

University of Miskolc  
Faculty of Economics  
Doctoral School of Enterprise Theory and Practice

THESIS OF PH.D. DISSERTATION

ZSÓFIA TÓTH

## **An Expected Tax Reform**

*Micro level analysis of the effects of the corporate tax base division's alternative model in Europe*

Head of the Doctoral School:  
Prof. Dr. Balaton Károly  
University Professor

Doctoral Supervisor:  
Dr. Pál Tibor CSc  
Associate Professor



Miskolc, 2014.

## Table of Content

1. Introduction.....	2
2. Purpose of the research .....	3
3. Methodology of the research .....	4
4. New research results .....	5
4.1. Theoretical framework of the research .....	5
4.1.1. Critical review of the international income allocation.....	5
4.1.2. The model of the formulary apportionment.....	7
4.2. Income tax effect of the formulary apportionment .....	8
4.2.1. Changes in the effective tax rate .....	10
4.2.2. Changes in the tax base distribution .....	15
5. Possible application of the research results .....	23
6. Future research objectives.....	23
7. Bibliography .....	25
8. Author's publications.....	28

# 1. Introduction

The development of the international business environment and the establishment of the related modern form of multinational enterprise significantly reshaped the tax policy structures of the countries in the 20<sup>th</sup> century, resulting in new issues which are not solved of still as of today.

According to the researches in the history of economics the influential European powers were exporting capital to their colonies overseas already in the 16<sup>th</sup> and 17<sup>th</sup> centuries. The investors located in the home country were lending and capitalizing corporations of the colonies and they were purchasing tangible and intangible assets in the colonies. Based on the international investor schemes of the 18<sup>th</sup> and 19<sup>th</sup> centuries, the European entrepreneurs were heading to Latin-America, Asia or Africa to establish corporations by themselves. In these cases, the foreign capital was flowing to the host countries in a way that there were no corporate and strategic dependencies to the home country, essentially, no foreign parent companies were setting up with certain exceptions (Vernon, 1972, pp. 201-202; Vernon, 2001, pp. 509-518). The traditional theories of the economic policies which were emerging to assist the free trade in line with the Western European and North American social developments of the 18<sup>th</sup> and 19<sup>th</sup> centuries were based on the assumption that the market participants are individual and independent entities not only in a legal sense, but also from an economic point of view (Deák, 1995, p. 1).

However, the technological developments of the 20<sup>th</sup> century significantly reshaped the weak relationship between the countries exporting and importing the capital, as the obstacles due to the immense geographic distances were diminishing, and the investor was able to direct and control its investments also from the home country. The time and the cost of the personal communication with the foreign enterprises were decreasing significantly, therefore, the intra-company strategic cooperation and control could emerge (Vernon, 1968, p. 114) resulting of the development of the intra-company transactions. Due to such progress, the owner and the user of the capital were coming apart in a geographic sense, and as a result, the economic and financial identity of the corporations were becoming undisclosed.

The expansion of the multinational corporations in the 20<sup>th</sup> century was significantly increasing the interrelation of the nation states and was decreasing the sovereignty of the national tax policies (Eden, 1998, p. 69). The trade liberalization and the cancellation of the foreign exchange controls were supporting the internationalization of the business activities and the emerging of the multinational corporations was highlighting the tax issues deriving from the international investments (Organization for Economic Co-operation and Development<sup>1</sup>, 1979, Article 7). In line with the rise of economic power of the multinational corporations the governments were facing with increasing budgetary restraints, and as a consequence of that, the tax position of the multinational corporations were drawing increasing attention, focusing on the question whether they contribute to the state budget proportionately to their economic power (Owens, 2013, p. 2).

---

<sup>1</sup> Hereinafter: OECD.

The increasing numbers of mergers and acquisitions of the multinational corporations experienced since the early nineties, the explosion of the electronic commerce and the expanding integration processes<sup>2</sup> of the global economy were highlighting more the already existing issues (European Commission, 2001, p. 6).

However, the regulatory environment of the taxation of income deriving from the international business activities has not been able to adapt to these changes so far (OECD, 2013, p. 28). As a result of the business schemes mentioned before, 70 percent of the world trade is coming from the intra-company transactions of the multinational corporations today. Notwithstanding to this, the current tax policy principles are not aligning to the changing business environments and as a result, are not able to provide a stable economic environment to the corporations affected and to the nation states. As per empirical researches, the most significant tax issue of the multinational corporations today is the treatment of the income arising from intra-company transactions (Ernst&Young LLP, 2010, p. 7).

## 2. Purpose of the research

With this current research, I purpose to contribute to the modelling work related to the taxation of intra-company transactions and to distribute such methodology within Hungary and the European Union. In the dissertation I map out the tax environment of the intra-company transactions, I present the currently effective tax policy principle and its alternative model coming into focus in the recent years: the formulary apportionment. *Within the doctoral research, I analyze the tax issues deriving from the intra-company transactions and the alternative income tax model reacting to this. Under my empirical research, I aim to prove that alternative model mentioned before may develop the regulatory environment of the international distribution of income tax.* The relevance of the topic researched is also supported by the fact that the European corporate income tax policy harmonization efforts are aiming transparently the introduction of this alternative model in the European Union<sup>3</sup> and besides this there are increasing tax policy initiatives in the overseas as well (Clausing and Avi-Yonah, 2008, pp. 319-344; Martens-Weiner, 2009, pp. 103-107).

Based on literature review related to the current research, I aim to prove that there is a necessity for an alternative income tax model in the present economic environment (section 2 of the dissertation). In addition, I present the formulary apportionment model from a theoretical and practical points of views based on the critical analysis of further related literatures (section 3 of the dissertation). Moreover, based on empirical research, I investigate what effects the formulary apportionment model and its introduction to the European Union would have to the income tax burden of the multinational corporations and how those could contribute to the treatment of the weaknesses (under taxation and double taxation) of the current regulatory environment (section 4 of the dissertation). In the final section of the dissertation (section 5) I summarize the results and thesis of the research and I map out the possible future research directions of the topic.

---

<sup>2</sup> Canada, the United States and Mexico established the North American Free Trade Agreement in 1994. In 1993, the internal market of the European Union was set up and in 2002 the euro was introduced.

<sup>3</sup> The European Commission published the related proposal in 2011: "Proposal for a Council Directive on a Common Consolidated Corporate Tax Base, COM (2011) 121/4".

### 3. Methodology of the research

The research is based on the review, study and critical analysis of the related literature and empirical data.

Under the sections referring to the literatures, I study the related economics and multidisciplinary definitions and summarize the findings of the previous works done in this field available in English mainly. Based on the literature studied and analyzed, I defined thesis of the dissertation.

Under the empirical research, I was reviewing the financial and accounting data of about 4.000 European corporations published in the Orbis database between April 2013 and June 2013 by Bureau van Dijk. In this section, I was modeling the income taxation of such corporations with the help of the econometrics applications, such as standardization, modeling of weighted distribution and modeling of simple and multiple linear regressions.

The structure of the research is presented on figure 1. The colored sections of the chart are representing the sections which are leading to the thesis defined by the dissertation. The sections indicated by yellow background (section 2 and section 3 of the dissertation) point out to the thesis defined based on literature review, the section indicated by blue background (section 4) points out to the thesis defined based on the empirical research.

