^i_{AFTER}}{\Pi^{grp}}$$

## 2.4. Simulation and Testing

To test the outcome of section 2.3 a number of simulations is conducted using the analysed apportionment formulas and comparing the resulting allocation to fictitiously calculated pre-consolidation earnings of the respective group entity using the same income factors and allocation factors.

### 2.4.1. The Canadian Formula

The Canadian Apportionment Formula uses only two factors and actually does not allocate income of a group of companies to the various group members but allocates corporate income to every Canadian province the company has a permanent establishment (PE) in. To simulate the effect of the Canadian Formula a company is assumed that has a PE in province A and a PE in province B. The company provides services without the use of any assets therefore its income factors contain only of *Sales* and *Payroll*.

| **Factor** | **Province A** | **Province B** | **Company** |
|---|---|---|---|
| *Sales* | 9.000 | 4.000 | 13.000 |
| *Payroll* | 6.000 | 3.000 | 9.000 |
| Pre-consolidation income | 3.000 | 1.000 | |
| Consolidated income | | | 4.000 |

If the Canadian Formula is used the company's income is allocated to the two provinces involved as follows:

$$\text{Province A:} \quad \left(\frac{1}{2} * \frac{9.000}{13.000} + \frac{1}{2} * \frac{6.000}{9.000}\right) * 4.000 \approx \mathbf{2.718}$$

$$\text{Province B:} \quad \left(\frac{1}{2} * \frac{4.000}{13.000} + \frac{1}{2} * \frac{3.000}{9.000}\right) * 4.000 \approx \mathbf{1.282}$$

The randomly chosen amounts of the income factors and apportionment factors show that the pre-consolidation income regularly does not equal the *Formulary Apportionment* results. Province B benefits from the *Formulary Apportionment* as more income is allocated to the permanent establishment located there as in the pre-consolidation situation while province A gets a smaller share of the company's income than in the pre-consolidation situation and therefore suffers a relative loss in tax revenues.

Transposing this result to the procedure of the CCCTB which does not aim to allocate corporate income to various permanent establishments of one corporation but to allocate corporate group income to various group entities leads to the finding that a corporation A would benefit from the apportionment as a part of its pre-consolidation income is allocated to a corporation B which would then be made liable for this additional tax payment.

If the income factors of the PE in both provinces are not randomly chosen but are modelled to be uniformly distributed and therefore satisfy the findings of section 2.3 of this paper no income shifting between the provinces or the entities can be observed:

| Factor | Province A | Province B | Company |
|---|---|---|---|
| *Sales* | 9.750 | 3.250 | 13.000 |
| *Payroll* | 6.750 | 2.250 | 9.000 |
| Pre-consolidation income | 3.000 | 1.000 | |
| Consolidated Income | | | 4.000 |

If the Canadian Formula is used the company's income is allocated to the two provinces as follows:

$$\text{Province A:} \quad \left(\frac{1}{2} * \frac{9.750}{13.000} + \frac{1}{2} * \frac{6.750}{9.000}\right) * 4.000 = \mathbf{3.000}$$

$$\text{Province B:} \quad \left(\frac{1}{2} * \frac{3.250}{13.000} + \frac{1}{2} * \frac{2.250}{9.000}\right) * 4.000 = \mathbf{1.000}$$

### 2.4.2. The *Massachusetts-Formula*

The US states use a variety of formulas that are all based on the *Massachusetts-Formula* and differ primarily in the weighting of the respective factors. However the most widely used formulas are the *Massachusetts-Formula* that weights every factor equally and the so called *Double-Weighted Sales Formula* that doubles the weight of the factor *Sales* relatively to the other two factors. The US *Formulary Apportionment* is similarly to the Canadian *Formulary Apportionment* used to allocate taxable income for state corporate income tax purposes to PE in different US states.

