Charles University in Prague

Faculty of Social Sciences
Institute of Political Sciences

MASTER THESIS

Corporate tax rates: A new area of international cooperation?

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Academic Year: **2013/2014**

Declaration of Authorship

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Acknowledgments

The author would like to thank Michal Parízek, Ph.D. for the consultations and supervision of the master thesis and provided guidance, patience and help with its completion.

Abstract

This thesis analyses the potential for international cooperation in the issue of corporate tax rates. Using newly created dataset we study the relationship between the foreign direct investments and corporate tax rates in order to confirm that countries benefit from competing in setting their tax rates. Lowering one's corporate tax rate pays off in increased FDI. Furthermore, under the assumption that competitive behavior is individually rational, we study with the use of coherent country clusters the extent of competition within selected clusters, as compared to the situation on the global level. We find that the degree of competitive behavior is lower within coherent block of countries than globally. Thus, there seems to be less mutually harmful competition within coherent clusters of countries, mainly in EU 15, OECD and ASEAN, than on the global level.

Keywords competition, corporate tax rate, international cooperation, foreign direct investments

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Extent of thesis: 135 505 characters including spaces

Bibliographic record

HRUŠČ, Erik. *Corporate tax rates: A new area of international cooperation?* Prague: Charles University, Faculty of Social Sciences, Institute of Political Sciences, 2014. 96 p. Master thesis supervisor Michal Parízek, Ph.D.

Abstrakt

Táto práca skúma možnosť medzinárodnej spolupráce v otázke korporátnych daní. Pomocou novo vytvoreného datasetu skúmame vzťah medzi priamymi zahraničnými investíciami a korporátnymi daňovými sadzbami, s cieľom potvrdiť, že krajiny profitujú so súťaženia v nastavení svojich korporátnych daňových sadzieb. Zníženie sadzieb vedie k zvýšeniu priamych zahraničných investícií. Nasledovne, s predpokladom, že súťaživé chovanie je individuálne racionálne, analyzujeme pomocou koherentných skupín krajín mieru súťaženia v rámci vybraných skupín, v porovnaní s globálnym prípadom. Zisťujeme, že miera súťaživého chovania je nižšia v rámci koherentnej skupiny krajín ako globálne. Zdá sa teda, že existuje menšia miera vzájomne škodlivého súťaženia v rámci koherentných skupín krajín, najmä čo sa týka EU 15, OECD a skupiny ASEAN, ako na globálnej úrovni.

Kľúčové slová súťaženie, korporátne daňové sadzby, medzinárodná spolupráca, priame zahraničné investície

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Rozsah práce: 135 505 znakov vrátane medzier

Bibliografický záznam

HRUŠČ, Erik. *Korporátne daňové sadzby: nová oblasť medzinárodnej spolupráce?* Praha: Univerzita Karlova, Fakulta sociálních věd, Institut politologických studií, 2014. 96 s. Vedúci diplomovej práce Michal Parízek, Ph.D.

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Acronyms

ASEAN	Association of Southeast Asian Nations
BRICS	Brazil, Russia, India, China, South Africa
CAGR	Compound annual growth rate
EU	European Union
FDI	Foreign Direct Investment
GDP	Gross domestic product
IMF	International monetary fund
OECD	Organization for Economic Co-operation and Development
PP	Percentage points
UN	United Nations

Introduction to the topic

The power to set independently tax rates and the ability to collect those taxes is one of the most important characteristics of the state´s autonomy. With the globalization of economy and deepening of the international economic transactions, the issue of taxes is no longer an issue of each country on its own. This can be seen mostly on the flow of the foreign direct investments to the countries, because it is mainly influenced by the investment opportunities in which corporate tax rates play a crucial role.

However, there exists an interesting paradox. On the one hand, it is in each country´s best interest to compete and unilaterally set their corporate tax rates in order to attract investors. On the other hand countries have a common goal not to compete in setting corporate tax rates in order to avoid the danger of *the race to the bottom*. In the same way in which states may compete for by lowering their social protection systems or environmental standards, or by artificially undervaluing their currencies, they can compete also by lowering their corporate tax rates.

As a result, countries have been lately interested in discussing this issue on the international level and organizations, such as OECD and IMF, will play an important role in providing platforms for these negotiations. However, it is very unlikely that there will be an agreement and any serious steps taken toward harmonization of corporate tax rates across the globe in terms of concrete institutional set up in the near future.

The motivation behind this thesis is that we have been observing progress in various fields regarding harmonization on global scale so far (environmental standards, tariffs, etc.) and further harmonization on regional level (regional economic integration processes), the question is, how far are the limits of widening global cooperation. The question of corporate tax rates is one of the examples, where the cooperation of states in form of binding institutional setup will most likely not happen in the near future. However, countries may wish not to compete among themselves in order to avoid mentioned race to the bottom. This thesis will examine theoretical and practical

possibilities and limitations of the mentioned paradox in corporate tax rate issue. Specifically we focus on whether the competitive under-cutting of corporate tax rates is for individual states profitable at all and, whether we can observe a difference in the level of competitiveness between, on the one hand, situation within coherent country clusters, and, on the other hand, the global level as a whole.

The two main questions we put forward in this thesis (with respective proposed hypotheses) are as following:

[1] "*Is non cooperative, competitive behavior of countries profitable in terms of bringing the expected results - attracting foreign direct investments?"*

[2] "*Is there a difference in the level of competitive behavior between coherent economic groups and the global level?"*

H1: *"Competing in corporate tax rate issue and taking unilateral action in terms of lowering corporate tax rates is profitable for states from the point of attracting foreign direct investments."*

H2: *"Member countries of coherent country clusters*[1] *are likely to show lower levels of competition in the issue of setting their corporate tax rate than is observed on the global level."*

In order to prove whether our stated hypotheses hold we answer our research questions by use of the regression analyses given statistical data, on which we elaborate later in text. We assume that some countries are more likely not to compete to such extent (there is higher convergence in their corporate tax rates) due to their characteristic socioeconomic development and international position. Confirming or rejecting of the second hypothesis is based on the convergence within the coherent clusters comparison.

[1] Coherent country clusters is a label used for international organizations as well as other logical country groupings, such as BRICS.

The reasoning behind above mentioned hypotheses is as following. Since there is no global governing body that can punish states for rogue behavior in setting the corporate tax rates, in order to not to compete there has to be no incentive in form of attracting foreign direct investments. Otherwise, there is a strong incentive for states not to cooperate and not to seek any form of further mutual agreement. However, while countries can benefit from the rogue behavior they may choose not to, because of the fear of the race to the bottom. The states are concerned with the possible retribution response from the other countries and worsening of the overall relations among countries. In this thesis we suppose that while on the global level the competition is present, within the coherent country clusters the competition is lower, due to the spillover effect from harmonization in other issues. In order to maintain a true cooperation in the corporate tax rates, there is a need of international institution or regime, as seen from the neoliberal institutionalism approach.

The reason why the above mentioned research questions were chosen is that we would like to continue in the already conducted research and go beyond studies on the OECD countries, by including other major economies. Furthermore we add several new variables into analysis and encompass up to date data with which we seek to confirm or reject given hypotheses. Last but not least, we question the issue whether even without a formal cooperation there is are signs of cooperative behavior and thus lower competition within coherent country clusters than on the global level. If this is the case, we assume that there is a higher future possibility for an institutionalized cooperation within coherent country clusters than on the global level.

Our subsequent analysis confirms our assumptions and we are able to confirm both of our hypotheses. The competitive behavior is indeed profitable, as the up to date academic research suggests, also given larger sample of data and inclusion of international and political aspects. Secondly, with regard to the competition within coherent country clusters as compared to the global level, we are able to conclude that there is less intense competition, mainly among economically integrated country clusters, and therefore we expect higher possibility of future institutional cooperation among these countries also in the question of corporate tax rates.

The thesis continues in the following matter. First we provide a theoretical background and summarization of the academic debate on the topic so far, along with the examples of regional efforts taken to harmonize tax rates. Secondly, we provide a thorough overview of the methodological concepts we use with the proposed variables and their operationalization. Then, we provide a statistical descriptive analysis of the underlying data, followed by the regression analysis and further corporate tax rate analysis, in order to provide confirmation of stated hypotheses. Finally we conclude this thesis with the discussion about the results and concluding remarks.

With regard to the proposed project of the thesis (listed after appendix), which was approved by the science-pedagogic committee of the Institute of Political Science, this thesis deviates from it in several aspects. First of all we slightly modified our hypotheses as to better reflect the underlying theory and subsequent qualitative analysis. Secondly, we do not compare development of corporate tax rates with the development of other tax rates, due to the sufficient analysis of the development of corporate tax rates and the extent of the thesis. The third and the most major change is the omission of the game theoretical model, due to the reasoning that underlying theoretical assumptions and current methodology is sufficient to fully answer our stated hypotheses. For the same reason we also omit the second regression analysis on the dependent variable *new firms* as foreign direct investments provide ample information to draw conclusion about the benefits from competition. On the other hand as opposed to the project, we increased our sample of countries to account not only for the OECD and BRICS, but our dataset consists of 149 countries. Also, the timeframe was enlarged to the period from 1981 to 2013, with the exception of the regression analysis, which is limited due to data availability to the period from 1997 to 2012.

1 Theoretical background and academic debate

In this chapter, the elaboration on the theoretical link between the issue of taxes and international relations, meaning their respected main theories, is provided. Furthermore, this chapter summarizes the current academic discussion in the issue of tax harmonization versus the free competition, along with the introduction of the main research papers on this topic. The chapter is concluded with the summary and brief analysis of the progress on the international level in the issue of corporate tax rate harmonization so far. The purpose of this chapter is to situate our consequent analysis of corporate tax rates into the international relations framework and connect empirical findings with the theoretical reasoning. Further we present the academic research upon which we built our hypotheses.

1.1 Theoretical background

The question of cooperation among states has been present in the theories of international relations since the first great debate between the realism and liberalism and later elaborated upon in the neo-realistic and neo-liberalistic branches. While realism emphasizes anarchy and egoism in the international relations, which resulted in the dominance of power politics over cooperation, liberalism on the other hand emphasizes peaceful cooperation of states through free trade and institutions. [DONELLY 2005: 30] [BURCHILL 2005: 59]

Further elaboration on this conflict between the self-interests of states and their cooperation has been provided by the neo-liberal offspring of the traditional liberalism, which offered a synthesis of liberalism and realism. Along the line of the realistic thinking, the main variable explaining states' action is their relative power and relative gains of actors in international politics and focus on distributive aspects of the cooperation. On the other hand neoliberalism claims that states are able to cooperate and pursue collective goals even in anarchic environment of international relations,

while still being the main system actors concerned with their self-interests. [HASENCLEVER, MAYER, RITTBERGER 2005: 81]

Subsequent debate between neorealism and neoliberalism was mainly concerned about the role of institutions in enabling cooperation among states and the relative gains problem. In that view, regarding neo-realism, states won't cooperate when they will obtain less than their adversary, therefore proposing only limited or almost non-existent cooperation among states. The cooperation is problematic due to a relative gains argument, under which states seek relative gains rather than absolute gains in international relations, with no emphasis on whether these gains will be ever achieved by any of the involved states. On the other hand, neoliberals believe that this relative gains argument can be diminished through negotiations and creation of international organizations and regimes. [GRIECO; POWELL; SNIDAL 1993] Furthermore, neoliberalism views states as rational egoists which are maximizing their utility function that is independent from the utility functions of other states. [HASENCLEVER, MAYER, RITTBERGER 2005: 105] Therefore, states are able to focus on achieving absolute gains which consequently enables cooperation.

Nevertheless, both branches of the international theory agree upon that absence of the authority creates an opportunity for states to pursue their own interests without the fear of being punished in case of noncooperation. Jervis stated this in his paper about the difference between the realism and neo-liberalism in the following way: *"Both realism and neo-liberalism start from the assumption that the absence of a sovereign authority that can make and enforce binding agreements creates opportunities for states to advance their interests unilaterally and makes it important and difficult for states to cooperate with one another."* [JERVIS 1999: 43] Thus without institutions that can enforce binding and safe agreements among states (and punish those who breach agreements) there is only a little room for international cooperation among states.

However, in this line of argument comes the main difference with regard to the role of institutions in cooperation of states. Neorealism doesn't pursue the issue that states never cooperate, on contrary, countries cooperate to achieve their goals; however this cooperation is limited at bests mainly due to the structurally implied intolerance to relative losses of states. [HASENCLEVER, MAYER, RITTBERGER 2005: 105] On

the other hand, neoliberalism criticizes neorealist claim that this cooperation is limited in an anarchical world and believes that potential for cooperation is much greater and can be nurtured through formal institutions. [BURCHILL 2005: 64] Robert Gilpin elaborates on this description of neoliberal branch of theory with the accentuation on acceptance of importance of nation state aspect in international relations and adds the belief that international institutions are able to cope with the current globalized world: *"Neoliberal institutionalists believe that international institutions have become sufficiently strong to meet the challenges of a globalized international economy."* [GILPIN 2001:379] In other words, under neoliberal institutionalism the cooperation among states is possible via institutions and the current institutions are able to enhance such cooperation.

In order to maintain a cooperation among states one of the possibilities is having a hegemonic dominance of one state, which will act as an alternative to the sovereign authority among the states. Robert Keohane states that *"hegemonic leadership can help to create a pattern of order...while...hegemony depends on a certain kind of asymmetrical cooperation, which successful hegemons support and maintain"* [KEOHANE 1984: 49] United States acted as such hegemon after the second world war, however its current role as a world hegemon is diminishing with questionable prospects into the future.

Another way how states can be steered into the cooperation is via international institutions and international regimes. Keohane believes that in the absence of the hegemonic power, the non-hegemonic cooperation is possible and can be facilitated especially by the international regimes. Furthermore these regimes do not experience decay during the decline of the hegemonic power due to the fact that *"the conditions for maintaining existing international regimes are less demanding than those required for creating them."* [KEOHANE 1984: 50] However, Keohane still puts emphasis on the fact that hegemonic set up helps in process of creating the international regimes. He further believes that *"international cooperation among the advanced industrialized countries since the end of World War II has probably been more extensive than international cooperation among major states during any period for comparable length in history."* [KEOHANE 1984: 5]

For the purpose of our work, it is important to briefly mention also the theory of neofunctionalism and the idea of the spillover effect which we utilize later in our analysis of competitiveness across selected coherent country clusters. With some simplification, the main argument in the spillover effect is that cooperation in one policy area leads to pressures on cooperation in other, similar policy areas and ultimately causes further cooperation and integration. [JENSEN 2013] Therefore, we assume that in selected coherent country cluster, which cooperate mostly in the economic issues, there is a spillover effect and these clusters shows also signs of higher cooperative behavior in corporate tax rate and are more likely to institutionally cooperate in this issue in the future. With regard to our hypotheses, we analyze this theoretical assumption in our second hypothesis.

However, firstly we prove the first given hypothesis if there is even a potential for this cooperation. When the first hypothesis is proven incorrect, we would have a state of a harmony in which there is no intention for states to unilaterally lower their corporate tax rates, and therefore also no need for cooperation either formal or informal. However, given so far academic research we do not expect that we reject our first hypothesis. Since this thesis works with economic methods and econometric tools, there is a need to briefly comment on the connection and blending of economics and politics.

Robert Gilpin defines economy in his work "*Global Political Economy: Understanding the International Economic Order"* in the following way: *"a sociopolitical system composed of powerful economic actors or institutions such as giant firms, powerful labor unions, and large agribusinesses that are competing with one another to formulate government policies on taxes, tariffs, and other matters in ways that advance their own interests."* Among those actors, the most powerful are regarding Gilpin national governments. [GILPIN 2001: 38]

Similar interconnection between politics and economics with emphasis on the national states and their governments provides Robert Keohane: *"Wealth and power are linked in international relations through the activities of independent actors, the most important of which are states not subordinated to a worldwide governmental hierarchy."* [KEOHANE 1984: 18] What once was though as two separated branches of academic research about the human society is now becoming an interconnected field

of study. As Gilpin puts it: *"the worlds of politics and economics, once thought to be separate (at least as fields of academic inquiry), do in fact importantly affect one another."* [GILPIN 2001: 25] Furthermore, Joseph S. Nye in his work Soft power: the means to success in world politics distinguishes among three sources of power, defined in two categories hard and soft power. While hard power encompasses both military and economic power, soft power *"rest on the ability to shape the preferences of others."* [NYE 2004: 5]

This thesis is one of the examples, in which the international relations, politics and economic interests affect each other and states have to carefully weight political as well as economic consequences of their actions. Many researchers have long ago begun to analyze economic consequences of political actions and role of the economy in the international relations. Economic variables (such as taxes, tariffs, FDIs, etc.) and economic organizations and their role in international relations are frequent topics in International Relations journals, such as Global Governance, Review of International Organizations, International Journal of Political Economy, and many others. Economic issues and problems have been established as a firm aspect of interest in international relations and researchers focus on questions such as of international finance or international trade among countries.

Monetary, trade and financial issues were in past labelled as *low politics*, nowadays they present a substantive element of the field of international relations. Among many new questions academic debate concerns itself with topics such as challenges to the state authority from markets and supranational corporations, who governs the world of international finance and if states and markets are in an opposition to one another, or not. [COHEN 2002: 429-430] Furthermore, questions of international trade are becoming more important topics on the agenda of international organizations and are affecting also domestic politics of involved countries. The increasing importance of these trade issues was enabled by larger openness of countries and further global interconnections. [MILNER 2002: 448] All this together gave away to a new connected branch of research, international political economy, and once solely economic research questions are now part of the field of international relations too.

With this in mind, in the field of international relations and international political economy, many authors researched and questioned the cooperation among states on the global level, the means and ways how the cooperation is possible and can be maintained. For example Stephen D. Krasner examined in his famous work "*Global Communications and National Power: Life on the Pareto Frontier"* with use of game theoretical models cooperation among states and role of international organization in reaching Pareto optimal outcomes. [KRASNER 1991] He researched in 1991 the cooperation of states in terms of establishing the international telecommunication regimes. He concluded that *"while all actors were better off with some form of coordination rather than none, the form of coordination adopted would affect them differently."* [KRASNER 1991: 363] In other words, while creation of international regime in international telecommunication resulted in gains for all involved states, the power of individual states influenced the distribution of individual gains for states. [KRASNER 1991]

Another example of such research is Robert Gilpin in his "*Political Economy of International Relations"*, where he analyzed the establishment of international economic institutions after Second World War and overall relationship between politics, international relations and economics on international scale. [GILPIN 1987] Or in Jervis´s comments on the game theory models and their usefulness in studying international relations and drivers behind the decision of states to cooperate or not cooperate on international level. [JERVIS 1988]

This thesis continues in the academic debate from the neoliberal institutionalism perspective and examines the extent of cooperative behavior and room for institutional cooperation among states in corporate tax rates, building upon the previous research conducted in the field of international political economy. We assume that within more coherent country clusters there are higher signs of cooperative behavior and lower competition than on the global level, which indicates higher possibility for future institutional cooperation in the issue of corporate tax rate within selected clusters.

1.2 Harmonization versus the free competition in tax issue

The question of corporate tax rates is one of the central topics of current international political economy which belongs as we have shown to the overall international relations debate. The current academic research concerns itself with the issues of tax harmonization versus tax competition, efficiency of tax competition and overall benefits resulting from possible harmonization of corporate tax rates, accompanied by the sheer possibility of cooperation of countries in this issue. The overview of main research papers from authors concerned with corporate tax rates and international cooperation questions follows.

John Douglas Wilson in his article *"Theories of Tax Competition"* addresses the gradual development of the academic research regarding the issue of tax competition. He states that since the beginning, when the tax competition among countries was straightforwardly regarded as an inefficient, the attitude has changed and competition among governments is viewed as less direct phenomenon with an emphasis also on the beneficial aspects of tax competition. [WILSON 1999] In his previous work *"A theory of interregional tax competition"* Wilson modelled a general equilibrium model, through which he showed that theoretically both states, one in which competition exist and one that is not characterized by the absence of competition in taxes, are possible. [WILSON 1986]

Wilson further together with David E. Wildasin define tax competition in their article *"Tax competition: bane or boon"* narrowing the academic broad definition that the tax competition is *"any form of noncooperative tax setting by independent governments."* They regard this definition as too broad and add the requirement that each government's tax policy influences the allocation of tax revenue across government treasuries. [WILDASIN; WILSON 2004] In our work we build upon this narrower definition of tax competition among countries with respect to the mentioned issue of the race to the bottom, where countries through the tax competition influence not only their tax revenues, but also the tax revenues of other countries.

Philipp Genschel and Thomas Plumper in their research *"Regulatory competition and international co-operation"* studied pressures on the regulation in general from the regulatory competition among countries with the emphasis on the fact that the regulatory competition does not cause only downward pressures on regulation, but may cause upwards pressures on regulation. They analyzed conditions, under which the enhancement of regulation can result from the international cooperation. [GENSHEL; PLUMPER 1997]

Dani Rodrick in his book *"Has globalization gone too far?"* challenges the growing level of globalization and thus the possibility of countries to compete for capital by providing cheap labor, less regulation and lower taxes for companies. He addresses the issue of the race to the bottom and the adversary effects mainly on the low-skilled workers, due to the increasing difficulties of countries in responding to demands for social insurance. Rodrick calls for a moderate opposition to the globalization in order to protect from the adverse effect of the competition among countries and proposes targeted protection, especially against losses from transferring production to countries that tolerate practices that are not tolerated in domestic countries. [RODRICK 1997]

Thomas Rixen in his work *"Politicization and Institutional (Non-) Change in International Taxation"* addresses the issue of institutional changes of international tax governance in response to growing politicization and contestation of international direct tax issues. He proposes that politicization of international taxation from civil society actors is a result of a governance gap: *"It is the lack of an institution outfitted with sufficient authority to effectively regulate tax competition between countries, which leads to dissatisfaction with the status qua and, ultimately, to politicization."* [RIXEN 2008: 2] However, this politicization from civil society side, according to Rixen, has not led to any significant institutional changes so far, and furthermore, the international organization, such as UN and OECD have not been willing to take civil society as an equivalent partner in the discussion. Only UN granted a formal access to consultation process in issue of the international taxation regime for the civil society so far. [RIXEN 2008: 24]

In another of his work *"Tax Competition and Inequality – The Case for Global Tax Governance",* Rixen states that the global tax governance has not been viable due to two reasons. First one being a belief that power to tax is central to state sovereignty and second one being the argument of the majority of political science research that that *„the externalities resulting from domestic tax policy choices on other nation states are negligible."* [RIXEN 2011: 1] He disagrees, mainly with the second reason and proposes a model for global tax governance, in which he calls for adoption of *"unitary taxation with formula apportionment"* by the international organization that would operate under the patronage of United Nations [RIXEN 2011]

The above academic literature and research topics influenced us in stating our hypotheses with regard to the possibility of institutionalized cooperation among countries in question of corporate tax rates. As we mention in the beginning of the thesis we expect signs of cooperative behavior, not necessary cooperation in true meaning of the word, within coherent country clusters and lower competition than on the global level. Institutionalized cooperation is assumed to be more possible within those coherent clusters than on the global level, which as the current research indicates is not achievable in the near future. Following review of academic literature includes papers and research questions that were influential in stating our first hypothesis about benefits from corporate tax rate competition.

