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A Comparison of Tax Systems in the Czech Republic and Italy

Master Thesis

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Abstract

In this thesis we compare the tax systems of the Czech Republic and Italy. At first we provide the major characteristics of their tax systems and then we assess the development of the tax burden, tax revenues and tax rates in both countries. Based on data from the period 1995-2009 we developed the regression models of tax revenues from four main types of taxes – corporate income taxes, personal income taxes, social security contributions and value added taxes. The models are designed to indicate the most important factors to determine these revenues and to explore which influences are the strongest. We address variables directly linked to the tax setting, e.g. the statutory tax rates or implicit tax rates, as well as the indicators linked to the country's performance and the economic cycle, e.g. GDP per capita, GDP growth or unemployment. As the major contribution of our work, we consider the final conclusions provided at the end of the sixth chapter. Based on our models we were able to indicate the opportunities to increase the tax revenues from different types of taxes and also to define the potential excessive tax burden and cases where further increases in tax rates are inconvenient.

Keywords

Czech Republic, Italy, public finance, tax burden, corporate income tax, personal income tax, value added tax, OLS

Abstrakt

Tato práce srovnává daňové systémy České republiky a Itálie. Na začátku práce popisujeme hlavní charakteristiky obou daňových systémů. Poté se věnujeme vývoji daňového břemene, daňových výnosů a sazeb v obou zemích. Těžištěm práce je regresní analýza a sestavení OLS modelů na základě dat z let 1995-2009. Tyto modely vysvětlují daňové výnosy čtyř nejvýznamnější daní – daně z příjmů právnických osob, daně z příjmů fyzických osob, daně z přidané hodnoty a příspěvků na sociální zabezpečení. Pro obě země a jednotlivé daně odhadujeme, které vlivy se nejvíce podílejí na výši daňových výnosů, ať už se jedná o faktory přímo související s nastavením daňového systému, např. statutární sazbu daně nebo efektivní sazbu daně, a nebo o jiné ekonomické ukazatele, jako např. HDP na hlavu, růst HDP nebo míru nezaměstnanosti. Na základě sestavených modelů prezentujeme závěry, které poukazují na příležitosti ke zvýšení výnosů z jednotlivých daní, a také odhalují možné nadměrné daňové sazby a případy, ve kterých by další navýšení statutárních sazeb vedlo pouze k nižším daňovým výnosům.

Klíčová slova

Česká republika, Itálie, veřejné finance, daňové břemeno, daň z příjmů právnických osob, daň z příjmů fyzických osob, DPH, OLS

Extent of the work: 156 291 characters

Declaration of Authorship

The author hereby declares that she compiled this thesis independently, using only the listed resources and literature.

The author also declares that this thesis has not been used to obtain any other university degree.

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Prague, January 5, 2012   Darina Sommerová

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Master Thesis Proposal

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Proposed Topic:

A Comparison of Tax Systems in the Czech Republic and Italy

Topic Characteristics:

My thesis will compare the tax systems of the Czech Republic and Italy. Italy is in comparison to the Czech Republic considered the country with much higher tax burden.
As the introduction I will provide the review of the basic literature on tax theory.
At the beginning I will describe tax systems in both countries with focus on the division of direct and indirect taxes. Because not only tax rates but also the methodology of determination of the tax base is important, I will emphasize the main differences between those countries - in the tax base definitions and also in different tax bonifications, tax deductibles and non-taxable incomes. Stressing main differences and unifying the assumtions are key for further comparison.
In the second part I will assess the specific data. First of all I will provide the development of general tax rates during the last years and also eventual changes in tax systems. Using different methodologies (provided by ex. OECD, The World Bank, etc.) I will also provide the overall comparison of the level of the total tax burden. Besides the standard tools such as effective tax rates or the total tax revenue I want to find other methods of comparison availible. I will as well run the regression analysis of the GDP growth to total tax burden.
Finally in the last part I want to concentrate on the tax revenues and their development during the recent financial crisis. The Czech republic has taken actions in order to reduce the impact of the crisis on the public finance, and has changed some tax rates or reduced some tax deductibles. I would like to assess the effect of these measures on the tax revenues in last 2 years. In comparison with Italy which has not taken any special precautions I would like to demonstrate the effect on the tax revenues and thus prove that the Czech Republic managed to obtain aditional financial reserves.

Hypotheses:

Hypothesis #1: Both Czech Republic and Italy follow the current trends of declining tax burden and reducing direct tax rates.
Hypothesis #2: In the Czech Republic the effective personal tax rate is much higher because of the determination of the tax base including social security contributions.
Hypothesis #3: Both Czech Republic and Italy experienced fall in tax revenues in last 2 years due to the current financial crisis.
Hypothesis #4: The revenues from indirect taxes in years of the crisis were proportionally higher than in the years before the crisis.
Hypothesis #5: In crisis the governments tend to increase the indirect tax rates rather than the direct tax rates.

Methodology:

In order to be able to provide the adequate tax comparison I will fist have to identify the main differences in determination of the tax bases in both Czech Republic and Italy. The individual tax systems I will describe in the context of the basic tax theory, ex. flat tax.

For the proper comparison I will use tools and approaches applied internationaly by different oraganisations, such as OECD, The World Bank, European Commission etc. I will focus in the direct taxes, corporate income taxes and personal income taxes in particular. Comparing the ordinary measures, for example total tax revenue as percentage of GDP or the implicit tax rates, I want to provide the objective comparison of the tax systems and total tax burden in both countries. Moreover I would like to provide other and less usual tools of comparison, such as number of tax payments, time to comply with taxes or the tax freedom day. I will also run the regression analysis – concerning the GDP growth and total tax burden, in order to demonstrate the effect of the tax systems on the tax payers in both countries.

In the last part, based on the statistical data I want to extract the revenues that Czech Republic was able to obtain due to the tax system and tax rate changes. Modelling the changes in the Czech system in comparison with Italian I want to asses the impact of the specific changes on the tax revenues.

Outline:

1. Introduction – tax literature overview
2. The tax system in the Czech Republic – direct and indirect taxes, determination of the tax base, other important issues
3. The tax system in Italy – direct and indirect taxes, determination of the tax base, other important issues
4. Empirical analysis
   a) Pre-crisis data comparison - evolution of the specific tax rates, efficient tax rates, total tax revenues, other tools of comparison
   b) Current trends - the evolution of tax systems and tax revenues in the crisis - precautions taken in the Czech republic and Italy, changes in tax revenues resulted from the tax changes
5. Conclusion

Core Bibliography:

Bibliography:

Carey, D., Rabesona, L. (2002): *Average Effective Tax Rates on Capital, Labour and Consumption.* Paper presented to The CESifo Summer Institute on Measuring the tax burden on labour and capital, Venice, Italy.

Deloitte Touche Tohmatsu (2008): *Italy International Tax and Business Guide.* Milan: Deloitte Italy.

Djankov, S., Ganser, T., McLiesh, C., Ramalho, L., Shleifer, A.(2009): *The effect of corporate taxes on investment and entrepreneurship.* Fourth Draft. The World Bank and Harvard University.

European Commission (2010): *Taxation Trends in the European Union. Data for the EU member states Iceland and Norway.* Luxembourg: Publications Office of the European Union. ISBN 978-92-79-15801-8.

Hamerníková, B., Maaytová, A. (2010): *Veřejné finance.* Praha: Wolters Kluwer, 2. vydání. ISBN 978-80-7357-497-0.

Lupi, A. (2008): *Tax Revenue in the EU.* Eurostat – Statistics in focus 48/2008. Luxembourg: European Communities. ISSN 1977-0316.

The World Bank and the International Finance Corporation (2010): *Doing Business 2011: Making a Difference for Entrepreneurs.* Washington: The International Bank for Reconstruction and Development / The World Bank. ISBN 978-0-8213-7960-8.

Vančurová, A., Láchová, L. (2010): *Daňový systém ČR 2010.* Praha: 1.VOX, 10. vydání. ISBN 978-80-86324-86-9.

Act No. 586/1992 Coll.*,* on Income Tax, as amended
Act No. 235/2004 Coll.*,* on Value Added Tax, as amended

Web sites:
http://www.oecd.org (OECD, Centre for Tax Policy and Administration)
http://www.doingbusiness.com (The Doing Business Project by The World Bank and the International Finance Corporation)
http://www.bruegel.org
http://www.mfcr.cz (Ministry of Finance of the Czech Republic)
http://www.mef.gov.it/ (Ministero dell'Economia e delle Finanze)
http://europa.eu/
http://epp.eurostat.ec.europa.eu/

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List of abbreviations

CIT	Corporate income tax
CPI	Consumer price index
CZE	Czech Republic
DPH	Czech indication for value added tax
EU	European Union
EU-15	European Union with its original 15 member states
EU-27	European Union with its 27 member states
GDP	Gross domestic product
IAS	International accounting standards
IRAP	Italian indication for regional tax on productive activities
IRES	Italian indication for corporate income tax
IRPEF	Italian indication for personal income tax
ITA	Italy
IVA	Italian indication for value added tax
NMS	new member states
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary least squares
PIT	Personal income tax
R^2	Coefficient of determination
SSC	Social security contributions
VAT	Value added tax
VIF	Variance inflation factor

1. Introduction

The recent global downturn has changed the economic landscape significantly and in an unprecedented fashion. Governments in economies of all sizes and at all stages are struggling with the tax policy choices available to them.
(PricewaterhouseCoopers and the World Bank Group, 2010)

Already from 1970´s there was a long-run increase in the overall tax burden due to the growing share of the public sector in the economy, increasing government spending, financing social welfare commitments etc. But since around the turn of the century there have been diverse trends in the tax policies. Two general tendencies can be observed - a decline in the corporate tax rates and a shift of the tax burden onto other bases, in particular onto consumption. In the European region significant changes in the tax structure might have been as well promoted by the accession of a group of new member states to the EU, a group of low-tax countries.

Therefore reduction of the corporate tax rates has recently become the common priority for tax authorities in order to maintain competitiveness, remain attractive for investors and provide favourable tax environment for the multinational companies. And so as to maintain the level of decent revenues the governments are expected to increase indirect tax rates, broaden and create more stable tax base, increase the taxes on immovable assets in general or introduce the environmental taxes (KPMG, 2010a).

Devereux (2006) in his work addressed an interesting notion that despite the decline in statutory tax rates, the tax revenues continue to rise. This was also the starting point for our analysis. The aim of this work is to compare the tax systems of two countries – the Czech Republic and Italy. In the empirical part our goal is to draw up models which explore the impact of different economic indicators on the tax revenues. We address both variables directly linked to the tax system setting as well as the indicators linked to the country's performance and the economic cycle, trying to identify which effect is more important for different types of tax revenues.

Based on our existing notion of the taxation issues we formulated these hypotheses:

1. Tax revenues from indirect taxes decreased less than revenues from income taxes due to the recent crisis.

2. The country's performance and the economic cycle have stronger impact on the corporate income tax revenues than the tax rate setting.

3. The tax rate setting has stronger impact on the value added tax revenues than the country's performance and the economic cycle.

4. There exists excessive taxation in both countries and further increase in certain statutory tax rates would only bring less revenues – in Italy in case of labour taxation and in the Czech Republic in case of social security contributions.

Second chapter concludes the most important tax theory addressing general tax division, tax determination and optimal taxation concepts. Third and fourth chapters focus on the tax systems of the Czech Republic and Italy respectively. The fifth chapter provides data analysis addressing the development of the tax burden, tax revenues and tax rates at first in general and then with the special focus on the recent trends and changes at the beginning of the crisis. In the sixth chapter we develop the regression models to analyse the impact of different variables on tax revenues, trying to assess the impacts of the tax system setting or the country's performance and the economic cycle. Seventh chapter concludes obtained results and provides comments on the initial hypotheses.

2. Basic Tax Theory

In the OECD classification (OECD, 1996) *the term 'taxes' is confined to compulsory, unrequited payments to general government.* Vančurová, Láchová (2010) moreover mention other basic properties of taxes – they also define taxes as irreversible, non-equivalent and non-purpose payments.

For governments taxes are the most important source of income. These resources are used to finance public services or other kinds of public expenditures. Therefore as the main function of taxes we can declare its fiscal function, i.e. raising the necessary funds. But there exist more functions of taxes in general, taxation exists also to *redistribute income (progressive income taxation), to stabilise the economy, to address externalities (environmental taxes, taxes on alcohol and tobacco), to influence the allocation of resources, while at the same time is being supportive to growth* (European Commission, 2011a).

Although only one general tax payment should be sufficient for the main purpose (the filling of the state's budget), usually a complex and heterogeneous system of taxes exists within the state. Economic theory (e.g. Musgrave and Musgrave, 1994) suggests that taxes create distortions, bring excess burden, change economic decisions of individuals and might have negative impact on economic growth. Each type of taxes brings different costs and benefits and the common solution is that the taxpayers are usually subject to several types of tax liabilities. The principle that policymakers should keep in mind is to minimise the costs of tax collection and support the growth.

Already Adam Smith developed the principles of optimal taxation in his famous Wealth of Nations and he defined so called Canons of taxation, foundations of the taxation principles. Smith declares (Economic, 2009) that *every subject of the state ought to contribute towards the support of the government … in proportion to the revenue which they respectively enjoy under the protection of the state.*

According to these canons, or principles, taxes ought to be:

- *certain and not arbitrary, plain and clear to the contributor and to every other person,* i.e. certain and equitable,
- *levied at the time, or in the manner, in which it is most likely to be convenient for the contributor to pay it,* i.e. convenient,
- *so contrived as to take out of the pockets as little as possible,* i.e. economical or efficient.