The *Massachusetts-Formula* uses three factors (*Sales*, *Payroll* and *Assets*) to allocate the income. To simulate the effect of the *Massachusetts-Formula* a company is assumed that has a PE in state A and another permanent establishment in state B. The company's income producing factors are only *Sales*, *Payroll* and *Assets*. Average amortization rates of 10% at the PE in state A and of 15% at the PE in state B are further assumed:

| Factor | State A | State B | Company |
|---|---|---|---|
| *Sales* | 9.000 | 4.000 | 13.000 |
| *Payroll* | 6.000 | 3.000 | 9.000 |
| *Assets* | 8.000 | 2.000 | 10.000 |
| *Amortization* 10% / 15% | 800 | 300 | 1.100 |
| Pre-consolidation income | 2.200 | 700 | |
| Consolidated Income | | | 2.900 |

The *Massachusetts-Formula* allocates the company's income as follows:

$$\text{State A: } \left(\frac{1}{3} * \frac{9.000}{13.000} + \frac{1}{3} * \frac{6.000}{9.000} + \frac{1}{3} * \frac{8.000}{10.000}\right) * 2.900 \approx \mathbf{2.087}$$

$$\text{State B: } \left(\frac{1}{3} * \frac{4.000}{13.000} + \frac{1}{3} * \frac{3.000}{9.000} + \frac{1}{3} * \frac{2.000}{10.000}\right) * 2.900 \approx \mathbf{813}$$

Again the randomly chosen amounts for income factors and apportionment factors show as expected that the *Formulary Apportionment* regularly does not allocate a share of the company's consolidated income that equals the respective PE's pre-consolidation share of the company's income. State B benefits from the *Formulary Apportionment* as a greater share of the company's income than the pre-consolidation income of the PE is allocated to the PE located there while state A gets a smaller share of the company's income than the pre-consolidation income of the PE and therefore suffers a relative loss in tax revenues.

To test the findings of section 2.3 of the paper with the *Massachusetts-Formula* all income producing factors and allocation factors are modeled to be uniformly distributed:

| Factor | State A | State B | Company |
|---|---|---|---|
| *Sales* | 9.862 | 3.138 | 13.000 |
| *Payroll* | 6.828 | 2.172 | 9.000 |
| *Assets* | 7.586 | 2.414 | 10.000 |
| *Amortization* 11% | 834 | 266 | 1.100 |
| Pre-consolidation income | 2.200 | 700 | |
| Consolidated income | | | 2.900 |

The *Massachusetts-Formula* allocates the company's income as follows:

$$\text{State A: } \left(\frac{1}{3} * \frac{9.862}{13.000} + \frac{1}{3} * \frac{6.828}{9.000} + \frac{1}{3} * \frac{7.586}{10.000}\right) * 2.900 = \mathbf{2.200}$$

$$\text{State B: } \left(\frac{1}{3} * \frac{3.128}{13.000} + \frac{1}{3} * \frac{2.172}{9.000} + \frac{1}{3} * \frac{2.414}{10.000}\right) * 2.900 = \mathbf{700}$$

### 2.4.3. Other Formulas used by US states

The US states use a variety of different formulas that are all based on the *Massachusetts-Formula* and differ primarily in the relative weight of each apportionment factor. For example 23 states use the *Double-Weighted Sales Formula* some states use solely the factor *Sales* (e.g. Iowa, Illinois, Nebraska); some states weight the factor *Sales* at 60% (Ohio), at 75% (Minnesota), at 80% (Oregon) or at 90% (Michigan); the other two factors are usually weighted relatively equal to each other. As these other US formulas differ only in the relative factor weights the findings of section 2.3 are also observable for these formulas:

| | **Randomly chosen** | | ***S, P, A* uniformly distributed** | | ***S,P, A, amo* uniformly distributed** | |
|---|---|---|---|---|---|---|
| **Formula** | **A** | **B** | **A** | **B** | **A** | **B** |
| *Massachusetts-Formula* (33,3% S; 33,3% P; 33,3% A) | 2.087,01 | 812,99 | 2.184,30 | 695,01 | 2.200,00 | 700,00 |
| *Double-weighted sales Formula* (50% S; 25% P; 25% A) | 2.067,18 | 832,82 | 2.184,30 | 695,01 | 2.200,00 | 700,00 |
| *Ohio-Pennsylvania-Rhode Island* (60% S; 20% P; 20% A) | 2.055,28 | 844,72 | 2.184,30 | 695,01 | 2.200,00 | 700,00 |
| *Minnesota* (75% S; 12,5% P; 12,5% A) | 2.037,44 | 862,56 | 2.184,30 | 695,01 | 2.200,00 | 700,00 |
| *Oregon* (80% S; 10% P; 10% A) | 2.031,49 | 868,51 | 2.184,30 | 695,01 | 2.200,00 | 700,00 |
| *Michigan* (90% S; 5% P; 5% A) | 2.019,59 | 880,41 | 2.184,30 | 695,01 | 2.200,00 | 700,00 |
| *Illinois-Iowa-Nebraska* (100% sales) | 2.007,69 | 892,31 | 2.184,30 | 695,01 | 2.200,00 | 700,00 |
| **Pre-consolidation Income** | **2.200,00** | **700,00** | **2.275,86** | **603,45** | **2.200,00** | **700,00** |