Concerning the already conducted empirical research on the subject of international tax competition, one of the main recent works was done by Michael Devereux, Ben Lockwood and Michela Redoano. In their study *"Do Countries Compete over Corporate Tax Rates?"* they analyzed competition in tax rates among 21 OECD countries over the period 1982 to 1999. From theoretical perspective, they identified two types of competition, namely over statutory tax rates (in case of mobile profit – transferring profits to lower taxed country) and over effective marginal tax rates (in case of capital – selection of the capital stock in country where production is based). Empirical analysis on the mentioned data sample confirmed their theoretical predictions on the competition, with conclusion that given countries compete over both types of tax rates and that countries adapt their tax policies to changes in other countries´ tax rates. [DEVEREUX; LOCKWOOD; REDOANO 2008]

In earlier work *"Corporate Income Tax Reforms and International Tax Competition"* Michael Devereux together with Rachel Griffith, Alexander Klemm and others, studied the development of corporate tax rates in EU and G7 countries. They focused on tax-cutting and base-broadening reforms which had an effect that for more profitable investments the effective tax rates had fallen, while on marginal investments the effective rates remained stable. [DEVEREUX; GRIFFITH; KLEMM et al. 2002]

One of the first work on FDI using panel data was research done by Joel Slemrod in his article *"Tax effects on foreign direct investment in the U.S.: Evidence from a cross-country comparison"* . He examined inflows of FDIs into United States of America depending on effective marginal tax rate as the main explanatory variable, using control variables such as unemployment, real exchange rate and gross domestic product. Furthermore, he studied inflows of investments from seven different countries. His results proved that there is generally a negative impact of effective marginal tax rates on total FDI. [SLEMROD 1991]

More recent example of research on FDI is the research by Agnès Bénassy-Quéré, Lionel Fontagné and Amina Lahrèche-Révil *"How Does FDI React to Corporate Taxation?"* Their research was based upon a panel of 11 OECD countries over the period of 1984 – 2000, focusing on bilateral relations in terms of foreign direct investments using tax rates differentials. The result of their analysis was that tax differentials play a significant role in allocation of foreign capital. [BÉNASSY-QUÉRÉ, FONTAGNÉ, LAHRÉCHE-RÉVIL, 2004]

Shafik Hebous, Martin Ruf and Alfons J. Weichenrieder analyzed in their article *"The effects of taxation on the location decision of multinational firms: M&A versus Greenfield investments"* the sensitivity of capital allocation with regard to Greenfield investments or mergers and acquisitions. They studied the firm-level data of German outwards foreign direct investments, enriching the research by more microeconomic approach, concluding that locations of Greenfield investments are more sensitive to differences in tax rates than M&A locations. [HEBOUS. RUF, WEICHENRIEDER 2011]

With the use of a game theoretical approach André Fourçans and Thierry Warin analyzed tax harmonization or cooperation in a monetary union, namely in European Union in their study *„Tax Harmonization versus Tax Competition in Europe: A Game Theoretical Approach.“* They concluded that for the one shot game, the harmonization is necessary, because both players (European countries) have to mutually agree to follow given tax policy, otherwise the result of non-cooperation (a simple extension of equilibrium in prisoners´ dilemma) will occur. For the infinite horizon with the existence of tax competition among countries, the players depend on their ability to signal their intentions and not to mislead the other country, otherwise it would lead to the race to the bottom and a worse off situation for the both players. The result of Fourçans and Warin theoretical approach is that the coordination between countries would incur without the formal rules, due to importance of signaling and knowledge that prolonged punishment would result in a worse off situation for both countries. The main important factor behind this reasoning is that country is able (and signals this ability) to enter a war for taxes, which is only possible with sound public finances. [FOURÇANS, WARIN 2001]

In their article for IMF quarterly magazine Finance & Development, *“FDI and Corporate Tax Revenue: Tax Harmonization of Competition“*, Reint Gropp and Kristina Kostial in 2001 studied tax harmonization or competition among OECD countries. They noted that countries with less attractive tax rates among OECD countries experienced decline in tax revenue. Furthermore, they stated that *“since the mid-1980s, OECD countries have been harmonizing their corporate tax regimes, as evidence by a reduction and convergence in both statutory and effective tax rates. “* [GROPP, KOSTIAL 2001: 2] This convergence of tax rates can mean that countries have begun to informally cooperate, however, the more viable explanation is that the reason behind decrease in average corporate tax rate among OECD countries (and behind the decrease in dispersion around the average rates) is according to Gropp and Kostial that *“tax competition is important and that governments may have redesigned their tax policies to counter the threat of FDI outflows and to attract FDI inflows.”* [GROPP, KOSTIAL 2001: 2] They research method, when they studied the dispersion around the average, influenced us in proposed method for further corporate tax rate analysis.

As Gropp and Kostial further state in their article, some European governments have been strong advocates of corporate tax harmonization, in order to avoid further decrease in tax rates, which would effect countries´ tax revenue and in turn their fiscal stability. To analyze possible tax harmonization and its impact on included countries, in terms of FDI flows and tax revenues, they modelled a system in which countries accepted harmonized rate. The main result from their simulation was that *"high-tax countries would gain revenue from harmonization, while low-tax countries would lose revenue."* [GROPP, KOSTIAL 2001: 6] As a policy implication from their research stands out the issue of letting tax competition run freely among states which would possible lead to low corporate tax rates and in turn increased tax on labor to compensate governments from loss of income on capital. [GROPP, KOSTIAL 2001]

Based on our knowledge, the listed review of academic works represents the main research regarding topic of cooperation of countries and corporate tax rate competition. This work adds to the debate by firstly including current panel data to address the most recent development and allow to include international aspect – membership in international organizations – in our corporate tax rate analysis. Secondly, we focus also on the issue if the level of governance plays a role in increasing foreign direct investments' net inflows or if on the other hand, the investments are driven purely by economic variables. Also we model if membership in OECD has an effect on FDIs with connection to corporate tax rate lowering. Therefore, governance index and OECD membership serve in our model not only as control variables, but also as the independent variables of interest. Thirdly, we address the issue of competition among countries in setting the level of corporate tax rates with respect to clustering of countries within the coherent country clusters. We assume that on the global level the competition is strongly present and possibility for institutionalized cooperation low, as suggested by the recent academic research. However, we expect signs of cooperative behavior within coherent country groups and lower competition, which leads us to expectation of future institutionalized cooperation in corporate tax rate issue.

1.3 Progress on the international level so far

So far, the international scene has seen not much of a formal cooperation in terms of global international taxation. The main goal of states has been primarily to avoid double taxation of firms as a result of international trade and investments, as Rixen states in his work on the politicization of international taxation. He continues that states were occupied by preserving their sovereignty in tax issues and the creation of internationally binding agreements was therefore constrained, which led to *"unintended consequences in the form of tax avoidance, evasion and tax competition"*[RIXEN 2008: 1-2] To summarize it, the same rules that were created to avoid double taxation of companies, allowed firms to structure their business relations in order to minimize their tax payments using various instruments, for example transferring its legal residence to low tax country. [RIXEN 2008: 7]

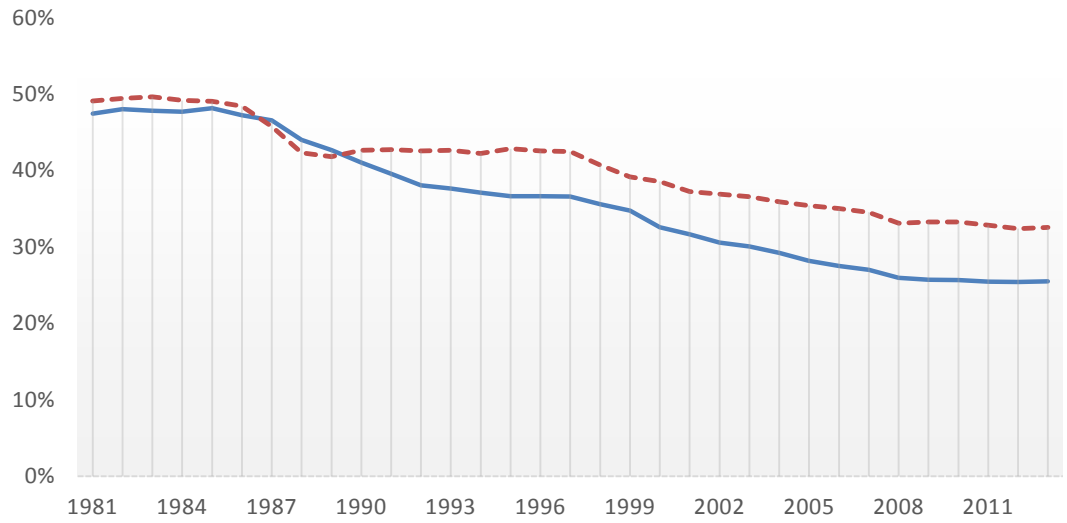
The only formal agreements over the tax issue on the international scene have thus so far been intergovernmental agreements and the creation of the true global taxation regulation must come from the development of supranational organization monitoring and enforcing rules. As Rixen concludes: *"the need for such institutional reform is not met"* and governments are just changing the current institutional set up, with no will to create a new one, resulting in diminishment of their sovereignty over taxation. [RIXEN 2008: 2] To conclude, there are *"neither international rules to regulate tax competition – which would have to aim at some degree of standardization among national tax systems – nor is there an international organization with sufficient competence to enforce such rules. In many cases, there is not even information exchange between national tax administrations."* [RIXEN 2008: 9]

Without any supranational cooperation, countries have thus been following the same decreasing trend in corporate tax rates (when we take into account for now only OECD countries). The average OECD combined[2] corporate tax rate has fallen from nearly 50% in 1980s to under 35% in 1999, and current average OECD tax rate is down almost to 25%. For better illustration see the following graph displaying simple average

[2] Combined tax rate is the same as a statutory tax rate, thus legally implied tax rate.

and GDP weighted average of combined corporate income tax rates in OECD countries since 1981 to 2013. [OECD Tax Database 2013]

Graph 1. Development of corporate tax rates of OECD countries



The most importantly, the decreasing trend in corporate tax rate is obvious throughout the entire time period. It is interesting also to observe growing difference between average tax rate (blue line) and GDP-weighted tax rate (red dashed line) in OECD countries showing that countries with lower GDP have lower tax rates compared to high GDP countries. The growing difference can be accounted to new member countries entering OECD with smaller GDP. Still the conclusion can be drawn that higher GDP countries tend to have higher corporate tax rates compared to their lower GDP neighbors in OECD.

Nevertheless, even without global supranational governing authorities with real power over this issue several attempts to regulate international tax competition and avoid its harmful aspects have been present in recent years. European Union, as the most advanced international organization in terms of integration and harmonization, can be regarded as the most prominent advocate of the fight against the harmful tax competition. European Union´s Ruding Committee passed in 1992 a recommendation to keep corporate tax rates at a minimum rate of 30%. At that time this recommended rate was lower than any rate in Europe, however, one third of European countries lowered in 10 years period their tax rates below this recommendation. [DEVEREUX; LOCKWOOD; REDOANO 2008: 2] Still, several recommendations of the Ruding

Committee were recognized by the Council and accepted as a Union´s goal, such as preventing tax evasion, ensuring effective taxation and elimination of double taxation. [European Commission 2014]

Furthermore, as part of the European strategy to create a single internal market, the goal of The Common Consolidate Corporate Tax Base (CCCTB) for European companies operating in more member countries was outlined in Commission´s communication: *„Towards an Internal Market without tax obstacles – A strategy for providing companies with a consolidated corporate tax base for their EU-wide activities"*[European Commission 2001]. The working group was set up, and after 10 years of negotiations the European Commission proposed for businesses operating in the Union on March 16th 2011 a common system for calculating their tax base, meaning that companies would need to file only one single consolidated tax return according to the Union´s law for all of their activities in all member states. [European Commission 2014] Still, this is a long way from harmonizing also corporate tax rates or even passing binding minimal or other requirements for member states with regard to taxing companies operating in their territory. Furthermore, the debate is still mainly about if the harmonization of corporate taxes is necessary, or this sovereign right of member states should be left to them and not passed to supranational jurisdiction of Commission and European Parliament.

Regarding other supranational organizations, there have been some efforts to enhance international cooperation and reduce harmful effects of tax competition also on the global scale. For example in July 2002 the Forum on Tax Administration was established encompassing 45 OECD and non-OECD countries in an effort to develop a global response to the tax administration issues with aim to nurture constructive dialogue among involved actors. [OECD 2014a] Furthermore, OECD in its study "*Addressing Base Erosion and Profit Shifting"* calls for stronger cooperation in the corporate tax rate, especially in the issue of large corporations shifting their profits in order to avoid tax. While no optimal international tax rate was presented by this study, the action plan was suggested to be developed in cooperation of governments and business community, in order to provide concrete steps to reinforce the global tax system´s integrity. [OECD 2013] With regard to the International Monetary Fund, in the recent note "*Issues in International Taxation and the Role of the IMF"* from June

2013, it was urged that the *"Fund be more present in current discussions of international tax issues".* [KEEN; PERRY 2013] The recommendation was made to focus on the mandate of the IMF and utilize its macroeconomic expertise in complementing the work of other institutions, mainly OECD. IMF´s extensive analytical and technical expertise in practicalities of international taxation and economics, alongside with its near-universal membership should be used to enhance international cooperation in this issue of international taxation. [KEEN; PERRY 2013]

Nevertheless, the bottom line is that there is yet no institutionalized pressure on countries to cooperate in corporate tax rates in terms of setting exact guidelines and norms for corporate tax rates harmonization. However, this harmonization can be beneficial and countries can compete less at least on cluster basis, when they would form local cartels, keeping the corporate tax rate at some given level. The last part of this thesis analyses if this behavior occurs, and to what extent countries do not accept competition in the issue of corporate tax policy and set their corporate tax rates within coherent country clusters in more *harmonized* manner.

2 Methodology

In this part of the thesis we describe in detail the methodology used for our research. At first, we provide an overall data description with sources and modifications we make, then we continue with in detail description of the regression model and the theory behind it and we conclude with the overview of the methodology for the further corporate tax rate analysis of cooperative behavior within coherent country clusters.

2.1 Data description and sources used

In this thesis we use two timeframes, different for descriptive and for the regression analysis, due to the lack of data availability. For studying trends in statutory corporate tax rates we have a dataset from 1981 to 2013, while in regression we model foreign direct investments' net inflows dependence on dataset from 1997 to 2012, due to most of the variables not being fully available for the whole time period for all countries from the descriptive analysis. In our further statutory corporate tax rate analysis for the comparison across coherent country clusters we adjust timeline accordingly to the data availability in order to maintain methodological and statistical soundness. These adjustments are more elaborated upon in respected chapter. With regard to the final comparison, this is provided for period from 2004 to 2013.

Countries involved

Altogether we have selected 149 countries for our research, due to the data availability for corporate tax rates. In case of the regression analysis, the countries are limited to the number of 59 in order to get a most balanced panel possible, while not losing much of our scope. Thanks to this countries limitations, our dataset has less than 2% data entries missing from the total of 5664 data entries. The dataset that we use for the regression analysis was manually collected from several sources and adjusted for our needs, therefore it represent a new and original dataset that can be further used to study associated topics and issues. Thus the source for following graphical representations, modelling and analysis used in this thesis is this newly created dataset.

For the long list of countries with the data availability for statutory corporate tax rates and for the regression analysis, please consult the appendix of this thesis.

Statutory corporate tax rate

In our thesis we use statutory corporate tax rates as opposed to marginal or effective corporate tax rates. Statutory corporate tax rate is the legal rate by which the corporations´ taxable income is taxed, in other words, it is the official rate that is given by law and applies to all corporations in the same way. The marginal corporate tax rate is a concept that takes into account by how much an additional unit of income is taxed, therefore a corporation is taxed based on the level of its income; in other words the corporation is taxed progressively. On the other hand, the effective corporate tax rate measures how much a corporation pays in taxes as a percentage of its economic profit, therefore, the effective tax rate measures how much (in percentage) corporation actually pays as taxes. [TODER 2008] [CNBC 2012] When country is using a marginal concept of taxation, in our dataset we take the highest level of tax as a statutory corporate tax rate. The reasoning behind taking the statutory corporate tax rate as the unit of interest is that it signals the official political decision of a country applying to all businesses and provides a clear signaling to investors. Another, more pragmatic, reason is that data for statutory tax rates are available for the larger sample of countries.

Data for statutory corporate tax rate come from three sources. The first being an OECD Tax database providing combined (statutory) corporate income tax rates, the second being a yearly survey done by KPMG Company collecting statutory corporate tax rates for each country in scope, and the third being the worldwide corporate tax guides from Ernst & Young Company, focusing also on statutory corporate tax rates. While OECD Tax database only covers 34 OECD members from 1981 to current date, and in case of data from 1981 to 1993 it fully covers only 21 countries; KPMG gathers data for larger scope of countries from 1993 to current date (24 in 1993, 57 in 1997 and 128 in 2013). Furthermore, Ernst & Young tax guide covers around 150 countries and jurisdictions from 2004 to 2013. Data for the year 2014 were left out of our analysis. [OECD Tax Database 2013] [KPMG International 2014] [KPMG International 2006] [Ernst & Young 2014]

In case that there are some minor differences between the OECD, KPMG and Ernst & Young datasets, due to different methodology, data collection or rounding, the OECD data are given a priority, followed by KPMG, and Ernst & Young database is utilized to fill in the missing observations, due to its shortest timeframe. However, such cases of differences among the source datasets are only with a minor occurrence and are limited only to several years, not the whole timeline for given countries.

From all countries in scope, 11 are regarded as tax havens[3] (Bahamas, Bahrain, Bermuda, Bonaire Saint Eustatius and Saba, British Virgin Islands, Cayman Islands, Isle of Man, Guernsey, Jersey, Maldives and Vanuatu) and we discard it from our dataset for descriptive analysis. Further, we discard also countries that have less than three observations for the selected period of time and also countries that have no most recent observations (for years 2011-2013), leaving us with 149 countries in our scope. From now on, whenever in the following analysis is mentioned corporate tax rate, we mean statutory corporate tax rate.

Foreign direct investments´ net inflows

Data for the foreign direct investments´ net inflows come from the World Bank database. The data portray net inflows of foreign direct investments (new investments less disinvestment) in given countries from foreign investors. Units used are current U.S. dollars. The timeframe of the original World Bank´s database is from 1970 to 2012 and covers majority of world countries (with of course not a full coverage for all countries throughout the time). [World Bank 2014a] For our regression analysis only a portion of this database is used.

Gross domestic product and gross domestic product per capita

Data for gross domestic product and gross domestic product per capita come also from the World Bank database. Both of them are expressed in current U.S. dollars and the timeframe is from 1970 to 2012 and the scope of countries is same as for the

[3] The listed corporate tax rate for these countries is 0. We also discard United Arab Emirates, due to the similar reasons and the fact that there is no federal tax system.

foreign direct investments´ net inflows dataset. [World Bank 2014b] [World Bank 2014c] Again, for our regression analysis we use only a portion of these datasets.

Labor cost

Data for labor cost come from the Economist Intelligence Unit database. The Economist Intelligence Unit database covers majority of countries, although not to the full extent of the timeframe in question and scope of countries for which also corporate tax rates are available. For our research we take only a portion of this database. Labor cost is expressed as an average cost of labor per hour (including pay and non-pay costs) and is listed in current U.S. dollars. [The Economist Intelligence Unit 2014]

Governance index

The data for governance index are taken from the World Bank database, from the Worldwide Governance Indicators project. The project aggregates indicators for six dimensions of governance, namely *Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law* and *Control of Corruption.* The methodology behind these aggregates is that the research is conducted to summarize views on the quality of governance from various actors, such as business enterprises, citizens and experts in industrial and developing countries. Furthermore, data are taken from think tanks, non-governmental organizations, international organizations and survey institutes. Index for each category ranks country along the scale from -2.5 (being the worst) to 2.5 (being the best). Timeframe of the index is from 1996 onwards with 215 countries in scope. For more detail on data availability again consult appendix for the long list of countries. [World Bank 2013]

For the regression analysis, data for governance index are adjusted in the following way. From the six separate indices, the one index is created which is used in the model, by taking a simple average of separate indices. In the case of years 1997, 1999 and 2001, where there was no research done by the World Bank (project was at first collecting data every two years, then after 2002 every year) we use a linear interpolation to add missing data, assuming that countries are following some trend in their governance development over time. The governance index is included in the

regression analysis, due to the fact that it represents an important political aspect of our analysis, further justification is provided in the following section.

OECD and EU membership

Data for OECD membership come from the OECD website and present dates on which member countries deposited their instruments of ratification. [OECD 2014b] For European Union membership, we take data from the EU official websites and again the data portray information about the year of admittance in the Union. [European Union 2014] For our analysis we only take into account if the country is in the organization for a given year (we assign them 1) or if it is not (we assign them 0). In regression analysis only an OECD membership is considered, however for the further corporate tax rate analysis we operate also with EU membership.

2.2 FDI net inflows model

In this section we describe the theoretical background for the model we use in the regression analysis in order to confirm or reject the first given hypothesis, and introduce the detailed generalized version of proposed model. The hypothesis that we want to answer through this analysis is as following:

H1: *"Competing in corporate tax rate issue and taking unilateral action in terms of lowering corporate tax rates is profitable for states from the point of attracting foreign direct investments."*

Panel data theory overview

The nature of our data sample is that of a panel data. We have an observation for each country in our scope (59 cross-section) with temporal ordering (16 time-series), which put together creates a panel that can be utilized for more efficient analysis. The most important issue to mention is that countries in our panel are not selected each time on random, on the other hand we have a same group of countries throughout all the time periods. Due to the fact that we do not chose our countries of interest each time period on random we have the same unobservable effects present for each country during our timeframe (in other words countries possess a consistent individual heterogeneity over time) which we can and must take into account. There are several advantages of using panel data samples instead of pure cross-sections or pure time-series datasets. First of all, by pooling data we get a richer source of variation, from which we can make more efficient estimation of our model. Secondly, as mentioned, panel data possess an ability to control for individual heterogeneity of countries in scope, which if not controlled for leads to a bias in the estimates (possible omitted variable bias). Thirdly, panel data are more able to estimate and identify effects that cannot be detected by pure cross-sections or pure time-series data modelling. [BALTAGI 2002]

The general description of a regression model for panel data is as following:

$$y_{it} = \alpha + X_{it}^{'}\beta + u_{it}$$

Where i denotes cross-sections and t denotes time-periods with $i = 1, 2, \dots, N$ and $t = 1, 2, \dots, T$. Error term can be written in the following way:

$$u_{it} = \mu_i + v_{it}$$

Where μ_i are cross-section specific components of the error, which are time-invariant and represent specific effect for each country (endogenous countries´ differences), and v_{it} are remainder effects with standard normal distribution. In order to deal with these time-invariant effects, which are correlated with our independent variables, we may use a first differentiation model by which we eliminate fixed effects for each country. Alternatively, when μ_i are though as fixed parameters to be estimated, we consider the fixed effects model for our panel data and are able to account for the omitted variable bias. In the fixed effects model the intercepts vary for each country, however, the slope of the betas are same for all countries. On the other hand, when we believe that μ_i are not correlated with our independent variables and are given on random, we use random effects model to capture also information in μ_i. [BALTAGI 2002] In our case, we have a panel data on 59 countries with non-random μ_i and therefore we want to estimate this effect by using a fixed effect estimator. The further information is provided in the regression analysis section.

Description of variables in the regression model

Dependent variable (l_FDI)

For our dependent variable we have chosen the foreign direct investments´ net inflows to the country as the main outcome of country´s attractiveness to firms. The assumption is that the foreign direct investments' net inflows bests describe the country´s attractiveness for investing companies among other countries. Increase in the foreign direct investments' net inflows in a given country means that that country has become more attractive and competitive to foreign firms. This increase can mean that new firms are opening their facilities and subsidiaries in a given country, or that already present firms are expanding their investments there or both effects are taking place simultaneously. Data for the foreign direct investments´ net inflows were adjusted by taking their logarithms in order to scale it to other variables. The reasoning behind this data transformation is that we are able to approximate normal distribution better with

the logarithmic transformation of data that are highly skewed. [BENOIT 2011] Furthermore, we are able to get a better fit for a non-linear relationship. Taking logarithms of our dependent variable means in simplification that a unit increase in our independent variables changes our dependent variable in percentages. However, the important thing to note is that by this transformation we lose 29 observations, due to the fact that some values for foreign direct investments´ net inflows are negative and taking their logarithms is not possible. Therefore, we leave these observations out. The left out observations are assumed to be randomly distributed[4] and we therefore accept this transformation without any significant loss of interpretative power.

Independent variables:

Corporate tax rate (CTR)

Corporate tax rate is our main independent variable. Since we define competing behavior as a behavior during which country lowers its tax rates, the corporate tax rate is undoubtedly our main variable of interest. Countries compete among each other and signal to the investor their intentions in tax policy via corporate tax rate in an attempt to attract investors. The logical reasoning behind this is that countries with lower corporate tax rates are more attractive for foreign direct investments than those countries that set their corporate tax rates higher. We expect that decrease in tax rate results in increase in foreign direct investments´ net inflows, in other words that the corporate tax rate is negatively correlated with the foreign direct investments´ net inflows.

Labor cost (LC)

Labor cost is expected to have a negative effect on the foreign direct investments´ net inflows in a given country. Countries with lower labor cost will be more attractive to potential investments, therefore decrease in labor cost is expected to result in increase of the foreign direct investments´ net inflows, in other words that the

[4] The 29 lost observation are assigned to 19 different countries, which none of them has more than 2 of these observations, except Indonesia, which has 5. Hence, there does not seem to be any systematic pattern.

relationship between them is negative. The logical argument for including the labor cost in our analysis is that it is besides corporate tax rate one of the most significant variable for firms decision making process as to where invests its capital that will be utilized by labor.

Gross domestic product per capita (GDPPC)

GDP per capita is expected to have a positive impact on the foreign direct investments´ net inflows, however we believe that only up to a certain point. Countries with very low GDP per capita are not attractive for investor because of low purchasing power of the local market and weaker overall economy, while countries with higher GDPs per capita have smaller investing opportunities due to already saturated markets. Therefore, also squared GDP per capita is added to measure diminishing returns of increasing GDP per capita per country. For both variables we expect therefore positive correlation with our dependent variable. The reasoning behind including GDP per capita in our model is that it measures wealth of the country and approximates purchasing power of potential customers for investing companies.

Governance index (GI)

Governance index in our model measures the political performance of a given country. Countries with less corruption, better government and more effective regulation attract more potential investors than countries suffering from bad governance. Therefore we expect a positive impact of the higher governance index on the foreign direct investments´ net inflows. As mentioned, in our model the simple average of six indices of World Bank is used. The logic behind inclusion of the governance index in our regression is that we assume that companies weight not only economic factors in their investing decisions, but also political factors and are concerned with also political risks for their investments resulting from the bad governance of country in which they localize their capital.

OECD membership (OECD and OECD*CTR)

In our model we are also interested in the question, whether membership in the economic international organization, such as OECD, diminishes or increases the effect of competing in corporate tax rate. Therefore, we include in our model an intercept

dummy variable for OECD membership and also a slope dummy variable OECD*CTR to measure an additional effect on FDIs from membership in OECD. The reasoning behind inclusion of these variables in the model is that we expect that when a country is a member of the economic integration unit it has a diminished possible benefit from competition. In other words, having a lower corporate tax rate won't result in such increase of foreign direct investments´ net inflows as for a non OECD country. Therefore we expect a positive correlation between OECD*CTR and dependent variable to offset a negative correlation between CTR and dependent variable, resulting in overall lower effect of corporate tax rate on the foreign direct investments´ net inflows. On the other hand, the intercept dummy variable (a simple observation if the country is in OECD for given year or not) has an inclusion reasoning that countries that are members of OECD are already developed markets with lower investing potentials. Therefore, we expect a negative correlation of variable OECD and our dependent variable, meaning that on average OECD countries have lower foreign direct investments´ net inflows, solely due to being members of OECD.