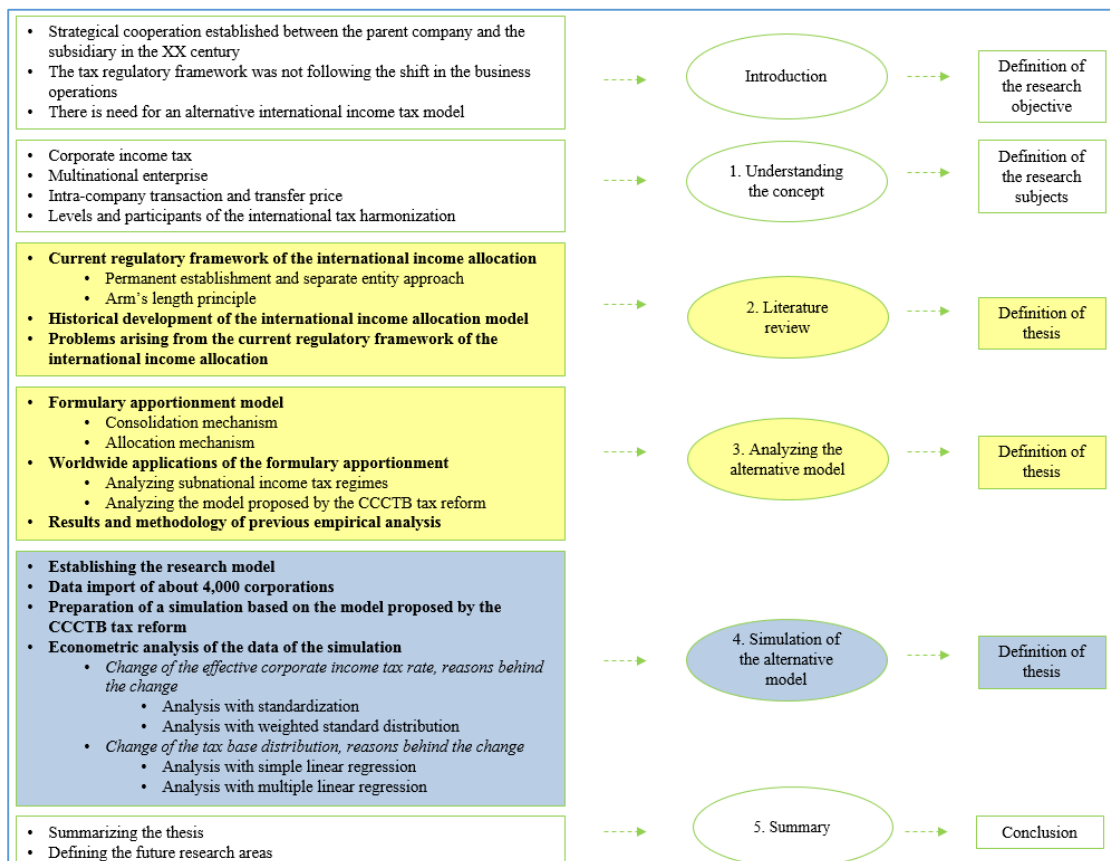


Figure 1. Structure of the research  
Source: author's own elaboration

## **4. New research results**

### **4.1. Theoretical framework of the research**

The current regulatory framework of the international income distribution allocates the income of the corporation to those source countries where the corporation operates a fixed place of business, the taxable income attached to these places is derived from the financial statement of the operation itself (separate entity view) (Musgrave, 1972, p. 398-401). However, the income calculated from the separate and fixed places of business may include artificial revenues and expenses due to such transfer prices which are intentionally or unintentionally different from the fair market values.

In 1933 the League of Nations proposed to introduce the arm's length principle to handle this issue (Carroll, 1933). The definition of the arm's length price was not modified substantially in the last decades<sup>4</sup>, the current interpretation of the OECD's model convention the arm's length price is the price which would be made between independent enterprises in comparable transactions and in comparable circumstances (OECD, 2010b, Article 9.1.). Regardless to the income determined by the national accounting principles, under the arm's length principle the intra-company transactions shall be viewed as transactions made between independent entities and if there is any price difference (and as such, profit difference) between the two, the income determined based on the arm's length price shall provide the income tax base. Based on this separate and occasionally adjusted income, the multinational corporation determines the taxable income allocated to the different source countries.

#### **4.1.1. Critical review of the international income allocation**

The most substantial critique of the current international income allocation model is the loophole to the tax avoidance, i.e. the under taxation. Earlier empirical researches prepared in relation to the topic of tax avoidance were analyzing the correlation between the rate of tax burden and the volume of the allocated income, which means those were comparing the corporate income tax rate applied to the accounting profit of the subsidiaries allocated to the given country.

For example, Hines and Rice (1994, pp. 149-182) was proving that any 1 percent increase of the corporate income tax rate results in a decrease of 2,3 percent of corporation's profit before tax allocated to the given country. Grubert and Mutti (1991, pp. 285-293), Huizinga and Laeven (2008, pp. 1164-1182) and Weichenrieder (2009) were finding similar results. Furthermore, based on European data, Bartelsman and Beetsma (2003, pp. 2225-2252) proved that with the increase of the corporate income tax rates, the income tax revenue of the countries are not increasing simultaneously, because the volume of income allocated to those countries are decreasing. Grubert (2003, pp. 221-242) was applying another type of indirect method and analyzing American multinational corporations he found that in the case of corporate groups which are present in high tax and low tax countries at the same time, the intra-company transactions are more frequent. In addition, regarding the United States, Clausing (2006, pp. 269-287) proved that any 1 percent decrease of a corporate income tax rate of a foreign country results in an increase of 1,9 percent increase of the volume of the intra-company transactions heading to that foreign country. Clausing

---

<sup>4</sup> The work of the League of Nations was later overtaken by the OEEC and the OECD, which organizations have also agreed on the application of the international income allocation model based on the arm's length principle.

(2006, pp. 703-725) and Avi-Yonah (2009) were proving the existence of tax avoidance with the fact that the foreign source profit of multinational corporations headquartered in the United States and the number of employees working in the same foreign country are significantly different.

Besides the problem of tax avoidance, the other issue is related to the double taxation of the income. First, double taxation may result from the case when the intra-company transactions are crossing such sovereign tax regimes which are not agreeing on the arm's length price and therefore on the volume of the taxable income deriving from these transactions. The European Commission's impact assessment (2011a) states that 42 percent of the related tax audits was resulting in the double taxation of the income.

The other side of the over taxation is hurting those multinational corporations, which are loss-making from a consolidated point of view, however, whose certain foreign subsidiaries are profit making (as regards the taxable income). Under the current regulatory framework the negative income tax base (tax loss) of certain members of the multinational corporation may not be consolidated for income tax purposes, which means that income tax liability may incur on the level of a given subsidiary even though the multinational corporation is loss-making from a consolidated point of view. This methodology is confronting with an important tax policy principle defined by Smith (namely the principle of tax liquidity) which says that the tax payment liability shall be established in such a point of time when the assets are available (Heller, 1943, pp. 139-144). A multinational corporation in a consolidated loss position should primarily use the liquid assets of the profit-making subsidiaries to the financing of the loss-making subsidiaries, instead of paying for the tax liabilities.

Third, the tax administration obligations related to the international income allocation provide a heavy burden for the corporate groups and for the tax authorities as well. In the most developed and developing countries, the corporations incurring intra-company transactions have substantial documentation liability regarding the volume of the arm's length price. Empirical analysis are proving that such liability is providing for the 80 percent of the administrative cost increase of the cross-border expansion and that 81,9 percent of the large companies are facing serious issues due to the tax liabilities related to the arm's length principle (European Commission, 2004). A further problem is related to the fact that the conditions of the comparable transactions needed for the calculation of the arm's length price are not publicly available in several cases (McLure, 2008, p. 158). At the same time, the tax authority can acquire such information qualifying for tax secret which may be used to determine the related arm's length price. This information asymmetry may result in a disproportional situation for the corporation incurring the intra-company transaction and the tax authority (Hamaekers, 2001, p. 36). Lastly, the corporations have significant difficulties as the accurate volume of the arm's length price is usually not predictable which may result in an uncertain tax environment (Christensen, 1996, p. 1157; Eden, 1998, p. 31).

Based on the literature review, I defined the thesis below:

T1: The international corporate income tax model is not adequate for the conditions of the current economic environment because it may result in the under taxation and double taxation of the income and it may cause high tax administration cost, information asymmetry and uncertain tax environment.

#### 4.1.2. The model of the formulary apportionment

Summarizing the above consequences, I turned my attention to the in-depth analysis of the alternative of the current income allocation model.

The other perspective of the international income allocation views the income of the corporation on a consolidated basis and disregards the analysis of the structure of the corporation. First the model defines the profit-making activity, then identifies the source countries where the corporation runs such profit-making activity and later allocates the proper volume of the taxable income linked to the source countries based on an allocation formula (Musgrave, 1972, p. 398; Musgrave, 1995, p. 56). This perspective is defined as formulary apportionment.

Currently, both the OECD and the United Nations reject the international application of the formulary apportionment, however, the introduction of the alternative model has been discussed regarding several sub regional territories, the model was previously reviewed regarding the former Soviet Union (McLure, Martinez-Vasquez and Wallace, 1995, pp. 281–319), North America (Canada, the United States and Mexico) and the European Union (McLure, 1989, pp. 39–51). Therefore, in order to provide an in-depth analysis of the model I was searching for intra-national applications and in the dissertation I was reviewing the formulary apportionment models applied by subnational income tax regimes (Musgrave, 1995, p. 66).

Based on the critical review of tax history documents, tax policy assessments and related tax legislations, I compared the local income allocation models of the United States (state income taxation), Canada (provincial income taxation), Switzerland (cantonal income taxation) and Hungary (local business taxation) to the model proposed by the European Commission in 2011. In the table below, I summarized the similarities and differences of the models mentioned before:

Factors determining the income allocation	United States states	Canada provinces	Switzerland cantons	Hungary municipalities	CCCTB <sup>5</sup> EU member states
<i>1. Sales revenue</i>					
Application	yes	yes	manufacturing: no / commerce: yes	no	yes
Weights	varying between 1/3 and 3/3	1/2	3/3	not applied	1/3
Allocation	place of destination	place of destination	place of origin	not applied	place of destination
<i>2. Fixed assets</i>					
Application	yes	no	manufacturing: yes/ commerce: no	yes	yes
Weights	varying between 1/3 and 0	not applied	not applied	1/2	1/3
Valuation	on historical cost	not applied	on historical cost	on depreciation cost	on net value
<i>3. Workforce</i>					
Application	yes	yes	manufacturing: yes/ commerce: no	yes	yes
Weights	varying between 1/3 and 0	1/2	not applied	1/2	1/3
Valuation	payroll cost	payroll cost	10% of payroll cost	payroll cost	payroll cost and number of employees

Table 1: Main characteristics of the subnational and the European formulary apportionment models

Source: author's own elaboration

<sup>5</sup> Based on the proposal for a Council Directive on a Common Consolidated Corporate Tax Base, COM (2011) 121/4. Hereinafter: CCCTB.



Based on the critical review of the subnational tax regimes, I defined the thesis below:

T2: In the case of regional economic integrations, alternative model may be applied for the taxation of income arising from the business operations crossing sovereign income tax regimes.