Economic efficiency of taxes is often mentioned together with the popular Laffer curve: *If a tax is gradually increased from zero up to a point where it becomes prohibitive, its yield is at first nil, then increases by small stages until it reaches a maximum, after which it gradually declines until it becomes zero again.* As cited by e.g. Auerbach (1982), *there may be a very great difference between the amounts of utility lost through these taxes which yield the same revenue.*

2.1 General division of taxes

According to the European Communities (2006) we can divide the tax burden, and tax revenues as well, by major types of taxes or by economic function and so we distinguish diverse types of taxes[1].

Picture 1: Division by major types of taxes   **Picture 2: Division according to economic function**
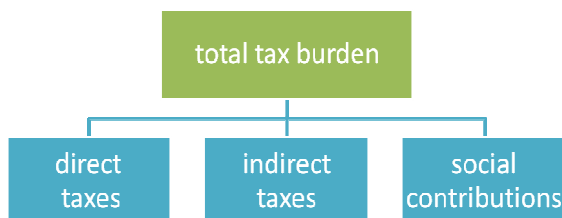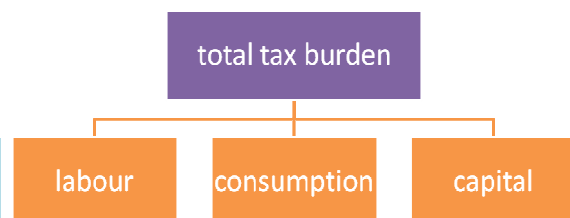
Source: European Communities (2006).

By major types of taxes we distinguish direct and indirect taxes and social contributions. There is an important note concerning the term taxpayer, as the person who is legally bound to pay taxes. It can either be a person who pays the taxes in other words who carries the tax burden and whose income is reduced by paying the tax; or the person on which the tax is levied. With direct taxation the both issues are bounded to the same person – the one on whom the tax is levied, i.e. the one who carries the burden. With indirect taxation a person (e.g. a legal entity) is a subject to the tax,

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[1] This division is based on the ESA classification, European System of Accounts, which enables further comparison of data and therefore we will stick to it.

reports the declaration on taxes etc., but the tax burden is usually transferred to another person (e.g. an individual or a consumer). Inclusion of social or mandatory contributions, i.e. social security contribution, unemployment contribution, sickness insurance, among the taxes used to be questionable. For example, they are not considered non-purposed payments, but payments in exchange for insurance services granted to the individual, such as health or old-age insurance. Still they fulfil most of the criteria given above as the definition of taxes. Moreover nowadays they take a large share of payments levied and revenues from these remittances contribute significantly into the public budgets.

The concept of the taxes by the economic function distinguishes taxes on labour (both employed and non-employed), consumption and capital (capital and business income and stocks). Under the classification by economic function environmental taxes were added lately because the use of the environment can be regarded as an additional production factor. As a matter of fact we recognise two general types of taxpayers – individuals and legal entities. As for the economic function of the taxes, tax policies for these two subjects are usually very different.

2.2 Tax determination

Tax determination in general should obey two simple rules – determine the tax base and tax rate structure. Then the tax liability is measured using these two factors.

A taxable base is a base amount on which the tax rate is applied, the income that is taxed (Slemrod, 1993). For the determination of the tax base there exist different rules for diverse types of taxes. In general the tax base composes of the value (of the goods or services provided, property etc.) or of the income earned (not only the income from the business activity or labour but also the interest income). The tax base determination for consumption taxes is usually very simple, while for the labour and capital taxes, or income taxes in particular, the assessment of the tax base is more complicated. Each country usually introduces the system of tax deductions, non-deductible items and other tools that a subject need to consider while determining its taxable income.

There exist several types of tax rates. When we speak about tax rate, we often mean the legally imposed rate, i.e. the statutory tax rate. For the purposes of our work we find it useful to explain other most commonly used types of tax rates. The short explanations are provided in the table below.

Table 1: Definitions of different types of tax rates

Statutory tax rate	Legally imposed rate
Effective tax rate	Actual tax rate, the rate that exists in fact
Average tax rate	Ratio of the amount of taxes paid to taxable income
Marginal tax rate	Tax rate that applies to a taxpayer's next unit of taxable income
Implicit tax rate	Aggregate tax revenues as a percentage of the potential tax base

Source: Walby (2010), European Commission (2011a).

In the following chapters when talking about the tax systems we refer to statutory tax rates imposed on incomes or commodities. The implicit and average tax rates we analyze further in the data comparison sections.

The most significant difference between the statutory and effective tax rate arises due to the tax exemptions. In case of the income tax the statutory tax rate is imposed on the taxable income, after proper adjustments of the tax base, e.g. identifying of deductible and non-deductible items. The effective tax rate as the actual tax rate measures the rate that the taxpayer pays as a percentage of the economic profit. When there exist tax exemptions, e.g. personal allowances, then the real taxable income is lower than the economic profit, thus the effective tax rate is lower than the statutory tax rate and vice versa[2].

The tax rate does not need to be the same for all the subjects. In terms of personal taxation there might be introduced the progressive tax rate structure (as currently applied in Italy) which divides the taxpayers into different tax brackets according to their income, and each bracket is then taxed with a different statutory tax rate. With the average tax rate we can, in this case, measure what the average rate on a person's income is. As for the personal taxation, marginal tax rates play an important role within the income brackets for further decisions on the additional income, thus on the increase of the marginal rates on the additional income earned. As for the business taxation, as claims Simone Pellegrino (in Bernardi, Chandler, Gandullia, 2005), low statutory tax rate is important but only effective average rates can affect the capacity to attract foreign investment, and again only effective marginal rates can be decisive in the choice of how many investments to do.

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[2] The other case, where effective tax rate is higher than the statutory one, could be easily illustrated on the Czech system of personal taxation. In the system of personal income tax the statutory rate is 15% but the real taxable income is by 1.34 higher than the economic profit (due to mandatory contributions) and therefore in a simplified way the effective tax rate is slightly over 20%.

Both tax bases and tax rates have been subject to a broad theoretical discussion with respect to a concept of tax competition. In 1970´s the first literature on tax competition came up with the possibility that the globalization of the economy and liberalization of the markets would lead to changes in designing the tax structure. In theory we typically distinguish mobile and immobile factors, i.e. capital and labour, and tax rates are treated as the strategic variables (Wilson, 1999). The mobility of the capital led governments to take competitive decisions. In the given region for the proper tax revenues the public good is provided and *taxes must be kept low enough to induce individual to reside in the region given the public goods that is being provided* (Wilson, 1999). As Devereux (2006) suggests the evidence about the tax rates having a direct effect on the decision about location of the real activities of businesses is not very clear. But evidence supports the notion that *in setting their statutory rates, governments do take account of the statutory rates in other countries*.

In a wider perspective Bernardi (2000) named four main implications for the past decade:

- The liberalisation of the markets would lead to unification of indirect tax rates among the regions. The goods subject to these taxes can be easily obtained in other regions if sold at lower prices. The important issue that supports this conclusion is the recent increase in e-commerce.

- The taxes on capital, as the most mobile factor, are those most affected by the tax competition. The companies would tend to concentrate their businesses in the regions with the most convenient conditions and therefore the necessary reaction would be the reduction of the tax rates.

- Reduction of the capital tax rates would result in different composition of the tax burden. Instead of taxing capital, less mobile factors would be heavily taxed, such as labour. The social security and other mandatory contributions would increase and their share would become more important in the total tax wedge.

- The minor effect of tax competition would lead to reduction in public expenditures and possible reduction in public goods.

The discussion about tax competition concerns not only the tax rate changes but operates also with the changes in tax bases. *It might be expected that multinational companies seek to use all allowances and deductions available in any jurisdiction* (Devereux, 2006). The expected effect is the tax base broadening and the general simplification of their assessment, such as reduction in possible tax exemptions, deductibility of business expenses, investment allowances etc.

The questionable issues are the harmful tax practices. They address so called tax havens, the *countries with no or nominal, effective tax rates and with a lack of effective exchange of information, lack of transparency and lack of substantial activity taking place in the country* (Griffith, Klemm, 2004). Having a tax rate of zero is in these terms not sufficient, for the harmful tax competition the lack of transparency and discriminative approach are another key concepts. Therefore Bernardi (2000) considers only those countries with democratic environment and proper functioning legislation as the real threat, i.e. the developed countries and some of the developing regions.

2.3 Optimal tax system

The optimal taxation theory is purely mathematical analysis trying to find conditions for taxes to be optimal or in other words *a system of equations that must hold simultaneously in order for the tax rates to be optimal* (Alm, 1996). We would rather focus on the practical aspects of designing the optimal tax system.

From the point of view of an individual, tax either lowers their income or raises the price of the good they buy. From the point of view of the whole system, tax brings both equity and efficiency considerations. As mentioned by Alm (1996), the optimal tax theory suggests specific approaches for the optimal commodity and income taxes or optimal tax mix. Their goals and results may differ with respect to efficiency, i.e. the behavioural effects of taxation on individual or firm decisions, or with respect to equity, i.e. the maximisation of the social welfare function.

The optimal design for the commodity taxes (such as VAT or consumption taxes in general) reaches higher efficiency with lower tax rates imposed on goods with more elastic demand and vice versa. On the other hand, respecting equity principle suggests lower tax rates for goods consumed more heavily by individuals with lower income.

Considering both of these principles necessarily results into a paradox where *commodities with more inelastic demands should be taxed more heavily in order to reduce the excess burden of taxation; however, if these goods are consumed predominantly by those with lower incomes, then equity concerns argue for lower tax rates* (Alm, 1996). Similar effects can be demonstrated in terms of income taxes or even with optimal tax mix.

Therefore, the important question for the decision makers is who in reality bears the fiscal burden. Common justifications operate with the progressive distribution of tax burden, where those with higher ability to pay should contribute with higher share, because a dollar has a different value for the low-income family and in the hand of upper-income family, e.g. as Slemrod (1993) shows. In this case the ability can be considered in terms of the income or in terms of other characteristics, such as being elderly, disabled, having children etc. (Auerbach, 2009). Progressiveness is easily applicable by the direct taxes because they are able to take into account individual characteristics of the taxed subjects, while indirect taxation, as transactional based, is hard to be designed in a progressive and desirable manner. In real life the tendency to follow equity principle is more common, both in terms of income and commodity taxes.

The common question is how progressive should the progressiveness be. Every system takes more from the person with higher income than from the person with lower income, although it is the proportional system (where all subjects are taxed with the same rate) or even regressive one (where e.g. the rate with additional income declines). But progressive tax system even increases the rates applied to those with higher incomes.

The last but not least important argument for designing a tax system is the revenue-yield aspect (Alm, 1996). This effect is supported in an intuitive manner by the Laffer curve already mentioned above. The loss of utility here supported by the decreasing yield effect can be a consequence of many factors. The tax revenues and the yields are directly dependent on the compliance costs of the firms and individuals, administrative costs of the governments for the tax collection or enforcement, and also on the level of tax evasion.

The empirical evidence supports the fact that the level of tax evasion in the society is beside other factors dependent on the *audit and fine rates,* and that *individual pays taxes because he or she is afraid of getting caught and penalized* (Alm, 1996). Also the tax compliance costs differ for commodity or income taxes as well as the possibility of tax evasion for both types of taxes differs significantly.

Therefore, the overall goals of the optimal tax system should be identified as obtaining the proper revenues while taking into account the equity and efficiency aspects. Efficiency aspect is more of an economic issue while we will consider the equity aspect more of a socially responsible one. Taking into account that taxes create distortions in the system, produce excess burden and in each tax system a certain deadweight loss is created, Auerbach (1982) defines the optimal tax problem as follows: *… taxes distort behaviour and cause excess burden. How can this excess burden be kept to a minimum while government simultaneously raises the revenue it requires for public expenditures?*

Alm (1996) in his paper suggests these *conclusions for the optimal taxation in the real world*:

- *Commodity tax rates should be largely proportional. Divergences from these proportional rates should be minimal and should take form of marginally higher tax rates on goods that are unresponsive to price changes…, goods that generates significant negative spillovers…, goods consumed by higher income groups… etc.*
- *Income taxes should be imposed at constant marginal tax rates on broadly defined tax bases above some level of income determined by generously defined exemptions and (standard) deductions with minimal use of special tax incentives.*
- *Both direct and indirect taxes should be levied.*

Hand in hand with the decision on the tax system goes the impact of the system, rates and bases on the tax revenues collected by the governments. Higher tax rates do not necessarily bring higher tax revenues, on the contrary they might alter the behaviour of taxpayers. As suggested by Clausing (2007), *firms have many ways to respond to increased corporate taxation. As tax rates increase, more tax avoidance activity occurs, as firms have increased incentives to take steps that reduce their tax burden.*

And from the other point of view higher tax revenues can be caused by diverse factors mentioned e.g. by Devereux (2006). In terms of corporate income taxes revenues can be affected simply by higher statutory tax rates, but also by increase in the level of profits, the greater number of businesses incorporated or by increase in taxable profits due to the broadening of the tax base. However, not only tax related issues matter when dealing with tax revenues, other economic indicators such as economic cycle might be relevant.

Hence, the objectives of our analysis are to find out what other economic indicators might be relevant for the amount of tax revenues collected and whether the statutory tax rates really matter the most.