The mathematical evidence in section 2.3 of this paper and the simulation in section 2.4 of this paper show that the figures calculated for pre-consolidation income and for after-apportionment income will only be identical if the income determination factors used by the apportionment formula are uniformly distributed. As the characteristics of those apportionment factors are highly diverse and a uniform distribution is thus not to be expected the two phases of the income determination and allocation process will regularly produce different results. Both results seem to be justifiable as both regard the corporate group as one single economic unit: The calculation of the pre-consolidation income in this paper by definition disregards all profit or losses from intra-group trade as well as the apportioned income that is based on the pre-consolidation income of every group entity.

## 3. Analysis of the Apportionment Factors

The WP CCCTB proposes an apportionment formula using 3 apportionment factors (*Sales, Labour* and *Assets*) whereas the factor *Labour* is split into two relatively to each other equally weighted part-factors *Payroll* and *Number of Employees*. The aim of these two + two apportionment factors is to represent all phases of the profit-making process of the group of companies. The factor *Sales* therefore represents the demand side of this process while the factors *Labour* and *Assets* represent the supply side of this process. These two phases are also represented in the pre-consolidation income determination of every group entity in the form of *revenues* and *expenditures* of the respective group entity.

After section 2 of this paper showed regularly observable differences between *formulary apportionment* results and the pre-consolidation income that are effected by rather structural and conceptual differences of these two phases of the income determination and allocation procedure section 3 of the paper analyses differences in the definitions of the proposed apportionment factors compared to the respective income producing factors and show their effects on the outcome of the apportionment procedure compared to the group entity's pre-consolidation income.

### 3.1. Sales

The factor *Sales* represents on the one hand the marketing phase of the profit making process and on the other hand basically the income determination factor *revenues*. As all profits or losses of the group entities are consolidated and therefore the income from intra-group trade in goods and services are excluded from the apportionment factor *Sales* will only contain sales from trade in goods and services to buyers not part of the consolidated group (*external sales*). But not all proceeds of sales of goods and services to third-party buyers will be included in the apportionment factors *Sales*. The WP CCCTB suggests that extraordinary income should be excluded from the factor as well as revenues from passive income such as interests, dividends, deemed dividends and royalties should be excluded unless these revenues are accrued in the ordinary course of business of the respective group entity. The WP CCCTB further stresses out that these exclusions should only affect the apportionment factor and not the tax base with the effect that this extraordinary and passive income will be taxable (WP CCCTB, 2007a, point 50).

The location of the factor *Sales* is suggested as *sales by destination*. One rationale of this concept is that the destination of goods or services esp the place of consummation of the goods by the customer can hardly be influenced by the seller company. The selling company may try to relocate the destination by selling to a third party intermediary which would reduce the profit margin compared to a direct business. Therefore the factor *sales by destination* is more expensively to manipulate than the factor *sales by origin* which could easily be

manipulated by the group of companies by establishing warehouse companies in favourable (low tax) countries. A second rationale of this concept is that the *marketing-state* which enables supply and demand to come together is provided with tax revenues in exchange for the cost of providing markets and infrastructure to the seller and the buyer (Oestreicher, 2000, p 155). Assuming that the sales will regularly exceed the costs of production (represented by the factors *Labour* and *Assets*) the destination-based sales-factor will regularly apportion a greater share of the taxable income to the *marketing-state* than to the *production-state*.