## 4.2. Income tax effect of the formulary apportionment

### *Methodology and dataset analyzed*

Regarding the American economy, Sheffrin and Fulcher (1984, pp. 192-213), Shackelford and Slemrod (1998, pp. 41-59), and Clausing and Lahav (2011, pp. 97-105) were researching the corporate income tax effect of the unilateral introduction of the formulary apportionment.

The announcement of the income tax reform published under the proposal directive of the European Commission mentioned before drew attention to the European economy as a primer subject of the researches related to the formulary apportionment. Fuest, Hemmelgarn and Ramb (2006, pp. 605-626), later Devereux and Loretz (2008), Cline et al. (Ernst&Young LLP, 2011) and Oestreicher and Koch (2011, pp. 64-102) were analyzing the changes in the tax revenue and the macro economical indexes (number of jobs, GDP, FDI) of the member states. Applying somewhat diverse methodologies, the researches mentioned before were determining the expected winner and loser member states of the proposed income tax reform inconsistently, however, were not defining the tax burden changes of the corporations.

The empirical data related to the income taxation of multinational corporations are usually covered in the tax returns and qualify for undisclosed information, in most of the developed countries tax legislations are protecting them.<sup>6</sup> Therefore, similar to previous empirical researches conducted in this topic, I could rely on the published accounting information for the analysis.

Shackelford and Slemrod (1998), and later Devereux and Loretz (2008) were estimating the income tax base grossing up the income tax liability published in the financial statements. Under this step, they were dividing the tax liability by the nominal (published in the tax legislations) income tax rate. Contrary to this methodology, Sheffrin and Fulcher (1984), Fuest, Hemmelgarn and Ramb (2006) and Oestreicher és Koch (2011) were defining the tax base as the book value of the profit or as the adjusted volume of the profit before tax.

In my point of view, the best methodology to estimate the real value of the income tax base is the one which was applied by Shackelford and Slemrod (1998), and Devereux and Loretz (2008), therefore, in this current research I determine the effective corporate income tax burden estimated under the application of the formulary apportionment as follows:

First of all, I determined the income tax base of group member  $i$  for 2011 ( $\pi_i^{ALS}$ ):

---

<sup>6</sup> The Hungarian accounting regulation provides for the publication of the income tax base in the explanatory notes, however, analyzing international issues, the information regarding a Hungarian member of a multinational corporation cannot be interpreted in itself.

$$\pi_i^{ALS} = \begin{cases} \frac{TAX_i^{ALS}}{T_i} & \text{if } TAX_i \geq 0 \\ \frac{TAX_i^{ALS}}{T_i} & \text{if } TAX_i < 0 \\ PBT_i & \text{if } TAX_i = n. a. \end{cases}$$

where TAX represents the income tax liability, T represents the effective income tax rate of the member state, ALS represent the current regulatory framework – based on the notion *Arm's Length Standard*, and PBT represents the profit before tax.

Equation 1. Estimate of the income tax base for 2011

Source: author's own elaboration based on Deveraux and Loretz (2008)

Further, I calculated the consolidated tax burden for 2011 for all the group members involved in the consolidation:

$$\alpha^{ALS} = \frac{\sum_{i=1}^n TAX_i^{ALS}}{\sum_{i=1}^n \pi_i^{ALS} \text{ if } \pi_i^{ALS} \geq 0}$$

Equation 2. Estimate of the income tax burden (%) for 2011

Source: author's own elaboration

As a next step, I combined the income tax bases of the group members  $\pi_i^{ALS}$  and calculated the consolidated value of the income tax base:

$$\pi_{EU}^{ALS} = \sum_{i=1}^n \pi_i^{ALS}$$

Equation 3. Estimate of the consolidated income tax base

Source: author's own elaboration

Subsequently, I calculated the part of the consolidated income tax base allocated to EU member state  $m$  in case the formulary apportionment model of the CCCTB proposal would be introduced:

$$\omega^m = \frac{1}{3} \times \left( \frac{1}{2} \times \frac{\text{payroll cost}^m}{\sum_{i=1}^n \text{payroll cost}} + \frac{1}{2} \times \frac{\text{employees}^m}{\sum_{i=1}^n \text{employees}} \right) + \frac{1}{3} \times \frac{\text{fixed assets}^m}{\sum_{i=1}^n \text{fixed assets}} + \frac{1}{3} \times \frac{\text{sales revenue}^m}{\sum_{i=1}^n \text{sales revenue}}$$

Equation 1. Allocation formula of the CCCTB proposal

Source: CCCTB Proposal, Article 86.1

$$\pi_m^{CCCTB} = \pi_{EU}^{ALS} \times \omega^m$$

Equation 2. Income tax base allocated to member state  $m$

Source: author's own elaboration

As a next step, I calculated the income tax liability payable in member state  $m$  in case of the introduction of the formulary apportionment:

$$TAX_m^{CCCTB} = \pi_m^{CCCTB} \times T_m$$

Equation 3. Income tax liability payable in member state  $m$

Source: author's own elaboration

Finally, I estimated the income tax burden of the consolidated group in case of the introduction of the formulary apportionment:

$$\alpha^{CCCTB} = \frac{\sum_{n=1}^m TAX_m^{CCCTB}}{\sum_{i=1}^n \pi_i^{ALS} \text{ if } \pi_i^{ALS} \geq 0}$$

Equation 4. Estimate of the consolidated tax liability (%)

Source: author's own elaboration

I conducted my calculations based on the financial statements and additional financial reports available in the Orbis database<sup>7</sup> between April and June of 2013. During the empirical research, I was focusing on the multinational corporations operating in the European Union in the car manufacturing, the retail and the tour operator industries.

#### 4.2.1. Changes in the effective tax rate

At the beginning of the research, I assumed that as the result of the alternative income allocation model the European income tax burden of the corporations analyzed would increase and in such increase the new methodology of income allocation would have higher impact than the loss consolidation.

I was examining the effects of the new mechanism of income allocation and the international loss consolidation to the changes of the effective tax rate with the methodology of standardization. First, I determined the intensity ratio representing the effective tax rate under the current regulatory framework (hereinafter: ALS data) and the model proposed by the CCCTB tax reform, then I derived the total difference between the effective tax rates (K), the impact of the international loss consolidation to the change in the effective tax rates (K') and the impact of the new methodology of the income allocation to the change in the effective tax rates (K'').

The total difference (K) between the effective tax rates is calculated as follows:

$$K = \alpha^{CCCTB} - \alpha^{ALS}$$

Source: author's own elaboration

$$K = \frac{\sum \pi^{CCCTB} \times \omega_i \times T_i}{\sum \pi^{ALS}} - \frac{\sum \pi_i^{ALS} \times T_i}{\sum \pi^{ALS}}$$

Source: author's own elaboration

First, I determined the impact of the international loss consolidation (K') as follows:

$$K' = \frac{\sum \pi^{CCCTB} \times \frac{\sum \pi_i^{ALS}}{\sum \pi^{ALS}} \times T_i}{\sum \pi^{ALS}} - \frac{\sum \pi_i^{ALS} \times T_i}{\sum \pi^{ALS}}$$

Source: author's own elaboration

---

<sup>7</sup> The Orbis database publishes financial statements and additional reports for about 100 million companies worldwide. The database include the consolidated and the unconsolidated financial reports of the companies, the information regarding their ownership structure and additional financial data as well. The Orbis database publishes information collected by national agencies, such as the national banks and tax authorities of the country (for example in the case of Belgium), the chamber of commerce (for example in the case of Romania) and by corporate data distributors (for example the Creditreform group).

Second, I determined the impact of the new income allocation methodology (K'') as follows:

$$K'' = \frac{\sum \pi^{CCCTB} \times \omega_i \times T_i}{\sum \pi^{ALS}} - K'$$

Source: author's own elaboration

The average value of the effective tax rate changes, index K' and index K'' are represented by Table 2 below.

Industry	Simple average/Distribution	$\alpha^{ALS}$	$\alpha^{CCCTB}$	K	K'	K''
Car manufacturing	Simple average	24.24%	19.62%	-4.62%	-5.51%	0.89%
Retail	Simple average	25.65%	21.84%	-3.81%	-4.35%	0.54%
Tour operator	Simple average	24.17%	20.56%	-3.61%	-4.91%	1.30%
	<b>Simple average</b>	<b>24.97%</b>	<b>20.95%</b>	<b>-4.02%</b>	<b>-4.80%</b>	<b>0.78%</b>
	Distribution	3.80%	6.47%	7.25%	7.26%	1.60%

Table 1. The average value of the effective tax rate changes, index K' and index K''

Source: author's own elaboration

Numerous factors may influence the above results. First, the low volume of index K' can be explained with the fact that index K'' has unexpected strong impact to the change of the effective tax rate. I conducted the research based on the most up-to-date financial statements available at the time of the data importing, i.e. based on the reports of the financial year 2011. In my point of view, the unexpected high value of index K' is the result of the decline of the demand generated by the economic downturn. The average high value of index K' generated by the economic downturn may be clearly analyzed on the level of the industries involved in this research, the highest losses (and therefore the highest value of index K') are taken by the corporate groups of the car manufacturing industry. In their cases, the effective tax rate was declining with 5.51 percentage point due the tax base consolidation of the loss-making subsidiaries. Compared to that, the corporate groups of the tour operator industry were reporting smaller volume of losses, in their cases my calculation determined a decrease of 4.91 percentage point of the effective tax rate as a result of the international loss consolidation. Based on the above results, the possibility of the international loss consolidation has weaker effect to the effective tax rate changes of the corporate groups of the retail industry, in their cases a decrease of 4.35 percentage point was identified.