Proposed model

The proposed model (in its simplified version) is thus as following:

$$l\_FDI = \beta_0 + \beta_1 CTR + \beta_2 LC + \beta_4 GDPPC + \beta_5 GDPPC_{sqr} + \beta_5 GI + \beta_6 OECD + \beta_7 (OECD\_CTR) + error$$

In our model specification we assume that we correctly specified the model and that there is no omitted variable bias problem, in other words that our explanatory variables are not correlated with the error term.

2.3 Further corporate tax rate analysis

In this section we describe the reasoning behind the methodology we use in our further corporate tax rate analysis, in order to confirm or reject the second given hypothesis:

> **H2:** *"Member countries of coherent country clusters[5] are likely to show lower levels of competition in the issue of setting their corporate tax rate than is observed on the global level."*

For our further corporate tax rate analysis we propose a research method based on the convergence within the coherent country clusters comparison. We define a coherent country cluster as a more integrated unit, which is characterized by some sort of cooperative behavior. The research done by Reint Gropp and Kristina Kostial in 2001 for IMF inspired us to study also the standard deviation of the corporate tax rate for the clusters, not only the average tax rate development (and supplementary statistics) and the value of the corporate tax rate itself as it is done in the descriptive analysis and in the regression analysis. [GROPP, KOSTIAL 2001] Therefore, in the further analysis we compare the development of the average corporate tax rate and standard deviation of the corporate tax rate across the selected country clusters. This method however has a setback due to not having a full dataset for our 149 countries in scope during the whole time period. Since standard deviation can change with new countries entering dataset (only as a result of the addition of new countries to dataset), we must account for this and adjust dataset accordingly, this mostly concerns our benchmark cluster, which we limit only to 132 countries, for which we have a full set of observations to obtain statistical soundness. Furthermore, in the further corporate tax rate analysis of this thesis, in each section, the required information about the nature of the given dataset for each country cluster is provided. The clusters selected for the further analysis are as following, based on the economic and political qualitative reasoning:

[5] Coherent country clusters is a label used for international organizations as well as other logical country groupings, such as BRICS.

- **European Union** – the most prominent example of economic and political regional integration. We further look at the division of EU into EU 15 and new countries that became members after 2004

- **OECD countries** – global economic organization with the high degree of harmonization of its members across various economic issues

- **BRICS countries** – group of fast growing developing economies, which recently have begun to formally cooperate

- **ASEAN countries** – successful regional economic integration covering south east Asian countries

- **World** – benchmark group for our analysis

The overall reasoning behind the third empirical part of this thesis is that the competing or cooperative behavior of countries in setting of their corporate tax rates is difficult to show only on the behavior of these rates across the whole scope of countries. However, we can utilize standard deviations across given clusters, which indicates the dispersion of corporate tax rates within the cluster and analyze if countries in some clusters tend to compete less (standard deviation in cluster is lower and therefore there is higher harmonization and less competition) than the countries in other clusters (standard deviation for the cluster is much higher and therefore there is lower harmonization and more competition). Further, we define a *competitive country* as a country which sets its corporate tax rate more than one standard deviation below the cluster's average and a *harmonized country* as a country, which keeps its corporate tax rate within one standard deviation from the cluster's average. We utilize a statistical unit of a one standard deviation, due to the fact that it displays how dispersed are countries within the clusters. More countries setting their corporate tax rates above or below one standard deviation from the average indicates less bell-shaped like distribution than the standard normal distribution, and therefore larger amount of countries is distributed farther from average, pointing to less harmonization and thus higher competition.

With the help of this reasoning we are able to state, whether in coherent country clusters there are signs of more cooperative behavior in terms of lower competition in corporate tax rates than on the global level. Furthermore, we can analyze the possibility of also future institutional cooperation among the countries inside country clusters in the issue of corporate tax rates. We assume that in clusters which are characterized by lower extent of competitive behavior the room for institutional cooperation is higher than on the global level where the competition in corporate tax rates is stronger.

Regarding the standard deviation, in order to analyze competitiveness we use two methods for calculating, based on the availability of the data. For a full population of countries, we calculated a population standard deviation. This is the case of OECD, EU, EU 15 and BRICS clusters. In case that we do not have a full set of countries for our cluster (the case of ASEAN and the benchmark cluster, where we have only 132 countries out of the all world countries) we use a sample standard deviation, which is used to estimate the population standard deviation and suits our needs better. The respective formulas for standard deviations are as following. [BARTOSZYŃSKI; NIEWIADOMSKA-BUGAJ 2008] [Laerd Statistics 2014]

A population standard deviation

$$\sigma = \sqrt{\frac{\sum_{i=1}^{n}(X_i - \mu)^2}{n}}$$

A sample standard deviation

$$S = \sqrt{\frac{\sum_{i=1}^{n}(X_i - \bar{X})^2}{n-1}}$$

Where μ is a population mean, $\bar{X}$ a sample mean and n is number of Xs in population/sample. Since when estimating the population standard deviation through a given sample we are only generalizing the population standard deviation, we account for the error in this estimation by subtracting 1 from the n, in order words by using a one degree of freedom.

In order to counter the possible bias in our analysis, due to potential non random sampling of our ASEAN and benchmark sample, we also calculated standard deviation for ASEAN and benchmark clusters via the population method. Still, competitiveness analysis in the later chapter of this thesis yields the same results (in terms of ranking clusters for competitiveness) for both methods of calculating the standard deviation and therefore, only the above described method different for two groups of clusters is shown. Another important note is that the standard deviation does not change solely due to increase of the population, which could be objected that the larger population - the entire globe, in our case 132 countries - has naturally a larger standard deviation than regional groupings. We should stress that this is not the case and that indeed the differences observed below are in this sense not any kind of a mathematical artefact. To see that, consider for example that when we double the observations with the same values (increase the size of our population by 100% but keeping the same dispersion), the population standard deviation does not change. Therefore, the reason for different standard deviations within our clusters is different dispersion of corporate tax rates and not the size of the clusters.

On the following pages we provide an empirical part of this thesis. The practical analysis follows the provided methodology and is divided into three separate sections. First comes a basic descriptive analysis of the data sample, followed by the regression model and the empirical part of this thesis is concluded by the analysis of convergence within the coherent country clusters comparison in the issue of the corporate tax rate development.

3 Trends in corporate tax rate

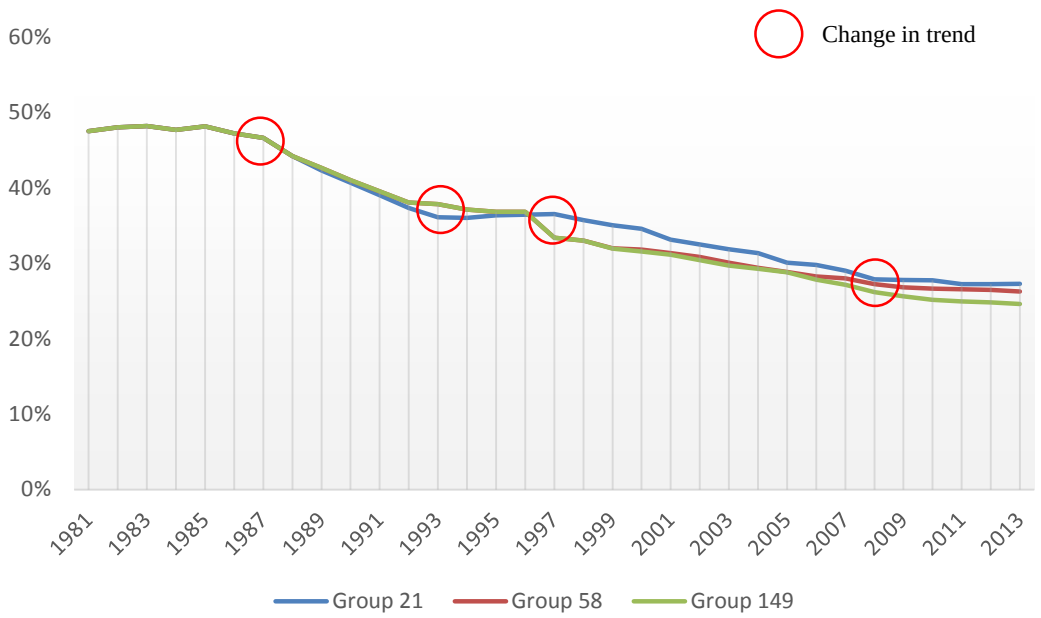
In this part of the thesis we provide a descriptive analysis of the corporate tax rates for our selection of countries on the global level. We start with the overview of the average corporate tax rate development, followed by development of further statistical indicators, and we conclude with the graphical representation of the level of corporate tax rate across countries for given points of time. On the following pages we can observe a collection of graphs, maps and tables that clearly illustrate decreasing trend in the corporate tax rates. This descriptive analysis if offered in order to provide a first glimpse on the nature of the trends upon which this thesis builds its analysis.

3.1 Average corporate tax rates development

We have already shown in the theoretical part that the average corporate tax rate for OECD countries has been declining over time. The same trend is present also on the global level, where the average corporate tax rate decreased from the value of 47.52% in 1981 to 24.62% in 2013. This decreasing trend is clearly illustrated on the following graph on the next page with highlighted changes in this overall decreasing trend. It is important to note that due to the data availability, the average is not calculated from the same number of countries each year, because we have not a full dataset for all countries throughout selected time period (please consult appendix). In 1981 there is data coverage only for 21 countries (old members of OECD), while in 1997 the coverage increases to 58 countries, in 2004 we have data for 135 countries (extension thanks to the Ernst & Young database) and in 2013 the number of countries covered is 149 total. Therefore, the respective averages for "21", "58" and "149" groups are also showed in order to provide a sound descriptive overview of the corporate tax rate development with lower bias due to the increase in our sample of countries. The "21" group is the group of countries with the full dataset and thus has no bias from the increasing sample of countries. On the other hand, the "58" and "149" groups suffer from bigger bias when observing earlier years of corporate tax rate development (before 1997 and 2004 respectively). For better clarification, the group "21" is composed of countries that have a full dataset from 1981 to 2013, the group

"58" encompassed countries that have an almost full dataset from 1997 to 2013 and finally group "149" consists of all countries in our scope, majority of which has a full dataset from 2004 to 2013.

Graph 2. Development of corporate income tax rates on global level [Own dataset]



From the Graph 2 we can distinguish periods of stagnating corporate tax rates followed by periods characterized by sharp decline of corporate tax rates. From 1981 to 1987, the corporate tax rates were stagnating as can be seen from our illustration. During this period the corporate tax rate was above 46.00%. In 1987 came sudden drop and countries were rapidly decreasing their corporate tax rates until 1993, where the average rate was around 36.11% for group "21" and 37.83% for group "58".

Since 1993 the trend on the global level became stagnating once again until 1997, when countries began to lower their tax rates again. The sharp drop between 1996 and 1997 for group "58" countries is mainly due to the extension of the database coverage from 30 to 58 countries (and new countries having lower rates). From the average values of 36.53% for group "21" and 33.41% for group "58" in 1997, the corporate tax rate decreased to the average values of 27.88% for group "21", 27.23% for group "58" and 26.19% for group "149" in 2008 when the decreasing trend slowed and the overall trend became stagnating and continues today. The following table provides detailed overview of continuous average growth rates (CAGRs) for mentioned periods.

Table 1. Development of CAGRs for global corporate tax rate periods [Own dataset]

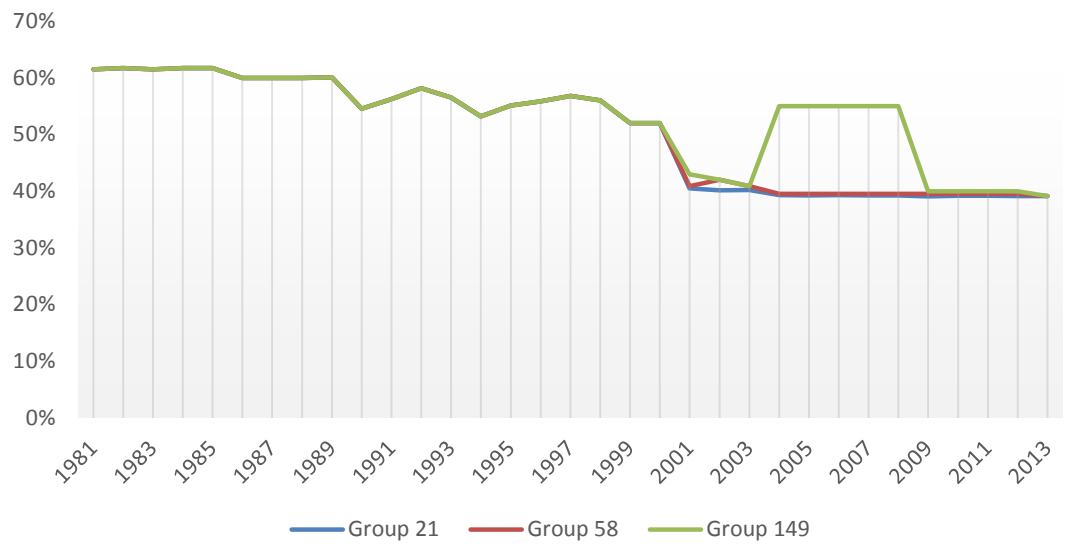
	1981-1987	***1987-1993***	***1993-1997***	***1997-2008***	***2008-2013***
Group 149	n.a.	n.a.	n.a.	-2.19%	-1.23%
Group 58	n.a.	n.a.	n.a.	-1.84%	-0.73%
Group 21	-0.31%	-4.17%	0.29%	-2.43%	-0.43%

The illustrated compound annual growth rate supports the previous graphical illustration of changes in corporate tax rate trend. We can distinguish periods of slow decline (the white columns) and the periods of increased decline or even increase in corporate tax rates (high lightened columns). This distinction is the most obvious for the group "21" group of countries, however it is also strong for two other groups of countries. Furthermore, it is clear that the rate of this decline in the corporate tax rates has been slowing over time. While in the first period of sharp decline from 1987 to 1993 the rate was above 4.00% per year for group "21", in the second period, that rate was 2.43% only. However, it is important to mention that while the first observed *competition period* lasted only six years, the second period eleven.

Financial crisis of 1987 and Asian financial crisis of 1997 could have acted as triggers for countries to start competing in corporate tax rates and attract investors in worsening economic situation. As we can observe, this competing behavior persists for period of time and then diminishes. However, as we have shown, the competing behavior lasted much longer for the second period, while this period was characterized by not so intensified decreasing of corporate tax rates. The overall decrease in the rate of decline of corporate tax rates can also be attributed to depletion of potential for competition with further decrease of corporate tax rates and possible diminishing marginal returns from such lowering, due to the fact that increase in base of tax (more firms are attracted) wont offset the decrease in tax collected from firms (lower overall tax rate). With this in mind it is not surprising that the most recent financial crisis of 2007 didn't caused accelerated decline in corporate tax rates as the previous financial crisis did cause.

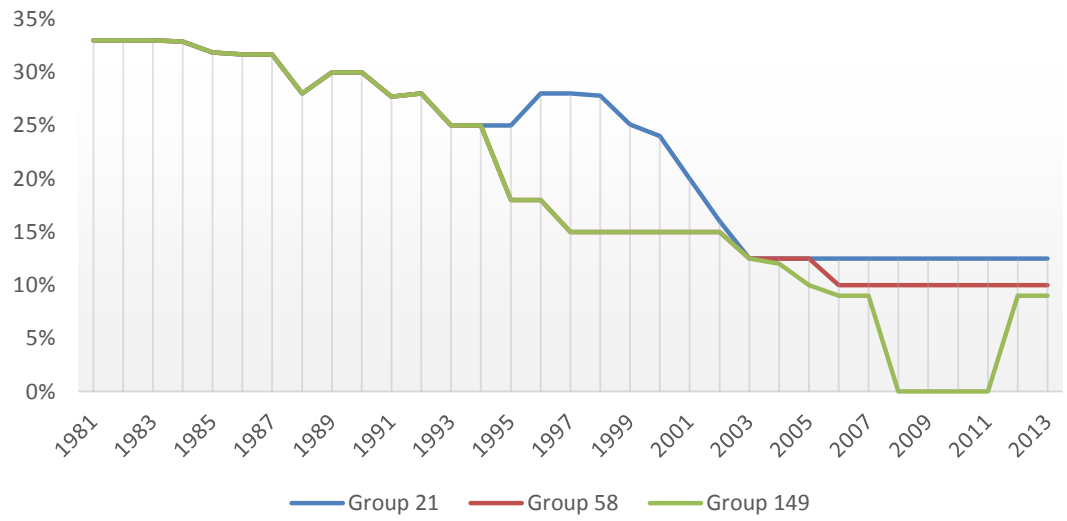
3.2 Development of further statistical indicators

Graph 3. Development of maximal corporate tax rate [Own dataset]



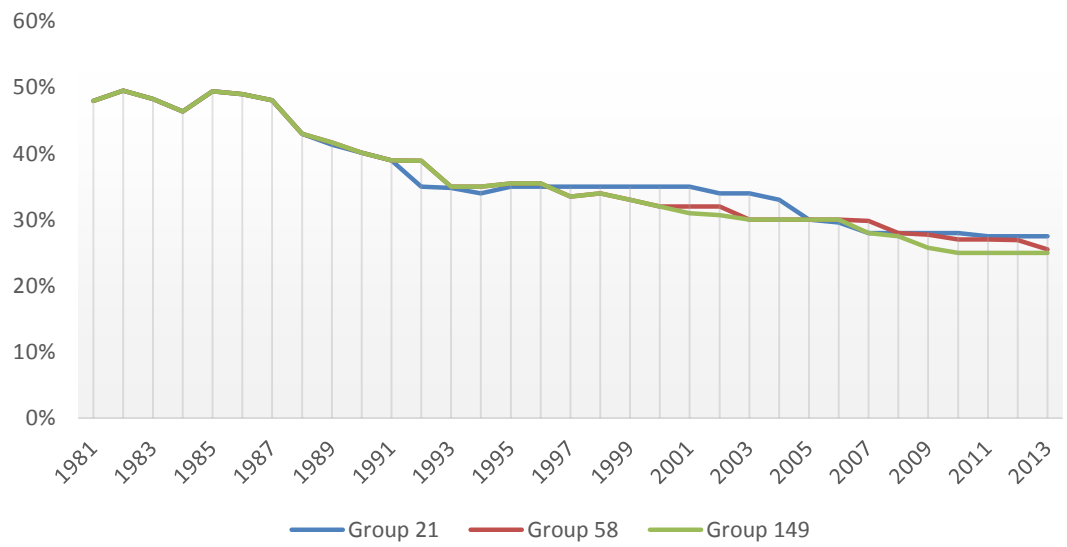
The maximal corporate income tax rate has been stagnating until the year 2000 on the level above 50%, when the sudden drop occurred and the maximal rate dropped from 52.03% to 43.00%. Germany, which was one of the countries having the highest corporate tax rate till 2001 and in 2000 had the highest corporate tax rate among observed countries, lowered its corporate tax rate in 2001 to 38.90%. Since 2001 the maximal rate was stagnating around 40.00%, except for the case of Kuwait in years 2006-2008.

Graph 4. Development of minimal corporate tax rate [Own dataset]



As we can observe from the previous graph, the minimal corporate tax rate has been steadily decreasing for group "21" until 2000, when the rate of decrease became faster until 2003 and the value of 12.50%. After 2003 the minimal value for this group of countries became stagnating. For the group "149", the minimal rate also further declined up to the value of 9.00% in 2006, when it became stagnating, except for the case of Moldova between years 2008 and 2011, when the rate for this country was zero. After 2011 Moldova again increased its corporate tax rate. The same trend can be applied to the group "58" with the stagnating value of 10.00% since 2006.

Graph 5. Development of median corporate tax rate [Own dataset]



The development of median corporate income tax rate follows similar trend as the development of the averages rates as can been seen from the above graph, however instead of the mostly continuous decline as we can observe for the averages rates, the median rate undergoes longer periods of stagnation.

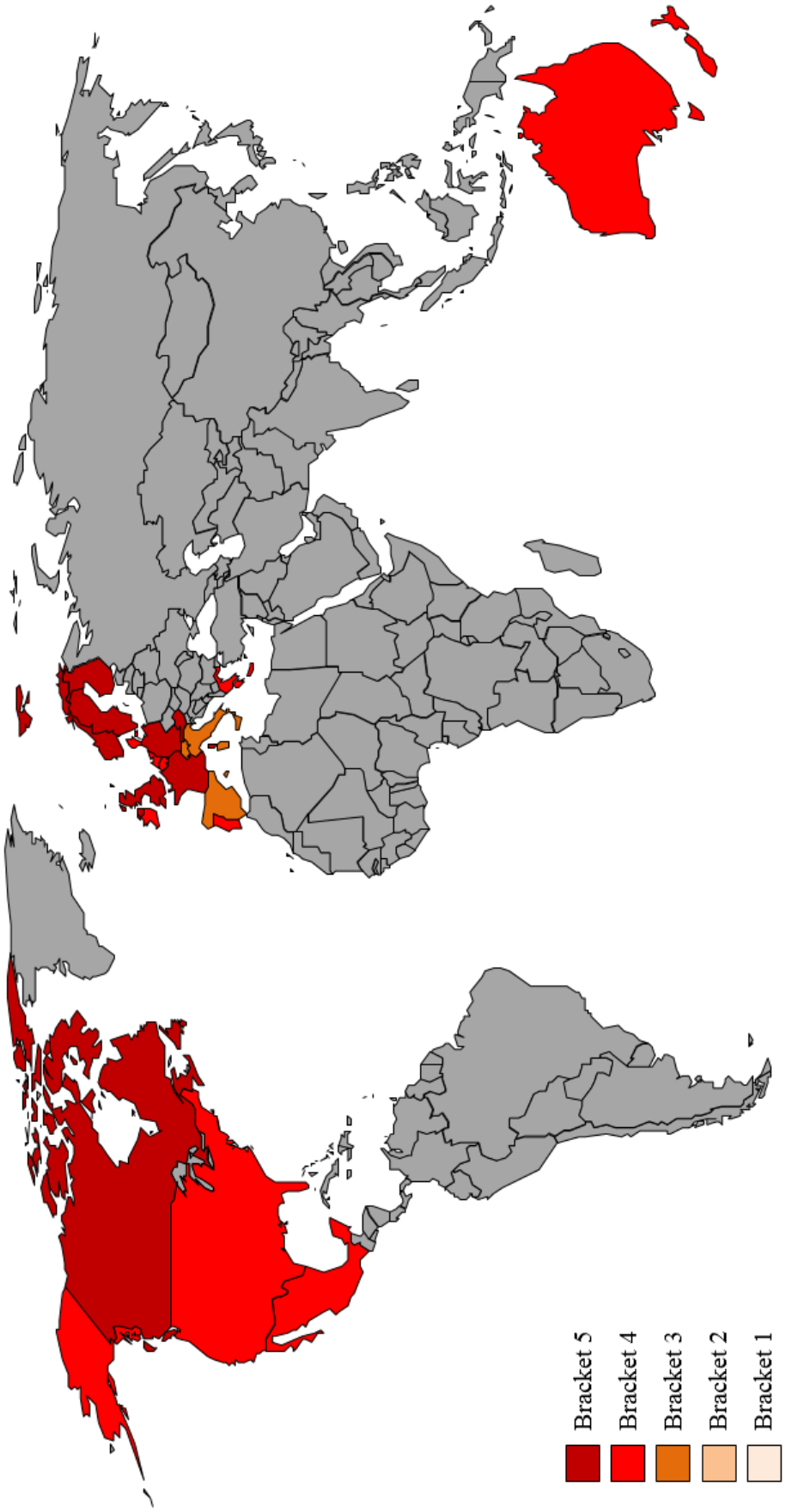
3.3 High tax countries versus low tax countries

Following are three maps portraying countries in scope for years 1981, 1997 and 2013 that are based upon our collected dataset, providing an overview of their corporate tax rates development, accompanied with basis statistical analysis of data for a given year. First we list all three maps on separate pages for better graphical overview and then we provide further comments and observations. We group countries into five tax brackets depending on the level of their corporate tax rate for a given point in time. The points in time are chosen in such way as to correspond with given country groups of "21", "58" and "119". The tax brackets were designed in the following matter:

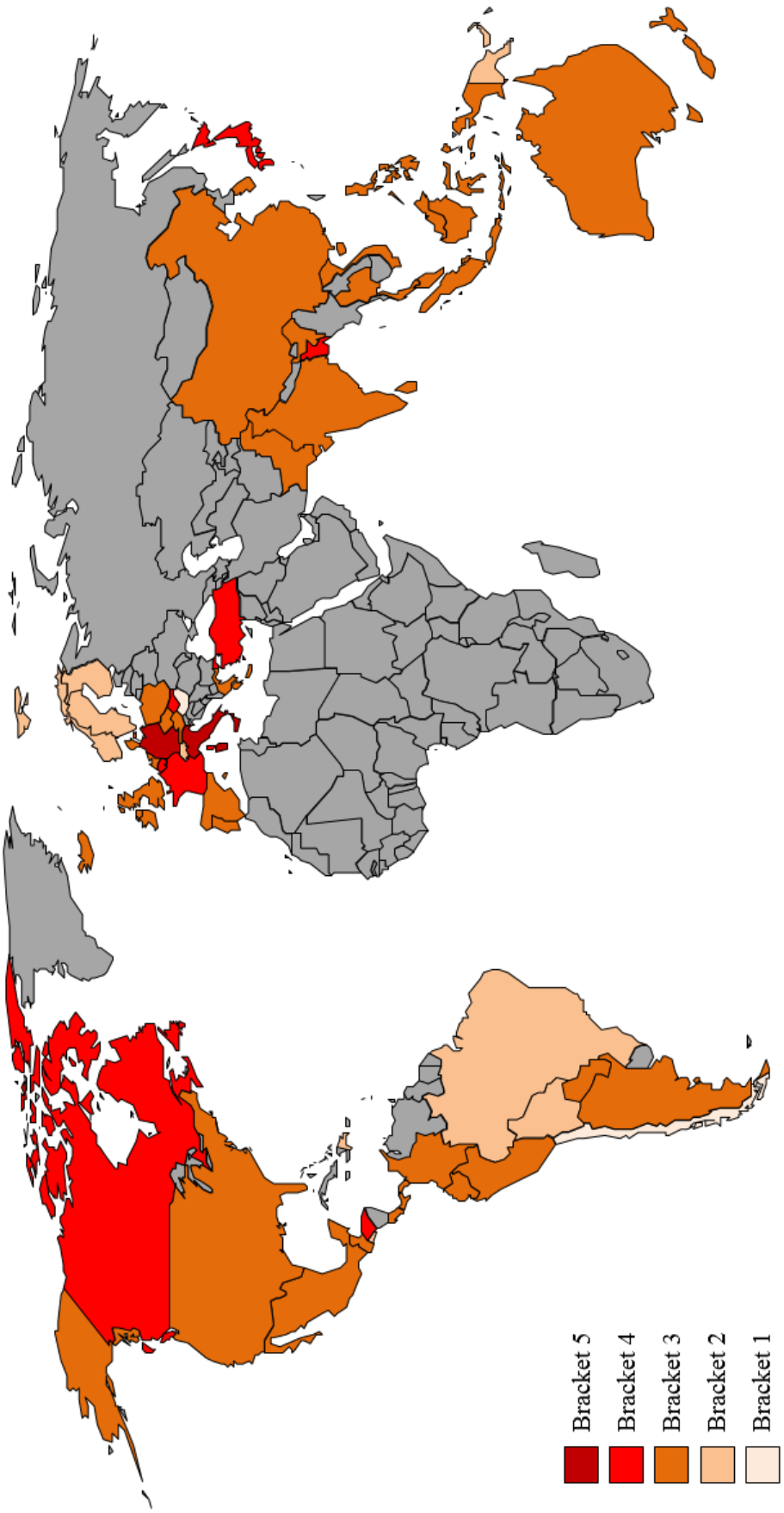
Table 2. Tax brackets used for descriptive analysis [Own dataset]

	Minimal corporate tax	*Maximal corporate tax*
Bracket 5	50.00%	not given
Bracket 4	40.00%	49.99%
Bracket 3	30.00%	39.99%
Bracket 2	20.00%	29.99%
Bracket 1	0.00%	19.99%

Map 1. Overview of corporate tax rates for countries in scope in 1981 [Own dataset]



Map 2. Overview of corporate tax rates for countries in scope in 1997 [Own dataset]



Map 3. Overview of corporate tax rates for countries in scope in 2013 [Own dataset]

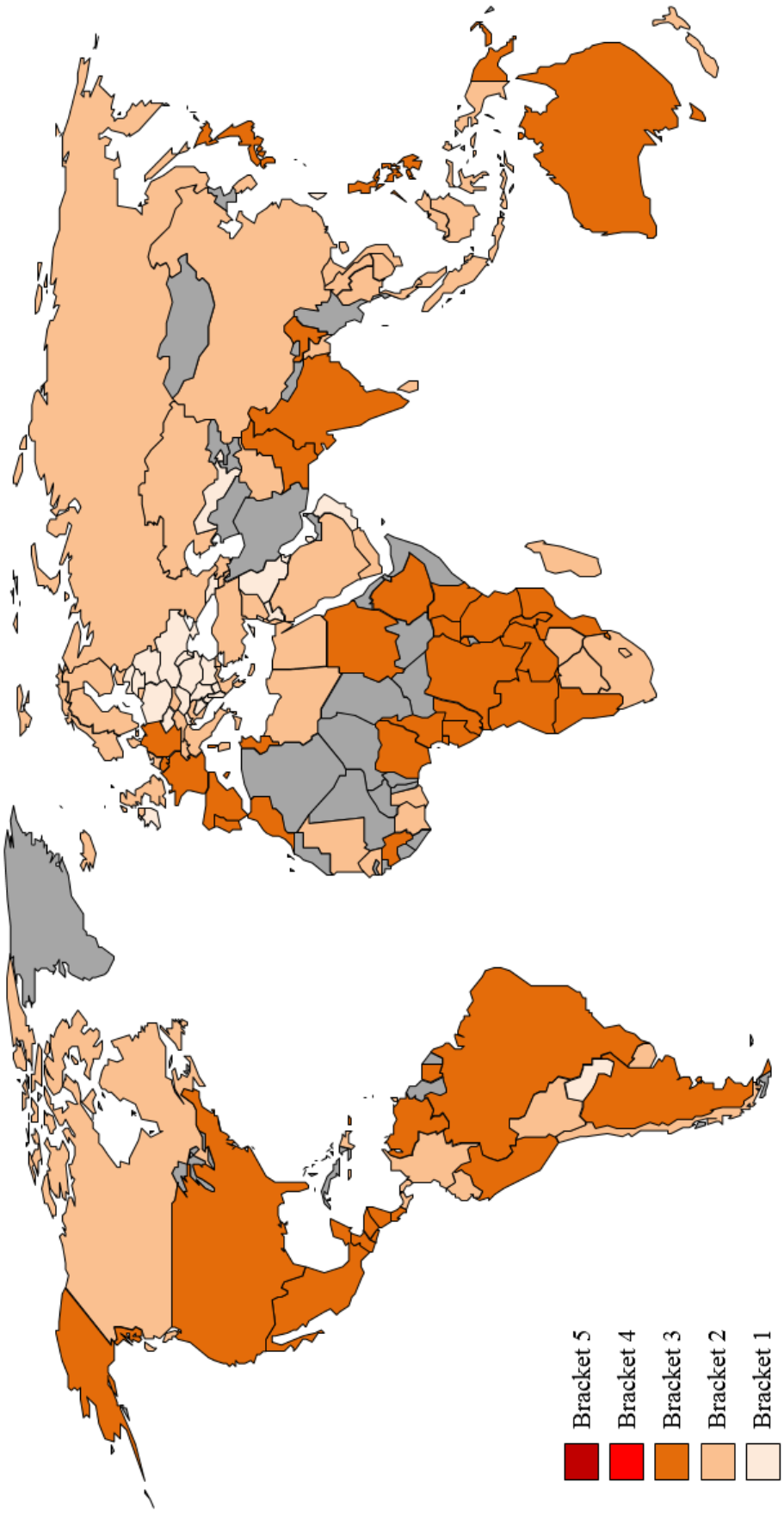


Table 3. Number of countries in corresponding tax brackets over time [Own dataset]

	1981	*1997*	*2013*
Bracket 5	8	2	0
Bracket 4	**10**	8	0
Bracket 3	3	**35**	51
Bracket 2	0	10	**64**
Bracket 1	0	3	34
Total	**21**	**58**	**149**

Year 1981

For the starting year 1981 we have 21 countries portrayed, all of them old members of OECD. At that time, the highest corporate tax rate was in Finland (61.50%), while the lowest was in Spain (33.00%). The average corporate tax was 47.52%, while median corporate tax was 48.00%. In *Bracket 5* we have 8 countries, in *Bracket 4* we have 10 countries, in *Bracket 3* we have 3 countries and we have zero countries in other, lower tax brackets. This period was characterized by high corporate tax rates across the OECD countries.

Year 1997

Besides increasing the sample to 58 countries, we can clearly observe that the majority of countries decreased their corporate tax rate. The only exception is Italy, which increased its corporate tax rate and as the only country moved to the higher tax bracket. The average for year 1997 was 33.41%, while median corporate tax rate was 33.50%. The highest corporate tax rate in 1997 was in Germany (56.80%), and on the other hand, the lowest was in Chile (15.00%). For 1997 we have only 2 countries in *Bracket 5*, in *Bracket 4* we have 8 countries, in *Bracket 3* we have 35 countries, in *Bracket 2* we have 10 countries and in *Bracket 1* we have 3 countries.

Year 2013

Between 1997 and 2013 our scope of countries gradually increased to 149. Again, majority of countries further decreased their corporate tax rate. However, as opposed to the previous case, several countries kept their corporate tax rate on the same level (Bolivia, Costa Rica, Hong Kong, Norway and Peru) or even increased their corporate tax rate as compared to year 1997 (Argentina, Brazil, Chile, Dominican Republic, El Salvador, Guatemala, Hungary, Pakistan and Papua New Guinea). Brazil, which increased its corporate tax rate from 25.00% to 34.00% is the most prominent example of counter intuitive behavior of countries and as can be seen, Brazil leveled up to the regional tax bracket. It is worth pointing out also the Central and Eastern Europe as a *harmonized region* (as compared to the Western Europe, which is 2 tax brackets higher than Central and Eastern Europe) and also the Central and Eastern Europe is the region with lowest corporate tax rates in the world (not taking into account tax havens). The average corporate tax rate for the year 2013 was 24.62%, while the median rate was 25.00%. The highest corporate tax rate in 2013 was in United States (39.13%), while the lowest was in Montenegro and Uzbekistan (9.00%). For 2013 we have in *Bracket 5* zero countries, in *Bracket 4* zero countries, in *Bracket 3* we have 51 countries, in *Bracket 2* we have 64 countries and in *Bracket 1* we have 34 countries.

Overall, the descriptive analysis confirms the decreasing trend in corporate tax rates across time with declining rate of this decrease. We can observe that several countries after previously decreasing their rates, have begun to increase their rates in order to level up with the average, or kept their rates at the same level. Further we can distinguish between periods of sharp decline in corporate tax rates and the periods of stagnation, where we can assume that countries didn't compete in corporate tax rates in such extent as compared to periods of sharp declines, where competition is obvious. Additional observation is that although the rate of decreasing tax rates slowed in the second observed period of competing behavior from 1997 to 2008, this period was almost twice as long as the first observed period of competing behavior from 1987 to 1993. On following pages we will shed more light on these conclusions and add additional quantitative analysis in order to confirm or reject our stated hypotheses.

4 Is competition profitable?

In this part of the thesis we elaborate on the previous theoretical and descriptive analysis with empirical confirmation of the relationship between the net foreign direct investments´ inflows and the corporate tax rates. Furthermore, we focus on other explanatory variables of interest, explained in the methodological part of the thesis, such as governance index and membership in OECD and additional effect of corporate tax rate on the net foreign direct investments´ inflows for OECD countries. The main aim of this part of our research is to confirm or reject the following hypothesis.

H1: *„ Competing in corporate tax rate issue and taking unilateral action in terms of lowering corporate tax rates is profitable for states from the point of attracting foreign direct investments."*

This chapter therefore provides a detailed overview of the modelling that was done in GRETL software for the proposed model with required result tables, test descriptions and finally conclusions and confirmation or rejection of the given hypothesis. The additional information required to conduct tests and find a correct model is taken from "*Using gretl for Principles of Econometrics* by Lee C. Adkins [Adkins 2010] [Adkins 2014]

4.1 Estimating the regression and correct model

At first we run a regression via a GRETL software for the proposed model, which is based upon our theoretical assumptions and logical reasoning. We expect that all our variables have statistical significance in explaining the foreign direct investments´ net inflows. The first-run model is for reminder as following (in simplified fixed effect form):

$$l\_FDI_{it} = \beta_{0_i} + \beta_1 CTR_{it} + \beta_2 LC_{it} + \beta_4 GDPPC_{it} + \beta_5 GDPPC_{sqr_{it}} + \beta_5 GI_{it} + \beta_6 OECD_{it} + \beta_7 OECD\_CTR_{it} + error_{it}$$

Figure 1. GRETL output for the first-run model [Own modelling]

Model 1: Fixed-effects, using 825 observations
Included 59 cross-sectional units
Time-series length: minimum 8, maximum 16
Dependent variable: l_FDI

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	22.8801	0.441492	51.8246	<0.00001	***
CTR	-0.0593566	0.0119535	-4.9656	<0.00001	***
LC	-0.13274	0.018003	-7.3732	<0.00001	***
GI	0.698278	0.249454	2.7992	0.00525	***
GDPPC	0.00016183	1.72169e-05	9.3995	<0.00001	***
sq_GDPPC	-4.73593e-010	1.17907e-010	-4.0167	0.00006	***
OECD	-0.862671	0.43918	-1.9643	0.04986	**
OECD_CTR	0.0285385	0.0146231	1.9516	0.05135	*

Mean dependent var	22.63804	S.D. dependent var	1.641424
Sum squared resid	441.0680	S.E. of regression	0.762311
R-squared	0.801328	Adjusted R-squared	0.784314
F(65, 759)	47.09795	P-value(F)	5.9e-223
Log-likelihood	-912.3233	Akaike criterion	1956.647
Schwarz criterion	2267.862	Hannan-Quinn	2076.027
rho	0.261089	Durbin-Watson	1.391282

Test for differing group intercepts -
Null hypothesis: The groups have a common intercept
Test statistic: F(58, 759) = 40.7185
with p-value = P(F(58, 759) > 40.7185) = 6.2139e-194

From the first-run model output we can conclude several interesting observation. First of all, we see that all our dependent variables have low p-values, therefore being a statistically significant and the theoretical and logical reasoning behind their inclusion in the model holds. More formally we can reject the null hypothesis that the given beta´s estimate is statically different from zero at the 95% confidence level[6] for all variables except OECD_CTR, where we have to increase confidence level, but it is still higher than 90%. Secondly, the assumption to use fixed effects seems to be correct. The confirmation for this is the result of the test for differing group intercept, with the null hypothesis that groups have a common intercept. The test statistic with a low p-value leads us to the rejection of this null hypothesis (again at the 95% confidence level) and the conclusion that intercept varies among our countries in scope. To be sure, we also run the first-run model also with random effect assumption, however the following Hausman test points also towards using fixed effects.

[6] A 95% confidence level means that there is at least a 95% probability that the results are reliable.

Figure 2. GRETL output for the random effects test [Own modelling]

Hausman test
Null hypothesis: GLS estimates are consistent
Asymptotic test statistic: Chi-square(7) = 43.7452
with p-value = 2.39404e-007

The null hypothesis of the Hausman test for random effects is that the random effects are indeed random and that they are not correlated with any other repressors. However, as we can see, the test statistic has a very low p-value, therefore we can strongly reject the null hypothesis (at 95% confidence level) that random effects are indeed random. This is backed up by the nature of the data. The differences among countries are fixed, with each country having its own unobservable characteristics that are not given on random over time. Therefore the assumption to use fixed effects is truly correct. In order to proceed with the estimation of the correct model and its interpretations we have to take into account the possible presence of the heteroskedasticity. In other words heteroskedasticity means that the variance of the error term is not constant over time, which leads to biased standard errors (not estimates). Biased standard errors then influence statistical inference that can cause wrong interpretation of hypotheses tests. Unfortunately, our panel data after conducting a Wald test for heteroskedasticity in GRETL show the fact that there is no constant variance over time, as can be seen from the following output from GRETL.

Figure 3. GRETL output for the heteroskedasticity test [Own modelling]

Distribution free Wald test for heteroskedasticity
Null hypothesis: the units have a common error variance
Asymptotic test statistic: Chi-square(59) = 1386.72
with p-value = 4.47329e-251

The null hypothesis is that there is a common error variance over time. However, as we can see from the test statistic with a very low p-value, we have to reject this null hypothesis (at 95% confidence level) and admit the presence of heteroskedasticity. This conclusion leads us to use a heteroskedasticity robust errors. Another issue to consider regarding correct statistical inference is the presence of autocorrelated errors. Due to the nature of time-series data, the autocorrelations of errors is often an issue and since panel data also possess a time vector, we have to test for the autocorrelation presence. To test for autocorrelation we use a Durbin-Watson test in GRETL. The Durbin-Watson statistic is estimated in figure 1, however, GRETL cannot run a test in order to provide a p-value for this statistic, due to missing time

periods for some of our countries. Therefore, we have to manually find adequate upper and lower critical values for Durbin-Watson test.

Figure 4. GRETL output for the Durbin-Watson values [Own modelling]

5% critical values for Durbin-Watson statistic, n = 800, k = 7
dL = 1.8662
dU = 1.9015

Since our Durbin-Watson statistic (1.391282) is lower than dL (lower critical value) we have to reject a null hypothesis (at 95% confidence level) that there is no positive autocorrelation. Our data thus possess positively autocorrelated standard errors and we have to account for this. Negative autocorrelation is no issue, given the statistic. In order to get rid of the positive autocorrelation we use lag of the dependent variable[7]. The results for the updated model are found in the following figure.

Figure 5. GRETL output for the lagged FDI model [Own modelling]

Model 2: Fixed-effects, using 798 observations
Included 59 cross-sectional units
Time-series length: minimum 7, maximum 16
Dependent variable: l_FDI

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	16.8493	0.914098	18.4327	<0.00001	***
CTR	-0.0327934	0.0119179	-2.7516	0.00608	***
LC	-0.125664	0.0186031	-6.7550	<0.00001	***
GI	0.396052	0.245208	1.6152	0.10671	
GDPPC	0.000143096	1.7661e-05	8.1024	<0.00001	***
sq_GDPPC	-4.06102e-010	1.14218e-010	-3.5555	0.00040	***
OECD	-0.499385	0.430294	-1.1606	0.24620	
OECD_CTR	0.0166951	0.0141938	1.1762	0.23989	
l_FDI_1	0.253291	0.0347654	7.2857	<0.00001	***

Mean dependent var	22.64448	S.D. dependent var	1.639555
Sum squared resid	383.1657	S.E. of regression	0.723993
R-squared	0.821155	Adjusted R-squared	0.805008
F(66, 731)	50.85370	P-value(F)	1.8e-229
Log-likelihood	-839.5902	Akaike criterion	1813.180
Schwarz criterion	2126.882	Hannan-Quinn	1933.704
rho	-0.012084	Durbin-Watson	1.912611

[7] To our dataset we added observations for foreign direct investments' net inflows for year 1996 as to not lose number of observations for year 1997. However, we lose additional 27 observations due to missing values as a result of log transformation described in the methodological part of thesis.

We can observe from the Durbin-Watson statistic that our model does not suffer any more from the positive autocorrelation issue as the test statistic is greater than the critical value. However, due to heteroskedasticity in the error term we have to use panel corrected standard errors. The estimates are displayed in the following figure.

Figure 6. GRETL output for the robust standard errors model [Own modelling]

Model 3: Fixed-effects, using 798 observations
Included 59 cross-sectional units
Time-series length: minimum 7, maximum 16
Dependent variable: l_FDI
Beck-Katz standard errors

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	16.8493	1.98113	8.5049	<0.00001	***
CTR	-0.0327934	0.0112165	-2.9237	0.00357	***
LC	-0.125664	0.0196104	-6.4080	<0.00001	***
GI	0.396052	0.233312	1.6975	0.09002	*
GDPPC	0.000143096	2.12735e-05	6.7265	<0.00001	***
sq_GDPPC	-4.06102e-010	1.3213e-010	-3.0735	0.00219	***
OECD	-0.499385	0.351314	-1.4215	0.15560	
OECD_CTR	0.0166951	0.0125924	1.3258	0.18532	
l_FDI_1	0.253291	0.0861402	2.9404	0.00338	***

Mean dependent var	22.64448	S.D. dependent var	1.639555
Sum squared resid	383.1657	S.E. of regression	0.723993
R-squared	0.821155	Adjusted R-squared	0.805008
F(66, 731)	50.85370	P-value(F)	1.8e-229
Log-likelihood	-839.5902	Akaike criterion	1813.180
Schwarz criterion	2126.882	Hannan-Quinn	1933.704
rho	-0.012084	Durbin-Watson	1.912611

As we can observe, estimates remained same, however, standard errors changed and now variables OECD and OECD_CTR are no longer significant even on the 90% confidence level. We also modelled the regression with the time trend, however, it proved to be statistically insignificant. Therefore, we decided to drop OECD and OECD_CTR variables. And our final model is as following.

$$l\_FDI_{it} = \beta_{0_i} + \beta_1 CTR_{it} + \beta_2 LC_{it} + \beta_4 GDPPC_{it} + \beta_5 GDPPC_{sqr_{it}} + \beta_5 GI_{it} + l\_FDI_{it-1} + error_{it}$$

4.2 Results of the estimation

Following is the output from GRETL software for our final model. The additional comments and observations are provided.

Figure 7. GRETL output for the final model with robust errors [Own modelling]

Model 4: Fixed-effects, using 798 observations
Included 59 cross-sectional units
Time-series length: minimum 7, maximum 16
Dependent variable: l_FDI
Beck-Katz standard errors

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	16.5521	1.98294	8.3472	<0.00001	***
CTR	-0.0224692	0.00903104	-2.4880	0.01307	**
LC	-0.129207	0.0189108	-6.8325	<0.00001	***
GI	0.390862	0.234277	1.6684	0.09567	*
GDPPC	0.000142881	2.07172e-05	6.8967	<0.00001	***
sq_GDPPC	-3.90179e-010	1.27716e-010	-3.0550	0.00233	***
l_FDI_1	0.255617	0.0863826	2.9591	0.00318	***

Mean dependent var	22.64448	S.D. dependent var	1.639555
Sum squared resid	383.9504	S.E. of regression	0.723745
R-squared	0.820789	Adjusted R-squared	0.805142
F(64, 733)	52.45549	P-value(F)	7.1e-231
Log-likelihood	-840.4064	Akaike criterion	1810.813
Schwarz criterion	2115.150	Hannan-Quinn	1927.739
rho	-0.014076	Durbin-Watson	1.917213

As we can observe all of our variables are statistically significant at 95% confidence level expect the governance index variable, where the significance is lower, however still acceptable at 90% confidence level. R-square of our regression is approximately 0.82, which means that our model explains more than 82% of the variance in our dependent variable, foreign direct investments´ net inflows. As was already mentioned, to account for present heteroskedasticity, we use in our final model heteroskedasticity robust standard errors. We have 798 observations, meaning that we have 798 full units of analysis from the total of 944 (59 countries across 16 years). Following are detailed explanations of individual dependent variables. It is important to note that since we have a log-linear model, the effects of betas on the dependent variable have to be interpreted as exponential values (multiplying dependent variable by exp(beta)). For small betas the simplification can be made that exp(beta) is approximately 1+beta and therefore we can interpret beta´s coefficient by transferring it to percentage points. [BENOIT 2011]

Corporate tax rate (CTR)

Corporate tax rate in our model is negatively correlated with our dependent variable as expected. A one unit decrease in corporate tax rate leads to a 2.25% increase in dependent variable ceteris paribus. In other words, lowering the corporate tax by one percentage point leads to 2.25% increase in foreign direct investments´ net inflows. The economic significant of the corporate tax rate is therefore sound and valid. Furthermore, the p-value of 0.01307 for corporate tax rate points toward a strong statistical significance of corporate tax rate.

Labor cost (LC)

Labor cost in our model is also negatively correlated with our dependent variable as expected. A one unit decrease in labor cost leads to a 12.92% increase in dependent variable ceteris paribus, therefore pointing to even stronger economic significance as the corporate tax rate. To put it in real terms, a decrease in average hourly wage by one dollar causes a 12.92% increase in foreign direct investments´ net inflows. As with the corporate tax rate, the p-value of almost zero for labor cost shows strong statistical significance of labor cost variable in our model.

Governance index (GI)

Governance index is as expected positively correlated with our dependent variable. This confirms our assumptions that firms also consider political risks regarding their investments. A one unit increase in the governance score leads to an approximate 39.09% increase in dependent variable ceteris paribus. Since the governance index is measured only on scale from -2.5 to 2.5 we should restate the effect of the governance index. The 0.1 increase in the governance index score leads to a 3.91% increase in foreign direct investments´ net inflows, which points towards a strong economic significance. With regard to the statistical significance of the governance variable, it is a lower with p-value of 0.09567, however still significant for our purposes (significant at 90% confidence level).

Gross domestic product per capita (GDPPC)

With regard to the gross domestic product per capita, the model confirms also our expectations. The effect of the gross domestic product per capita on foreign direct investments´ net inflows is positive, however with diminishing returns of having higher values of this dependent variable. Economic significance is sound for the positive correlation, however diminishing effect is economically negligible. Overall, a 100 unit increase in gross domestic product per capita (increase by 100 U.S. dollars) leads to a 1.43% increase in foreign direct investments´ net inflows ceteris paribus. Concerning statistical significance, both variables are statistically very significant.

Dropped variables (OECD and OECD_CTR)

Although we drop OECD variables from the final model, there are some comments worth mentioning. From Figure 6 we can observe that the economic significance of the effect of being an OECD country and an additional effect on the corporate tax rate is as expected. OECD countries have lower foreign direct investment´s net inflows and the overall corporate tax rate effect on the investments is lower. However, both are statistically insignificant. This can be caused also because of the correlation of gross domestic product per capita and an OECD membership, due to the fact OECD countries tend to have higher products per capita.