The concept of *sales by destination* causes the need to determine that very destination. A pure concept of *sales by destination* would lead to an allocation of a share of the group's taxable income to any member state in which the group has sold one product or in which the group has provided one service. This would without much doubt lead to an increase in the group's compliance costs and in certain situations to an increase in the group's overall tax burden. Therefore the WP CCCTB suggests allocating taxable income to any given member state only if the group of companies has a qualitative economic relation (*Nexus*) to that member state. To establish *Nexus* it is necessary according to the WP CCCTB to have a physical presence (WP CCCTB, 2007a, point 61) in that very state which means that the traditional concept of permanent establishment and its shortcomings is prolonged by the CCCTB and the concept of *sales by destination* is only implemented to a certain degree. Sales to a buyer located in a state where *Nexus* is not established will be allocated to all group entities according to the so called *spread throw-back rule* (WP CCCTB, 2007a, point 58) which implicitly gives the other two apportionment factors a higher weighting.

The WP CCCTB aims at making the apportionment factor *Sales* as little manipulable as possible. This aim is pursued by excluding proceeds from passive income whose underlying assets could easily be transferred to other group entities and this aim is pursued by proposing the *sales by destination* concept. However the proposed *Nexus*-requirements still allow the group of companies to manipulate its overall tax liability by choosing to establish *Nexus* or not. Not-establishing *Nexus* in a high tax country will lead to an apportionment of all proceeds from this country to the whole group and to a taxation of those proceeds at the effective (average) group tax rate.

### 3.2. Labour

The factor *Labour* representing inter alia the supply side of the profit making process is suggested to be split into two part-factors *Payroll* and *Number of Employees*. The split is justified by the WP CCCTB with the different wage levels throughout the European Union especially between the western European member states (EU-15) and the central and eastern European member states (EU-12) (WP CCCTB, 2007c, point 16). The higher wage

levels and higher ancillary labour costs in the EU-15 would apportion a greater part of the group's tax base to the EU-15 which may not always correspond with the value created in these member states. Thus it is seen necessary to relativise the *Payroll* costs by the *Number of Employees* producing these costs.

### 3.2.1. Payroll

The factor *Payroll* is relatively straightforward defined as it is suggested that the apportionment factor *Payroll* should be equal to the remuneration that is taken into account as a deductible expense for the purpose of calculating the tax base, including fringe benefits, social contributions, etc (WP CCCTB, 2007a, point 25), which should make the calculation of the apportionment factor *Payroll* relatively easy. However regarding the definition of the factor *Payroll* two issues arise: The location of the factor *Payroll* and the definition of '*employee*' are critical. Usually the employee will render services at the same place where the group entity that registered this employee on its payroll is located. So therefore the corporation paying the wage will also be the corporation that benefits from the work of the employee and therefore it is reasonable to allocate taxable income to that corporation. However it is possible that a corporation has an employee on its payroll but the employee provides services to a different group entity. The group could for example use a special purpose corporation in a low tax country that registers all employees of the group on its payroll to artificially shift portions of the tax base to this low tax country by shifting the *Payroll*-factor to this low tax country. To hinder such artificial factor shifting it is suggested that the factor *Payroll* contains only the wages paid to employees that actually perform services for or to the respective group entity regardless which group entity actually registered the employee on its payroll.

The second issue is the definition of *'employee'*. The WP CCCTB does not provide one harmonised definition of employee but instead proposes that the definition of employee should be based on the domestic legislation of the member state in which the employee performs its services (WP CCCTB, 2007a, point 22). The WP CCCTB further suggests a system of mutual recognition of the various employee definitions by the other member states involved. The definition of a 'typical' employee will regularly not differ heavily from one member state to the other but on the edges of this definition where directors or (in)dependent contractors are concerned these definitions may vary from member state to member state. In the U.S. on the contrary the harmonised definition of *employee* for tax purposes is seen as a major advantage (Hellerstein and McLure, 2004).