Further interesting explanation may be concluded based on the low value of index K'' determined by the research. Analyzing the results I experienced that the corporate groups involved in the research are not operating subsidiaries – with certain limited exceptions - in such member states which are generally providing loopholes for the corporate tax avoidance. Surprisingly, none of the approximately 4,000 companies involved in the research are established in Cyprus, Luxembourg or Malta, nonetheless, all of these member states are providing beneficial tax environment for the income allocation aiming under taxation. The data on the income taxation qualifies for sensitive corporate information, regarding the European economy more extensive database for academic research purposes than the Orbis and Amadeus databases published by Bureau van Dijk are not available currently. In December 2012, I discussed the above results with Daniel Deak of Budapest Corvinus University, Institute of Financial Law. The view of Daniel Deak is in line with the results received, as he added that the member states (especially Cyprus) interested in the under taxation refuse such data services. I agree with Daniel Deak and based on the research, I determine that the

volume of index K'' is at least 0.78 percentage point in case of the European introduction of the formulary apportionment.

Further to the above explanation, the results received may illustrate the case that corporate groups involved allocates significant part of their profits for taxation purposes to subsidiaries operating outside of Europe. Based on this, I assume that the non-European subsidiaries (for example the ones operating in China and in the United States) of the corporate groups involved in the research were generating higher profit than the European subsidiaries. Furthermore, I also assume that the target jurisdictions of the income allocation aiming for the tax avoidance are non-European tax heaven countries (like Bermuda and Cayman Islands). As the formulary apportionment model envisaged by the CCCTB proposal involves only those subsidiaries to the consolidation which have tax residency (under my assumption place of incorporation) within the territory of the European Union, I could not include the before-mentioned, presumably profit-making non-European subsidiaries in the research. Such a view is also supported by my discussion with Yansheng Zhu (Xiamen University, China), who added that the European introduction of the formulary apportionment analyzed in this current research is a weak tool to counteract the tax avoidance and double taxation. Zhu noticed that the tax avoidance and the double taxation resulting from the intra-company transactions is a global issue which cannot be treated by regional efforts. The results received is supporting that the European introduction of the formulary apportionment would be inefficient to provide remedy for an issue globally defined.

As a summary, I conclude that the introduction of the formulary apportionment within Europe increases the competitiveness of the European companies as a result of the possibility of international loss consolidation for taxation purposes, which means that the double taxation of the multinational corporations operating any loss-making subsidiaries ceases to be exists. This provides for a tax policy environment in Europe supporting the free movement of capital. It is crucial to add to the conclusion of the empirical results that although the formulary apportionment impedes the tax avoidance, i.e. the under taxation, it cannot completely hinder its worldwide application.

In general, the European introduction of the formulary apportionment would provide beneficial affects to the effective tax rate and the tax environment of the companies operating in the European economy. The formulary apportionment to be introduced under the CCCTB tax reform has pluses and minuses. On the one hand, it can contribute to the decrease of the double taxation cases in the European Union as a result of the possibility of the international loss consolidation (as per the simulation, this would decrease the effective tax rates of the corporations with 4.8 percentage points. On the other hand, it can hinder the income reallocation aiming for the tax avoidance currently occurring in the member states of the European Union (as per the simulation, this would increase the effective tax rate by 0.78 percentage points).

Testing my hypothesis H3, I define my thesis number 3 as follows:

T3: As a result of the European introduction of the formulary apportionment, the effective tax rate of the corporations analyzed would decrease by 4.02 percentage points. The international loss consolidation has a more significant impact to the changes in the effective tax rates than the new methodology of the income allocation.

The formulary apportionment of the local (state) income taxation of the United States provides an increasing weight to the demand representing factor, i.e. to the sales revenue. Based on this, it may be assumed that the income allocation methodology envisaged by the CCCTB tax reform would align to the tax policy trend of the American local income taxation due to global tax harmonization efforts.

As a result of this, the next chapter of my research is analyzing the effective tax rate changes of the European corporations in case the income allocation model of the formulary apportionment would be based solely on the demand representing factor, i.e. the sales revenue similar to the North American practice. In order to test such hypothesis, I determined the effective tax rate of the corporate groups analyzed in case the methodology of the formulary apportionment would allocate the income tax base based on the allocation of the sales revenue.

In table 3 below, I present the industry specific and the total average results of the calculation. In general, it can be concluded that there is no significant difference between the effective tax rate calculated based on the income allocation methodology envisaged by the CCCTB reform ( $\alpha^{CCCTB}$ ) and the effective tax rate calculated based on the North American trends, i.e. calculated based on the demand representing factor ( $\alpha^{Sales}$ ). The difference determined between  $\alpha^{CCCTB}$  and  $\alpha^{Sales}$  is only 1.67 percentage.

Applying the allocation mechanism based on the sales as demand representing factor, the effective tax rate of the companies analyzed is 21.28 percentage, which is only 0.33 percentage point higher than the average effective tax rate calculated based on the allocation mechanism proposed by the CCCTB tax reform.

Industry	Simple average / Distribution	$\alpha^{ALS}$	$\alpha^{CCCTB}$	$\alpha^{Sales}$	$\alpha^{Sales} / \alpha^{CCCTB}$
Car manufacturing	Simple average	24.24%	19.62%	20.76%	105.62%
Retail	Simple average	25.65%	21.84%	21.93%	100.47%
Tour operator	Simple average	24.17%	20.56%	20.18%	98.35%
<b>Total</b>	<b>Simple average</b>	<b>24.97%</b>	<b>20.95%</b>	<b>21.28%</b>	<b>101.67%</b>
	Distribution	3.80%	6.47%	6.55%	

Table 2.  $\alpha^{ALS}$ ,  $\alpha^{CCCTB}$  and  $\alpha^{Sales}$

Source: author's own elaboration

The small difference between  $\alpha^{CCCTB}$  and  $\alpha^{Sales}$  can be explained by two reasons in general.

First, based on the result of the empirical analysis it can be concluded that the distribution of the income tax base of the corporate groups of the service sector (retail and tour operator industries) is not modified even though the allocation mechanism was significantly revised. In the case of the service sector, only an average of 11.06 percentage of the income tax base of the corporate groups were transferred to another tax jurisdiction due to the modification in the allocation mechanism. Meanwhile, the low volume of correction in the tax base distribution can be explained by the scenario that the factor representing the demand side (sales) is situated in the same member states where the factors representing the supply side (fixed assets and workforce) are situated. Apparently, the low volume of the correction in the tax base distribution is resulting in a low volume of changes in the effective tax rates, since if a significant portion of the tax base remains allocated to the same tax jurisdiction, then the effective tax rate remains also generally the same.

Industry	$(\sum \pi_i^{\text{Árbevétel}} - \pi_i^{\text{CCCTB}}) / 2 / \sum \pi_i^{\text{CCCTB}}$
Car manufacturing	47.47%
Retail	9.86%
Tour operator	14.78%
<b>Total</b>	<b>22.05%</b>

Table 3. Simple average values of the portion of the reallocated tax base, by industry and in total  
Source: author's own elaboration

Notwithstanding to the above, in the case of the manufacturing sector (car manufacturing industry), the modification of the allocation mechanism caused significant reallocation of the tax base. In the case of the car manufacturing corporate groups, an average of 47.47 percentage of the tax base was transferred to another member state's tax jurisdiction. Within this industry the location of the factor representing the demand side (sales) – i.e. the customer's place of living – significantly differs from the location of the factors representing the supply side (fixed assets, work force) – i.e. the location of the production. However, surprisingly the significant correction of the tax base distribution established in the case of the manufacturing sector does not result in a significant change of the effective tax rate. This develops from the assumption tested below that there is no significant difference between the tax rates of the member states involved in the tax base redistribution. To analyze my above assumption, I studied the volume of the difference between the tax rates of those member states in which the tax base of the corporate group is redistributed due the modification of the allocation mechanism. For this reason I was examining the volume of the distribution between the tax rates of the member states, I was applying the statistical index of the weighted standard distribution to answer the question.

Industry	$sd_w$
Car manufacturing	4.18%
Retail	2.82%
Tour operator	2.52%
<b>Total</b>	<b>3.18%</b>

Table 4. Average value of the weighted standard distribution, by industry and in total  
Source: author's own elaboration

In all the industry groups, the weighted standard distribution has low volume, nevertheless, the standard distribution of the 2011 corporate income tax rates of the member states is 6.44 percentage. As a conclusion of the test, the tax base is redistributed between member states whose corporate income tax rates are somewhat similar. Besides the low volume of the weighted standard distribution it can be concluded that the corporate income tax rates of the member states are aligning on a regional basis (for example in the case of Baltic countries, Central-European countries, Western-European countries), which indicates that the tax competition has partially forced the regional harmonization of the tax rates of the European member states.

Based on the calculations above, it can be concluded that a future modification of the allocation mechanism proposed by the CCCTB tax reform would result in a slight change of the effective tax rate of the multinational corporations. As a summary of the above, I define my thesis 4 as follows:

**T4:** The European introduction of the allocation mechanism applying the factor representing the demand side would result in a 1.67 percentage change of the effective tax rates compared to the effective tax rates based on the allocation mechanism proposed by the CCCTB tax reform.