4.3 Hypothesis

With regard to our first hypothesis we can conclude that our regression analysis confirms our assumptions and that countries benefit from lowering corporate tax rates. Overall, by lowering a corporate tax rate by one percentage point, country´s foreign direct investments´ net inflows increase by more than 2%. This conclusion points towards a strong incentive for countries to not cooperate and unilaterally lower their corporate tax rates. It is important to emphasize that under the benefit from lowering the corporate tax rate we understand only increase in foreign direct investments' net inflows. The final effect on the state budget, for which the further analysis is required, is determined by the tradeoff effect between the increase of the tax base (how many companies are taxed) and decrease in the amount of money collected from companies (as a result of decreased tax rate). Still, attracting investors to country brings more benefits than increase in taxes collected, such as providing new work opportunities.

Furthermore, concerning our other dependent variables of interest, governance index and OECD membership, we can conclude that governance index plays a significant role in determination of foreign direct investments´ net inflows. Countries that have a better governance tend to have higher investments´ net inflows than other countries. With regard to the OECD membership, the effect was not statistically significant, however an observation can be made that the expected economic relationship is present. Still, when considering our control variables, labor cost is the most dominant aspect in increasing the foreign direct investments' net inflows. This is well within the logical reasoning as firms consider mainly costs associated with the production and operation of business.

Our regression analysis thus confirms the relation between corporate tax rate and foreign direct investments from the previous academic research on larger sample of data and analyses also the significance of other political variables of interest, such as mentioned governance index or membership in OECD. On the following pages we continue in the further analysis of the corporate tax rates by looking at the given coherent country clusters, in order to elaborate on the confirmed fact that the countries benefit from competition in corporate tax rates.

5 Is there lower competition in coherent economic groups?

Since we have confirmed in the previous chapter that the competing in corporate tax rate is profitable for countries in terms of increasing foreign direct investments' net inflows, in this part of the thesis we look closer how strong this competition really is. We provide a detailed look on the corporate tax rates of our countries in scope and their development in time, in order to analyze signs of cooperative and more harmonized behavior within selected country clusters than on the whole global level. The assumption that within the coherent country clusters the competition is less intense comes from the presented theoretical background in earlier chapter, especially from the functionalistic theory of the spillover effect. We expect that countries, which are more integrated in economic policies are more likely to be coherent also in the question of corporate tax rates and show signs of cooperative behavior. The hypothesis this chapters aims to answer is as following.

H2: *"Member countries of coherent country clusters[8] are likely to show lower levels of competition in the issue of setting their corporate tax rate than is observed on the global level."*

In order to confirm or reject this stated hypothesis, we divide countries in our scope into following coherent clusters and analyze them in that order: OECD, EU, BRICS, ASEAN and benchmark group World. Due to the limitations in our dataset for certain country clusters we can make only a limited comparison for the unified time period of 2004 to 2013, in order to not have a statistical bias from the unavailable data. Still, overall description and analysis for each group is provided for the most available time horizon. As mentioned in the methodological part of this thesis, the main analysis consists of comparison of standard deviations for selected clusters. The standard deviation captures the information about the dispersion of the corporate tax rates in the

[8] Coherent country clusters is a label used for international organizations as well as other logical country groupings, such as BRICS.

given cluster and higher the dispersion, higher the standard deviation and thus we assume higher level of competition. As a reminder, we use two calculations for standard deviation, a sample and a population one, as mentioned in the methodological part of thesis. For OECD, EU and BRICS we use a population standard deviation, since we have a full population of countries. On the other hand, for the benchmark cluster and ASEAN we use a sample deviation, because we do not have a full population and we want to estimate a population standard deviation.

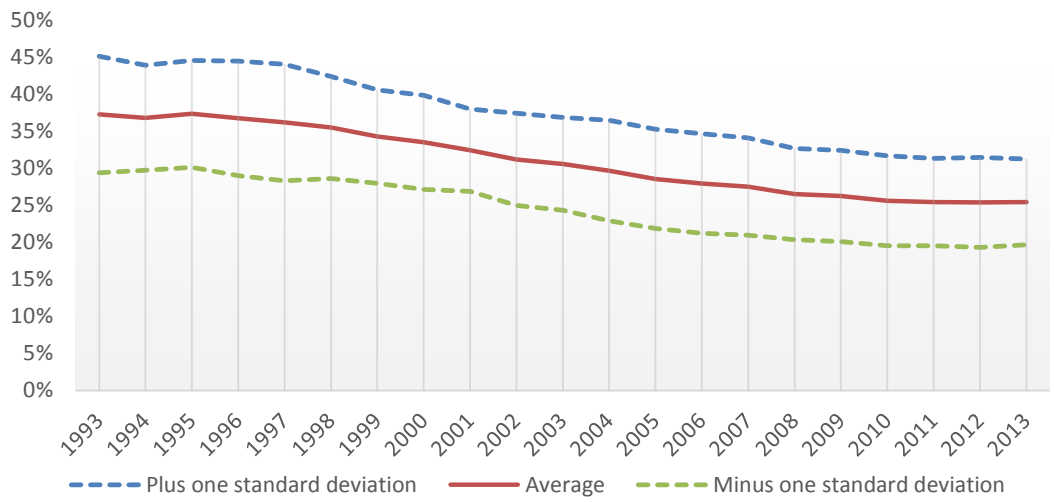
This part of the thesis will unfold in the following manner. First we provide a detailed analysis for each cluster, which we secondly complement by the subsequent comparison of clusters. We conclude similarly to the previous part of the thesis by addressing the stated hypothesis.

5.1 Coherent country clusters overview

OECD

For the OECD countries we have the most complete dataset available for our analysis from all clusters in scope. In this part of the thesis we take data for the member[9] countries of OECD from 1993 to 2013 and provide a further analysis of their corporate tax rates development. There is only one observation missing for the Republic of Korea in 1996[10], however we assume that this does not cause a significant statistical bias in calculating the population standard deviation. On the following graph, we can observe the development of the average corporate tax rate for OECD members along with portrayed standard deviations.

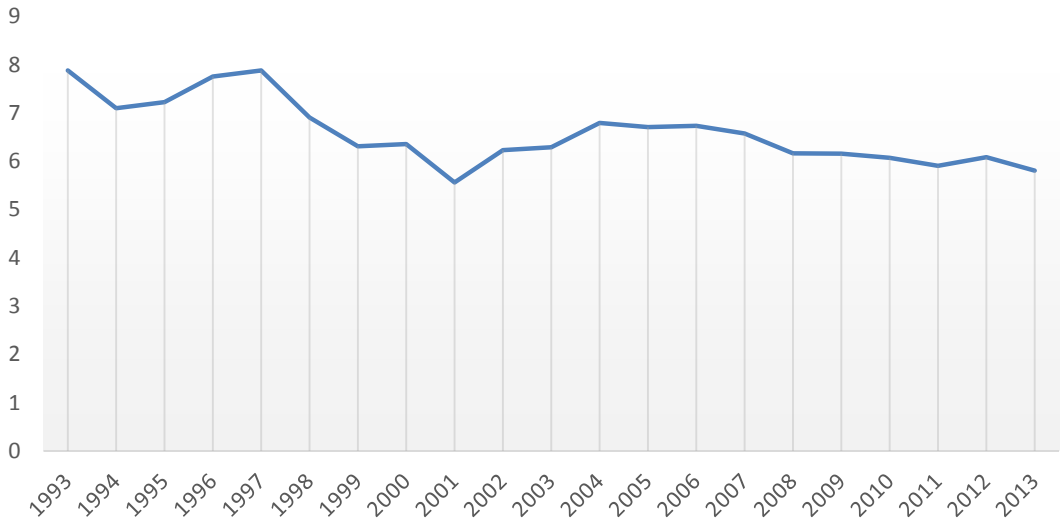
Graph 6. Development of OECD members' corporate tax rate [Own dataset]



The average corporate tax rate for OECD members has been declining steadily since 1993 from the value of 37.30% until the current value of 25.48% in 2013. The CAGR for the corporate tax rate average was -1.89% for selected period. The development of standard deviation followed the same trend and since 1993 the standard deviation for OECD member countries decreased from 7.88 pp. in 1993 to 5.81 pp. in 2013. On the following graph this declining trend in standard deviation is further showed for better illustration.

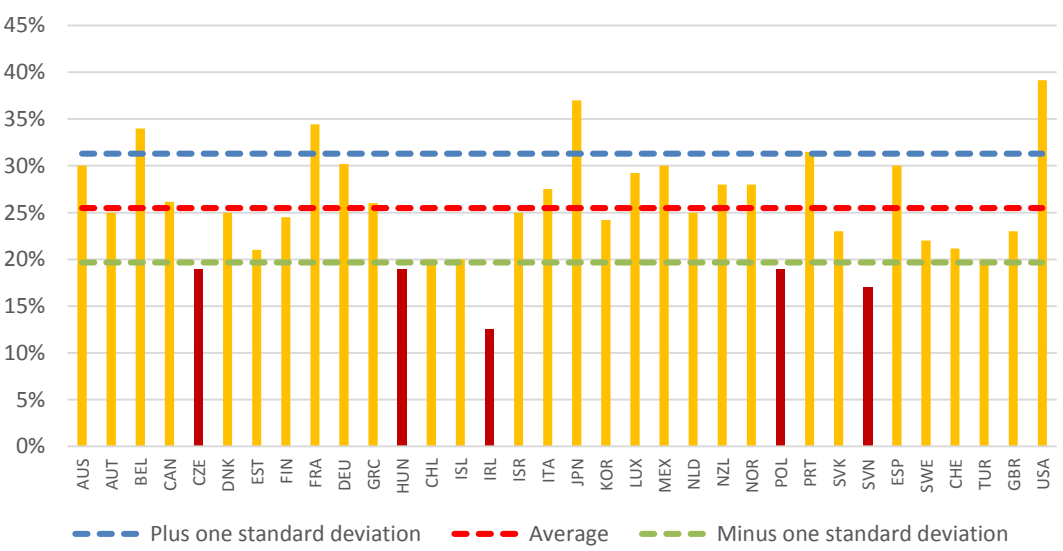
[9] Meaning that dataset include entries for countries that were for a given year member of the OECD. Same applies also for EU and ASEAN analysis.
[10] Republic of Korea became member of OECD in 1996. Data available for Republic of Korea from 1997.

Graph 7. Development of OECD members' standard deviation in pp. [Own dataset]



As we can observe, the standard deviation for OECD member countries has been mostly steadily decreasing from 1993 to 2013 with a more volatile period between 1997 and 2004. Overall, the CAGR for the period of 1993 to 2013 was -1.52%, which signals that OECD member countries gradually leveled their corporate tax rate with the OECD average. Furthermore, as we can observe from the next graphical representation, only a minority of OECD countries tend to set their corporate tax rates below one standard deviation from the average.

Graph 8. OECD members and their corporate tax rates in 2013 [Own dataset]



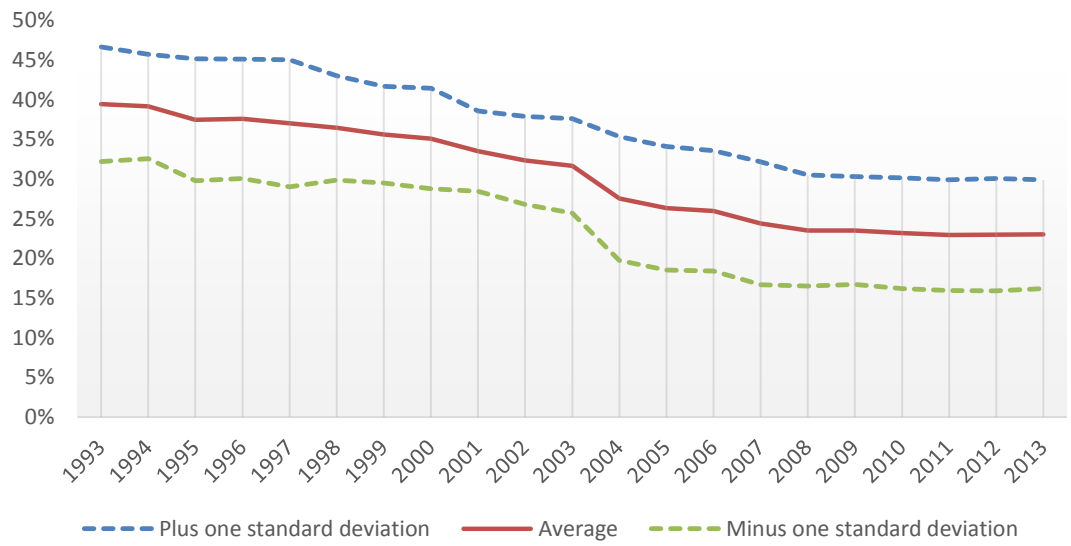
From the previous graph it can be noted that several OECD members set their rates in 2013 significantly lower than the other OECD member countries, meaning that their corporate tax rates are below one standard deviation from the OECD average. The most prominent example is Ireland with its corporate rate of 12.50% being 12.98 pp. below OECD average, followed by Slovenia with its corporate rate of 17.00% being 8.48 pp. below OECD average. Interesting observation is that the remaining three countries (Czech Republic, Hungary and Poland) set their corporate tax rate in 2013 at the same level of 19.00%, just below one standard deviation from the OECD average. On the other hand, Belgium, France, Japan and United States kept their corporate tax rates in 2013 above one standard deviation from the OECD average.

Overall, we can conclude that 73.53% of OECD countries (25 out of 34) were in 2013 *harmonized countries* and kept their corporate tax rates within one standard deviation from the average, and only 14.70% of OECD countries (5 out of 34) were in 2013 *competitive countries* and set their rates below one standard deviation from the average, which we evaluate as a competitive behavior.

European Union

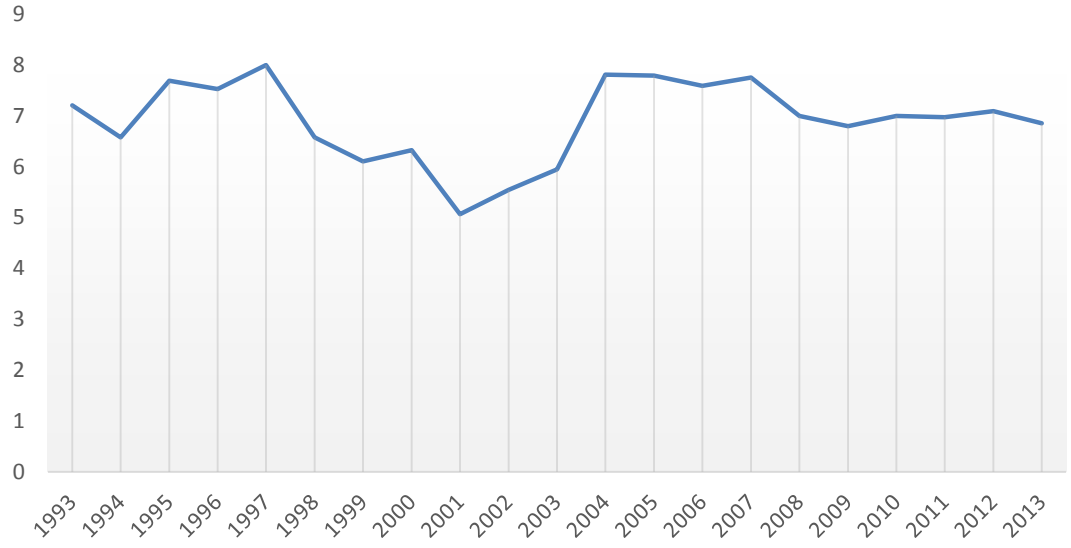
For the European Union we have a complete dataset for member countries from 1993 to 2013. On the following graph we can observe the development of the average corporate tax rate for the European Union members along with portrayed standard deviations.

Graph 9. Development of EU members' corporate tax rate [Own dataset]



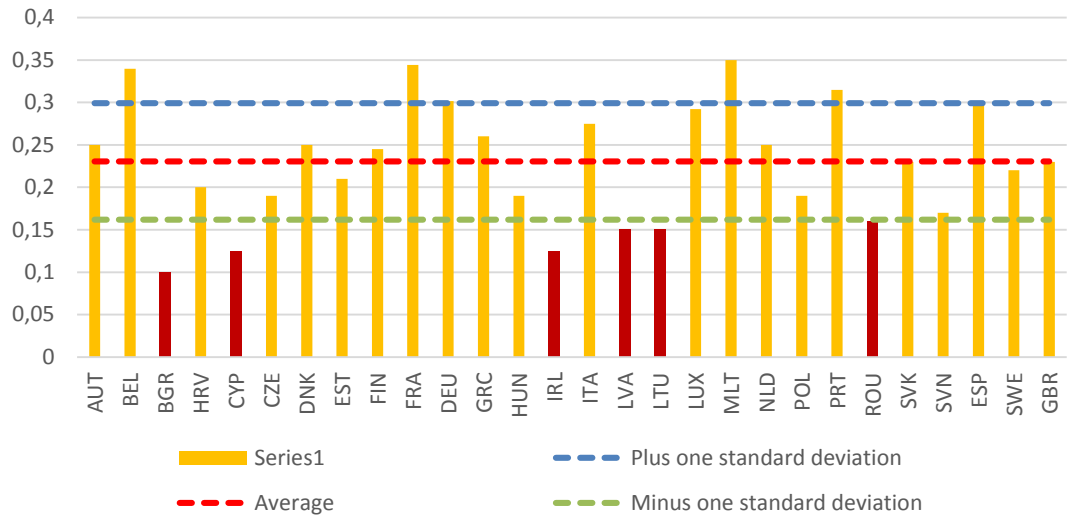
Similar to the development for the OECD member countries, the average corporate tax rate for European Union's members has been declining since 1993 from the value of 39.44% to the value of 23.05% in 2013, which is lower than the average corporate tax rate for the OECD countries. The compound annual growth rate for this period was -2.65%, higher than for the OECD cluster. Standard deviation's development followed similar trend and since 1993 the standard deviation decreased from the value of 7.21 pp. to the value of 6.85 pp. in 2013, which is higher than for the OECD countries. It is important to note the sharp drop in average corporate tax rate for the European Union's member countries between the years 2003 (average corporate tax rate of 31.67%) and 2004 (average corporate tax rate of 27.55%), which was caused by the enlargement of the Union in 2004 by ten new members, which had their corporate tax rates at that time below Union's average, except for Malta that was above average. On the following graph we portray in detail the development of standard deviation for the European Union for better illustration.

Graph 10. Development of EU members' standard deviation in pp. [Own dataset]



The effect of the 2004 enlargement is even more obvious when considering the standard deviation for the European Union's member countries and the apparent increase between the years 2003 and 2004. However, it is also important to note the increase in standard deviation from 2001 to 2003, which can be attributed to Ireland lowering its corporate tax rate from 20.00% in 2001 to 16.00% in 2002 and 12.50% in 2003 (the case which we look upon closer later). On the other hand the sharp decrease in standard deviation in 1998 was caused by Italy lowering its corporate tax rate from 53.20% to 37.00% and the sharp decrease in 2001 was caused by Germany lowering its corporate tax rate from 52.03% to 38.90% in 2001. The overall compound annual growth rate for the period from 1993 to 2013 was only -0.25%. Therefore, due to the enlargement of the European Union in 2004 we also look in detail on the old EU countries and new EU members separately on the following pages, because there is apparent distinction in these two sub clusters. Nevertheless, we first provide a graphical representation of the corporate tax rates in the European Union as a whole for the year 2013.

Graph 11. EU members and their corporate tax rates in 2013 [Own dataset]



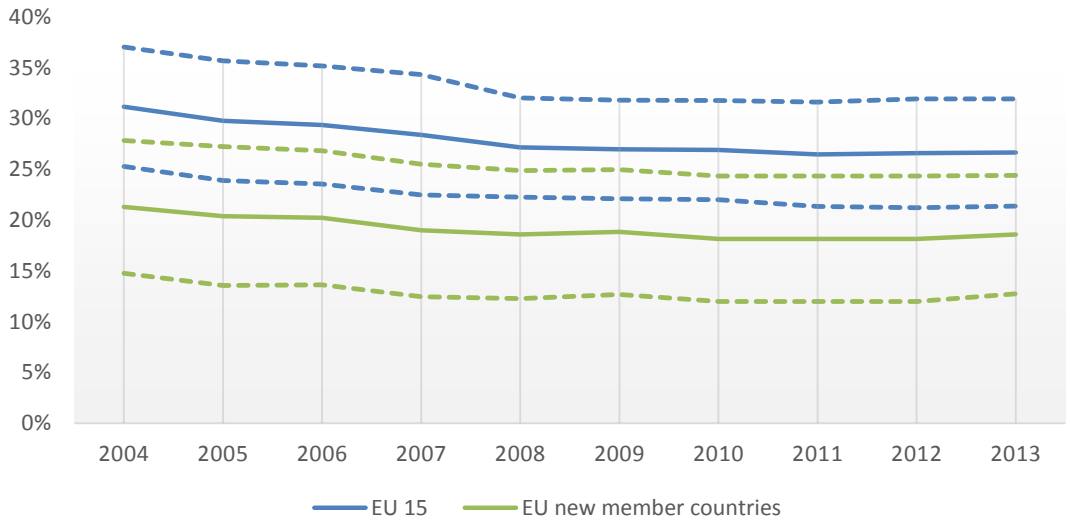
From the above graph we can observe that similar to OECD cluster, some member countries of the European Union set their corporate tax rates in 2013 significantly lower than the other member countries, below one standard deviation from the EU average. With the exception of Ireland, all of them were new member countries, which joined Union in 2004. The lowest corporate tax rate of 10.00% in 2013 had Bulgaria (13.05 pp. below EU average), followed by Cyprus and Ireland, both of them having corporate tax rate of 12.50% (10.55 pp. below EU average), Latvia and Lithuania with the same corporate tax rate of 15.00% (8.05 pp. below EU average) and Romania with the level of corporate tax rate of 16.00% (7.05 pp. below EU average). On the other hand, Belgium, France, Germany, Malta, Portugal and Spain kept their corporate tax rates in 2013 above one standard deviation from the EU average.

Overall, we can see that only 57.14% of EU countries (16 out of 28) were *harmonized* and kept their corporate tax rates within one standard deviation from the average, and 21.43% of EU countries (6 out of 28) were *competitive* and set their rates below one standard deviation from the average, which can be evaluated as a competitive behavior. From the comparison with the OECD cluster, we can conclude that the competition among members of the European Union is higher than for the OECD members. However, in order to address the issue of distinctive sub clusters we also look separately on old EU countries and the new members.

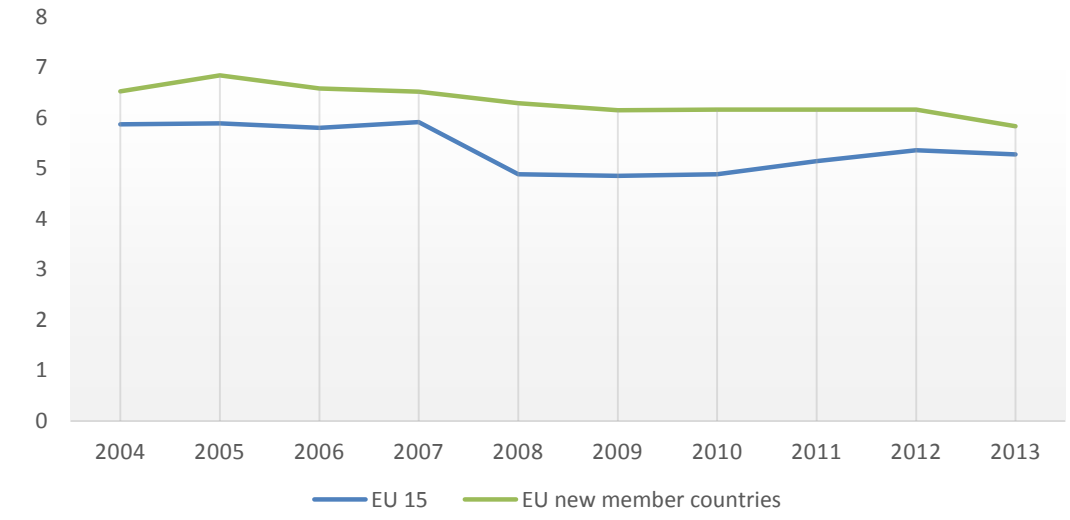
Old EU 15 vs. new member countries

On the following graphs we can observe the development of the average corporate tax rate for old EU 15 countries and new countries entering the Union since 2004[11] and corresponding development in standard deviations.