In most of the European countries a great amount of government revenues is generated from a relatively small number of taxes. Usually from personal income tax, corporate income tax, value added tax and excise duties (Bernardi, Profeta, 2004). Therefore, we expect those four types of taxes playing the most important role in related decisions.

3. Tax System in the Czech Republic

In this chapter we will assess the tax system in the Czech Republic and its particularities. For simplicity at first we will focus on the business taxation, in which the taxpayers are legal entities, and then on the personal taxation, in which taxpayers are individuals[3]. In both sections we will describe which taxes each person is subject to. We will also concentrate on different approaches in taxing those persons, with respect to direct and indirect taxation and the tax burden imposed.

As Simone Pellegrino claims (in Bernardi, Chandler, Gandullia, 2005) the development of the recent tax system and fiscal reform began in the Czech Republic in 1993 after splitting of the previous Czechoslovakia and after the transition from a planned economy system to a market-oriented economy had finished. The new tax system is now close to the EU model. The great issue of the Czech economy used to be the lack of harmonization in terms of VAT and European standards, diverse tax rates and tax exemptions in particular.

In 2009 the total tax-to-GDP ratio reached 34.5 %, which is lower than the EU-27 average but higher than the ratio of comparable new-member countries such as Slovakia or Poland (European Commission, 2011a). Czech-specific issue is the composition of the tax revenues, whose main share comprises of social security contributions which are in the Czech Republic among the highest in the world. Also *by adding social security contributions to personal income tax, the negative consequence arises of a very high taxation of labour* (Bernardi, Profeta, 2004). In terms of distribution of the fiscal burden, the employed labour thus remains the most heavily taxed factor. The Czech Republic, as one of the new member states in the EU, has lower fiscal revenues than the EU average and also a different tax mix, which relies more on the revenues from indirect taxes and still the most pronounced revenues are those from mandatory contributions.

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[3] Deloitte (2010) uses this division in its International Tax and Business Guide reports and we found it both helpful and transparent.

The Czech tax system has not experienced any other important fiscal reform since 1993. The system was repeatedly amended but still basic improvements are needed in the area of direct taxes, pension reform etc. The tax system originally operated with a progressive personal income tax which was reduced to a flat tax rate in 2008. Also original high level of corporate taxation was reduced systematically to compete better with other new EU members. The fiscal policy now faces the matter of sustainability of public finances, even though the public debt in the comparison with Maastricht criteria remains relatively low, the budget deficit, on the other hand, is too high. Moreover, both budget deficit and public debt has been still rising recently.

In the Czech Republic there are many types of taxes or mandatory contributions that a company or an individual must pay or withhold (The International Bank for Reconstruction and Development/The World Bank, 2010a and Pricewaterhouse-Coopers, 2010). Certain types of taxes are imposed solely on companies, some of them solely on individuals and several are obligatory for both subjects independently on their legal status.

Business taxation only includes:

- corporate income tax,
- value added tax,
- road tax,
- energy tax,
- excise duty.

Personal taxation only includes:

- personal income tax.

Business or personal taxation includes:

- gift and inheritance tax,
- real estate tax,
- property transfer tax,
- health insurance,
- social security contributions which are paid jointly with sickness insurance and unemployment contribution.

3.1 Business taxation

Any company or legal entity carrying out its business activities in the Czech Republic is subject to a number of taxes and mandatory contributions. In total there are 12 kinds of payments that a company must pay or withhold (The International Bank for Reconstruction and Development/The World Bank, 2010a and Pricewaterhouse-Coopers, 2010). To stick with the division of the taxes by its economic function provided above, the picture provides a complete list of the business taxes imposed.

Picture 3: System of business taxation in the Czech Republic

Labour	• health insurance • social security contribution • unemployment contribution • sickness insurance
Consumption	• value added tax • road tax • energy tax • excise duty
Capital	• corporate income tax • real estate tax • property transfer tax • gift and inheritance tax
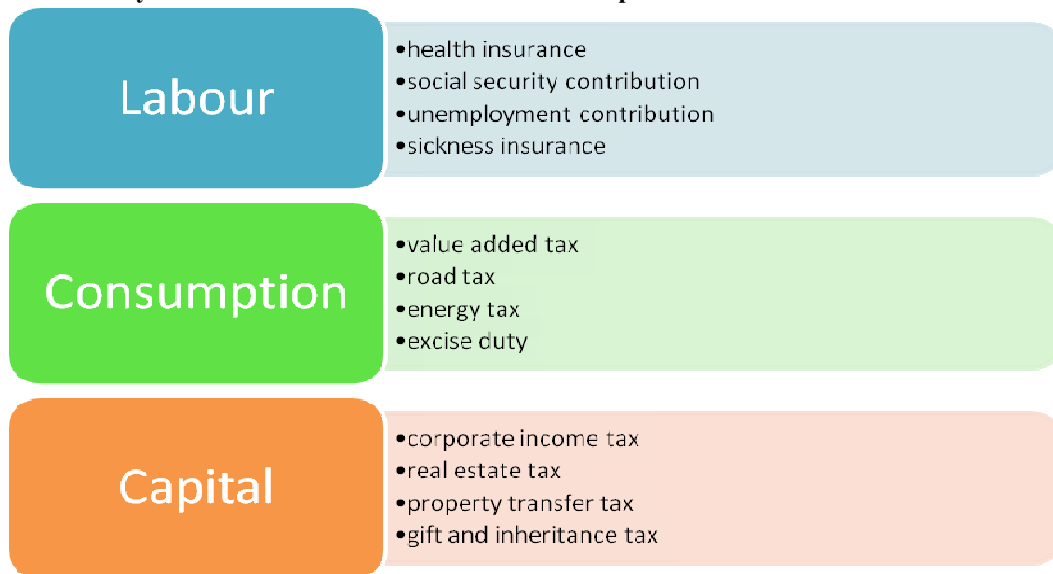
Source: author.

3.1.1 Taxes on capital

Corporate income tax was introduced in 1993 and is the only income based tax in the system of business taxation in the Czech Republic. Taxpayers are both resident and non-resident companies, where Czech residents are the companies with its legal seat or the place of effective management in the Czech Republic. CIT is levied on the worldwide income and capital gains of the Czech taxpayers, non-resident companies are taxed only on the Czech source income. There exist also other specific rules for the non-resident companies, other specific group subject to CIT are non-profit organisations which again have specific rules for taxation.

In general the tax base is determined as the difference between income and expenses, i.e. the net profit of the company. The process of the tax base determination is more complex, the net profit provided and reported in the financial

statements needs to be adjusted at first – the company needs to consider both tax exemptions and tax deductibles, and tax non-deductible costs as well.

Since 2010 the standard CIT rate in the Czech Republic has been 19%, with the flat tax rate uniform for all the taxpayers. There has been a systematic process of reducing the CIT rate since 1993, which is illustrated in the table below.

Table 2: Corporate income tax rates in the Czech Republic (1993-2011)

CIT rates	1993	1994	1995	1996	1997	1998	1999	2000	2001
	45%	42%	41%	39%	39%	35%	35%	31%	31%
2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
31%	31%	28%	26%	24%	24%	21%	20%	19%	19%

Source: OECD (2011b).

Tax rates in the Czech Republic originated at the level of 45% and by the end of 2011 they descended to only 19%. The decrease in CIT rates continued even after the beginning of the crisis and the Czech government decreased the rates in both 2009 and 2010. According to the current plans of the Czech government the CIT rate should stay the same, i.e. 19%, even in the new act on the income tax which is being prepared for 2013. In the wider perspective, from 1993 when the Czech Republic introduced the new and independent system of taxation the tax rates on corporate income experienced continuous and systematic decrease which seems to stop in 2010, as illustrated in the following graph.

Graph 1: Corporate income tax rates in the Czech Republic (1993-2012)
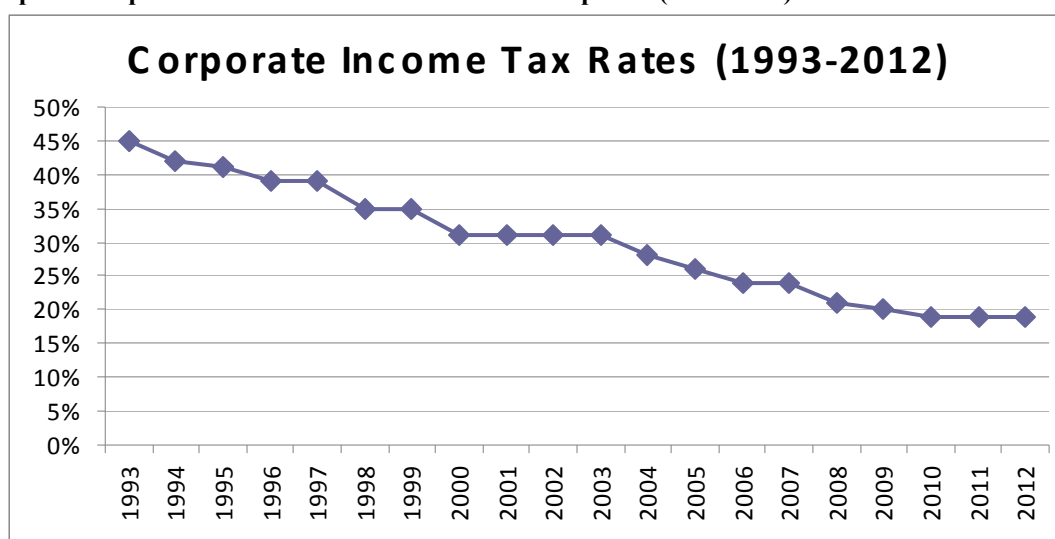
Source: OECD (2011b).

Exemptions which are subject to special tax regimes in corporate taxation exist as follows (KPMG, 2010a).

- *Profits of investment funds, mutual funds and pension funds are subject to a special rate of 5 %.*
- *Dividends derived by resident companies are subject to a withholding tax of 15 %.*
- *Income tax relief for a period of 5 years is available under special investment incentive schemes.*

By the economic function in the category of taxes on capital we include real estate tax, property transfer tax and gift and inheritance tax as well. These taxes have the same rules for both companies and individuals.

Real estate taxes, or real property taxes, are imposed on land or building that the person or a company owns. The tax rate varies from 0.25 percent to 0.75 percent of the tax base and is multiplied by the price of land, where the price of land differs for different parts of the Czech Republic. Property transfer tax is imposed on any sale or transfer of real estate and the tax rate is 3% of the price of the property. The gift and inheritance tax is imposed either on the acquirer of a donated property or on a heir, both are taxed according to the value of the property with possible application of exemptions.

3.1.2 Taxes on consumption

Value added tax (Daň z přidané hodnoty, DPH) is the most important consumption tax in the Czech Republic. Until 1993 there used to exist the turnover tax applied to all goods instead. Current VAT is in principle a tax on consumer expenditure and it is charged on the supply of most goods and a provision of services. The major change in VAT legislation came with the accession to the EU in 2004 and recently the Czech Republic is in the process of implementation of the EU directives.

VAT has typically differentiated tax rates – there exist a standard tax rate, which is common for majority of goods and services and also a reduced rate, which applies on essential goods and certain types of services, for example food products, books, newspapers, public transport services, social residential housing, construction. Also there exist a zero rate for exports and intra-community supplies of goods and international transport of goods.

In 2011 the VAT rates were 20% standard rate and 10% reduced rate. During all its existence the VAT rates were quite stable, the only major change came in 2004

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with the accession to the EU, when from 1 April 2004 the standard VAT rate was reduced to 19 %. Recently on the other hand they have experienced significant changes. The changes in VAT rates, both standard and reduced, are provided in following table.

Table 3: VAT rates in the Czech Republic (1993-2012)

	1993-1994	1995-2003	2004-2007	2008-2009	2010-2011	2012
Standard VAT	23%	22%	19%	19%	20%	20%
Reduced VAT	5%	5%	5%	9%	10%	14%

Source: European Commission (2011b) and Ministerstvo financí (2011a).

Although companies are VAT payers, tax burden is in this case typically transferred, as is common for the indirect taxes. The price in fact is paid by each individual, because the tax is included in the price of goods or services, thus the real burden is transferred to a final consumer.

For the Czech government changes in VAT rates seem to become a popular tool to increase the tax revenues and other changes are planned as well. For 2012 we expect increase of the reduced rates and also changes in the structure – there has been an emotive discussion about shifting certain goods and services from the reduced rate to the standard one. For 2013 other changes are planned as well, this time the unification of both rates and their stabilization at 17.5%[4]. Most current changes and future perspective are shown in the following picture.