#### 4.2.2. Changes in the tax base distribution

Besides the above, in order to better understand the changes of the effective tax rate I was studying which value determining factors' geographical location have influence on the allocation of the tax base to a certain member state. Within this context, I was analyzing those factors representing the supply side which are taken into consideration by the European model of the formulary apportionment during the tax base allocation process (i.e. the fixed assets and the workforce). Primarily, I assumed that in the case of applying the formulary apportionment model, there is a stochastic relationship between the tax base allocation and the geographical distribution of the immobile factors representing the supply side compared to the tax base allocation mechanism currently in force. In order to test this hypothesis, I was applying the simple linear regression model where I regarded the tax base distribution as the dependent variable and the distribution of the factors representing the supply side mentioned previously as the explanatory variables. I run the test under the current income tax allocation mechanism (hereinafter: ALS data) and under the alternative model of the formulary apportionment (hereinafter: CCCTB data). As a last step, I compared the coefficients of determination determined by the simple linear regression models. The test was run for the factors representing the supply side of the formulary apportionment separately.

First, I publish the simple linear regression model under the current income allocation mechanism studied for the fixed assets' distribution (ALS tax base determination, Figure 2). Under the current income tax model, the simple linear regression model is as follows:

$$y = 0,606 * x + 0,180$$

where y represents the tax base distribution under the current income tax model (ALS) and x represents the distribution of the fixed assets.

The coefficient of determination is as follows:  $R^2 = 0,167$ ;  $P=0,002$ .

Therefore, it can be concluded that under the current income tax model, the geographical distribution of the fixed assets are not determining the tax base distribution, i.e. the effective tax rate of the corporations analyzed.

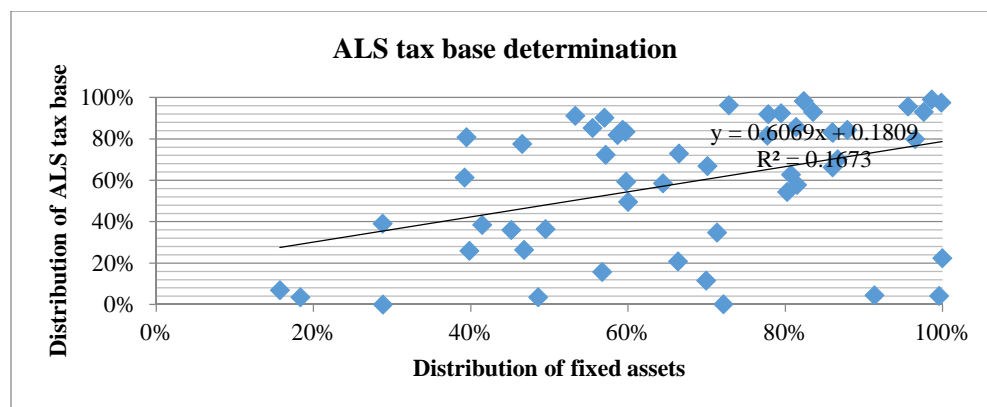


Figure 2. Simple linear regression model - Distribution of ALS tax base and fixed assets  
Source: author's own elaboration



Further to the analysis of the current income tax model I was also testing the simple linear regression model in the case of the application of the formulary apportionment model (CCCTB tax base determination, Figure 3). In the case of the CCCTB model, the simple linear regression model is as follows:

$$y = 0,784 * x + 0,087$$

where y represents the income tax base allocation under the formulary apportionment model (CCCTB) and x represents the distribution of the fixed assets.

The coefficient of determination is as follows:  $R^2 = 0,648$ ;  $P=0,000$ .

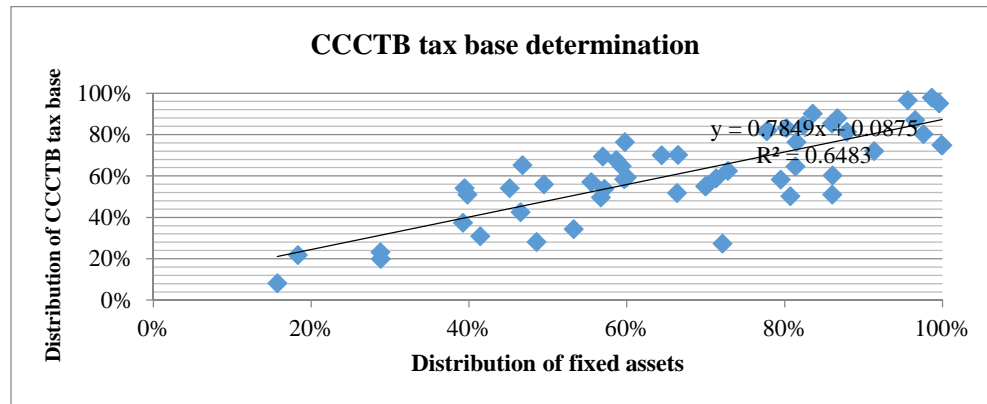


Figure 3. Simple linear regression model - Distribution of CCCTB tax base and fixed assets  
Source: author's own elaboration

As an explanation of the simple linear regression models presented above, I conclude that in the case of the application of the formulary apportionment model (CCCTB) the distribution of the income tax base is determined significantly stronger by the geographical location of the fixed assets than in the case of the current income tax model (ALS). Based on the significant and stochastic relationship, it can be stated that the application of the formulary apportionment decreases the possibility for the under taxation since in this case the tax jurisdictions of the member states where the corporation's fixed assets are operated take captive stronger the tax base of the corporations. As the fixed assets are generally not immobile assets, the corporation's tax planning possibilities aiming for tax avoidance are expected to decrease in case of the application of the formulary apportionment.

Further to this, I run the same test regarding the distribution of the workforce as well, the simple linear regression model in the case of the current income tax model is as follows (Figure 4):

$$y = 0,637 * x + 0,187$$

where y represents the allocation of the tax base in case of the current income tax model (ALS) and x represents the distribution of the workforce.

The coefficient of determination is as follows:  $R^2 = 0,163$ ;  $P=0,003$ .

Therefore, in the case of the application of the current income tax model, the geographical distribution of the workforce does not determinate the distribution of the corporates' income tax base, i.e. does not determinate the volume of the effective tax rate either.

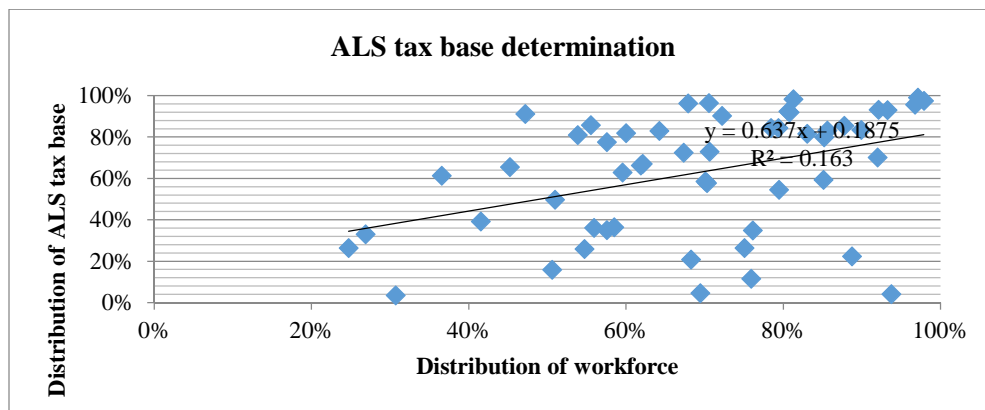


Figure 4. Simple linear regression model - Distribution of ALS tax base and workforce  
Source: author's own elaboration

Further to this, I also tested the relationship between the income tax base allocation in case of the formulary apportionment (CCCTB tax base determination, Figure 5) and the geographical distribution of the workforce. In the case of this, the simple linear regression model is as follows:

$$y = 0,907 * x + 0,004$$

where y represents the income tax base allocation under the formulary apportionment model (CCCTB) and x represents the distribution of the workforce.

The coefficient of determination is as follows:  $R^2 = 0,777$ ,  $P=0,000$ .

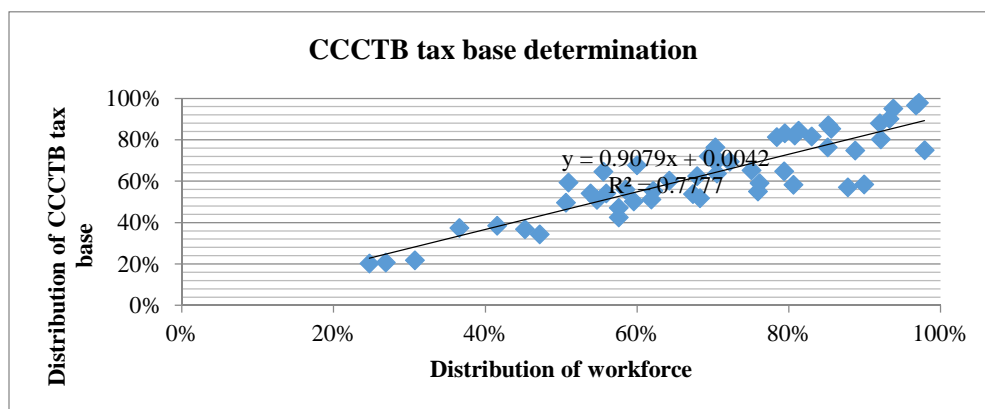


Figure 5. Simple linear regression model - Distribution of CCCTB tax base and workforce  
Source: author's own elaboration

In the case of the formulary apportionment model, there is a significant and stochastic relationship between the distribution of the income tax base and the workforce based on the high value of the coefficient of determination (0.777). Similar to the analysis of the distribution of the fixed assets, this result leads to the conclusion that the application of the formulary apportionment model decreases the risk of the under taxation of the income as the member states can take captive

stronger the income tax base of those corporations which employ their workforce within their jurisdictions. Parallel to the fixed assets, the workforce are generally qualify for immobile assets.