Graph 12. Development of the corporate tax rate for EU 15 and new members [Own dataset]



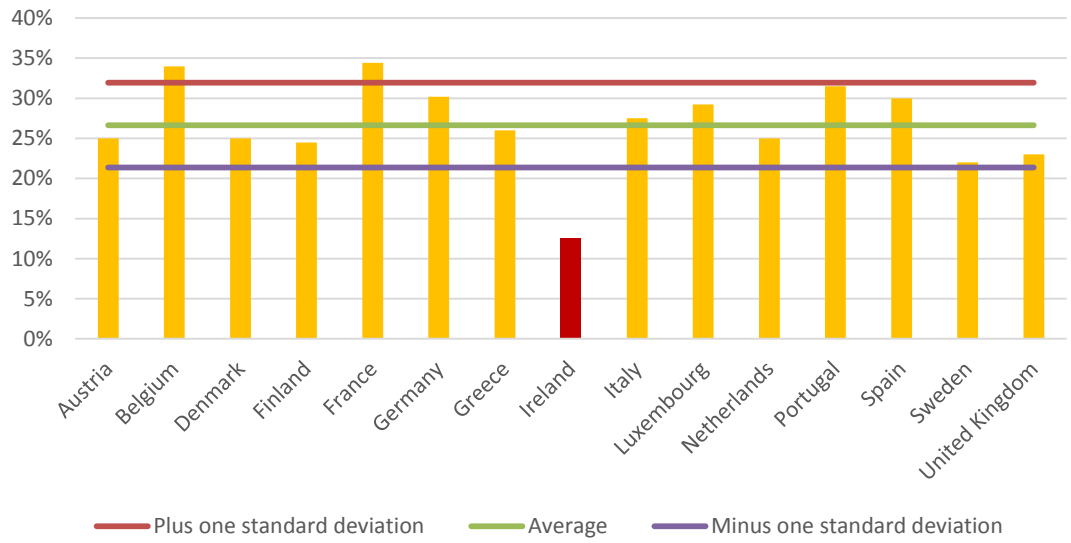
Graph 13. Development of EU 15 and new members' standard deviation in pp. [Own dataset]



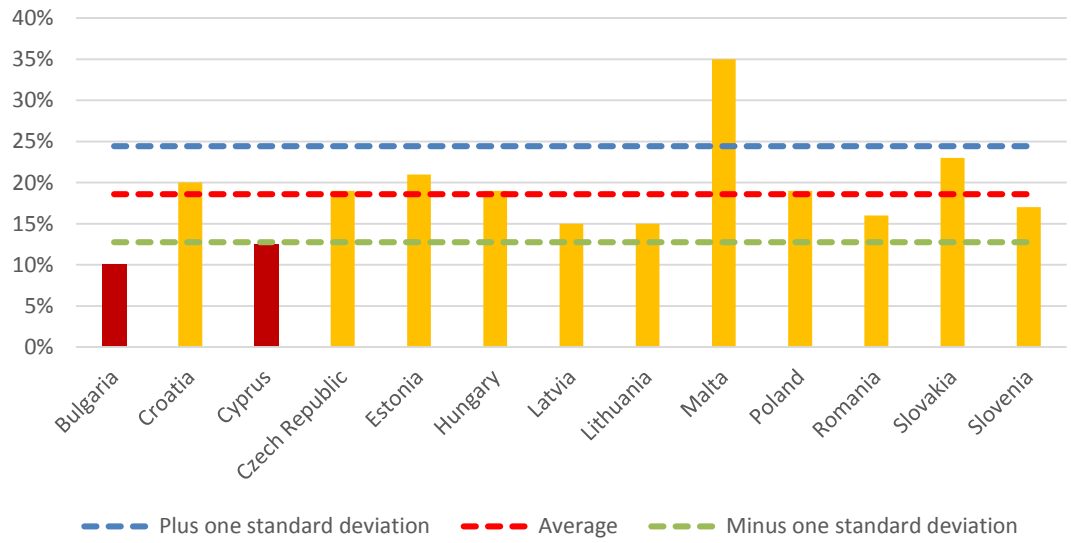
[11] Again we include only those countries to the cluster, which were at a given year member of the European Union.

It is clear that the average corporate tax rate for new member countries was significantly lower throughout the observed time period. Furthermore, it should be noted that the average for new member countries was for the whole period from 2004 to 2013 below one standard deviation from the EU 15 average. Both sub clusters followed the same trend of decrease in average corporate tax rates. Regarding the standard deviation development we can observe that for both sub clusters standard deviation decreased and is smaller than for the whole European Union cluster. Following are portrayed graphical representations of countries and their corporate tax rates in 2013.

Graph 14. EU 15 countries and their corporate tax rates in 2013 [Own dataset]



Graph 15. EU new members and their corporate tax rates in 2013 [Own dataset]



Among the older members of the European Union, only Ireland set its corporate tax rate in 2013 one standard deviation below the average. Its corporate tax rate of 12.50% was 14.15 pp. below the EU 15 average. On the other hand, Belgium and France kept their corporate tax rates above one standard deviation from average. Overall, only to 6.67% (1 out of 15) of countries from EU 15 cluster were *competitive*, while 80.00% (12 out of 15) of countries were *harmonized* and kept their corporate tax rates within one standard deviation from the cluster's average.

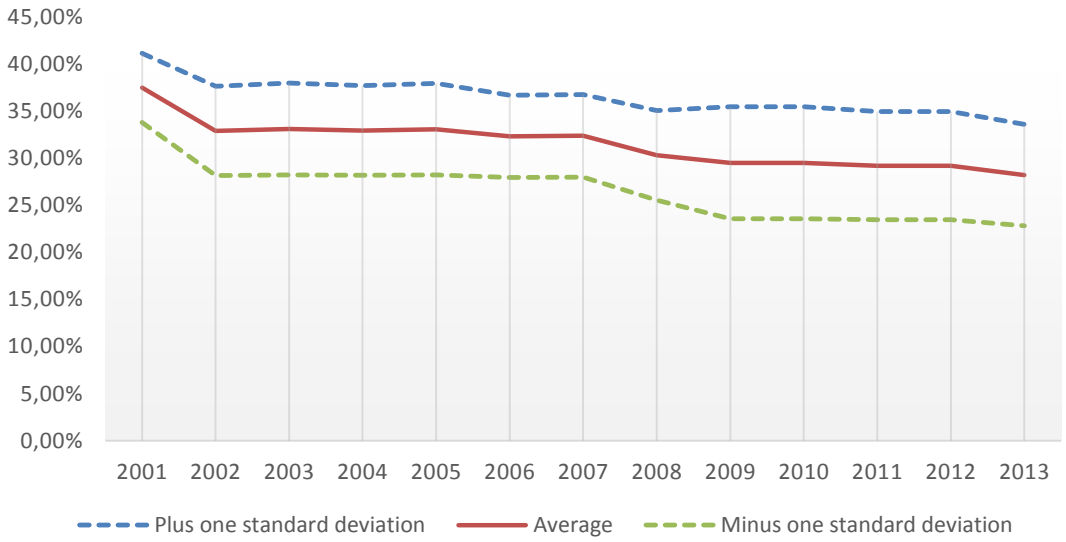
With regard to the new member countries of the European Union, in 2013 only Bulgaria and Cyprus set their corporate tax rates below one standard deviation from the average. Bulgaria with its corporate tax rate of 10.00% was 8.58 pp. below the average, while Cyprus with the corporate tax rate of 12.50% was 6.08 pp. below average. On the other hand, Malta kept its corporate tax rate in 2013 on level of 35.00%, which was 16.42 pp. above average. Overall, 76.92% (10 out of 13) of countries from new member countries were *harmonized* and kept their rates within one standard deviation from the average. On the other hand, 15.38% (2 out of 13) of countries were *competitive* and showed aggressive competitive behavior in setting their corporate tax rate.

Concerning the EU 15 countries and the case of Ireland, it is important to present a brief overview of the effect of the sharp corporate tax rate lowering and the fact that Ireland became one of the lowest corporate tax countries in the world in 2003. Ireland underwent a tremendous change it its attractiveness for investors since it began to lower its corporate tax rate from the 20.00% value in 2001. When we compare two periods for Ireland, one before the decrease in tax rate from 1997 to 2001 and the second one after the subsequent tax decrease from 2002 to 2012, we can clearly observe a sharp increase in foreign direct investments' net inflows. For the first period with the average tax rate of 28.00% the average net inflow of foreign direct investments to Ireland was 13,435 million of U.S. dollars, while in the second period, where the average corporate tax rate was 12.82%, the net inflow of foreign direct investments increased by 136.52% to the value of 31,775 million of U.S. dollars. [Own dataset] This provides an another proof that lowering corporate tax rates increases country's attractiveness to investors in terms of attracting foreign direct investments as presented in regression analysis.

BRICS

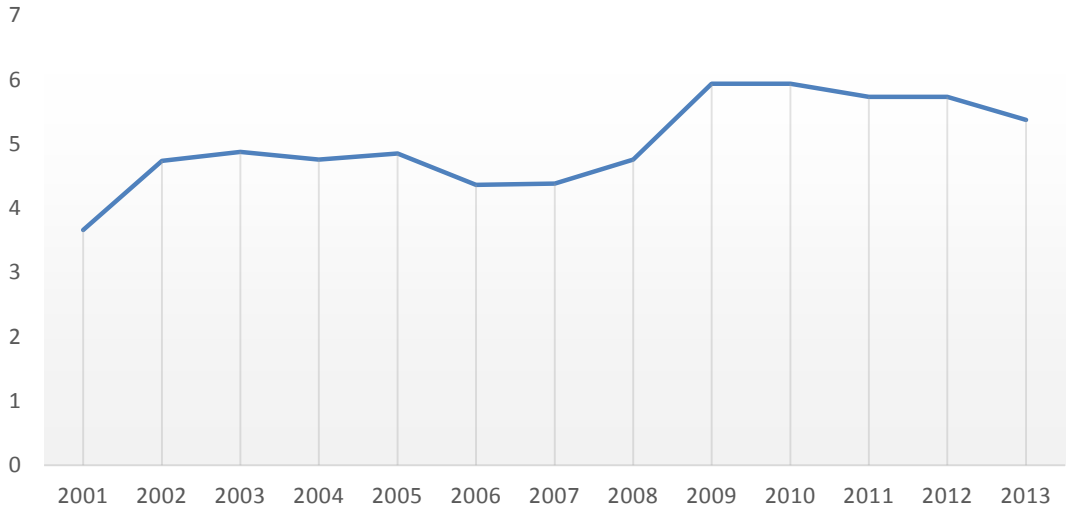
In the case of BRICS countries we have a full dataset for Brazil, China, India, Russia and South Africa only from 2001 up to the current date. On the following graph, we can observe the development of the average corporate tax rate for BRICS countries along with portrayed standard deviations.

Graph 16. Development of BRICS countries' corporate tax rate [Own dataset]



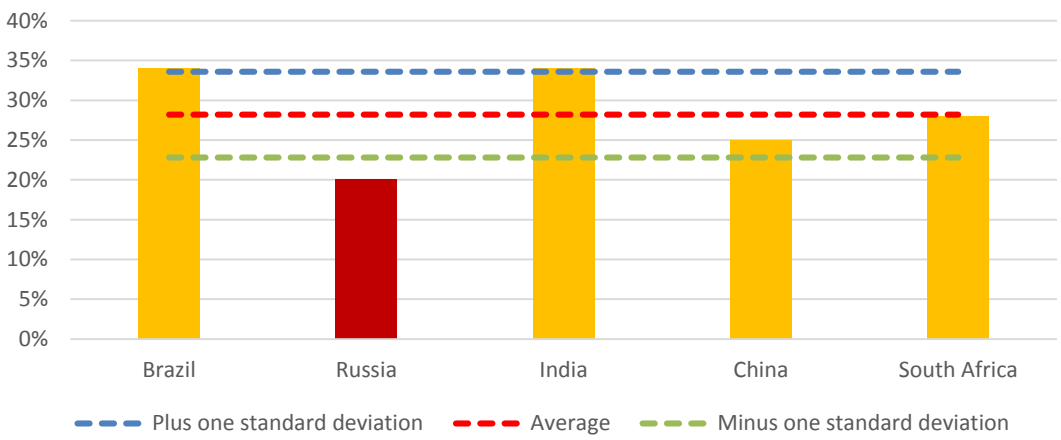
As we can note from the above graph, the average corporate tax rate for BRICS countries has been also slowly decreasing over time from the initial value of 37.47% in 2001 to the current value of 28.20% in 2013, with CAGR of -2.34%. On contrary to the previous examples of OECD and European Union, the standard deviation for the BRICS countries increased during the observed time period. From the 3.66 pp. in 2001, the standard deviation increased to 5.38 pp. 2013. This trend can be better observed on the following graph.

Graph 17. Development of BRICS' standard deviation in pp. [Own dataset]



The development of the standard deviation for BRICS countries has showed an increasing trend mostly throughout the observed time frame. Overall, CAGR for the selected period was 3.26%, which points toward an increase in competition among BRICS countries in setting their corporate tax rates.

Graph 18. BRICS countries and their corporate tax rates in 2013 [Own dataset]

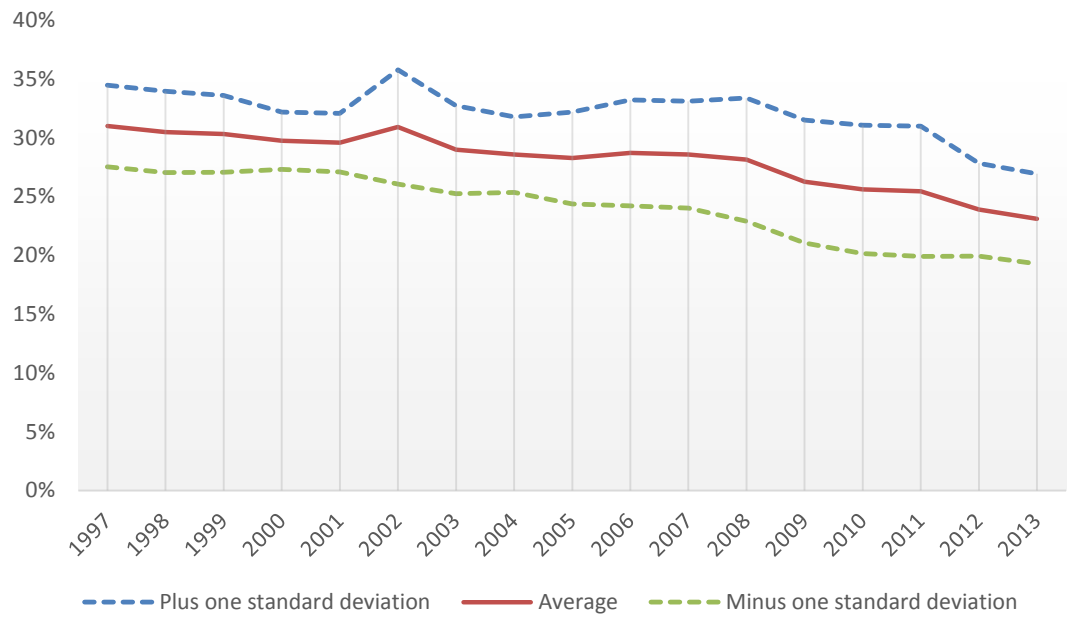


We can observe that only Russia set its corporate tax rate in 2013 significantly lower than the rest of the BRICS countries. On the other hand, Brazil and India kept their rates above one standard deviation from the average. Overall, 40% of BRICS countries (2 out of 5) were *harmonized* in 2013 and 20% (1 out of 5) were *competitive* and set the corporate tax rate below one standard deviation from the cluster's average.

ASEAN

For the ASEAN cluster we have only a partial[12] dataset from 1997 to 2013 for nine member countries. The only country missing is Myanmar, where we have no observation at all. Even with the dataset limitations, we assume that the partiality of the dataset for ASEAN cluster does not cause such significant bias as to challenge our overall analysis. In order to estimate standard deviation of the population we calculate a sample deviation as explained in the theoretical part of the thesis. As for the previous clusters, on the following graph we can observe the development in the average corporate tax rate for ASEAN countries.

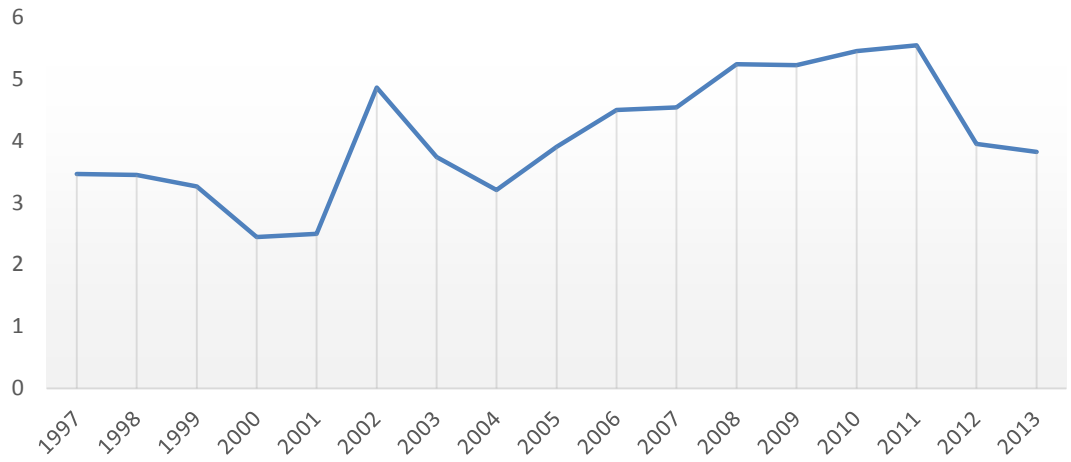
Graph 19. Development of ASEAN countries' corporate tax rate [Own dataset]



We can observe that the average corporate tax rate for ASEAN countries follows the same decreasing trend as for the previous clusters. From the initial value of 31.00% for our observed period, the average corporate tax rate decreased to the value of 23.11% in 2013. The CAGR rate for the period of 1997 to 2013 was -1.82%. On the other hand, the development of standard deviation for ASEAN cluster has been more volatile as portrayed by the following graph.

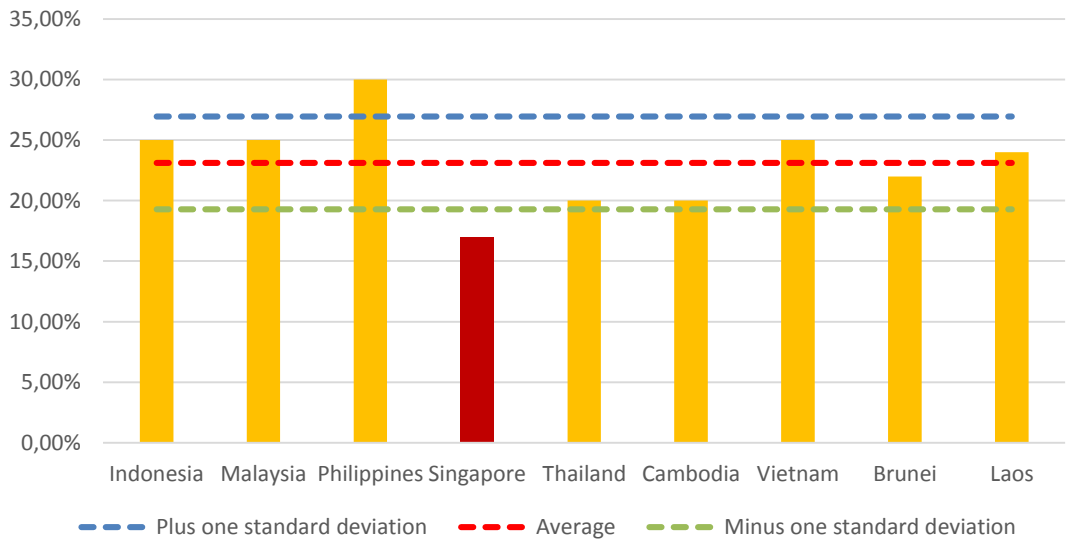
[12] For six ASEAN members we have full dataset from 1997 to 2013 (Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam). For Brunei we have data from 2004 to 2013. For Cambodia and Laos we have only data from 2009 to 2013.

Graph 20. Development of ASEAN's standard deviation in pp. [Own dataset]



Similarly to BRICS countries, the standard deviation for ASEAN cluster slightly increased during observed time period from the initial value of 3.46 pp. to the value of 3.82 pp., however undergoing more volatile development. The overall CAGR was 0.62% for the observed time frame.

Graph 21. ASEAN countries and their corporate tax rates in 2013 [Own dataset]

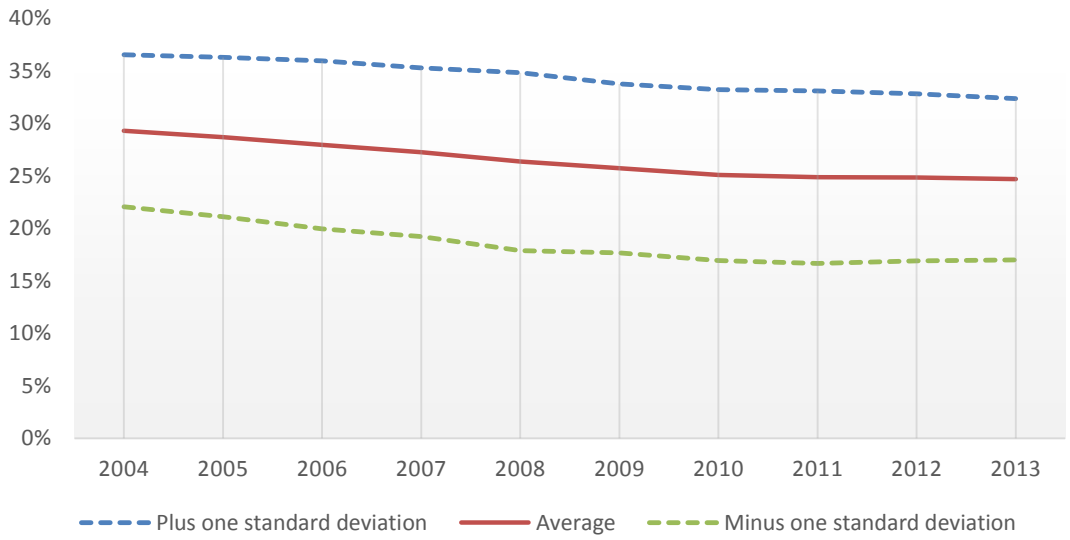


From the portrayed ASEAN countries, only Singapore set its corporate tax rate in 2013 below one standard deviation from the average. Overall 77.78% of ASEAN members (7 out of 9) were *harmonized* and kept their corporate rates in 2013 within one standard deviation from the cluster's average, and only 11.11% (1 out of 9) countries were *competitive* in 2013.

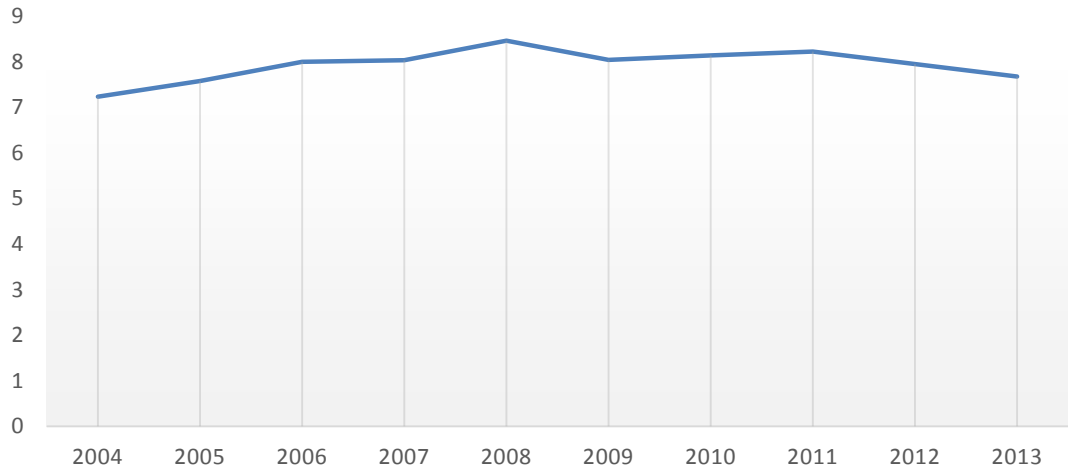
WORLD

For our benchmark group we take a dataset for period from 2004 to 2013 for 132 countries for which we have all observations out of our 149 countries. The timeframe for comparison and the selection of countries is due to the statistical soundness. Again, please consult appendix for the list of countries. As mentioned earlier, since we have not a full population we calculate the sample standard deviation in order to estimate the standard deviation for the whole world cluster. The average corporate tax rate development with adequate standard deviations for our benchmark cluster is portrayed.

Graph 22. Development of World cluster's corporate tax rate [Own dataset]

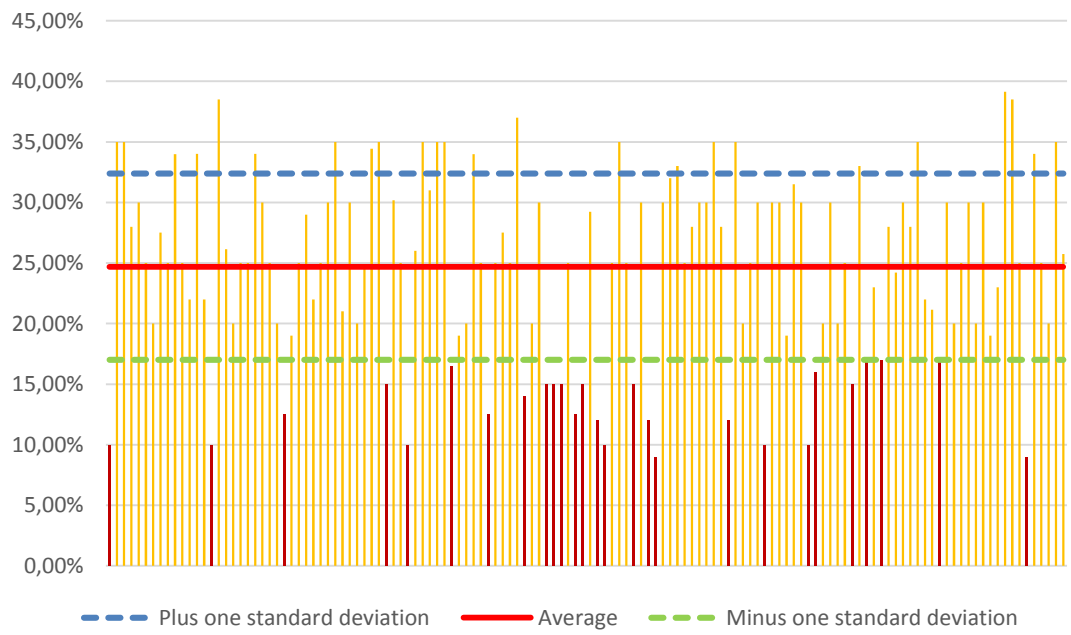


Graph 23. Development of World cluster's standard deviation in pp. [Own dataset]



As can be observed, the average corporate tax rate for our benchmark cluster decreased from the initial value of 29.30% in 2004 to the value of 24.69% in 2013 with the CAGR of -1.88%. With regard to the development of the standard deviation we can note that it has been increasing in the period from 2004 to 2011 and then slightly decreased. From the initial value of 7.24 pp. in 2004, the standard deviation for our benchmark cluster increased to the value of 7.69 pp. in 2013, with the CAGR of 0.66%. Therefore, we can conclude that on the global level the competition in setting the corporate tax rate increased in the observed time period. On the following graph, the current status in world corporate tax rate is shown.