### 3.2.2. Number of Employees

With the part-factor *Number of Employees* the WP CCCTB proposes an apportionment factor that has no direct influence in the calculation of the pre-consolidation income of the group entity or the consolidated group income nor is it part of any apportionment formulas currently

employed worldwide. The implementation of this part-factor *Number of Employees* seems at a first glance reasonable and justifiable as it should help to even the influences of the different wage levels in the various member states on the apportionment results. By drawing this direct relation between *Payroll* and *Number of Employees* it is assumed that a high amount of payroll combined with a relatively small number of employees shows a lower degree of productivity whereas a small amount of payroll combined with a relatively high number of employees shows a higher degree of productivity. The lower degree of productivity therefore justifies allocating a smaller amount of tax base to the situs state whereas as a higher degree of productivity justifies the opposite. But a higher amount of *Payroll* combined with a small *Number of Employees* could also mean that the services the employees perform demand a higher degree of education and knowledge and therefore higher wages are justifiable. Therefore the part-factor *Number of Employees* seems to result in reasonable allocations only if any unit of labour has the same effect on the value of the corporate group what may not always be the case. However the mere existence of the part-factor *Number of Employees* will lead to a taxable income apportioned differntly than the pre-consolidation income of the group entity as the part-factor NE is not directly represented in the income calculation process (Agúndez-Garcia, 2006).

### 3.3. Assets

The WP CCCTB proposes that for practicability, simplicity and manipulability reasons only fixed tangible assets (Property, Plant and Equipment – PPE) should be taken into account for calculating the apportionment factor *Assets* (WP CCCTB, 2007a, point 30). Financial assets and current assets are excluded because of their mobility which could easily be used by the group to manipulate its tax liability by factor shifting. The exclusion of intangible assets (patents, trademarks, etc) is primarily justified by the difficult valuation of intangible assets especially of self-generated intangible assets. This argumentation does only hold true with respect to self-generated intangible assets while acquired intangible assets can easily be valued with their historical cost or their historical cost less amortisation (book value) as it is proposed for PPE. Additionally the WP CCCTB mentions that self-generated intangible assets are already included indirectly in the apportionment formula by the other factors (WP CCCTB, 2007a, point 34); in the factors *Payroll* and *Number of Employees* through the employees (researchers and developers) producing the intangible assets and in the factor *Sales* through the goods sold that were produced with the intangible assets. This argument is basically correct but it is not an argument for the exclusion of intangible assets exclusively as also self-generated fixed tangible assets and self-generated current assets are represented in the apportionment formula by the other two factors. Based on this argument it would be

justifiable to exclude all self-generated assets regardless whether they are fixed or current, tangible or intangible and not only self-generated intangible fixed assets.

Apart from the question which categories of assets may be included the WP CCCTB suggests as regards to valuation using the "tax written down value" (historical cost less amortisation) of the assets (WP CCCTB, 2007a, point 36) at the balance sheet date. However to hinder arbitrary factor shifting shortly before the balance sheet date the WP CCCTB also discusses to use an average of the tax written down value at the actual balance sheet date and the previous balance sheet date.

The respective asset is suggested to be located for purposes of the apportionment factor not at the legal owner but at the group entity which effectively uses the asset. Intra-group rented/leased assets will therefore be located at the lessee. For rented or leased assets from a lessor or to a lessee outside the group it is suggested to include the asset in both the lessor's and the lessee's apportionment factor as both use the asset to generate taxable income. At the level of the lessor it should be included with the tax written down value. And at the level of the lessee the asset is suggested to be included at eight times the annual lease. Using eight times the annual lease as a value for leased assets is justified by the WP CCCTB by the current practise in the U.S. This seems rather unsubstantiated especially as this method is highly criticised in U.S. tax literature (McLure 2002; Hellerstein and McLure, 2004).

As intra-group transfers of assets will be consolidated transferring written-down assets into low tax countries prior to the disposal of the assets can be used to shift the *Asset*-factor and with it the taxation of the capital gains into that country. To hinder such arbitrary factor-shifting it is suggested to either include the asset sold in the factor of the group-entity that has used it primarily over the asset's useful life or to impose a holding-period of one year before the asset is included at the apportionment factor *assets* of the selling group entity (WP CCCTB, 2007a, point 41).