Studying the research results, I recognized that the geographical distribution of the workforce as an explanatory variable has stronger influence on the CCCTB tax base allocation than the geographical distribution of the fixed assets. The coefficient of determination in the case of the analysis of the fixed assets is  $R^2 = 0,648$  while in the case of the tests regarding the workforce the coefficient of determination shows stronger relationship:  $R^2 = 0,777$ . The analysis of the reasons behind the difference in the values of the coefficient of determination will be included in the subchapter below.

Testing the above hypothesis, I define the following thesis:

T5: In the case of the application of the formulary apportionment, there is a stochastic relationship between the tax base allocation and the geographical distribution of the immobile value promoting factors representing the supply side compared to the relationship under the income allocation model currently in force. This mean that the formulary apportionment can hinder the under taxation (i.e. the tax avoidance) and the double taxation.

Further to the analysis of simple linear regressions, I also investigated which value promoting factoring's distribution has a higher effect to the distribution of the CCCTB tax base. Under the analysis made for the thesis above, I experienced that the geographical distribution of the workforce has a higher influence on the allocation of the CCCTB tax base than the geographical distribution of the fixed assets.

As the corporate groups of both the retail and the tour operator industries are involved in the service sector operating based on human workforce, I conduct the analysis of the influence of the factors of the supply side for the corporate groups of the retail and the tour operator industries together. With the help of the multiple linear regression model, I tested which of the factors' distribution supporting the supply side (fixed assets and workforce) has higher influence on the distribution of the tax base. I applied the distribution of the workforce and fixed assets as explanatory variables, while I applied the tax base distribution as a dependent variable. The resulting multiple linear regression model is as follows:

$$\frac{\pi_m^{CCCTB}}{\pi^{CCCTB}} = 0,0153 + 0,6961 \times \frac{workforce_m}{\sum_{i=1}^n workforce} + 0,2754 \times \frac{fixed\ assets_m}{\sum_{i=1}^n fixed\ assets}$$

The explanatory statistical data are the following:

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.357	2	.679	339.411	.000 <sup>b</sup>
	Residual	.068	34	.002		
	Total	1.425	36			
a. Dependent variable: CCCTB tax base distribution						
b. Predictors: (Constant), Distribution of workforce, Distribution of fixed assets						

Table 5. Explanatory statistical data  
Source: author's own elaboration

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	.015	.029		.522	.605			
	Distribution of fixed assets	.275	.054	.355	5.134	.000	.908	.661	.192
	Distribution of workforce	.696	.073	.659	9.529	.000	.957	.853	.357
a. Dependent variable: CCCTB tax base distribution									

Table 6. Explanatory statistical data  
Source: author's own elaboration

Studying the research results, I can conclude that in the case of applying the CCCTB model the distribution of the workforce has a stronger influence on the allocation of the tax base to a given member state than the distribution of the fixed assets. During the preparation of the simulation, I assumed that the stronger influence of the workforce factor is due to an interrelation incurred between the three factors involved in the formulary apportionment model. The above multiple linear regression model can indicate a stronger relationship between the distribution of the workforce and the tax base because there may be a stochastic relationship between the distribution of the third factor of the formulary apportionment model, i.e. the distribution of the sales and the distribution of the workforce. In order to test my assumption I was studying simple linear regression models to understand the relationship between the distribution of the fixed assets and the sales (Figure 6) and the distribution of the workforce and the sales (Figure 7).

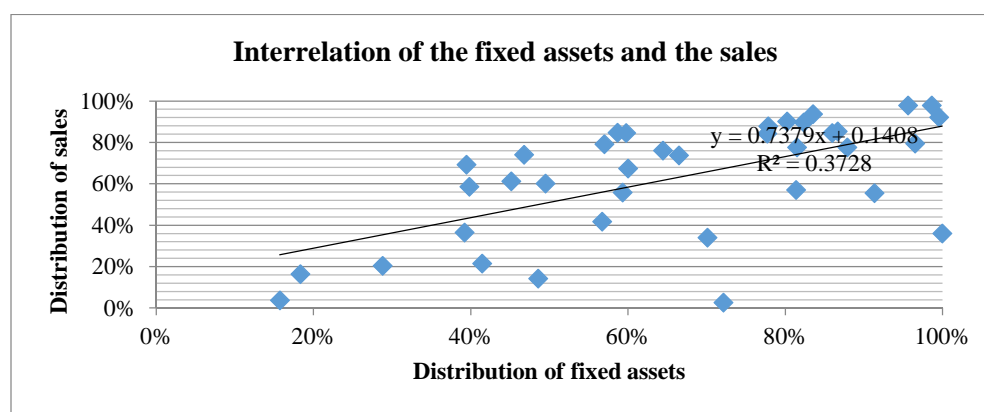


Figure 6. Interrelation of the distribution of the fixed assets and the sales – retail and tour operator industries  
Source: author's own elaboration

The model described by Figure 6 is as follows:

$$y = 0,737 * x + 0,140$$

Where y represents the distribution of the sales and x represents the distribution of the fixed assets. The coefficient of determination is as follows:  $R^2 = 0,372$ ,  $P=0,000$ .

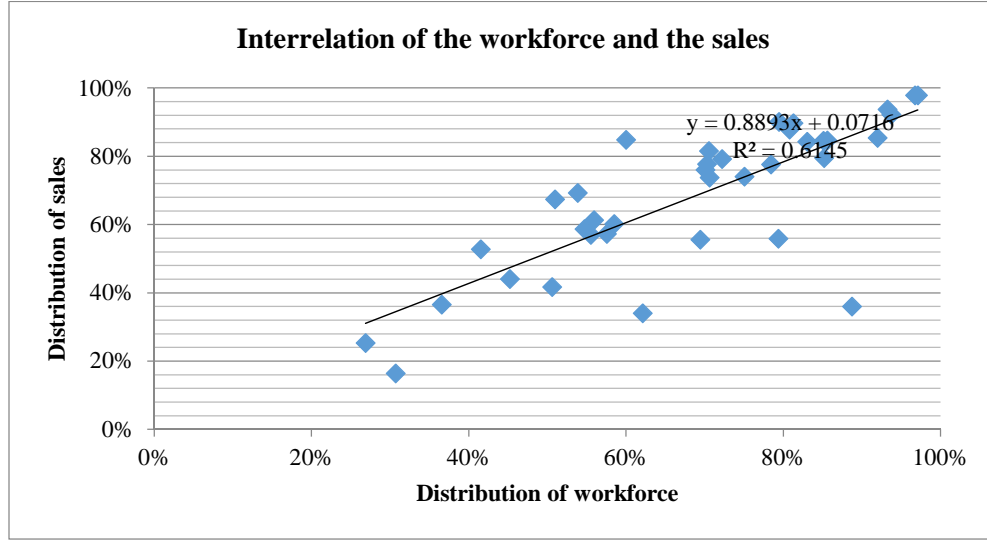


Figure 7. Interrelation of the distribution of the workforce and the sales – retail and tour operator industries  
Source: author's own elaboration

The model described by Figure 7 is as follows:

$$y = 0,889 * x + 0,071$$

where y represents the distribution of the sales and x represents the distribution of the workforce. The coefficient of determination is as follows:  $R^2 = 0,614$ ,  $P=0,000$ .

Following the analysis of the retail and tour operator industries, I was testing the multiple linear regression model for the corporate groups included in the car manufacturing industry. In case of the corporate groups included in the car manufacturing industry, I was also studying the influence of the distribution of the factors representing the supply side (fixed assets and workforce) to the distribution of the tax base. Under this scenario, the multiple linear regression model is as follows:

$$\frac{\pi_t^{CCCTB}}{\pi^{CCCTB}} = 0,5240 \times \frac{fixed\ assets_t}{\sum_{i=1}^n fixed\ assets} + 0,1681 \times \frac{workforce_t}{\sum_{i=1}^n workforce} + 0,6226 \times \frac{sales_t}{\sum_{i=1}^n sales} - 0,0367$$

The explanatory statistical date of the multiple linear regression model are as follows:

Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.291	3	.097	112.003
	Residual	.010	12	.001	
	Total	.301	15		
a. Dependent variable: CCCTB tax base distribution					
b. Predictors: (Constant), Distribution of sales, Distribution of fixed assets, Distribution of workforce					

Table 7. Explanatory statistical data  
Source: author's own elaboration

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-	Partial	Part
1	(Constant)	-.037	.033		-1.127	.282			
	Distribution of fixed	.525	.075	.703	7.032	.000	.832	.897	.377
	Distribution of workforce	.168	.099	.220	1.694	.116	.901	.439	.091
	Distribution of sales	.623	.168	.371	3.698	.003	.492	.730	.198
a. Dependent variable: CCCTB tax base distribution									

Table 8. Explanatory statistical data  
Source: author's own elaboration

Based on the above tests, it can be concluded that in the case of the corporate groups included in the retail and tour operator industries the distribution of the workforce has a stronger influence on the distribution of the tax base than the distribution of the fixed assets. In the case of corporate groups belonging to both industries I proved that the stronger influence of the workforce as a factor representing the supply side is due to the stochastic relationship found between the distribution of the sales and the workforce. All the corporate groups belonging to the retail and tour operator industries are providing services based on human workforce. In the case of both industries tested, the place of the provision of the service is identical with the place of purchase or consumption. A similar stochastic relationship cannot be found in the case of the car manufacturing industry.