Graph 24. World cluster's countries and their corporate tax rates in 2013 [Own dataset]



Overall, only 61.36% countries (81 out of 132) in our benchmark group were *harmonized* and kept their corporate tax rates within one standard deviation from the cluster's average. Furthermore, 20.45% countries (27 out of 132) were *competitive* and set their rate below one standard deviation from the cluster's average, which is considered as a competitive behavior. The most important observation is that all our coherent country clusters had lower standard deviations in 2013 than the benchmark world cluster. On the following pages, we provide a thorough comparison and overview of our selected coherent country clusters, in order to determine clusters with less competition and possible room for future cooperation.

5.2 Comparison of the coherent country clusters

For the convergence within the clusters comparison we take a time period from 2004 to 2013, due to the limitation in our benchmark group. The longer time frame for each cluster can be consulted in previous section of this thesis. We focus mainly on the comparison of the CAGRs for standard deviation, due to the mentioned fact that it can best describe the dispersion of the corporate tax rates and thus assess the competitiveness. However, we also provide a comparison in other selected statistics. In the following tables, the selected statistics for our clusters can be found.

Table 4. Overview of the selected statistics (I) for coherent country clusters [Own dataset]

	Average			***Standard deviation***		
Cluster	*2004*	*2013*	*CAGR*	*2004*	*2013*	*CAGR*
OECD	29.71%	25.48%	-1.69%	6.79 pp.	5.81 pp.	**-1.73%**
EU	27.55%	23.05%	-1.96%	7.81 pp.	6.85 pp.	-1.45%
EU 15	31.15%	26.65%	-1.72%	5.88 pp.	5.27 pp.	-1.19%
EU new	**21.30%**	**18.58%**	-1.51%	6.53 pp.	5.84 pp.	-1.23%
BRICS	32.94%	28.20%	-1.71%	4.76 pp.	5.38 pp.	1.37%
ASEAN	28.57%	23.11%	**-2.33%**	**3.21 pp**.	**3.82 pp**.	1.97%
Benchmark	29.30%	24.69%	-1.88%	7.24 pp.	7.69 pp.	0.66%

Table 5. Overview of the selected statistics (II) for coherent country clusters [Own dataset]

	Competitive countries		***Harmonized countries***	
Cluster	*2004*	*2013*	*2004*	*2013*
OECD	17.65%	14.71%	73.53%	70.59%
EU	8.00%	21.43%	64.00%	57.14%
EU 15	6.67%	**6.67%**	**86.67%**	**80.00%**
EU new	**0.00%**	15.38%	80.00%	76.92%
BRICS	20.00%	20.00%	60.00%	40.00%
ASEAN	14.29%	11.11%	71.43%	77.78%
Benchmark	18.94%	20.45%	72.73%	61.36%

From the selected clusters, the lowest standard deviation in 2013 was among ASEAN countries, followed by EU 15 and BRICS clusters. It is interesting to note that without taking into account Ireland, the older EU cluster had a standard deviation of 3.80 pp. in 2013[13]. For the European Union we can confirm the sub cluster specification, where the standard deviations for EU 15 and EU new are much lower as for the European Union as a whole unit. This shows that countries within those two sub clusters have lower level of competition. In other words, the competition is higher among the two sub clusters than among the countries within sub clusters. Important observation is also that in all selected clusters that are regarded as more integrated units and cooperate in various issues to some extent, the standard deviation was lower in 2013 than for our benchmark world cluster, which confirms our assumption from the theoretical point of view, and that the competition in coherent country clusters is lower than on the global level.

Regarding the development of the standard deviation for our clusters, the fastest decrease in standard deviation for the selected time period was in OECD cluster, followed by EU cluster and EU sub clusters. On the other hand the standard deviation increased for our benchmark group and for ASEAN and BRICS clusters increased even faster than for the benchmark group. The conclusion from the growth rates is that while for EU sub clusters and OECD, the standard deviations are low and decreasing over time, for BRICS and benchmark cluster the deviations are relatively high and increasing over time. ASEAN while having the lowest standard deviation in 2013, had also the highest CAGR for the standard deviation in the selected time period. Concerning other portrayed statistical indicators for selected clusters, the lowest average corporate tax rate in 2013 was among the EU new countries, while the highest was for the BRICS. The lowest share of *competitive countries* had in 2013 the EU 15 cluster, while the highest share was in EU as a whole, followed by the benchmark cluster. This is the result of a competitive behavior of new member countries in the European Union, however as we can see, the share of competitive countries among the EU new sub cluster is much lower, but still high. Regarding the share of *harmonized countries,* the highest was in EU 15 and ASEAN clusters, while the lowest was again in the BRICS cluster, followed by the EU cluster. Another interesting observation is

[13] For OECD the effect is smaller, without Ireland, the standard deviation in 2013 was 5.43 pp.

that it could be pointed out that with decreasing average of the corporate tax rates, the standard deviations should decrease also. However, as we can observe from ASEAN, BRICS and benchmark case, the standard deviations increased while the average corporate tax rate decreased in the observed period.

In order to rank the clusters from the lowest competitive cluster to the highest competitive cluster, we assign them scores from 1 to 7, depending on the position among other clusters in selected statistics (1 being the lowest competitive and 7 the highest)[14]. The final score for our analysis is presented in the following table.

Table 6. Ranking of clusters' competitiveness [Own dataset]

Cluster	*Standard deviation*	*CAGR deviation*	*Competitive*	*Harmonized*	*Total*
OECD	4	1	3	4	**12**
EU	6	2	7	6	21
EU 15	2	4	1	1	**8**
EU new	5	3	4	3	15
BRICS	3	6	5	7	21
ASEAN	1	7	2	2	**12**
Benchmark	7	5	6	5	23

The lowest competitive cluster according to our analysis is the EU 15, followed by the OECD and ASEAN clusters. This also corresponds, except for BRICS, to our main indicator, the standard deviation, which shows the dispersion of corporate tax rates and overall competitiveness. However, the most important conclusion is that all of selected clusters ranked better than the benchmark cluster, meaning that the competition is lower in selected clusters than on the global level. Therefore we can conclude that in higher integrated clusters, mainly EU 15, OECD and ASEAN, the competition in setting the corporate tax rate is lower, which confirms our second hypothesis. The EU and BRICS show higher competition. While for BRICS this is possibly because of the lowest integration from our coherent clusters, for the whole EU the reason is that new member countries form a separate sub cluster as we have showed.

[14] For standard deviation, 1 represents the lowest, while 7 the highest. For CAGR of deviation, 1 represents the fastest decrease, while 7 the fastest increase. For competitive, 1 represent lowest share, while 7 the highest share. For harmonized, 1 represents the highest share, while 7 the lowest share.

5.3 Hypothesis

Concerning our second stated hypothesis we can conclude that the analysis of convergence within coherent country clusters confirms our assumptions and leads us to the conclusion that there is less competition within coherent country clusters than on the global level, especially in EU 15, OECD and ASEAN clusters. Overall, EU 15 is the lowest competitive cluster, which is intuitive given its socio-economic and political development and the integration issues. Among EU 15 countries only Ireland is characterized by competitive behavior and as we showed, this behavior led to a desired effect of increasing foreign direct investments' net inflows. Furthermore, this conclusion elaborates on the assumption presented in the theoretical part that higher tax countries (EU 15 having the second highest average corporate tax rate as showed in the previous comparison) are better off when the corporate tax rates are harmonized. Lower competition in OECD and ASEAN clusters is also within our assumption, due to the cooperative nature of these clusters and higher economic integration, which allows for a spillover effect and signs of cooperative behavior also in the issue of corporate tax rates. The interesting observation is also the division of the EU into two sub clusters, which have much lower competition within themselves as the whole EU itself. Overall, we conclude that within EU 15[15], OECD and ASEAN there is the largest room also for future institutional cooperation in corporate tax rate issue. We end this thesis by summarizing the acquired knowledge in the concluding remarks along with providing additional comments.

[15] Since EU 15 is the most integrated unit within the EU itself and provides the main political and economic drive in the Union, we can expect the push for formal cooperation also on the whole EU level.

Concluding remarks

The issue of competition/cooperation in corporate tax rate is currently one of the most discussed topics in the field of the international political economy as the provided theoretical literature suggests. In our thesis we focused on the issue of competition among countries in the issue of corporate tax rates set up, which could eventually lead to the race to the bottom. As we have showed, we can distinguish between periods of stagnation, when countries do not compete to such extent and periods of increased competition characterized by sharp decline in corporate tax rates. The bottom line is that the average corporate tax rates have been decreasing over time, which supports the assumption of competitive behavior among countries.

We analyzed and confirmed by using a panel data for 59 countries and a period from 1997 to 2012 that countries benefit in competition in corporate tax rate in terms of increasing foreign direct investments' net inflows. Lowering a corporate tax rate by one percentage point increases country´s foreign direct investments´ net inflows by more than 2%. It is important to emphasize that under the benefit from lowering the corporate tax rate we understand only the increase in foreign direct investments' net inflows. Furthermore, concerning our other dependent variables of interest, governance index and OECD membership, we concluded that governance index plays a significant role in determination of foreign direct investments´ net inflows and countries that have a better governance tend to have higher investments´ net inflows than other countries. OECD membership has an expected economic effect in terms of lowering the effect of corporate tax rates on foreign direct investments' net inflows, however we showed that it is not statistically significant. Still, labor cost is the most dominant aspect in increasing foreign direct investments' net inflows. This is well within the presented theoretical background and the fact that one of the tools in attracting foreign investors is offering lower labor costs and associated lower regulation.

Since we have showed that the average corporate tax rates have been decreasing which signalizes that countries compete among themselves and further that this competition is indeed beneficial for them, we also analyzed if the extent of the competition is lower within the coherent country clusters. The results of our analysis supported our assumptions and the lowest competition is among the countries, which are characterized by increased economic cooperation, namely EU15, OECD and ASEAN. This conclusion supports the possible spillover effect and points toward the higher possibility of future institutional cooperation also in question of corporate tax rate set up within coherent country clusters than on the global level.

Naturally, our analysis only covered a part of this topic and provided several new observations and conclusions regarding the issue of countries' competition in question of corporate tax rate. The conclusion that there is a lower competition and signs of cooperative behavior within coherent country clusters does not necessarily mean that this cooperation will be institutionalized in terms of formal institutions. On the other hand we state that the room for the institutionalized cooperation in question of corporate tax rates is larger within the coherent country clusters than on the global level. The consequent more political and structural analysis is required as to assess the concrete institutional set up, in order to maintain international regulation, which requires a supranational body with sufficient authority and ability to implement and execute the necessary reforms.

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Appendix A: Corporate tax rates

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Afghanistan											
Albania											
Angola											
Argentina											
Armenia											
Aruba											
Australia	46.00	46.00	46.00	46.00	46.00	49.00	49.00	39.00	39.00	39.00	39.00
Austria	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	30.00	30.00	30.00
Azerbaijan											
Bangladesh											
Barbados											
Belarus											
Belgium	48.00	48.00	45.00	45.00	45.00	45.00	43.00	43.00	43.00	41.00	39.00
Bolivia											
Bosnia and Herzeg.											
Botswana											
Brazil											
Brunei Darussalam											
Bulgaria											
Cambodia											
Cameroon											
Canada	50.92	49.53	48.27	47.63	49.43	49.76	48.58	41.29	41.34	41.45	41.81
Chile											
China											
Colombia											
Congo, Dem. rep. of											
Congo, Republic of											
Costa Rica											
Côte D´Ivoire											
Croatia											
Curacao											
Cyprus											
Czech Republic											
Denmark	40.00	40.00	40.00	40.00	50.00	50.00	50.00	50.00	50.00	40.00	38.00
Dominican Republic											
Ecuador											
Egypt											

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Afghanistan											
Albania											
Angola											
Argentina						33.00	33.00	35.00	35.00	35.00	35.00
Armenia											
Aruba											
Australia	39.00	33.00	33.00	36.00	36.00	36.00	36.00	36.00	34.00	30.00	30.00
Austria	30.00	30.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00
Azerbaijan											
Bangladesh						40.00	40.00	35.00	35.00	35.00	35.00
Barbados											
Belarus											
Belgium	39.00	40.17	40.17	40.17	40.17	40.17	40.17	40.17	40.17	40.17	40.17
Bolivia						25.00	25.00	25.00	25.00	25.00	25.00
Bosnia and Herzeg.											
Botswana											
Brazil						25.00	25.00	33.00	37.00	34.00	34.00
Brunei Darussalam											
Bulgaria											
Cambodia											
Cameroon											
Canada	42.52	42.56	42.58	42.86	42.94	42.94	42.94	42.87	42.43	40.48	38.02
Chile						15.00	15.00	15.00	15.00	15.00	15.00
China						33.00	33.00	33.00	33.00	33.00	33.00
Colombia						35.00	35.00	35.00	35.00	35.00	35.00
Congo, Dem. rep. of											
Congo, Republic of											
Costa Rica						30.00	30.00				
Côte D´Ivoire											
Croatia										20.00	20.00
Curacao											
Cyprus										28.00	28.00
Czech Republic		45.00	42.00	41.00	39.00	39.00	35.00	35.00	31.00	31.00	31.00
Denmark	34.00	34.00	34.00	34.00	34.00	34.00	34.00	32.00	32.00	30.00	30.00
Dominican Republic						25.00	25.00	25.00	25.00	25.00	25.00
Ecuador						32.00	36.25	15.00	25.00	36.25	36.25
Egypt											

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Afghanistan		20.00			20.00	20.00	20.00	20.00	20.00	20.00	20.00
Albania		25.00	23.00	20.00	20.00	10.00	10.00	10.00	10.00	10.00	10.00
Angola		35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Argentina	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Armenia				20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Aruba		35.00	35.00	35.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00
Australia	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Austria	34.00	34.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Azerbaijan		25.00	24.00	24.00	22.00	22.00	22.00	20.00	20.00	20.00	20.00
Bangladesh	30.00	30.00	30.00	30.00	30.00	30.00	27.50	27.50	27.50	27.50	27.50
Barbados		36.00	30.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Belarus				24.00	24.00	24.00	24.00	24.00	24.00	18.00	18.00
Belgium	33.99	33.99	33.99	33.99	33.99	33.99	33.99	33.99	33.99	33.99	33.99
Bolivia	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Bosnia and Herzeg.				10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Botswana		25.00	25.00	25.00	25.00	25.00	25.00	25.00	22.00	22.00	22.00
Brazil	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00
Brunei Darussalam		30.00	30.00	30.00	30.00	30.00	25.50	23.50	22.00	22.00	22.00
Bulgaria		19.50	15.00	15.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Cambodia							20.00	20.00	20.00	20.00	20.00
Cameroon		38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50
Canada	35.87	34.38	34.18	33.93	33.95	31.43	31.02	29.36	27.64	26.14	26.14
Chile	16.00	16.50	17.00	17.00	17.00	17.00	17.00	17.00	20.00	17.00	20.00
China	33.00	33.00	33.00	33.00	33.00	25.00	25.00	25.00	25.00	25.00	25.00
Colombia	35.00	35.00	35.00	35.00	34.00	33.00	33.00	33.00	33.00	33.00	25.00
Congo, Dem. rep. of								40.00	40.00	40.00	35.00
Congo, Republic of		38.00	38.00	38.00	38.00	38.00	38.00	38.00	36.00	35.00	34.00
Costa Rica	36.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Côte D´Ivoire		35.00	35.00	35.00	27.00	25.00	25.00	25.00	25.00	25.00	25.00
Croatia	20.32	20.32	20.32	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Curacao									34.50	27.50	27.50
Cyprus	15.00	15.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	12.50
Czech Republic	31.00	28.00	26.00	24.00	24.00	21.00	20.00	19.00	19.00	19.00	19.00
Denmark	30.00	30.00	28.00	28.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Dominican Republic	25.00	25.00	25.00	30.00	25.00	25.00	25.00	25.00	29.00	29.00	29.00
Ecuador		25.00	25.00	25.00	25.00	25.00	25.00	25.00	24.00	23.00	22.00
Egypt		40.00	40.00	20.00	20.00	20.00	20.00	20.00	20.00	25.00	25.00

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
El Salvador											
Equatorial Guinea											
Estonia											
Ethiopia											
Fiji											
Finland	61.50	61.75	61.50	61.75	61.75	51.50	51.50	51.50	52.50	44.50	42.00
France	50.00	50.00	50.00	50.00	50.00	45.00	45.00	42.00	42.00	42.00	42.00
Gabon											
Georgia											
Germany	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	54.55	56.25
Ghana											
Gibraltar											
Greece	45.00	45.00	45.00	45.00	49.00	49.00	49.00	49.00	46.00	46.00	46.00
Guam											
Guatemala											
Guinea											
Honduras											
Hong Kong SAR											
Hungary									50.00	40.00	40.00
Iceland											
India											
Indonesia											
Iraq											
Ireland	45.00	50.00	50.00	50.00	50.00	50.00	50.00	47.00	43.00	43.00	40.00
Israel											
Italy	36.25	41.34	46.40	46.40	46.40	46.40	46.40	46.40	46.40	46.40	47.80
Jamaica											
Japan										49.98	49.98
Jordan											
Kazakhstan											
Kenya											
Korea, Republic of											
Kuwait											
Laos											
Latvia											
Lebanon											
Lesotho											
Libya											
Liechtenstein											
Lithuania											
Luxembourg											

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
El Salvador						25.00	25.00	25.00	25.00	25.00	25.00
Equatorial Guinea											
Estonia									26.00	26.00	26.00
Ethiopia											
Fiji						35.00	35.00	35.00	35.00	34.00	32.00
Finland	39.00	25.00	25.00	25.00	28.00	28.00	28.00	28.00	29.00	29.00	29.00
France	34.00	33.33	33.33	36.66	36.66	41.66	41.66	40.00	37.76	36.43	35.43
Gabon											
Georgia											
Germany	58.15	56.52	52.17	55.11	55.88	56.80	56.05	52.03	52.03	38.90	38.90
Ghana											
Gibraltar											
Greece	40.50	35.00	35.00	35.00	35.00	35.00	40.00	40.00	40.00	37.50	35.00
Guam											
Guatemala						30.00	25.00	27.50	25.00	31.00	31.00
Guinea											
Honduras						40.25	40.25	25.00	25.00	25.00	25.00
Hong Kong SAR						16.50	16.50	16.00	16.00	16.00	16.00
Hungary	40.00	40.00	36.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00
Iceland		33.00	33.00	33.00	33.00	33.00	33.00	30.00	30.00	30.00	18.00
India						35.00	35.00	35.00	38.50	39.55	35.70
Indonesia						30.00	30.00	30.00	30.00	30.00	39.00
Iraq											
Ireland	40.00	40.00	40.00	38.00	36.00	36.00	32.00	28.00	24.00	20.00	16.00
Israel								36.00	36.00	36.00	36.00
Italy	52.20	52.20	53.20	53.20	53.20	53.20	37.00	37.00	37.00	36.00	36.00
Jamaica											
Japan	49.98	49.98	49.98	49.98	49.98	49.98	46.36	40.87	40.87	40.87	40.87
Jordan											
Kazakhstan											
Kenya											
Korea, Republic of						30.80	30.80	30.80	30.80	30.80	29.70
Kuwait											
Laos											
Latvia											
Lebanon											
Lesotho											
Libya											
Liechtenstein											
Lithuania											
Luxembourg		39.40	39.40	40.30	40.30	30.30	37.50	37.50	37.45	37.45	30.38

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
El Salvador	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	30.00	30.00
Equatorial Guinea		25.00	25.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Estonia	26.00	26.00	24.00	23.00	22.00	21.00	21.00	21.00	21.00	21.00	21.00
Ethiopia		30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Fiji	32.00	31.00	31.00	31.00	31.00	31.00	29.00	28.00	28.00	28.00	20.00
Finland	29.00	29.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	24.50	24.50
France	35.43	35.43	34.95	34.43	34.43	34.43	34.43	34.43	34.43	34.43	34.43
Gabon		35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Georgia		20.00	20.00	20.00	20.00	15.00	15.00	15.00	15.00	15.00	15.00
Germany	40.22	38.90	38.90	38.90	38.90	30.18	30.18	30.18	30.18	30.18	30.18
Ghana		32.50	30.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Gibraltar		35.00	35.00	35.00	35.00	33.00	27.00	22.00	10.00	10.00	10.00
Greece	35.00	35.00	32.00	29.00	25.00	25.00	25.00	24.00	20.00	20.00	26.00
Guam		35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Guatemala	31.00	31.00	31.00	31.00	31.00	31.00	31.00	31.00	31.00	31.00	31.00
Guinea		35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Honduras	25.00	25.00	30.00	30.00	30.00	30.00	30.00	25.00	35.00	35.00	35.00
Hong Kong SAR	16.00	17.50	17.50	17.50	17.50	16.50	16.50	16.50	16.50	16.50	16.50
Hungary	18.00	16.00	16.00	17.33	20.00	20.00	20.00	19.00	19.00	19.00	19.00
Iceland	18.00	18.00	18.00	18.00	18.00	15.00	15.00	18.00	20.00	20.00	20.00
India	36.75	35.88	36.59	33.66	33.99	33.99	33.99	33.99	32.44	32.45	33.99
Indonesia	30.00	30.00	30.00	30.00	30.00	30.00	28.00	25.00	25.00	25.00	25.00
Iraq						15.00	15.00	15.00	15.00	15.00	15.00
Ireland	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50
Israel	36.00	35.00	34.00	31.00	29.00	27.00	26.00	25.00	24.00	25.00	25.00
Italy	34.00	33.00	33.00	33.00	33.00	27.50	27.50	27.50	27.50	27.50	27.50
Jamaica		33.33	33.33	33.33	33.33	33.33	33.33	33.33	33.33	33.33	25.00
Japan	40.87	39.54	39.54	39.54	39.54	39.54	39.54	39.54	39.54	39.54	37.00
Jordan		35.00	35.00	25.00	25.00	25.00	25.00	14.00	14.00	14.00	14.00
Kazakhstan		30.00	30.00	30.00	30.00	30.00	20.00	20.00	20.00	20.00	20.00
Kenya		30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Korea, Republic of	29.70	29.70	27.50	27.50	27.50	27.50	24.20	24.20	24.20	24.20	24.20
Kuwait		55.00	55.00	55.00	55.00	55.00	15.00	15.00	15.00	15.00	15.00
Laos							35.00	35.00	35.00	28.00	24.00
Latvia		15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
Lebanon		15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
Lesotho		35.00	35.00	35.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Libya					40.00	40.00	40.00	40.00	20.00	20.00	20.00
Liechtenstein		20.00	20.00	20.00	20.00	20.00	20.00	20.00	12.50	12.50	12.50
Lithuania		15.00	15.00	15.00	15.00	15.00	20.00	15.00	15.00	15.00	15.00
Luxembourg	30.38	30.38	30.38	29.63	29.63	29.63	28.59	28.59	28.80	28.80	29.22

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Macao SAR											
Macedonia (FYR)											
Madagascar											
Malawi											
Malaysia											
Malta											
Mauritania											
Mauritius											
Mexico	42.00	42.00	42.00	42.00	42.00	42.00	40.60	39.20	37.00	36.00	35.00
Moldova											
Montenegro											
Morocco											
Mozambique											
Namibia											
Netherlands	48.00	48.00	48.00	43.00	43.00	42.00	42.00	42.00	35.00	35.00	35.00
New Zealand	45.00	45.00	45.00	45.00	45.00	48.00	48.00	28.00	33.00	33.00	33.00
Nicaragua											
Nigeria											
Northern Mariana Isl.											
Norway	50.80	50.80	50.80	50.80	50.80	50.80	50.80	50.80	50.80	50.80	50.80
Oman											
Pakistan											
Palestine											
Panama											
Papua New Guinea											
Paraguay											
Peru											
Philippines											
Poland											
Portugal	48.96	50.72	55.12	55.12	55.12	50.28	48.08	48.08	40.15	40.15	39.60
Puerto Rico											
Qatar											
Romania											
Russia											
Rwanda											
Samoa											
Saudi Arabia											
Senegal											
Serbia											
Seychelles											
Singapore											