Graph 2: VAT rates in the Czech Republic (1993-2013)
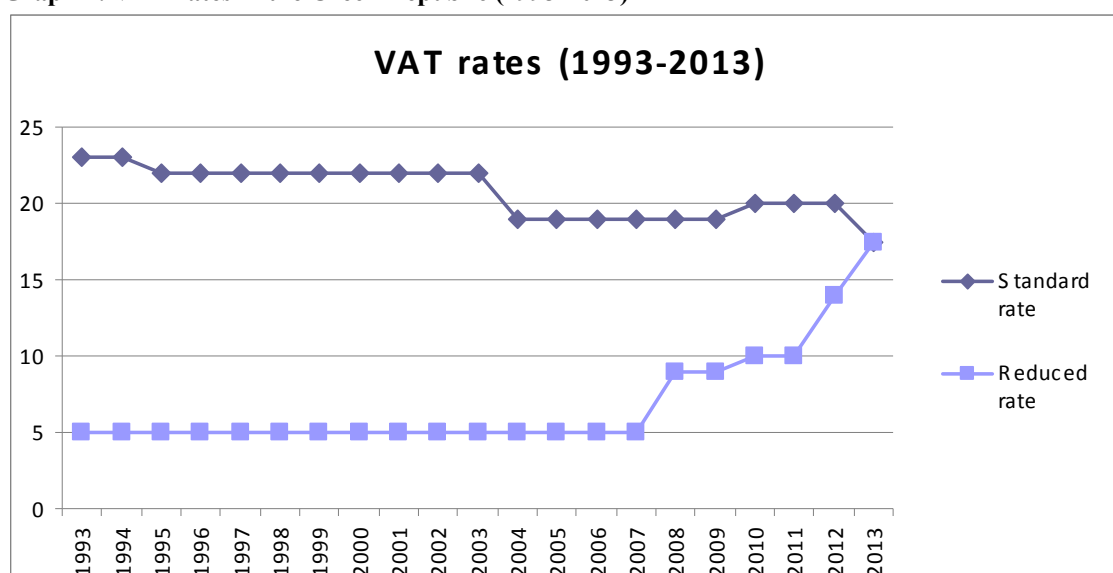
Source: European Commission (2011ba) and Ministerstvo financí (2011a).

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[4] This is the expected development according to the situation as of November 2011when the amendment to the act on VAT prepared by the Ministry of Finance of the Czech Republic for 2012 and 2013 was signed by the president.

Besides the value added tax there exists a number of other consumption taxes, whose taxpayers are solely the companies, mostly producers of the goods subject to this taxation.

Excise duty or tax is a consumption tax that a government levies traditionally on sale and consumption of selected products. In the Czech Republic the excise duty is imposed on five products – (1) tobacco products, (2) beer, (3) wine, (4) alcohol and spirits, and (5) hydrocarbon fuels and lubricants. The reason to levy the excise tax is usually motivated by the health or ecological concerns.

The same motivation comes with another kind of consumption taxes – energy tax. In the Czech Republic this is the newest kind of tax which came into existence in 2008 as a reaction to the EU legislation. Energy tax is levied on the companies which are suppliers of the energy from diverse resources – electricity, natural or other gases or solid fuels. By levying these taxes government aims at reducing the energy consumption and the CO_2 pollution.

The last kind of taxes in this category is the road tax. In the Czech Republic the road tax is levied on the vehicles used for commercial purposes. Motor trucks are subject to road tax in all the circumstances. The purpose of this tax is to get the revenues for the maintenance, servicing, reconstruction and building-up of the public road system (Vančurová, Láchová, 2010).

3.2 Personal Taxation

Any individual resident in the Czech Republic is again subject to a number of taxes and several mandatory contributions. In total there are 8 kinds of payments that an individual must pay or withhold (Deloitte Touche Tohmatsu, 2010). Again, to stick to the division of taxes according to their economic function, the following picture illustrates all of them.

Picture 4: System of personal taxation in the Czech Republic

Labour
- personal income tax
- health insurace
- social security contribution
- unemployment contribution
- sickness insurance

Consumption
- individuals are not subject to consumption taxes

Capital
- real estate tax
- property transfer tax
- gift and inheritance tax
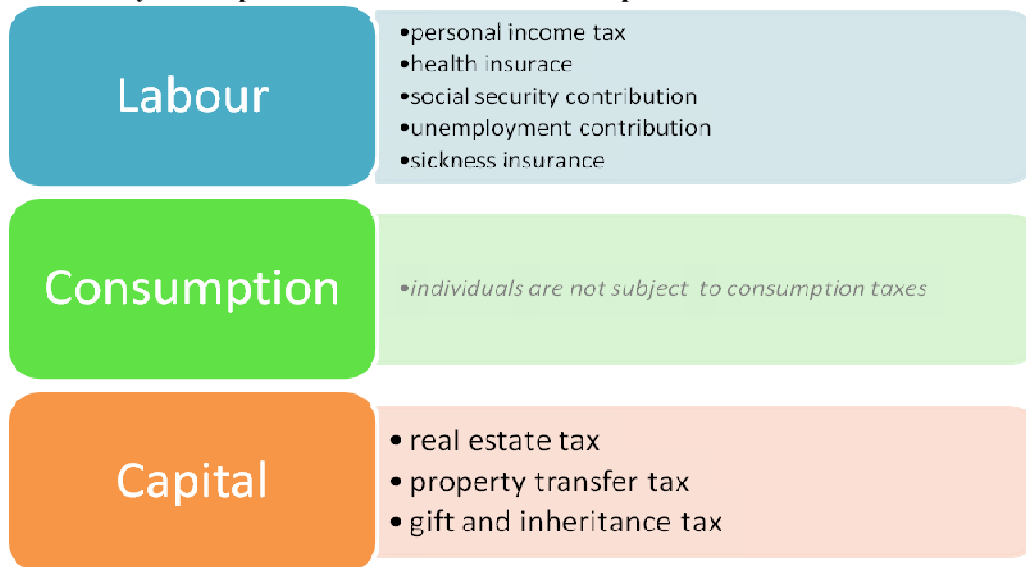
Source: author.

Several issues are worth mentioning. The main difference is the taxes on consumption which are business specific only. These taxes are indirect and while business entity is subject to this tax – e.g. hands in the declaration of taxes and levies the tax, an individual has no direct obligation resulting from this kind of tax. But the real tax burden is in this case typically transferred, lies right on the final consumers, because the tax is included in the price of goods and services.

Real estate tax and property transfer tax are subject to the same rules as in the case of business taxation. We have already discussed them although only briefly in the previous section. Gift and inheritance tax is levied on the person who acquires property. The rates depend on the relationship between the deceased/donor and the recipient, where no inheritance or gift is imposed in case of the closest relationships.

The final note concerns the division of the revenues from personal and business income taxes. While corporate income tax is obviously imposed on the companies, the personal income tax is imposed on the income of individuals, but those employed only. The revenues from self-employed individuals and their taxes are in statistics (published by ex. European Commission) included in the capital and business incomes.

3.2.1 Taxes on labour

Worldwide income of every individual resident in the Czech Republic is subject to the personal income tax, in case of non-residents only Czech-sourced income is subject to this tax. There exist in general five different sources of the personal income, each of them has its own rules for taxation and partial tax base determination. As a personal income we consider:

- employment income,
- income from business activities,
- capital gains and dividend income,
- rental income, and
- other income[5].

The most important and most usual are the first two types, which comprise regular income from the employed labour or business activity of an individual. Other 3 types of income comprise either assets or occasional income that the individual could obtain. Special regimes exist for taxation of income from dividends and interest which are subject to a special withholding tax.

Employment income is the salary and other kinds of remunerations, including employee benefits. Rather complex system of tax deductions and other tax allowances exist, e.g. basic personal allowance or allowance for a dependent child, deduction of donation for certain purposes etc.

Second source of personal income is the income from business activities. Any individual who has income from business activities has to pay the tax from the business profits, the partial tax base is in this case computed as the difference between the income and costs. An individual can also choose whether or not they will pay the tax according to his actual costs and expenses – both provided and reported in the financial statements. Or alternatively he can choose to pay the lump-sum tax which is calculated as a percentage of his business revenues.

From the other three sources of income, i.e. capital gains, dividend income, rental or other income, an individual determines the partial tax bases and all these summed up together compose the tax base for the personal income tax. In the Czech Republic the flat personal income tax rate of 15 % is applied.

The development of the personal income tax rates is illustrated in the table below. Until 2008 the Czech PIT was progressive and levied across several income brackets. In the table there are the tax rates for top-bracket incomes for the period 1995-2007, since 2008 the flat tax rate has been imposed.

Table 4: Personal income tax rates in the Czech Republic (1995-2011)

PIT rates	1995	1996	1997	1998	1999	2000	2001	2002
	43%	40%	40%	40%	40%	32%	32%	32%
2003	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
32%	32%	32%	32%	32%	15%	15%	15%	15%

Source: European Commission (2011a).

In the Czech Republic a unique concept for determining the tax base of the employment income came into existence as of 2008[6]. To get the tax base we add up the personal income together with the mandatory contributions paid by the employer – and get the so-called "super-gross" wage. Employer contributes with 34% of the gross wage for each employee therefore the partial tax base of the employment income comprises of 134% of the gross wage. For simplicity following picture illustrates the determination of the partial tax base from the employment income.

Picture 5: Employment income - determination of the partial tax base
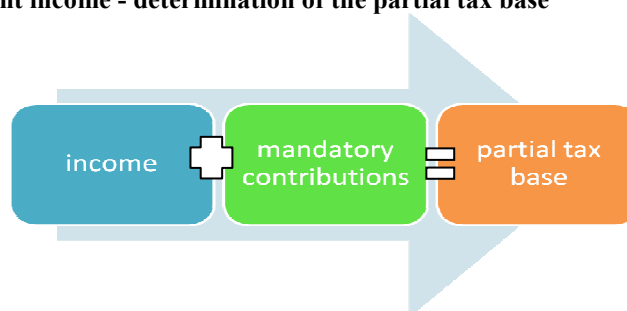
Source: author.

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[5] This division copies the structure of the Czech Act on Income Taxes, as amended.
[6] Before 2009 the tax base was determined simply by the gross wage. Employers used to pay mandatory contributions as well but these payments were not included in the partial tax base. As for the plans for the future – Ministry of finance plans to abandon this concept of „super-gross" wage with the new act on income tax which should enter into force from 2013.

3.2.2 Mandatory contributions

Both companies and individuals have a specific role in the Czech system of mandatory contributions. Because they are, according to their economic function, considered taxes on labour we placed them in this section.

In the Czech Republic we distinguish social security contributions and health insurance payments, where health insurance covers health and medical care and social security contributions cover three different kinds of payments: (1) pension, (2) sickness and (3) unemployment contributions.

The base for calculation is the gross wage of each individual employee. Both employers and employees are included in the system – each of them contributes by diverse portion of payments. The contributions of employers are much higher and practically they increase the costs of each employee. The total amount of the mandatory contributions paid by the employer is 34%, while the contributions of an employee are 11 %. The detailed structure is provided in the following picture.

Picture 6: Mandatory contributions paid by the employers and employees

EMPLOYER
- total of 34 %

social security contributions (25 %)

health insurance (9 %)

EMPLOYEE
- total of 11 %

social security contributions (6.5 %)

health insurance (4.5 %)
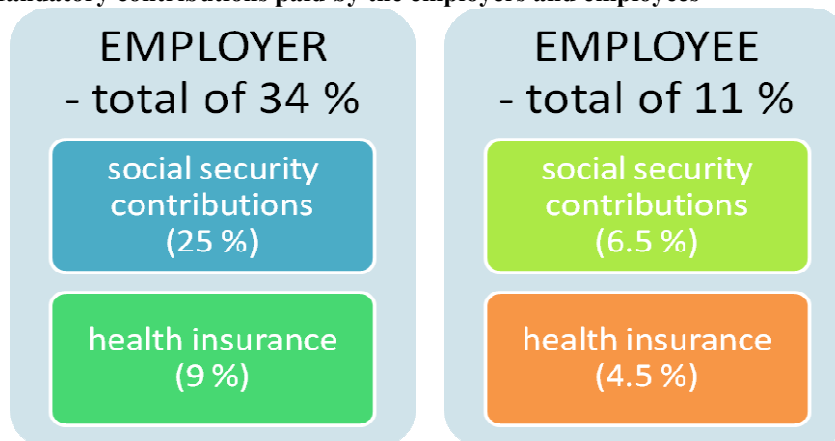
Source: author.

Payments for the social security contributions are collected only up to a certain limit. In case the salary of an individual from one employer within one calendar year exceeds this limit, both employee and employer do not pay the contribution from his additional salary. The limit is set specifically each year as the amount of six times the average annual salary and in 2011 was at the amount of CZK1,781,280.

The development of the rates for both employers and employees is illustrated in the table below.

Table 5: Social security contributions in the Czech Republic (1993-2009)

	1993	*1994-1995*	*1996-2008*	*2009*
employer	36%	35.25%	35%	34%
employee	13.5%	13.25%	12.5%	11%

Source: OECD (2011b).

The development of the rates on social security contributions has not changed much over the years. The highest contributions were paid in 1993 when employers contributed with 36% and employees with 13.5% of their gross wage. The rates then decreased slightly and for a very long period leveled-off at 35% for employers and 12.5% for employees. Only in 2009 rates were slightly reduced again and since then employers have contributed with 34% and employees with 11%.

3.3 Tax reforms overview

The most important tax reform was introduced with the creation of the Czech Republic in 1993 when also most of the current taxes were created, such as CIT, PIT, VAT, system of social security contributions etc.

System of personal taxation has been amended several times. Originally the system was set as a progressive with six income brackets, in 2000 those six brackets were reduced to four. The major change in personal taxation came in 2008 when the progressive system changed to linear one and flat tax was introduced. This resulted in a significant reduction in statutory tax rates and also in a decrease in effective tax rates. In terms of corporate taxation the reduction of statutory tax rates was associated with changes in the tax base.

Nowadays Czech government plans further amendments to the tax system, the convergence of the VAT rates is one of the most recent ones. For the time being the major tax reform, i.e. the whole new act on income taxes is being prepared, which would bring many changes and which should bring more transparency into the whole system, effective of 2013. Among the suggested changes we can expect e.g. the abolition of the system of the "super-gross" wage with contemporary increase of statutory PIT rates, changes in the structure of mandatory contributions in favour of the employers, or unification of the VAT rates (Ministerstvo financí, 2011b).