It is a well-known thesis that the formulary apportionment transforms the corporate income tax into a tax on the factors applied in the allocation mechanism. Therefore, the income tax becomes a turnover tax due to the sales factor, a payroll tax due to the factor of workforce and a capital tax due to the factor of fixed assets (McLure és Hellerstein, 2002, p. 5). Based on the research presented in the dissertation, it can be concluded that in the case of the industries of the service sector operating based on human workforce, the tax burden linked to the factors in the formulary apportionment model representing the supply side may turn to a tax on the workforce (tax on payroll and headcount). As a result of this, the employment of the European workforce may become more expensive for the corporations and it can contribute to the further enlargement of the wide tax wedge (OECD, 2013b) characterizing the member states of the European Union.

This current research shows that in the case of the corporate groups belonging to the car manufacturing industry, the distribution of workforce, as a factor representing the supply side has no significant influence on the allocation methodology of the formulary apportionment. In this

case the multiple linear regression model predicts that the distribution of the fixed assets has a stronger influence on the distribution of the tax base compared to the distribution of workforce.

Regardless to the characteristic of the business activity, the model of the formulary apportionment assumes that a given amount of capital invested and payroll cost contributes to the generation of the same amount of profit. As the critique of the model says this assumption is incorrect because the different business activities of the corporation require different capital and workforce intensity. This criticism could be resolved if different allocation indexes would be applicable in the case of capital intensive and employment intensive industries (Anon., 1976, p. 1229).

Therefore, based on the result of the current research, I propose that - similarly to the Swiss cantonal allocation mechanism - the allocation mechanism of the formulary apportionment of the CCCTB tax reform proposal provides different methodology for the corporations of industries belonging to the service sector and to the manufacturing sector. Accordingly, in my point of view under the formulary apportionment model there is need for different allocation indexes for the corporations of the service sector and the manufacturing sector.

Based on the above results, I define thesis 6a and 6b as follows:

T6a: In the case of the service sector, the location of the workforce as a factor representing the supply side has a strong influence to the allocation of the income tax base under the application of the formulary apportionment model. In the instance of the introduction of the CCCTB tax reform, this provides for the increasing tax burden of the workforce as far as the service sector is concerned.

T6b: In the case of the manufacturing sector, there is no significant relationship between the location of the workforce as a factor representing the supply side and allocation of the income tax base under the application of the formulary apportionment. Regarding the manufacturing sector, the location of the fixed assets as a factor representing the supply side has significant influence on the allocation of the income tax base in the case the CCCTB tax reform is introduced.

## 5. Possible application of the research results

In summary, I conclude that the introduction of the formulary apportionment suggested by the CCCTB tax reform would have positive effect on the tax environment of the multinational corporations operating in the European economy. The CCCTB tax reform has pluses and minuses. On one hand, the corporations lose a significant part of their tax avoidance techniques as allocating their income tax base between different nation states they would have to rely on such factors which might not be mobilized easily due to tax planning reasons only. As a result of this, the increase of the weighted tax burden of the multinational corporations can be anticipated.

On the other hand, the tax reform would provide the possibility of the tax consolidation which would resolve a significant portion of the issues around the double taxation identified in the European tax environment. As a result of this, the decrease of the weighted tax burden of the multinational corporations can be anticipated.

In short, I am convinced that the introduction of the alternative tax accounting model suggested by the CCCTB tax reform presents a beneficial arrangement for the multinational corporations and its introduction is inevitable within the European economy. Most critics are saying that the CCCTB tax reform is a utopian scheme which will not be accepted by the member states. However, in my point of view, the acceleration of the integration and the increasing harmonization of the sovereign tax environments of the member states are strongly required by the corporations themselves. The expansion of the digital economy and the development of the intra-group value chains are all indicating the directions of the international economic trends.

The question is how sensitive are the economic leadership of the European Union member states to these claims. Both the tax policies of the United States and Canada already accepted about a century ago that in case of a strong economic integration, the only possible model of the tax base allocation is the formulary apportionment. If we ever consider the idea of the United States of Europe, why we should not accept the tax allocation model already proved to be efficient overseas?

The Lisbon strategy defined that the European Union shall be the most competitive economy in the world. One important piece of this development is the European corporate income tax harmonization analyzed in this thesis.

## 6. Future research objectives

Based on the empirical research and the literature review I identified those criticized areas of the formulary apportionment model which require further empirical analysis and provide for the possible future objectives of the research presented in this dissertation. These are the following:

- *International tax harmonization:* in the case of introduction of the CCCTB, it is questionable how the risk of the double taxation and the tax avoidance can be mitigated between the European Union member states and third countries (Sullivan, 2010, p. 9).
- *Competitive neutrality:* it is questionable if there is any groups of companies who would incur tax disadvantage due to the application of the formulary apportionment model (for



example the companies operating on the domestic market only, the companies headquartered in third countries) (OECD, 2010a, Article 1.7).

- *Scope of consolidation and the consolidated income:* an empirical analysis would be required to test which group members can be involved in the consolidation and whether the total income or only the business income of the group members can be included in the consolidated income (McLure, 1983).
- *Diverse profitability:* it is questionable whether a further variable should be included in the allocation methodology proposed by the CCCTB tax reform to capture the rate of return or the risk associated with the capital invested in different geographical locations (e.g. interest rate) (Anon., 1976, p. 1229).
- *Tax administration cost:* is there any increase in the tax administration cost due to the application of the formulary apportionment proposed by the CCCTB tax reform.
- *Immaterial assets:* further research may be required to test if there is a need to include the immaterial assets in the allocation methodology of the formulary apportionment proposed by the CCCTB tax reform.
- *Information asymmetry and objectivity:* is the CCCTB tax reform able to reduce the issues related to the information asymmetry and the objectivity.

## 7. Bibliography

1. Anon. (1976): *Multinational Corporations and Income Allocation under Section 482 of the Internal Revenue Code*, Harvard Law Review, Vol. 89., No. 6.
2. Avi-Yonah, Reuven S. (2009): *Between formulary apportionment and OECD guidelines: A proposal for Reconciliation*, The John M. Olin Center for Law & Economics Working Paper Series, WP. 102.
3. Bartelsman, E. - Beestma, R. (2003): *Why pay more? Corporate tax avoidance through transfer pricing in OECD countries*, Journal of Public Economics, Vol. 87. No. 9-10.
4. Carroll, M. B. (1933): *Survey Fiscal Committee League of Nations*, Vol. I. League of Nations Document C73M38.1932; Vol. II, C245.M217.1933; Vol. III. C425(a)M217(a).1933
5. Christensen, S. (1996): *Formulary Apportionment: More simple – on balance better?* Law and Policy in International Business, Georgetown University Law Center, Vol. 28., No. 4.
6. Clausing, K. A. – Avi-Yonah, R. S. (2008): *Reforming Corporate Taxation in the Global Economy: A proposal to adopt formulary apportionment*, The Brookings Institution, Path to Prosperity: Hamilton Project Ideas on Income Security, Education and Taxes, Brookings Institution Press, Washington, D.C.
7. Clausing, K. A. – Lahav, Y. (2011): *Corporate tax payments under formulary apportionment: Evidence from the financial reports of 50 major U.S. multinational firms*, Journal of International Accounting, Auditing and Taxation, 20.
8. Clausing, K. A. (2006): *International Tax Avoidance and U.S. International Trade*, National Tax Journal, Vol. LVIV., No. 2., June 2006
9. Deák, D. (1995): *A nem független felek közötti kapcsolatok adójogi problémái*, kézirat
10. Devereux, M. P. és Loretz, S. (2007): *The effects of EU formulary apportionment on corporate tax revenues*, Oxford University Centre for Business Taxation, Working Paper 07/06
11. Devereux, M. P., Elschner, C., Endres, D. és Spengel, C. (2012): *Effective Tax Levels using the Devereux/Griffith Methodology*, Centre for European Economic Research, Mannheim, Project for the EU Commission TAXUD/2008/CC/099, October, 2012.
12. Eden, L. (1998): *Taxing Multinationals: Transfer Pricing and Corporate Income Taxation in North America*, University of Toronto Press
13. Ernst&Young LLP (2010): *Global Transfer Pricing Survey, Addressing the challenges of globalization*
14. Ernst&Young LLP (2011): *Study on the Economic and Budgetary Impact of the Introduction of a Common Consolidated Corporate Tax Base in the European Union*
15. European Commission (2001): *Company Taxation in the Internal Market*, Commission Staff Working Paper, SEC (2001) 1681
16. European Commission (2011a): *Impact Assessment, Accompanying document to the proposal for a council directive on a Common Consolidated Corporate Tax Base*, SEC (2011) 315
17. European Commission (2011b): *Proposal for a Council Directive on a Common Consolidated Corporate Tax Base (CCCTB)*, COM (2011) 121/4
18. European Commission, Directorate General Taxation & Customs Union (2004): *European Tax Survey*, Working Paper No. 3.