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Macao SAR											
Macedonia (FYR)											
Madagascar											
Malawi											
Malaysia						30.00	28.00	28.00	28.00	28.00	28.00
Malta											
Mauritania											
Mauritius											
Mexico	35.00	34.80	34.00	34.00	34.00	34.00	34.00	35.00	35.00	35.00	35.00
Moldova											
Montenegro											
Morocco											
Mozambique											
Namibia											
Netherlands	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	34.50
New Zealand	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00
Nicaragua											
Nigeria											
Northern Mariana Isl.											
Norway	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00
Oman											
Pakistan						30.00	30.00	35.00	43.00	34.65	35.00
Palestine											
Panama						37.00	37.00	37.00	37.00	37.00	37.00
Papua New Guinea						25.00	25.00	25.00	25.00	25.00	25.00
Paraguay						30.00	30.00	30.00	30.00	30.00	30.00
Peru						30.00	30.00	30.00	30.00	30.00	30.00
Philippines						35.00	34.00	33.00	32.00	32.00	32.00
Poland	40.00	40.00	40.00	40.00	40.00	38.00	36.00	34.00	30.00	28.00	28.00
Portugal	39.60	39.60	39.60	39.60	39.60	37.40	37.40	37.40	35.20	35.20	33.00
Puerto Rico											
Qatar											
Romania										25.00	25.00
Russia										43.00	24.00
Rwanda											
Samoa											
Saudi Arabia											
Senegal											
Serbia											
Seychelles											
Singapore						26.00	26.00	26.00	26.00	25.50	24.50

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Macao SAR		15.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Macedonia (FYR)		15.00	15.00	15.00	12.00	10.00	10.00	10.00	10.00	10.00	10.00
Madagascar					30.00	25.00	24.00	23.00	22.00	21.00	20.00
Malawi			30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Malaysia	28.00	28.00	28.00	28.00	27.00	26.00	25.00	25.00	25.00	25.00	25.00
Malta		35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Mauritania		20.00	20.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Mauritius		25.00	25.00	25.00	22.50	15.00	15.00	15.00	15.00	15.00	15.00
Mexico	34.00	33.00	30.00	29.00	28.00	28.00	28.00	30.00	30.00	30.00	30.00
Moldova		20.00	18.00	15.00	15.00	0.00	0.00	0.00	0.00	12.00	12.00
Montenegro		20.00	20.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
Morocco		35.00	35.00	35.00	35.00	30.00	30.00	30.00	30.00	30.00	30.00
Mozambique		32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00
Namibia		35.00	35.00	35.00	35.00	35.00	35.00	35.00	34.00	34.00	33.00
Netherlands	34.50	34.50	31.50	29.60	25.50	25.50	25.50	25.50	25.00	25.00	25.00
New Zealand	33.00	33.00	33.00	33.00	33.00	30.00	30.00	30.00	28.00	28.00	28.00
Nicaragua		30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Nigeria		30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Northern Mariana Isl.		35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Norway	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00
Oman		12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Pakistan	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Palestine		20.00	20.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	20.00
Panama	30.00	30.00	30.00	30.00	30.00	30.00	30.00	27.50	25.00	25.00	25.00
Papua New Guinea	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Paraguay	30.00	30.00	30.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Peru	27.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Philippines	32.00	32.00	32.00	35.00	35.00	35.00	30.00	30.00	30.00	30.00	30.00
Poland	27.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00
Portugal	33.00	27.50	27.50	27.50	26.50	26.50	26.50	26.50	26.50	31.50	31.50
Puerto Rico		39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	30.00	30.00
Qatar		35.00	35.00	35.00	35.00	35.00	35.00	10.00	10.00	10.00	10.00
Romania	25.00	25.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00
Russia	24.00	24.00	24.00	24.00	24.00	24.00	20.00	20.00	20.00	20.00	20.00
Rwanda		35.00	35.00	35.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Samoa				29.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00
Saudi Arabia		30.00	30.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Senegal		35.00	33.00	33.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Serbia		14.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	15.00
Seychelles		40.00	40.00	40.00	40.00	40.00	40.00	33.00	33.00	33.00	33.00
Singapore	22.00	22.00	20.00	20.00	20.00	18.00	18.00	17.00	17.00	17.00	17.00

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Sint Maarten (Dutch)											
Slovakia											
Slovenia											
South Africa											
Spain	33.00	33.00	33.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Sri Lanka											
Sudan											
Suriname											
Swaziland											
Sweden	57.80	57.80	58.10	56.60	56.60	56.60	56.60	56.60	60.10	53.00	30.00
Switzerland	33.05	33.05	33.05	32.87	31.87	31.68	31.69	30.59	30.60	30.60	27.72
Syrian Arab Republic											
Taiwan											
Tanzania											
Thailand											
Trinidad and Tobago											
Tunisia											
Turkey											
Uganda											
Ukraine											
United Kingdom	52.00	52.00	50.00	45.00	40.00	35.00	35.00	35.00	35.00	34.00	33.00
United States	49.70	49.70	49.83	49.79	49.79	49.82	44.18	38.59	38.67	38.65	38.85
U.S. Virgin Islands											
Uruguay											
Uzbekistan											
Venezuela											
Vietnam											
Yemen											
Zambia											
Zimbabwe											

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Sint Maarten (Dutch)											
Slovakia		45.00	40.00	40.00	40.00	40.00	40.00	40.00	29.00	29.00	25.00
Slovenia									25.00	25.00	25.00
South Africa										37.80	37.80
Spain	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Sri Lanka		35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	42.00
Sudan											
Suriname											
Swaziland											
Sweden	30.00	30.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00
Switzerland	28.03	28.47	28.47	28.47	28.47	28.47	27.80	25.09	24.93	24.70	24.42
Syrian Arab Republic											
Taiwan								25.00	25.00	25.00	25.00
Tanzania											
Thailand						30.00	30.00	30.00	30.00	30.00	30.00
Trinidad and Tobago											
Tunisia											
Turkey		49.20	42.80	44.00	44.00	44.00	44.00	33.00	33.00	33.00	33.00
Uganda											
Ukraine										30.00	30.00
United Kingdom	33.00	33.00	33.00	33.00	33.00	31.00	31.00	30.00	30.00	30.00	30.00
United States	38.86	39.75	39.69	39.61	39.53	39.45	39.44	39.39	39.34	39.26	39.30
U.S. Virgin Islands											
Uruguay								30.00	30.00		
Uzbekistan											
Venezuela								34.00	34.00	34.00	34.00
Vietnam						35.00	35.00	35.00	32.50	32.00	32.00
Yemen											
Zambia											
Zimbabwe											

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Sint Maarten (Dutch)									34.50	34.50	34.50
Slovakia	25.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	23.00
Slovenia	25.00	25.00	25.00	25.00	23.00	22.00	21.00	20.00	20.00	20.00	17.00
South Africa	37.80	37.80	37.80	36.89	36.89	34.55	34.55	34.55	34.55	34.55	28.00
Spain	35.00	35.00	35.00	35.00	32.50	30.00	30.00	30.00	30.00	30.00	30.00
Sri Lanka	35.00	35.00	32.50	32.50	35.00	35.00	35.00	35.00	28.00	28.00	28.00
Sudan		35.00	35.00	35.00	30.00	15.00	15.00	15.00	35.00	35.00	35.00
Suriname		36.00	36.00								36.00
Swaziland		30.00	30.00	30.00				30.00	30.00	30.00	30.00
Sweden	28.00	28.00	28.00	28.00	28.00	28.00	26.30	26.30	26.30	26.30	22.00
Switzerland	24.10	24.10	21.32	21.32	21.32	21.17	21.17	21.17	21.17	21.17	21.15
Syrian Arab Republic			35.00	35.00	28.00	28.00	28.00	28.00	28.00	28.00	22.00
Taiwan	25.00	25.00	25.00	25.00	25.00	25.00	25.00	17.00	17.00	17.00	17.00
Tanzania		30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Thailand	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	23.00	20.00
Trinidad and Tobago		30.00	30.00	30.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Tunisia	33.00	33.00	35.00	35.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Turkey	30.00	33.00	30.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Uganda		30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Ukraine	30.00	30.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	21.00	19.00
United Kingdom	30.00	30.00	30.00	30.00	30.00	28.00	28.00	28.00	26.00	24.00	23.00
United States	39.33	39.31	39.28	39.30	39.26	39.25	39.10	39.21	39.19	39.13	39.13
U.S. Virgin Islands		38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50
Uruguay	32.00	28.00	30.00	30.00	30.00	25.00	25.00	25.00	25.00	25.00	25.00
Uzbekistan		20.00	18.00	15.00	10.00	10.00	10.00	10.00	9.00	9.00	9.00
Venezuela	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00
Vietnam	32.00	28.00	28.00	28.00	28.00	28.00	25.00	25.00	25.00	25.00	25.00
Yemen		35.00	35.00	35.00	35.00	35.00	35.00	35.00	20.00	20.00	20.00
Zambia		35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Zimbabwe		30.90	30.90	30.90	30.90	30.90	30.90	25.75	25.75	25.75	25.75

Appendix B: Content of enclosed DVD

There is a DVD enclosed to this thesis which contains our collected dataset used in the regression analysis.

Master Thesis Proposal

Introduction to the topic and motivation behind it

The power to set independently tax rates and the ability to collect those taxes is one of the most important characteristics of state´s autonomy. With the globalization of economy and deepening of the international economic transactions, the issue of taxes is no longer an issue of each country on its own. This can be seen mostly on the flow of the Foreign Direct Investments (later in text: FDIs) to the countries, because it is mainly influenced by the investment opportunities, in which corporate tax rates play a crucial role. Also number of newly registered firms in a particular country (later in text: new firms) can point to the process of transferring companies' activities (at least in formal way) to countries with lower regulation levels and taxation rates.

However, there exists an interesting paradox. On the one hand, it is in each country´s best interest to compete and unilaterally set their corporate tax rates in order to attract investors. On the other hand, countries have a common goal to cooperate in setting corporate tax rates in order to avoid "the race to the bottom". Therefore, countries have been lately interested in discussing this issue on the international level and organizations, such as WTO and IMF, will play an important role in providing platforms for these negotiations. However, it is very unlikely that there will be an agreement and any serious steps taken toward harmonization of corporate tax rates across the globe in terms of concrete institutional set up in the near future.

The motivation behind this thesis is that while there are few studies concerning game theoretical application of cooperation in corporate taxes in the monetary unions – mostly European Union – much less attention has been given to the issue of cooperation in this field on the global level. Moreover, since we have seen progress in various fields regarding harmonization on global scale so far (environmental standards, tariffs, etc.) and further harmonization on regional level (regional economic integration processes), the question is, how far are the limits of widening global cooperation. The question of corporate tax rates is one of the examples, where the cooperation of states in form of binding institutional setup will most likely not happen in the near future.

However, countries may wish (and do to some extent) cooperate without set norms, in order to avoid mentioned "race to the bottom". This proposed thesis will examine theoretical and practical possibilities and limitations of this cooperation/non-cooperation paradox.

Theoretical background

The question of cooperation among states comes from the liberal branch of the international relation. In this thesis from the theoretical perspective I plan to utilize the outcomes of neoliberal institutionalism (and International Political Economy as well) authors (Keohane, Milner, Nye, etc.) and enrich the ongoing debate about possible economic cooperation among states as such. In the field of international relations many authors researched and questioned the cooperation among states on the global level, the means and ways how the cooperation is possible and can be maintained. For example Stephen D. Krasner examined in his work *Global Communications and National Power: Life on the Pareto Frontier* with use of game theoretical models cooperation among states and role of international organization in reaching Pareto optimal outcomes. Further, Robert Gilpin in his *Political Economy of International Relations* analyzed the establishment of international economic institutions after Second World War and overall relationship between politics/international relations and economics on international scale. Furthermore, the question of corporate tax rates (tax rates and state´s control and power over them on the international scale) is one of the central topics of current International Political Economy, which belongs to the overall International Relations debate. Examples of this research can be found in works of Thomas Rixen – states power over taxes - *The political economy of tax governance*, etc. and for example in work of Daniel Drezner – influence of states on global regulations and global governance - *All Politics Is Global: Explaining International Regulatory Regimes.* Economic variables (such as taxes, tariffs, FDIs, etc.) and economic organizations and their role in international relations are frequent topics in International Relations journals, such as Global Governance, Review of International Organizations, International Journal of Political Economy, and many others.

This thesis, from the theoretical perspective, will continue in the debate from the neoliberal institutionalism perspective and will examine the possibility (and actual empiric confirmation) of cooperation among states in corporate tax rates on global

level, building upon the previous research conducted in the field of International Political Economy. Therefore, it is expected in this thesis that on the global level cooperation among states is possible, although it is not likely in the empirical terms without the rules and international organizations. Furthermore, this thesis will utilize the game theoretical approach in order to examine under which conditions the cooperation is possible and then compare beforehand created theoretical concept of cooperation with empirical data.

Proposed research question

The main research questions of this thesis with regard to what was said above are therefore:

[3] "*Is non cooperative behavior of countries profitable in terms of bringing the expected results - attracting FDIs and new firms?"*

In this thesis the above mentioned question will be answered by use of statistical data from sources listed below, in order to determine through regression analysis, whether there is a statistically significant negative correlation between the level of corporate tax rates and the level of FDIs flow and new firms.

[4] "D*o the selected countries compete in corporate tax rates over time or is there a sign of convergence of their behavior in the area of corporate tax rate even without formally institutionalized cooperation?"*

The second question will be answered also by use of statistical data from sources listed below; however, this part of analysis will also require qualitative approach. Some countries will be more likely to cooperate (converge in their corporate tax rates) due to their character (socioeconomic development) and international position. Analysis will be based on the modeling of time trends of corporate tax rates development during the given time frame and comparison to other factors, such as development in other tax rates. This will be done in order to show, whether there is a tendency of cooperative behavior among states during times of crisis. The hypotheses for this thesis are as following:

H1:*„Noncooperation and taking unilateral action in terms of lowering corporate tax rates is profitable for states from the point of attracting FDIs and new firms."*

H2: *If H1 holds, then countries intentionally do not cooperate on the global level in corporate tax rates."*

The reasoning behind above mentioned hypotheses is as following. Since there is no governing body that can punish states for rogue behavior in setting the corporate tax rates, in order to cooperate there has to be small or none incentive in form of FDIs or new firms benefits. Otherwise, there is a strong incentive for states not to cooperate and not to seek any form of mutual agreement. However, while countries can benefit from the rogue behavior they may choose not to, because of the fear of „the race to the bottom". In my thesis I suppose that this is not happening and that above mentioned hypotheses hold: that countries benefit from „rogue" behavior and because of that, there is no cooperation. In order to maintain cooperation in the corporate tax rates, there is need of international institution or regime, as seen from the neoliberal institutionalism approach.

The reason why I chose above research questions is that there is no analysis to my knowledge confirming if the countries really benefit from unilaterally lowering corporate tax rates, and therefore if there really is an incentive for states to intentionally not cooperate. This relationship, as well as, the question of states behavior on global level in the field of corporate tax rates setting hasn't been empirically tested and this thesis will provide such empirical verification.

Proposed concepts and variables and their operationalization

With regard to the proposed concepts for this thesis, the main theoretical concept for cooperation of states will come from the game theoretical model – most likely modified prisoner´s dilemma scheme. In this case, the dependent variables are cooperative and non-cooperative behavior of each country. The idea is that the cooperation is possible and that states are willing to cooperate (although some institutional set up is needed) as seen from the perspective of neoliberal institutionalism.

In order to explain and analyze strategies of selected countries in practical terms the main variables that will be used are FDIs and new firms (as seen as one of the most important variables affecting countries from the International Political Economy perspective). These variables will be used in the regression analysis as dependent

variables. With regard to the variable FDIs, it will be operationalized in the regression part of the thesis, when it will act as a main dependent variable - FDIs flowing to the countries over time. The same model will be used for variable new firms. This variable accounts for all firms registered in a given country – meaning they don't need to have any activities there, only formal registration, and therefore tax payments to that country, is taken into account. Independent variables in this regression will be the corporate tax rate, lagged variables, GDP and other variables, in order to avoid omitted variable bias in this part of the analysis (those variables will be specified during the model construction).

Secondly, after testing the first hypothesis, the second one will be tested by more qualitative approach, where dependent variables will be cooperative/non-cooperative behavior of countries. Result of the first hypothesis (whether the unilateral changes in corporate tax rates are profitable or not) will act as an independent variable.

The purpose of this selection is first to show what is the main strategy in theory of each country by the given assumptions. Then, to show by the data analysis, whether there is a significant increase in FDIs flow and new firms with regard to the corporate tax rates and other factors. Finally, to show whether there is a trend among countries over time to converge and cooperate in corporate tax rates, or whether some countries try to get competitive advantage at the expense of other by unilaterally lowering their corporate tax rates (for example in times of crisis and such).

Proposed methodology

The main methods proposed for this thesis are of a quantitative nature: econometric analysis and partly formal game-theoretical analysis. In more detail, this thesis will use these methods:

[1] Game theoretical model that would consists of two identical countries deciding on whether or not to cooperate in terms of corporate tax rates setting in finite horizon (one shot game) and infinite horizon.

[2] Pooled OLS regression of panel data, which would consist of two models. First one will use flow of FDIs as a dependent variable, which will be regressed on independent variables - (mostly lagged variables – taxes, FDI; GDP and others to avoid omitted variable bias). The precise nature and form of regression analysis

will be decided based on the further data analysis, most likely there will be a qualitative analysis of countries in order to divide them into groups – clusters – and running of separate regressions on each of them. The second model will be analogical to the first one with the exception of setting new firms as a dependent variable. Further adjustments (e.g. to check correlation between FDIs and new firms and construction of joint model of FDIs and new firms as dependent variables) will be considered based on the data and regression results.

[3] Furthermore, there would be a qualitative analysis concerning the corporate tax rates development over the selected countries in a given time period to show, whether there has been a trend in the corporate tax rates development, or whether some countries decreased/increased their rates more significantly then others. This will be supported by comparison in development of other tax rates, in order to discuss, whether there is a tendency to cooperate among countries or not.

Proposed data and timeframe

For the purpose of this thesis, the time frame is set from 1990 till 2011, the time period after the end of cold war until the present time. Data used in this thesis would come primarily from the OECD database – for OECD countries, and from databases of other institutions. With regard to the BRICS countries the issue of data selection would be much trickier and will have to come from various statistical databases, their possible inclusion in thesis would depend on the data availability and quality of data.

Proposed outline of the thesis

[1] Introduction to the topic

[2] Theoretical background and short description of academic debate about harmonization vs. free competition in taxes

[3] Progress on the international level in question of tax harmonization so far – role of IOs

[4] Game theory model
   a. Description of the model
   b. Assumptions of the model
   c. One shot game and repeated game
   d. Applications of the model and its implementation possibilities

[5] Application of the theoretical model on global level
   a. Data description
   b. Countries involved – OECD and BRICS countries
      i. Qualitative analysis – creating clusters of countries
   c. Panel data regression of FDI
      i. Regression assumptions
      ii. Results and empirical analysis of these results
   d. Panel data regression of number of registered firms
      i. Regression assumptions
      ii. Results and empirical analysis of these results
   e. Trend analysis in corporate tax development – is there a significant proof of non-cooperative behavior?
   f. Specific cases
      i. European Union
      ii. USA vs. EU
      iii. BRICS countries vs. OECD

[6] Conclusion

Proposed literature and sources

[1] Theoretical literature – monographic literature and academic articles:

BALAAM, David N. *Introduction to international political economy.* Boston: Longman, 2011. ISBN: 978-0-205-79138-5.

BUENO DE MESQUITA, Bruce. *The logic of political survival.* Cambridge: MIT Press, 2005. 536 p. ISBN 0-262-52440-6.

BUENO DE MESQUITA, Bruce. *Principles of international politics.* Washington: CQ Press, 2010. 460 p. ISBN 978-0-87289-598-0.

BURCHILL, Scott; LINKLATER, Andrew; et al. *Theories of International Relations.* New York: Palgrave Macmillan, 2005. 310 p. ISBN: 978-1-4039-4865-6.

DREZNER, Daniel. *All Politics Is Global: Explaining International Regulatory Regimes.* Princeton: Princeton University Press, 2007. 244 p. ISBN: 978-0-691-09642-1.

FRIEDEN, Jeffry A; LAKE, David A. *International political economy: perspectives on global power and wealth.* New York: Routledge, 2000. 485 p. ISBN: 9780415222792.

GILPIN, Robert. *Political Economy of International Relations.* Princeton: Princeton University Press, 1987. 449 p. ISBN: 0-691-07732-0.

GILPIN, Robert. *Global Political Economy. Understanding the International Economic Order.* Princeton: Princeton University Press, 2001. 423p. ISBN-13: 978-0-691-08677-4.

GRIECO, Joseph; POWELL, Robert; SNIDAL, Duncan. *The Relative-Gains Problem for International Cooperation.* JSTOR [online]. September 1993 [cited 2012-08-12]. *Online available at:* http://www.jstor.org/stable/pdfplus/2938747.pdf?acceptTC=true.

HARVEY, David. *A brief history of neoliberalism.* Oxford: Oxford University Press, 2005. 247 p. ISBN: 978-0-19-928326-2.

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KEOHANE, Robert. O. *After hegemony. Cooperation and Discord in the World Political Economy.* Princeton: Princeton University Press, 1984. 290 p. ISBN: 0-691-07676-6.

KEOHANE, Robert. O. *Reciprocity in International Relations.* JSTOR [online]. 1986 [cited 2012-08-12]. Online available at: http://www.jstor.org/stable/pdfplus/2706740.pdf.

KEOHANE, Robert. O; NYE, Joseph S. *Power and interdependence.* New York: Harper Collins, 1989. 315 p. ISBN 0-673-39891-9.

KRASNER, Stephen D. *Global Communications and National Power: Life on the Pareto Frontier.* JSTOR [online]. April 1991 [cited 2012-09-11]. Online available at: http://www.jstor.org/stable/2010398.

MILNER, Helen V; MORAVCSIK, Andrew. *Power, interdependence, and nonstate actors in world politics.* Princeton, N.J.: Princeton University Press, 2009. 299 p.

NYE, Joseph S. *Soft power: the means to success in world politics.* New York: Public Affairs, 2004. 191 p. ISBN: 1-58648-228-4.

SCHELLING, Thomas C. *The strategy of conflict.* Cambridge: Harvard College, 1980. 309 p. ISBN 0-674-84031-3.

WOOLDRIDGE, Jeffrey M. *Econometric analysis of cross section and panel data.* Cambridge: MIT Press, 2002. 752 p. ISBN 0-262-23219-7.

WOOLDRIDGE, Jeffrey M. *Introductory econometrics.* Mason: Thomson Southwestern, 2003. 805 p.

[2] Academic articles and works regarding the issue of harmonization and tax rates:

HARSTAD, Bård. *Harmonization and Side Payments in Political Cooperation.* JSTOR [online]. June 2007 [cited 2012-06-03]. Online available at: http://www.jstor.org/stable/pdfplus/30035024.pdf?acceptTC=true.

DEVEREUX, Michael; GRIFFITH, Rachel; KLEMM, Alexander. *Corporate income tax: Reforms and tax competition.* WILEY [online]. October 2002 [cited 2012-06-03]. Online available at: http://onlinelibrary.wiley.com/doi/10.1111/1468-0327.00094/pdf.

DEVEREUX, Michael; LOCKWOOD, Ben; REDOANO, Michela. *Do Countries Compete over Corporate Tax Rates?* WARWICK [online]. November 2004 [cited 2012-06-03]. Online available at: http://www2.warwick.ac.uk/fac/soc/economics/staff/academic/lockwood/dlrrev.pdf.

FOURÇANS, André; WARIN, Thierry. *Tax Harmonization versus Tax Competition in Europe: A Game Theoretical Approach*. ESG [online]. April 2001 [cited 2012-06-03]. Online available at: http://www.economie.uqam.ca/CREFE/cahiers/cah132.pdf?referer=http%3A%2F%2Fworks.bepress.com%2Fwarin%2F48%2F.

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MITCHELL, Dan. *Tax competition and fiscal reform: rewarding pro-growth tax policy.* CATO institute [online]. April 2004 [cited 2012-06-03].Online available at: http://www.cato.org/events/russianconf2004/papers/mitchell.pdf.

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RIXEN, Thomas. *Politicization and Institutional (Non-) Change in International Taxation.* ECONSTOR [online]. March 2008 [cited 2012-06-03]. Online available at: http://econstor.eu/bitstream/10419/49735/1/614427517.pdf.

RIXEN, Thomas. *The Political Economy of International Tax Governance.* Palgrave Macmillan, 2008. 264 p.

RIXEN, Thomas. *Tax Competition and Inequality – The Case for Global Tax Governance.* Social Science Research Network [online]. December 2010 [cited 2012-09-11]. Online available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1488066.

SINN, Hans-Werner. *Tax harmonization and tax compensation in Europe.* National Bureau of Economic Research [online]. January 1990 [cited 2012-06-03]. Online available at: http://www.nber.org/papers/w3248.pdf.

[3] Data sources:

Eurostat: http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/.
IMF database: http://www.imf.org/external/data.htm#data.
OECD tax database: http://www.oecd.org/document/60/0,2340,en_2649_34533_1942460_1_1_1_1,00.html#C_CorporateCaptial.
UN database: http://www.un.org/en/databases/.
WB financial statistic database: http://data.worldbank.org/topic/financial-sector.
WTO statistic database: http://stat.wto.org/Home/WSDBHome.aspx?Language=E.

For further data the official statistical offices of countries will be utilized.