Recent changes introduced in times of the crisis are illustrated in the table bellow.

Table 6: Changes introduced in the Czech Republic in the period 2009-2012

MEASURES IN THE DOMAIN OF PERSONAL TAXATION	
2011	Cut in basic personal tax credit from CZK 24,840 to CZK 23,360
2012	From 1 January 2012, that credit can again be claimed in the amount of CZK 24,840
MEASURES IN THE DOMAIN OF SOCIAL CONTRIBUTIONS	
2009	Reduction in employers' and employees' contribution rates
2010	Increase in maximum basis of assessment for social and health insurance payments
MEASURES IN THE DOMAIN OF TAXATION CONSUMPTION	
2010	Increase in reduced VAT rate to 10%
2012	Increase in reduced VAT rate to 14%

Source: European Commission (2011a, 2011b).

4. Tax System in Italy

In this chapter we will focus on the tax system in Italy. We will keep the same structure of the tax division as in the previous chapter in order to be able to compare both countries later and stress the particularities. Again we will at first focus on the business taxation, i.e. taxation of legal entities, and then personal taxation of individuals.

As Luigi Bernardi claims (in Bernardi, Profeta, 2004) Italian tax system is very similar to European average of a developed industrial country. Italy experienced two major tax reforms, first in 1972 and the other one at the end of the 1990s. Firstly, Italy concentrated on its *lack of expected tax revenues by reducing the basis and increasing the rates, or the number of taxes*. Public welfare expenditures experienced a sharp rise while the level of total taxes was very low, thus the issues of high Italian budget deficit and public debt originated. In 1990s the fulfilment of the Maastricht criteria became an important issue and therefore Italy was forced to consider its debt and deficit properly. But still these two issues are to be dealt with, with more fiscal pressures emanating recently. Still the greatest problem of Italian tax administration is *the persistent high level of inefficiency and corruption and tax avoidance and exemptions which are in Italy higher than in any developed countries*.

According to the data provided by the European Commission and Eurostat (European Commission, 2011a) the overall tax to GDP ratio reached in 2009 in Italy 43.1 % which was the highest value from 1997. Italy's overall tax ratio ranks fourth highest in the EU. In distribution of fiscal burden Italy relies heavily on the direct taxes which constitute 35.8% of all tax revenues, while indirect taxation (with 32.1%) is well below the European average. Moreover, the shares of direct taxes has been recently increasing – this increase was affected both by the decline in CIT revenues due to the recession and cut in rates, as well as by the decline in VAT revenues on one hand and on the other hand by the pickup of PIT and other direct taxes and introduction of IAS standards which lead to special kind of payments.

Italy currently has very high revenues from capital taxes as a percentage of GDP. Taxes levied on the income of corporations are the fifth highest in the EU, although the revenues reached its peak in 2007 and then started declining due to the recession.

In total the number of taxes paid in Italy is much higher than in the Czech Republic and the whole tax system is much more complex and complicated. Again we can distinguish several types of taxes, those imposed solely on companies, solely on individuals or those obligatory for both subjects independently on their legal status.

Business taxation only includes:

- corporate income tax,
- regional tax on productive activities,
- value added tax,
- environmental tax,
- vehicle tax,
- fuel tax,
- advertising tax,
- insurance tax.

Personal taxation only includes:

- personal income tax,
- inheritance and gift tax,

Business or personal taxation includes:

- real estate tax,
- taxes on dividends and interest,
- social security contributions – paid jointly with mandatory contribution for work termination.

4.1 Business taxation

Any legal entity doing business in Italy is again subject to various types of taxes and other mandatory contributions. In total the number of taxes paid is much higher than in the Czech Republic, a company is subject to many different types of tax payments (The International Bank for Reconstruction and Development/The World Bank, 2010b). The most important ones are illustrated in the picture according to their economic function.

Picture 7: System of business taxation in Italy

Labour
- social security contributions
- mandatory contribution for work termination

Consumption
- value added tax
- environmental tax
- vehicle tax
- fuel tax

Capital
- corporate income tax
- regional tax on productive activities
- real estate tax
- taxes on dividends and interest
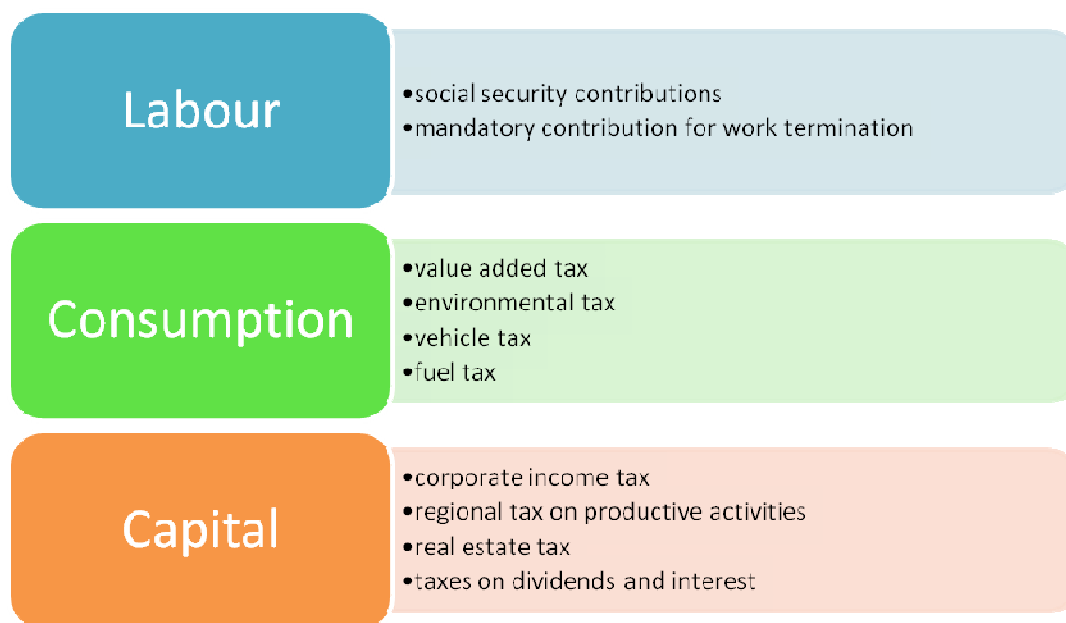
Source: author.

In Italy besides these taxes there also exist many stamp duties, one-time fees and taxes which level up the total tax burden for the businesses, e.g. stamp duty on contracts, stamp duty on property transfers, chamber of commerce duties, fixed tax on legal and fiscal registries and tax on check. Among minor business taxes Italy imposes taxes on starting a business, insurance, mortgages, stamp duties or motor vehicles. State also taxes any kind of gambling, lotteries and entertainment. At the regional level also other types of small taxes may be imposed – e.g. occupation of public areas, use of public water, disposal of solid wastes etc.

Special regimes exist for investment funds, pension funds and for non-operating companies, for which a minimum taxable income is presumed, based on a minimum return on assets.

4.1.1 Taxes on capital

Companies are in Italy subject to total corporate income tax, whose construction is a bit more complicated. It consists of two different taxes: corporate income tax (so-called IRES) and regional tax on productive activities (so-called IRAP). Resident companies are typically taxed on the income from any source, while non-residents are taxed only on income earned in Italy. Banks, insurance companies and other financial intermediaries are subject to specific computation of taxable income, on both IRES and IRAP bases.

Tax basis is restricted by many factors e.g. capital gains could be taxed at a lower rate, capital losses are fully deductible, as well as interest payments. As of 31 December 2008 it is possible to deduct for IRES purposes 10% of the IRAP tax paid on interest and personnel expenses. Italy allows numerous tax deductions, e.g. research expenditures, financial contributions to research, royalties paid for intellectual property, advertising and entertainment expenses. The bases differ as well because certain expenses are allowed for IRES purposes but not for IRAP and again can differ by the regions.

The total corporate income tax is set to 31.4%. *IRES is levied at a rate of 27.5 % on both retained and distributed profits. IRAP is levied on the net value of production derived in each Italian region by resident companies. The ordinary tax rate is 3.9 %, although the tax authorities may increase or decrease the rate by up to one percentage point* (Deloitte Touche Tomhmatsu, 2008). The complete set of the total corporate income tax rates is presented in the following table.

Table 7: Corporate income tax rates in Italy (1993-2011)

CIT rates	1993	1994	1995	1996	1997	1998	1999	2000	2001
	52.2%	52.2%	53.2%	53.2%	53.2%	41.3%	41.3%	41.3%	40.3%
2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
40.3%	38.3%	37.3%	37.3%	37.3%	37.3%	31.4%	31.4%	31.4%	31.4%

Source: KPMG International (2007, 2011a).

Since 1993 Italy has experienced significant decrease in CIT rates, starting at the level of 52.2% and finishing with total tax rate of 31.4%. But the decrease was not continuous, Italy increased the tax rates in the period 1995-1997 and the actual decline started only after. Italy experienced two considerable falls in rates, first in 1998 and second one in 2008. In the meantime the rates were only slightly modified as illustrated in the picture.

Graph 3: Corporate income tax rates in Italy (1993-2011)

Corporate Income Tax Rates (1993-2011)

[Line chart showing corporate income tax rates from 1993 to 2011. The rate starts around 52% in 1993, remains near 53% through 1997, drops to about 41% in 1998-2001, declines gradually to about 37% through 2007, then drops to about 31% from 2008 to 2011. Y-axis ranges from 0,0% to 60,0% in 10% increments. X-axis shows years 1993 through 2011.]
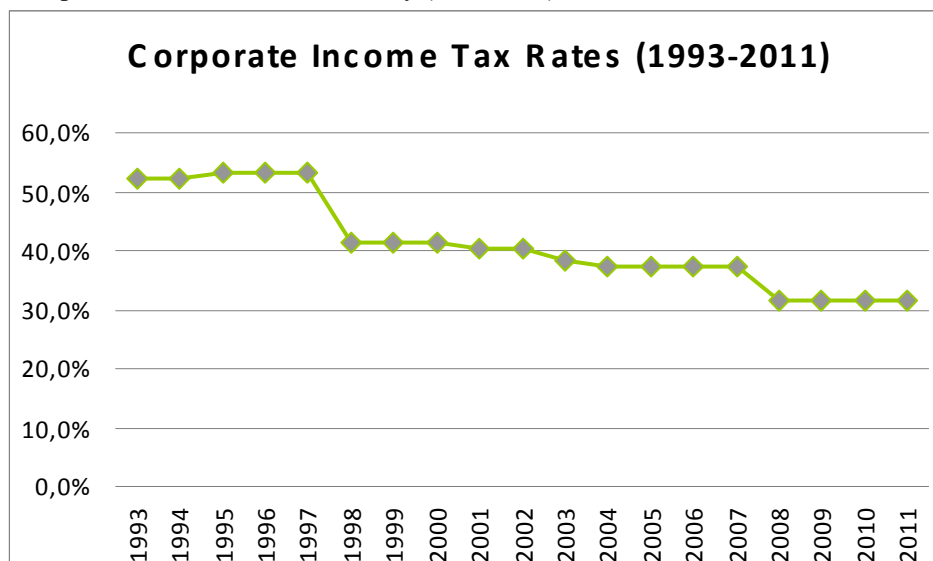
Source: KPMG International (2007, 2011a).

From fiscal year 2010 Italy introduced a new *additional corporate income tax charge which is levied on companies (i) having revenues higher than EUR 25 million in the relevant fiscal period and (ii) carrying on their activities in specific fields, such as research and exploitation of hydrocarbon, oil refining, production and sale of petrol, gasoline, gas, lubricating oil, liquefied gas of petrol and natural gas, production and sale of electricity* (PFK, 2011).

Among other direct taxes which are business-specific we include real estate tax and taxes on dividends and interest. Real estate tax is at a rate ranging from 0.4% to 0.9%, and levied on the cadastral value for each property located in Italy.

4.1.2 Taxes on consumption

The value added tax (Imposta sul valore aggiunto, IVA) is levied at a standard rate of 20%. Italy imposes 3 different levels of rates – standard, reduced (10%) and super-reduced (4%), and also zero rate for certain types of goods and services. *10% rate typically applies for certain foods, hotel accommodations, public transport, pharmaceuticals, water; 4% rate to basic foodstuffs, books and newspapers, main residence, medical equipment and aids for handicapped; zero rate then for exports of good and intra-community supplies, international transport services and services directly connected with exports or imports* (KPMG, 2010a).

Italian taxation of consumption is traditionally very low, in particular the fourth lowest in the European Union. (European Commission, 2011a). The weighted rate is about 16% and the effective rate is 9.5% which is very low for the European average at about 15-20%.

The development of the VAT rates, basic, reduced and super-reduced is illustrated in the table bellow.

Table 8: VAT rates in Italy (1993-2011)

	1993-1994	1995-1996	1997-2010	2011
Standard VAT	19%	19%	20%	21%
Reduced rate	9%	10%	10%	10%
Super-reduced rate	4%	4%	4%	4%

Source: European Commission (2011b).

The rates had not changed much over the last 20 years. Italy experienced slight increase in both reduced and standard rates during 1990s but then for more than 10 years rates remained the same. The situation has changed recently when as of September 2011 the standard rate increased to 21% and other increase is planned for the future as well. In 2012 the standard VAT rate should be 23%. The complete development, future perspective included is illustrated in the following picture.