### 3.4. Concluding Remarks

The proposed definitions of the two plus two factors are obviously influenced by the WP CCCTB's aim of making the result of the apportionment as little manipulable as possible by the corporate group. Therefore it is seen necessary to exclude certain components of the underlying income producing factors in defining the respective apportionment factor. The apportionment factor *Sales* contains only of ordinary sales and active sales. However the taxable income contains also of sales derived from extraordinary business and also of passive income. Therefore the group entity earning the passive or extraordinary income and benefitting from its positive cash flow is not taxed with the full amount of this passive or extraordinary income but the passive or extraordinary income is allocated for tax purposes to

every group entity. With the passive income closely connected are the assets generating these revenues; basically financial assets and fixed intangible assets. These components of an *Assets* factor in its broader sense are also excluded from the apportionment factor *Assets* for anti-manipulation reasons. Therefore the income producing financial assets and/or intangible assets will not be included in the apportionment factor *Assets* of the group entity owning the financial assets and/or intangible assets that also earns the passive income and benefits from the positive cash flow. Not only that the passive income is not part of the apportionment factor *Sales* the assets producing the passive income are also not part of the apportionment factor *Assets*. A group entity that has passive income from financial assets or intangible assets will only be taxable with this income in the relation of its *Payroll* and *Number of Employees* relative to the corporate group's *Payroll* and *Number of Employees*. Other income producing factors used to determine a group entity's pre-consolidation income and the Common Consolidated Corporate Tax Base of the group such as depreciation, consumption of raw materials or consumption of inventory and stock are also excluded from the apportionment formula.

As the apportionment formula does on the one hand not include every income producing factor but only represents some components of the income producing process and on the other hand includes a figure that is not directly represented in the income determination of the group and the respective group entity the apportionment formula may lead to apportionment results that do not equal the respective group entity's pre-consolidation income. The exclusion of certain components of the factor *Sales* as well as of the factor *Assets* leads to an allocation of the taxable income derived from those sales and produced with those assets to all members of the corporate group regardless whether the actual cash-flow from this revenues is allocated to the whole group or not. Thus one group entity probably pays taxes for income it did not realise while another group entity realizes income without being taxed.

### 3.5. Simulation

The income calculation proposed by the WP CCCTB is based upon the pre-consolidation income of each member of the corporate group. At first each group entity separately calculates its income based on its financial accounting by adjusting the financial accounting income to the provisions of the CCCTB. This preliminary taxable income of the group entity may then be corrected to eliminate the income derived from intra-group trade ("push-down accounting") to form a (semi-)separately accounted pre-consolidation income of every member of the CCCTB-group. These (semi-)separately accounted pre-consolidation profits or losses of every group entity will then be consolidated to form the Common Consolidated

Corporate Tax Base of the group which will in a last step be allocated to the group entities using the apportionment formula.

To demonstrate the differences between the pre-consolidation income of a given group entity and the allocated share of the group's tax base resulting from the formulary apportionment a brief simulation using a corporate group established by two corporations is conducted. It is assumed that all revenues and expenditures from intra-group trade in goods and services have already been considered and eliminated at the level of each group entity. Thus only revenues and expenditures from trade with external partners remain. It is further assumed that both the parent and the subsidiary produce a positive pre-consolidation income so that the results are not influenced by an intra-group loss offset:

**Income Producing Factors**

| | Parent | Subsidiary | Group |
|---|---|---|---|
| Assets | | | |
| Fixed tangible (useful life: 20 Y) | 2.000 | 2.000 | 4.000 |
| Fixed intagible (useful life: 25 Y) | 3.500 | 0 | 3.500 |
| Financial Assets | 450 | 0 | 450 |
| Sales | | | |
| Sales (active) | 300 | 600 | 900 |
| Sales (passiv) | 300 | 0 | 300 |
| Labour | | | |
| Payroll | 100 | 200 | 300 |
| Number of Employees | 5 | 12 | 17 |
| Miscellaneous | | | |
| Leasing Cost | 0 | 8 | 8 |
| Consumption of comodity | 100 | 200 | 300 |

These income producing factors are used to calculate the following pre-consolidation earnings of the two group entities:

**Pre-consolidation income**

| | Parent | Subsidiary | Group |
|---|---|---|---|
| **Revenues** | | | |
| Sales (active) | 300 | 600 | 900 |
| Sales (passiv) | 300 | 0 | 300 |
| ∑ Revenues | 600 | 600 | 1.200 |
| **Expenditures** | | | |
| Amortisation (fixed tangible) | 100 | 100 | 200 |
| Amortisation (fixed intangible) | 140 | 0 | 140 |
| Amortisation (Financial) | 0 | 0 | 0 |
| Leasing Cost | 0 | 8 | 8 |
| Consumption of comodity | 100 | 200 | 300 |
| Payroll | 100 | 200 | 300 |
| ∑ Expenditures | 440 | 508 | 948 |
| **pre-consolidation income** (absolute) | **160** | **92** | **252** |
| **pre-consolidation income** (in %) | **63,49%** | **36,51%** | **100%** |

These pre-consolidation earnings are then consolidated to form the CCCTB (also presented in the table) which is then apportioned by using the proposed components of the income producing factors:

**Formulary Apportionment**

| | Parent | Subsidiary | Group |
|---|---|---|---|
| **Apportionment Factors** | | | |
| Sales | | | |
| Sales (active) | 300 | 600 | 900 |
| Labour | | | |
| Payroll | 100 | 200 | 300 |
| Number of Employees | 5 | 12 | 17 |
| Assets | | | |
| Fixed tangible assets[2] | 1.900 | 1.900 | 3.800 |
| Leasing (8 x annual lease) | 0 | 64 | 64 |
| **Apportionment Relation**[3] | **37,96%** | **62,04%** | **100%** |
| **Tax Base** (absolute) | **95,66** | **156,34** | **252** |

If these income factors are used to allocate the group income by using the proposed apportionment procedure and apportionment factors the group income will be allocated as expected to each group entity in a different relation. As the proposed apportionment factors exclude certain types of income producing factors the income derived from these factors is taxable according to the relations of the other factors and is thus allocated for tax purposes to every group member. In the example a smaller share of the group income than the pre-consolidation income is apportioned to the parent company for tax purposes while the subsidiary's taxable share of the group income is higher than its pre-consolidation income.

## 4. Summary and Discussion

The findings in section 2 of this paper show that under the assumption that every apportionment factor and the respective income producing factor are identically defined the pre-consolidation income of any given member of the corporate group will only under very specific circumstances equal the results of the *Formulary Apportionment* of the consolidated group income. The *Apportionment Formula* can only allocate a share of the consolidated group income to the group entity that equals the group entity's pre-consolidation income if all used apportionment factors are uniformly distributed between the group entity and the corporate group. Such a uniform distribution of income factors that are used as allocation factors will probably not be observable in reality. The reasons for these different results can

[2] The fixed assets are valued at the book value at the balance sheet date.
[3] The apportionment factors are weighted relatively equal with 1/3 each.

be found in the specifics of the apportionment procedure: The Apportionment Formula uses a different arithmetical combination of the apportionment factors than the calculation of the pre-consolidation income. This different arithmetical combination takes place regardless of the outcome of the economic combination of the related income producing factors by the respective group entity.

While section 2 of the paper assumes that the income producing factors and the income allocation factors are identically defined, section 3 of the paper takes the actual definitions proposed by the WP CCCTB in consideration. In an attempt of making the income allocation as little exposed to artificial manipulations by the corporate group as possible certain components of the income producing factors are not represented in the definitions of the related apportionment factors. This incompleteness of the apportionment factors leads to an allocation of the income derived from the excluded components according to the included components of the income producing factor. The group entities concerned will regularly get a share of the group's consolidated tax base allocated that does not equal the pre-consolidation income it has calculated (semi-)separately before. The amount of this allocated share of the group's tax base can regardless of the group entity's profitability be higher or lower than the entity's pre-consolidation income which could lead to an over or an under taxation of that particular group entity. The *Apportionment Formula* will thus also allocate a share of the taxable group income to the group entity even if the (semi-)separately calculated pre-consolidation income is negative which may cause a substantial decrease in liquidity of the group entity. Considering the matter of fact that each group entity will remain its separate legal entity with all the associated legal rights and duties *Formulary Apportionment* potentially leads without the existence of an intra-group compensation system to unremunerated transfers of liquidity and assets from one group entity to another. However for the WG CCCTB there seems to be no need for an intra-group compensation system "*as a group member receives a share in all the profits and all the losses of the group. All the group members receive reciprocal advantages and disadvantages*" (WP CCCTB 2007b, in footnote 30).

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