19. Fuest, C., Hemmelgarn, T. and Ramb, F. (2007): *How would the introduction of an EU-wide formula apportionment affect the distribution and sized of the corporate tax base? An analysis based on German multinationals*, International Tax and Public Finance 2007.14.
20. Grubert, H. (2003): *Intangible Income, Intercompany Transactions, Income Shifting and the Choice of Location*, 56 National Tax Journal, No.1., Part 2.
21. Grubert, H. and Mutti, J. (1991): *Taxes, Tariffs and Transfer Pricing in Multinational Corporate Decision Making*, The Review of Economics and Statistics 17.
22. Hamaekers, H. (2001): *Arm's Length – How Long?* International Transfer Pricing Journal, March/April 2001
23. Heller, F. (1943): Pénzügytan, Magyar Közgazdasági Társaság, Budapest
24. Hines, J. és Rice, E. (1994): *Fiscal Paradise: Foreign Tax Heavens and American Business*, Quarterly Journal of Economics, 109(1)
25. Huizinga, H. és Laeven, L. (2008): *International profit shifting within multinationals: A multi-country perspective*, Journal of Public Economics, 92
26. Martens-Weiner, J. (2009): *It's time to adopt formulary apportionment*, Tax Analyst
27. McLure, C. (1983): *Defining a unitary business: an economist's view*, National Bureau of Economic Research, Working Paper No. 1125., May 1983
28. McLure, C. (1989): *Economic Integration and European Taxation of Corporate Income at Source: Some Lessons from the U.S. Experience*, in M. Crammie and B. Robinson (eds.), Beyond 1992: A European Tax System. London: Institute for Fiscal Studies
29. McLure, C. (2008): *Harmonizing Corporate Income Taxes in the European Community: Rationale and Implications*, NBER 2008./Tax Policy and the Economy, Vol. 22., University of Chicago Press
30. McLure, C. és Hellerstein, W. (2002): *Does sales-only apportionment of corporate income violate the GATT?* NBER Working Paper Series 9060.
31. McLure, C.- Jorge Martinez-Vasquez - Sally Wallace (1995): *Subnational Fiscal Decentralization in Ukraine*, in R. M. Bird, R. Ebel, and C. Wallich (eds.), Decentralization of the Socialist State: Intergovernmental Finance in Transition Economies. Washington: The World Bank
32. Musgrave, P. B. (1972): *International Tax Base Division and the Multinational Corporation*, Public Finance, 1972. Vol.27.
33. Musgrave, P. B. (1995): *Interjurisdictional equity in company taxation: principles and applications to the European Union*, in S. Cnossen (ed.), Taxing Capital Income in the European Union, Oxford University Press
34. Musgrave, P. B. (1995): *Interjurisdictional equity in company taxation: principles and applications to the European Union*, in S. Cnossen (ed.), Taxing Capital Income in the European Union, Oxford University Press
35. OECD (2010a): *Transzferár irányelvek a nemzetközi vállalatok és az adóhatóság számára*, Párizs
36. OECD (2010b): *Model Tax Convention on Income and on Capital*, Paris
37. OECD (2013a): *Addressing Base Erosion and Profit Shifting (BEPS)*, online publikáció
38. OECD (2013b): *The tax wedge overview for an average single worker in the OECD in 2013*, OECD Economic Outlook Volume 2013, No. 94.
39. Oestreicher, A. és Koch, R. (2011): *The revenue consequences of using a Common Consolidated Corporate Tax Base to determine taxable income in the EU Member States*, Public Finance Analysis, Vol. 67., Issue 1.

40. Owens, J. (2005): *Should the Arm's Length Principle Retire?* 2005 May/June, International Transfer Pricing Journal, Vol. 12. No. 3.
41. Owens, J. (2013): *Myths and misconceptions about transfer pricing and the taxation of multinational enterprises*, Bloomberg BNA Daily Tax Report. February 11, 2013.
42. Shackelford, D. és Slemrod, J. (1998): *The revenue consequences of using formula apportionment to calculate U.S. and foreign-sourced income: A firm-level analysis*, International Tax and Public Finance 5.
43. Sheffrin, S. M. és Fulcher, J. (1984): *Alternative division of the tax base: how much is at stake?* In: McLure, C.E., Jr. (Ed.), *The State Corporate Income Tax*, Hoover Institution Press, Stanford
44. Sullivan, M. A. (2010): *Transfer Pricing Issues in the Global Economy*, Testimony before the Committee on ways and means U.S. House of Representatives, July 22, 2010
45. Vernon, R. (1968): *Economic Sovereignty at Bay*, Foreign Affairs, 1968., Vol 47., No.1.
46. Vernon, R. (1972): *The Economic Environment of International Business*, Prentice-Hall, Inc.
47. Vernon, R. (2001): *Big business and national governments: Reshaping the compact in a globalizing economy*, Journal of International Business Studies, 2001, Vol 3.

## 8. Author's publications

1. [2007]Dankó Zsófia, "Offshore tevékenység tervezése", Microcad 2007 International Scientific Conference 22-23 March 2007, P szekció: Vállalati versenyképesség a XXI. században, Miskolci Egyetem, 67-75.o., ISBN 978-963-661-757-8
2. [2007]Dankó Zsófia, „Adóoptimalizáció offshore befektetésekkel”, XXVIII. Országos Tudományos Diákköri Konferencia, 2007. április 25-27., Közgazdaságtudományi Szekció, Közpénzügyek Tagozat, Miskolci Egyetem, Konferenciaközlemény
3. [2011]Dankó Zsófia, „Az eredménymegosztás módszertani különbségei az OECD gyakorlata és a CCCTB javaslat értelmében”, In: Majoros Pál (szerk.), BGF Tudományos Évkönyv 2011: Útkeresés és növekedés. Budapesti Gazdasági Főiskola, Budapest, pp. 120-121., Konferenciaközlemény
4. [2012]Dankó Zsófia, "Corporate tax harmonization in the European Union", Conference Proceedings, Crisis Aftermath: Economic policy changes in the EU and its Member States, 8-9 March 2012, University of Szeged, 207-219.o., ISBN 978-963-306-159-6
5. [2012]Dankó Zsófia, "Identification of Beneficial Owners in the Foreign-Sourced Dividend and Interest Payments", Proceedings of the CFA-BBS International Conference on the Global Financial Crisis, Macro-Economy, Management, Finance and Accountancy, Budapest Business School, College of Finance and Accountancy, 88-98.o., ISBN 978-963-7159-4
6. [2012]Dankó Zsófia, „Könyvismertető: Rendhagyó bevezetés a közpénzügyek tanulmányozásába”, Vezetéstudomány, (18:12), 61-62.o.
7. [2012]Dankó Zsófia – dr. Sipos Ágnes – Tasi Péter, „Adók és támogatások Tesztfeladatok”, Feleletválasztós tesztkérdések Adók és támogatások című tárgyhoz, Saldo Pénzügyi Tanácsadó és Informatikai Zrt., 5-9.o., 22-27.o. és 42-43.o., ISBN 978-963-638-421-0
8. [2012]Dankó Zsófia, „Unitárius jövedelemadó-rendszerek nemzeti és nemzetközi viszonylatban”, In.: Kihívások 2013 - Európai Unió, magyar gazdaság és társadalom, felsőoktatás: Programfüzet. 12. Nemzetközi Tudományos Konferencia a Magyar tudomány Ünnepe 2012 tiszteletére. 2012.11.08-2012.11.09., Budapesti Gazdasági Főiskola, pp. 20-21. Konferenciaközlemény
9. [2013]Dankó Zsófia, "Subnational Income Allocations with Formulary Apportionment – Examples to Better Understand the European Corporate Income Tax Reform", Conference Proceedings, 4th International Conference of Economic Sciences, 9-10 May 2013, Kaposvári Egyetem, 313-320.o., ISBN 978-963-9821-62-0
10. [2013]Dankó Zsófia, "A different tax policy approach of intra-group transactions", Conference Proceedings, Theoretical and Practical Aspects of Public Finance, 12-13 April

2013, University of Economics Prague, Faculty of Finance and Accounting, Prague, Czech Republic, 9 oldal, ISBN 978-80-245-1929-6

11. [2013]Dankó Zsófia, “A multinacionális vállalatok európai adózása és egy lehetséges alternatíva elemzése”, In.: Dankó L. (szerk): Nemzetközi üzleti esettanulmányok, Miskolci Egyetem Marketing Intézet, Miskolc 2013, 6. fejezet, 66-92. o., ISBN 978-963-358-023-3
12. [2013]Tóth Zsófia – dr. Sipos Ágnes, “Tax morale – Hungarian legal, historical, social and cultural circumstances”, International Conference in Economics and Business Management, Babes-Bolyai University, Kolozsvár, 2013. november 23. (szóbeli előadás)