Graph 4: VAT rates (1993-2012)
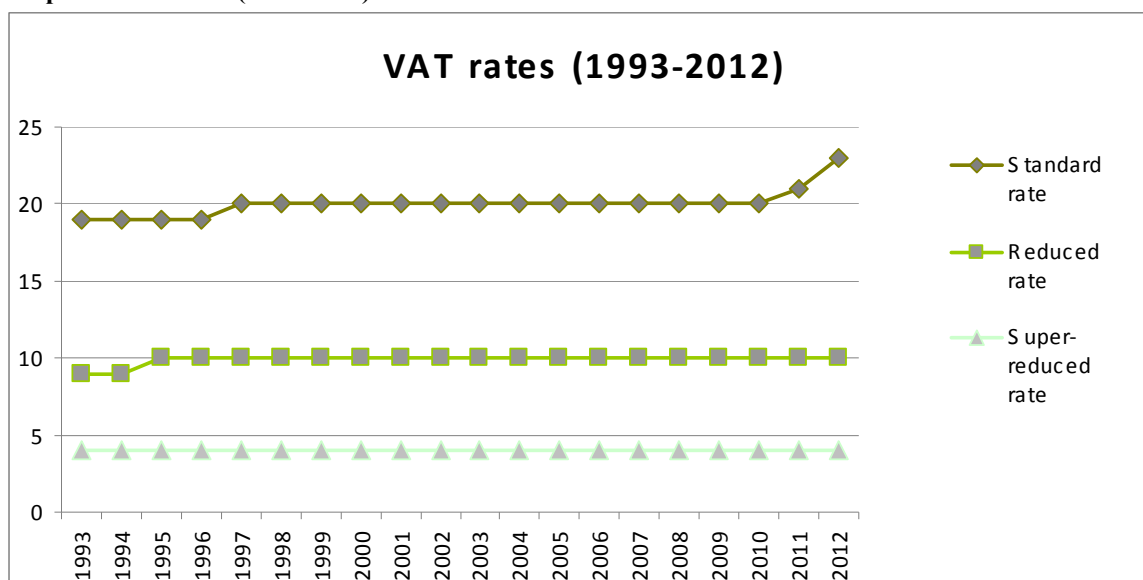
Source: European Commission (2011a).

Excise duty is in Italy imposed on oil products, and then "luxury" goods, such as tobacco and alcohol products or perfumes.

4.2 Personal Taxation

Individuals are in Italy again subject to a personal income tax and mandatory contributions. Residents are typically subject to tax on their worldwide income, while non-residents only on the income earned in Italy. In general there exist 5 types of taxes imposed on individuals as illustrated by the picture.

Picture 8: System of personal taxation in Italy

Labour	• personal income tax • social security contributions
Consumption	*• individuals are not subject to consumption taxes*
Capital	• inheritance and gift tax • real estate tax • taxes on dividends and interest
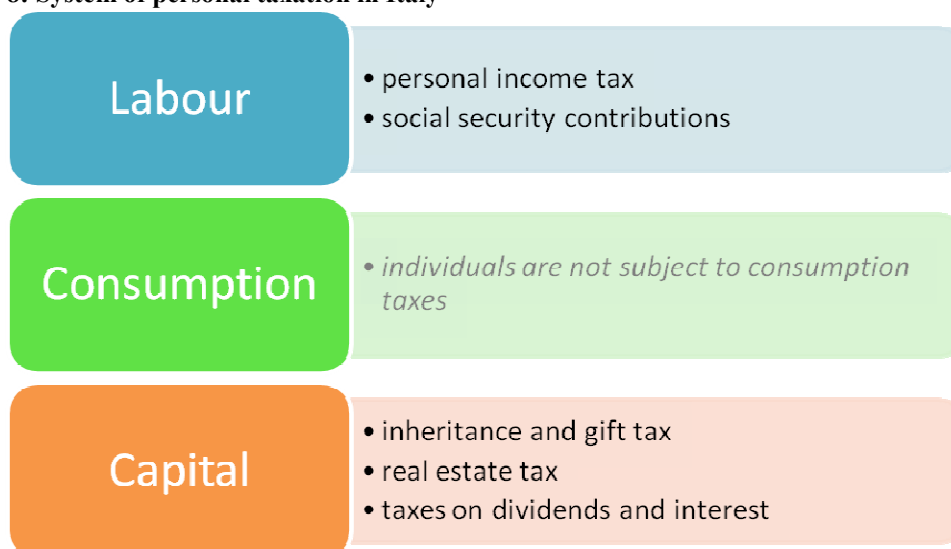
Source: author.

Again the number of taxes paid by an individual differs, this time more significantly. With running the business there exist numerous fees and taxes that an individual is relieved of.

4.2.1 Taxes on labour

The personal income tax (so called IRPEF) in Italy is progressive across five income brackets. The lowest bracket begins at 23%, while the top rate is rising up to 43%. Complete division of the personal income tax according to the level of income is illustrated in the following table.

Table 9: Personal income tax in Italy – progressive tax rates

Taxable income (in EUR)	Tax rate
up to 15,000	23%
15,001 - 28,000	27%
28,001 - 50,000	38%
50,001 - 75,000	41%
exceeding 75,000	43%

Source: Deloitte Touche Tohmatsu (2008).

Moreover, regions may levy surcharges on PIT ranging from 0.9 to 1.4% and also municipalities may levy a special surcharge of up to 0.8%. (European Commission, 2011a).

Italian system recognizes six kinds of personal incomes[7]:

- income from lands and buildings,
- capital gains,
- employment income,
- income from self-employment,
- income from business activities, and
- other incomes.

All these types of income summed up together create the total income, which after extracting the deductible expenses generates the taxable income. The deductible expenses are mainly in the form of credits on tax payable and are typically subject to specific limits and dependent on the form of income. Individuals can apply the tax credits for e.g. *dependent persons, spending on medical treatment, life and health insurance premium, mortgage interest, fees for university or secondary education and the renting of the main dwelling or home restructuring expenses* (European Commission, 2011a).

On the other hand, as of 2011 an additional 10% tax on financial sector employees was introduced. The tax is imposed on *variable remuneration that exceeds three times the fixed remuneration received by individuals working in the financial sector* (KMPG International, 2011b).

The development of the tax rates in the top-income tax bracket is illustrated in the table below. We included both the standard personal income tax rates and the PIT rates with already included regional and municipal surcharges[8], respectively.

Table 10: Personal income tax rates in Italy (1995-2011)

	1995	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
PIT rates				45.5%	45.5%	45%	45%	45%
	51%	51%	51%	46%	46%	45.9%	45.9%	46.1%
2003	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*
45%	45%	43%	43%	43%	43%	43%	43%	43%
46.1%	46.1%	44.1%	44.1%	44.9%	44.9%	44.9%	45.2%	45.6%

Source: European Commission (2011a).

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[7] The division according to the Italian Income Tax Act, as amended.
[8] Those surcharges may slightly differ across the regions. In the table there are rates for the Rome region.

No wealth tax is applied on individuals, the only other tax imposed is the inheritance and gift tax. Special withholding tax at two different rates of 27% or 12.5% is applied to a certain types of payments made by domestic companies, e.g. dividends and interest income, royalties etc.

4.2.2 Mandatory contributions

The system of the social security contributions in Italy is again little bit more complicated. Both employers and employees contribute to the system but the rates are not uniform. The employers' contributions may differ and depend on many different criteria, such as the seniority of the employee, the kind of the activity, the number of the employees, the collective bargain applicable, and so on.

Employers recently contribute with average of 32.08% of the monthly salary. The employee's share of these contributions ranges from 9.49% to 10.49% of taxable compensation, depending on the classification of the employee (worker, executive, or manager) and depending upon the employer's activity (manufacturing, trading, tourism, and so on) (KPMG International, 2010b). The complete development of the rates for both employers and employees can be found in the table. For employees we include the lowest and the highest possible rate applied.

Table 11: Social security contributions in Italy (1993-2009)

	1993-1995	1996-1997	1998	1999-2000	2001-2005	2006	2007-2009
employer	35.36%	35.76%	34.9%	34.08%	33.08%	32.08%	32.08%
employee	9.99% 10.99%	10.19% 11.19%	9.19% 10.19%	9.19% 10.19%	9.19% 10.19%	9.19% 10.19%	9.49% 10.49%

Source: OECD (2011b).

Italy changes the rates of the mandatory contribution quite often. The highest rates were applied in the period 1996-1997 when employers contributed with 35.76% and employees might have contributed at the maximum with 11.19% of their salary. Then the rates were gradually reduced for both employers and employees until 2006. For the following years the rates were set to 32.08% of employers´ contributions and up to 10.49% of employees´.

4.3 Tax reforms overview

The reforms at the beginning of the 1970s concentrated on three main goals (Bernardi, Profeta, 2004): (1) to give more room to direct taxation, (2) to introduce the value added tax (which replaced the turnover tax) and (3) to centralize the tax revenues at the level of central government. Most of the important taxes were brought by this reform – e.g. PIT, CIT, VAT.

In 1997 Italy introduced so-called Visco reform[9] which aimed at creating simpler and more neutral tax system. The country followed the overall trend of reducing and converging the overall tax rates. In particular taxation on capital has been reduced significantly. Statutory rates of corporations declined and the tax wedge shifted to taxation of labour. The reason is mostly the Italian long economic stagnation in 1990s which lead to the need of taxing different factors of production. But the debate goes on that the lack of revenue might be covered by cost cuts, not by introducing the welfare state a increasing taxes (Bernardi, 2004). The personal taxation experienced major cuts in tax rates in period 2001-2002 and then again in 2007 when particularly cuts in the middle brackets were introduced. In 2008 the Italian government reduced the possible regional and municipal surcharges to personal income tax.

As for the planned tax reform, the government has announced three priorities. The first is the reform of Italy's highly centralised tax system and the introduction of 'fiscal federalism'. *Secondly, the government plans to rationalise the vast array of tax expenditures (242 measures have been identified, costing € 142 billion annually). Finally, the government intends to gradually shift the tax burden from direct to indirect taxation* (European Commission, 2011a).

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[9] As refered to in Bernardi, Profeta, 2004, which was initiated by the Minister of Finance Vicenzo Visco.

Also Italy introduced several changes to the tax system in the times of recent crisis, as illustrated in the table.

Table 12: Changes introduced in Italy in the period 2009-2012

MEASURES IN THE DOMAIN OF PERSONAL TAXATION	
2009	Extension of the 10 % special tax rate only on productivity-based pay increases.
2011	An additional 10% tax on financial sector employees was introduced
MEASURES IN THE DOMAIN OF CORPORATE TAXATION	
2009	IRAP paid by employers is now 10 % deductible from CIT or PIT.
2010	Additional corporate income tax charge levied on companies having revenues higher than EUR 25 million or carrying on their activities in specific fields
MEASURES IN THE DOMAIN OF TAXATION CONSUMPTION	
2011	Increase in standard VAT rate to 21%
2012	Increase in standard VAT rate to 23%

Source: European Commission (2011a, 2011b).

5. Empirical data analysis

At the beginning of this chapter before the analysis of the tax relevant data we illustrate the development of the GDP per capita in both countries. Given that most of the revenue statistics are provided as the percentage of GDP, we found it useful to provide the overall summary of this characteristic. We provide data starting in 1993 when the Czech Republic was created and its data was implemented into OECD statistics.

Graph 5: GDP in the Czech Republic (1993-2010)
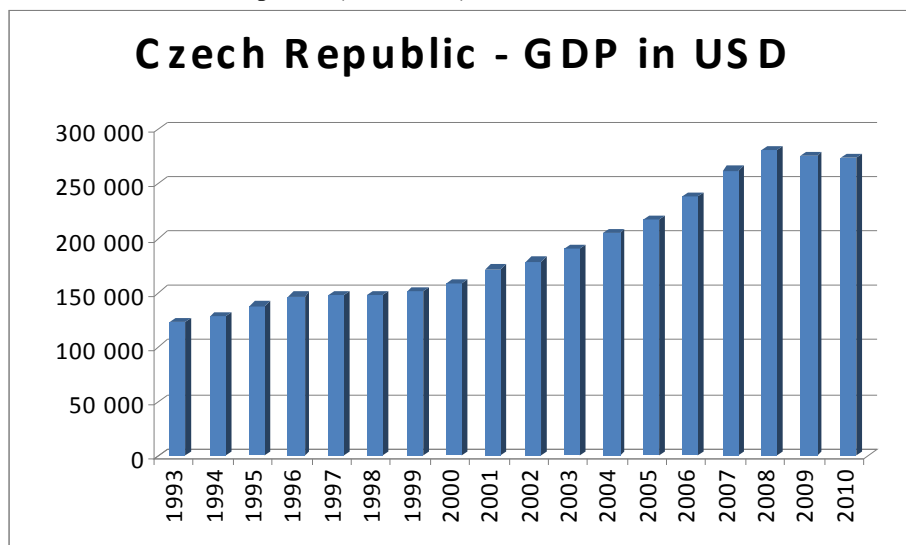
Source: OECD (2011a).

Graph 6: GDP in Italy (1993-2010)

Source: OECD (2011a).

From the graphs above we can see that in terms of GDP Italy is much higher than the Czech Republic. The Italian GDP was in 1993 approximately nine times the Czech GDP, in 2008 thanks to the faster growth the Czech Republic was able to mitigate the difference to only seven times lower GDP than in Italy. Both countries experienced economic progress from 1993 and the values of their GDP reached the peak right before the crisis in 2008. The growth in the Czech Republic was stronger – Czech GDP more than doubled from 1993 while in Italy the values reached approximately 182% in 2008 compared to the year 1993. The Czech Republic experienced stagnation around 1997, the year of the Czech crisis and then started to moderately rise again. Italy continuously rose with the exception of the year 2002, with some periods more prosperous and some less, as those of 1995-1996 and 2003-2004.

For the purposes of our analysis in the next chapter we will use GDP per capita indicator, as well as other economic variables, such as real GDP growth, unemployment rate and consumer price indices (as an indicator of inflation). A complete dataset is provided in the table.

**Table 13: Selected economic indicators in the Czech Republic and in Italy (1995-2009)**

		1995	1996	1997	1998	1999	2000	2001
CZECH REPUBLIC	**GDP per capita**	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*
		11350	11839	12809	13642	13827	13962	14313
		2002	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*
		16872	17992	19304	20366	22350	24579	25845	25563
	Real GDP growth	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*
		0.06	2.22	5.94	4.03	-0.73	-0.76	1.34
		2002	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*
		1.90	3.60	4.48	6.32	6.81	6.13	2.46	-4.15
	Unemployment rate	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*
		4.40	4.30	4.10	3.90	4.80	6.40	8.60
		2002	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*
		7.30	7.80	8.30	7.90	7.20	5.30	4.40	6,70
	CPI	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*
		20.81	10.04	9.12	8.78	8.45	10.68	2.11
		2002	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*
		1.82	0.11	2.80	1.88	2.55	2.98	6.34	1.03
ITALY	**GDP per capita**	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*
		21104	21800	22580	23725	24196	25594	27127
		2002	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*
		26804	27138	27416	28144	30224	31898	33269	32413
	Real GDP growth	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*
		-0.89	2.15	2.83	1.10	1.87	1.40	1.46
		2002	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*
		0.45	-0.02	1.53	0.66	2.04	1.48	-1.32	-5.22
	Unemployment rate	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*
		9.80	10.60	11.20	11.20	11.20	11.30	10.90
		2002	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*
		8.60	8.50	8.00	7.70	6.80	6.10	6.80	7,80
	CPI	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*
		4.63	4.05	5.24	4.01	2.04	1.96	1.66
		2002	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*
		2.47	2.67	2.21	1.99	2.09	1.83	3.35	0.77

Source: OECD (2011a).

5.1 Pre-crisis data comparison

In the first place we will concentrate on the development of the total tax revenues in both countries.

Graph 7: Total tax revenues in the Czech Republic in USD (1993-2009)
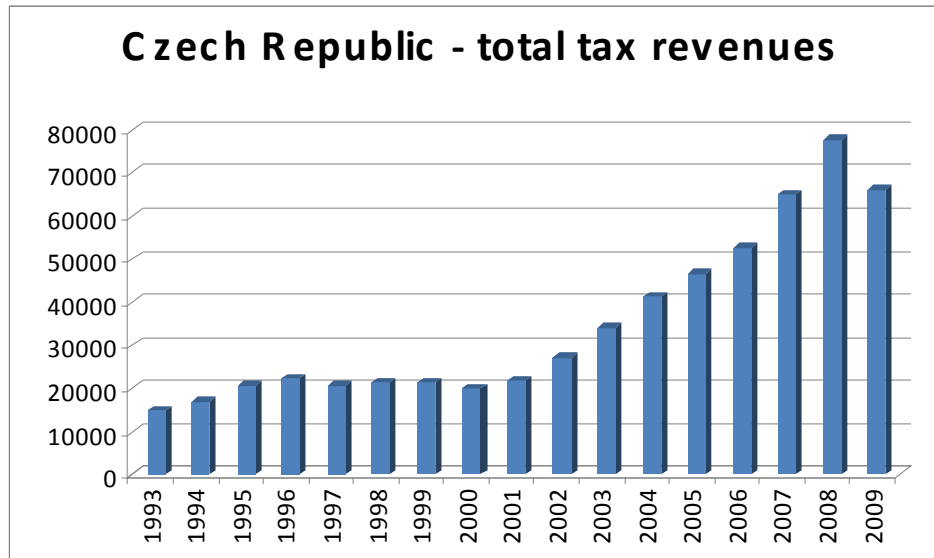
Source: OECD (2011a).

In the Czech Republic the total tax revenues followed increasing trend and from 1993 when they started at the lowest level of USD 15,000 they rose more then five times until 2008. The development also experienced two periods of stagnation, first in 1997 and then in 2000. Since then the sharp growth of average 18% each year can be observed, reaching the top in 2008, when total tax revenues generated USD 77,855.

The development in Italian tax revenues followed similar trend but the changes were not that significant. Italy again, with the lowest values of its tax revenues in 1993 at USD 410,655, experienced the increasing trend in the total tax revenues development. There were two periods of stagnation, first between 1997–1998 and second 2000. Since then the values rose continuously and reached the peak in 2008 and then dropped due to the recession, as illustrated on the following graph.

Italy - total tax revenues

Source: OECD (2011a).

The average growth was around 10%, i.e. significantly below the Czech one, and in 2008 Italy reached the top values and collected total amount of USD 991,927. Compared to the Czech Republic, Italian tax revenues were approximately 27 times higher in 1993, but only 12 times higher in 2008.

5.1.1 The distribution of fiscal burden

The most commonly used measure of the total fiscal burden is the total tax ratio or the tax-to-GPD ratio. The development of the fiscal burden on the Czech Republic and Italy is illustrated in the following graph. The Italian values fluctuate between 40-43.5%, while the values in the Czech Republic in spite of cyclical fluctuations experience the downward trend.

Although the development of the GDP was very similar in both countries, with a more detailed look into the picture we can see the evolution of the total tax ratio, i.e. the value of total tax revenues, as a percentage of GDP, is somehow opposite in both countries. The most significant is the difference in the period 1996-2001 when the Czech Republic significantly reduced the total tax-to-GPD values. In Italy, on the other hand, this was the period of nearly the highest values ever. The same effect, even more evident, occurred after 2007, as illustrated on the next graph.

Graph 9: Tax-to-GDP ratio (1993-2009)
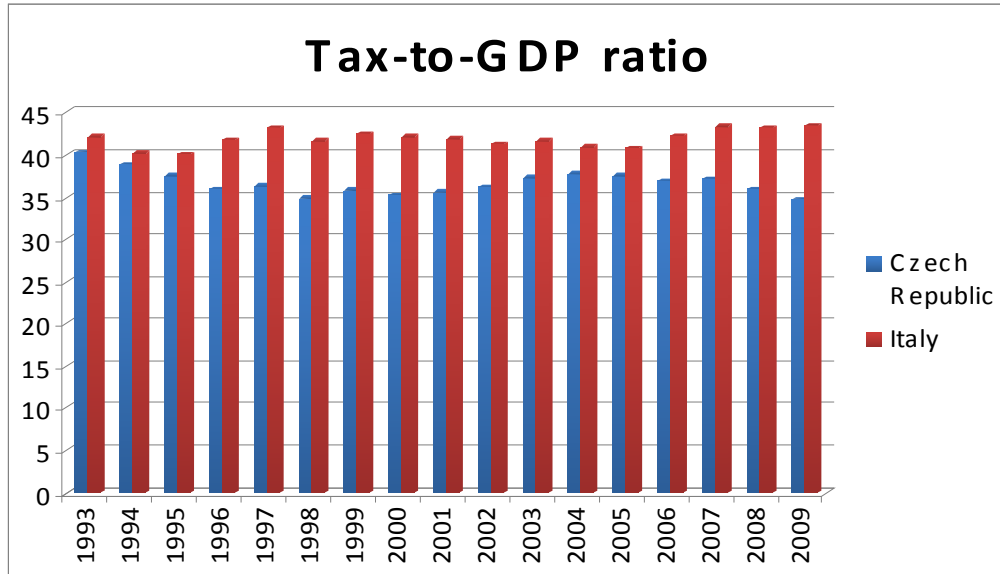
Source: OECD (2011a).

Comparing the fiscal burden of both countries we need to take into account its distribution, which means the importance of the different types of taxes in terms of total taxation. The OECD classification recognizes six categories of tax revenues: (1) taxes on income, profits and capital gains, (2) social security contributions, (3) taxes on payroll and workforce, (4) taxes on property, (5) taxes on goods and services and (6) other taxes. All the values are expressed in terms of tax revenues as the percentage of GDP, which is the measurement most commonly used.

In the Czech Republic the distribution had not changed much between 1993 and 2008 as illustrated below.

Graph 10: The distribution of the fiscal burden in the Czech Republic (1993 and 2008)
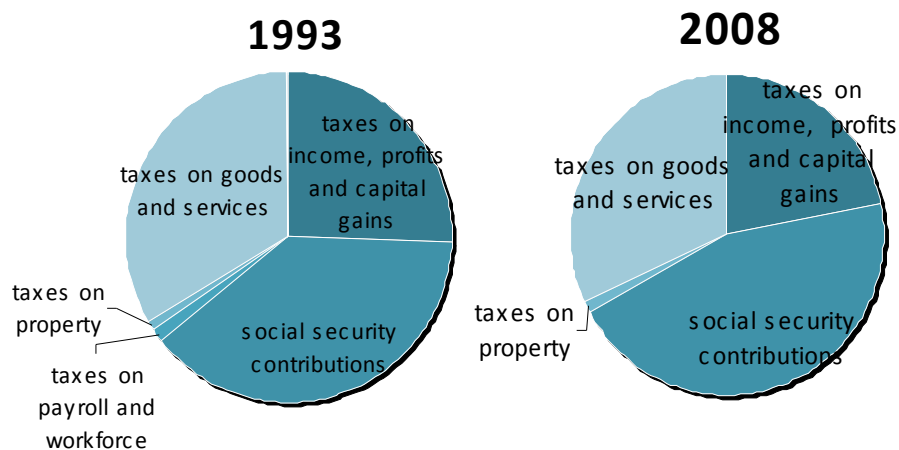
Source: OECD (2011a).

The most important component in the Czech Republic are the revenues from social security contributions, followed by the taxes on goods and services and then by taxes on income, profits and capital gains in the third place. In 1993 the revenues from social security contributions composed around 39%, taxes on goods and services approximately 33% and taxes on income, profits and capital gains composed 25% of the total tax revenues. In 2008 the weights changed a little bit, the share of social security contributions rose to nearly 45%, taxes on goods and services decreased to 32% and taxes on income, profits and capital gains represented only 22% of the total tax revenues.

In Italy the distribution of the fiscal burden is different as well as the changes between 1993 and 2008. The most important component are the taxes on income, profits and capital gains, followed by social security contributions and taxes on goods and services in the third place. In 1993 taxes on income, profits and capital gains represented 37%, social security contributions 31% and taxes on goods and services approximately 26% of the total tax revenues. In 2008 the taxes on income, profits and capital gains remained still the most important but their share decreased to 34%, social security contributions remained at 31% and taxes on goods and services declined slightly to 25%. Between the years 1993 and 2008 the significant share of other taxes occurred. The changes are illustrated in the following graph.

Graph 11: The distribution of the fiscal burden in Italy (1993 and 2008)
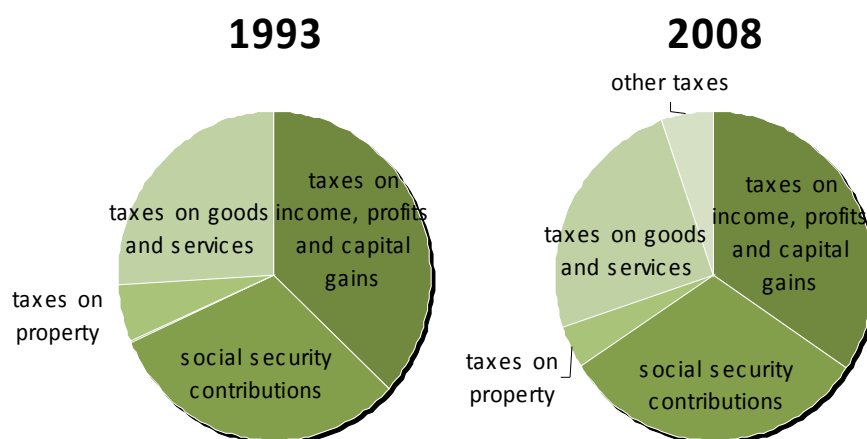
Source: OECD (2011a).

The OECD classification further divides these six main categories to many other types of taxes. Based on the previous analysis, and the tax theory as well, we will concentrate on several types of taxes which play the most important role in the specific tax systems and which contribute most significantly to the total tax revenues. Thus we will further work with 4 types of taxes or payments, which we were able extract from those most important taxes by their economic function based on the OECD classification.

5.1.2 Main types of taxes

For our purposes, further on we will work with four main types of taxes or payments – corporate income tax, personal income tax, social security contributions and value added taxes.

Picture 9: Four main types of taxes

corporate income tax	personal income tax	social security contributions	value added tax
• taxes on income, profits and capital gains	• taxes on income, profits and capital gains	• social security contributions	• taxes on goods and services
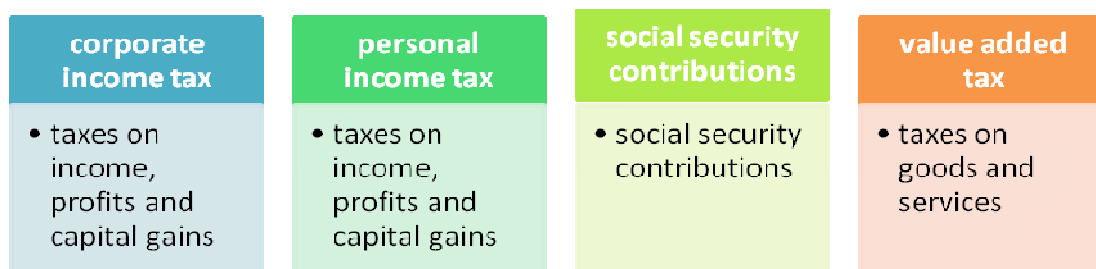
Source: author.

Both corporate income tax and personal income tax are in the general division part of taxes on income, profits and capital. Because both of them play important roles in the local tax systems and their treatments are typically very different, we will distinguish those two types of taxes in our analysis. In the group of indirect taxes, or taxes on goods and services, we include the consumption taxes such as VAT, energy taxes or excise duties (on tobacco and alcohol products). VAT component has the strongest share in these revenues, therefore we will focus our analysis only on this component. Social security contributions can be also divided to the contribution paid by employers and employees. Although rates for these categories typically differ significantly, for our purposes we will treat the component of the social security contributions revenues as a whole.

The corporate income tax revenues, as a percentage of the total taxation, and their development are illustrated in following graph.

Graph 12: Corporate income tax revenues as % of total taxation (1995-2009)
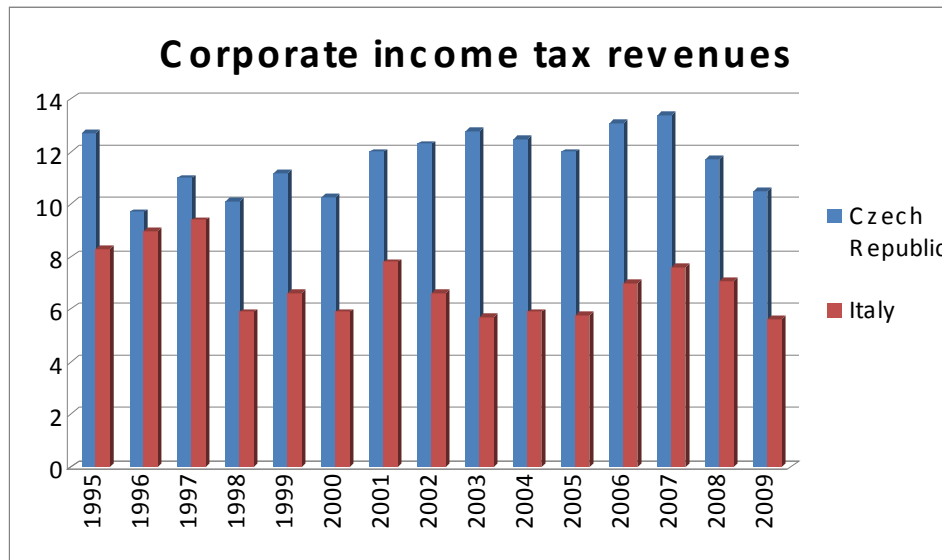
In the graph we can see that the Czech Republic relies on the revenues from corporate income taxes more heavily than Italy. The share of these revenues reached approximately 12.7% in 1995 and 2003, and the highest values of 13.4% in 2007. The lowest values around 10% are identified in the years in 1996, 1998, 2000 and 2009. All of these declines are identical with the periods when the Czech Republic decreased the statutory tax rates. This development suggests close relationship between the tax rates and tax revenues.

Italy reached the highest values at the beginning of the monitored period with the maximum share of 9.4% in 1997. In this period also the tax rates were the highest. Then Italy experienced fluctuations with the lowest values of 5.6% and the highest of 7.8%. In Italy the highest values were reached in 2001 despite the reduction of the CIT rate in this year. Therefore other factors, besides the tax rate, seem to be relevant based on the common sense.

The revenues from the personal income taxes, again as a percentage of total taxation, are illustrated in the following graph. The most important notion is that the share of PIT revenues on the total taxation is higher than of the corporate taxes, especially in case of Italy, and also that the PIT revenues had not experienced significant changes or drops.

Graph 13: Personal income tax revenues as % of total taxation (1995-2009)
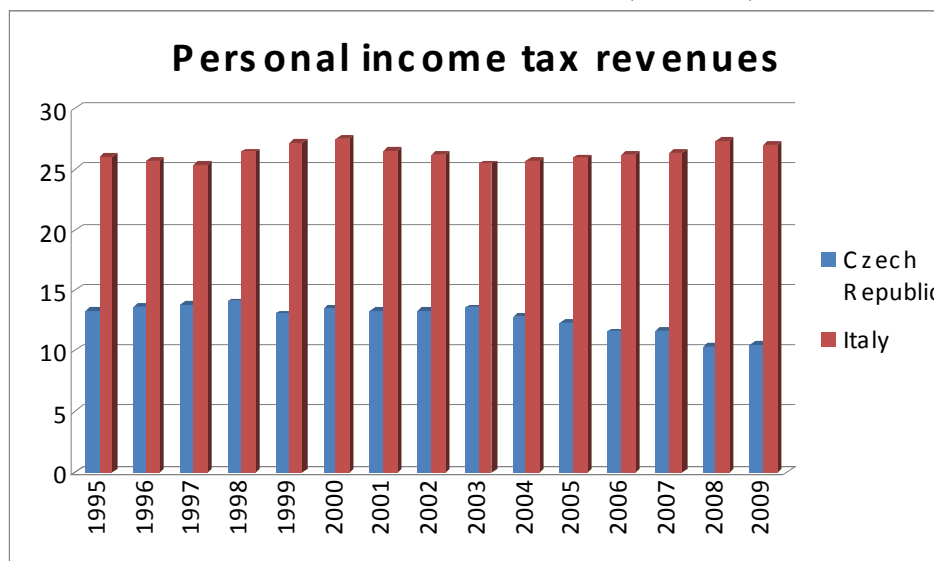
Personal income tax revenues

In the Czech Republic, the reliance on the personal income taxation is only slightly higher than on the corporate taxation. The highest share was reached in 1998 with the values slightly above 14%, the lowest values in 2008 with only 10.4% share on total taxation. Moreover, we can observe a slightly decreasing trend of the values, gradually coming closer to the corporate values. We cannot see any sharp breaks in revenues development with the changes in tax rates, not even in 2008 with the radical switch to flat tax regime.

Italy, on the other hand, relies on the personal income taxation much more significantly. Highest values were reached in 2000 at the level of 27.5% and the lowest levels in 1997 and 2003 did not drop below 25.4%. Again Italy introduced several changes in PIT rates but no significant changes in the revenues can be monitored in the context of tax rate changes. Common sense thus suggests that revenues from personal income taxes are not that dependent on the changes in tax rates, or at least that revenues of CIT are much more sensitive to the tax rate changes than the revenues from the PIT.

The third graph in this section provides the comparison of the revenues from social security contributions in the Czech Republic and Italy, again as the percentage of total taxation.

Graph 14: Revenues from social security contributions as % of total taxation (1995-2009)

Revenues from mandatory contributions

Legend: Czech Republic (blue), Italy (red)
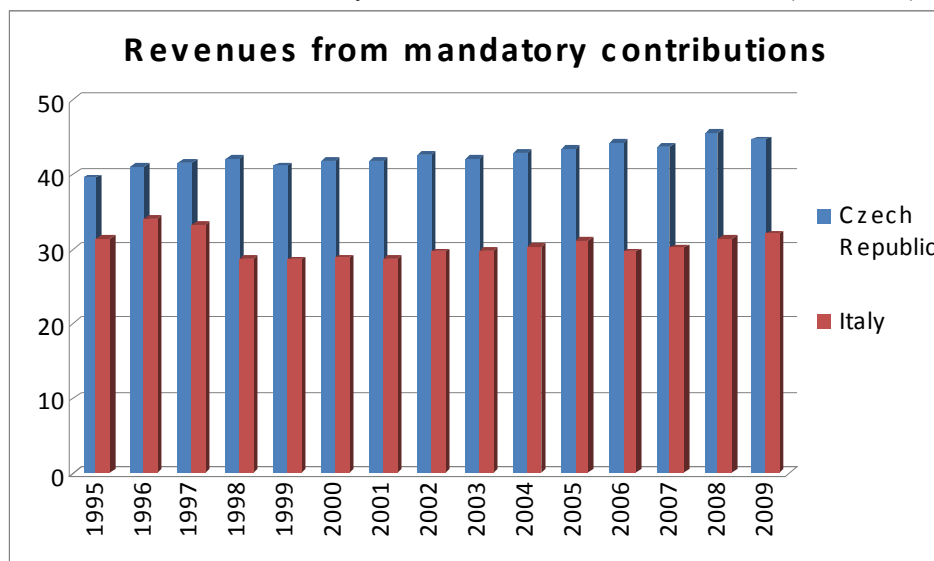
Source: European Commission (2011a).

Analysing these kinds of revenues, we can see that their share is significantly the strongest for both countries, for the Czech Republic even more than for Italy. In the Czech Republic we can observe the increasing trend with the lowest values of 39.6% in 1995 and the highest of 45.6% in 2008. In 2008 the PIT revenues were the lowest and SSC revenues the highest and the share of SSC on total taxation was more than four times higher than this of PIT.

The revenues from social security contributions in Italy are approximately around 30% of the total taxation. The highest values were reached in 1995 with 34%. In 1998 the significant drop to 28.7% came and since then continued to rise slowly. Another fall came in 2006 and then rise came again, which continued until 2009 when the revenues reached the level of 32.1% of the total taxation.

Because the tax burden on labour in general is composed of both personal income taxes and social security contributions, therefore it is interesting to analyse these two components together, as provided in the following graphs.

Comparing the two graphs the differences between these two countries are not that significant, and we can see that both countries´ taxation of labour is very similar and very high. Revenues from personal income taxes and mandatory contribution provide in both countries more than 50% of the total taxation and in some periods the taxation is even higher in the Czech Republic than in Italy.

Graph 15: Czech Republic - taxation of labour (1995-2009)
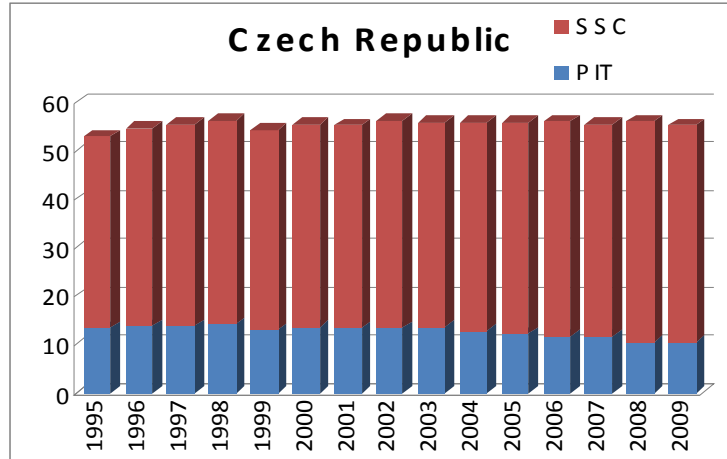
Source: European Commission (2011a).

The lowest taxation of labour was in the Czech Republic in 1995 with the values of 52.9%, but since then it has been relatively stable and very occasionally decreases below 55%. The highest values were reached in 1996, 2002 and 2008 with the values of 56.2%, 56.1% and 56%, respectively. The comparison across the countries indicates that three times during the monitored period the taxation of labour was higher in the Czech Republic, particularly in 1998 and 2002-2003.

Graph 16: Italy - taxation of labour (1995-2009)
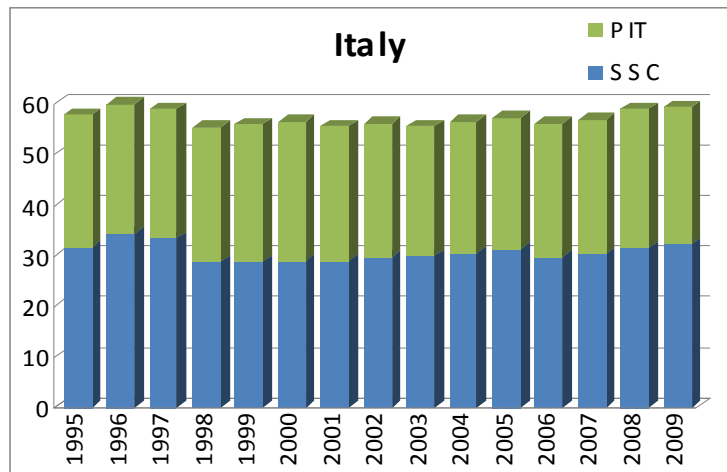
Source: European Commission (2011a).

In Italy the revenues from labour taxation sre slightly more volatile and fluctuate between 55.2% and 59.8% with the lowest share in 1998 and the highest in 1998, respectively. Since 1998, when a significant drop appeared, the rates has been slightly increasing which fully corresponds with the development in the PIT revenues.

Last graph is dedicated to the development of the value added tax revenues, as the strongest component of the indirect taxation.

Graph 17: Value added tax revenues as % of total taxation (1995-2009)
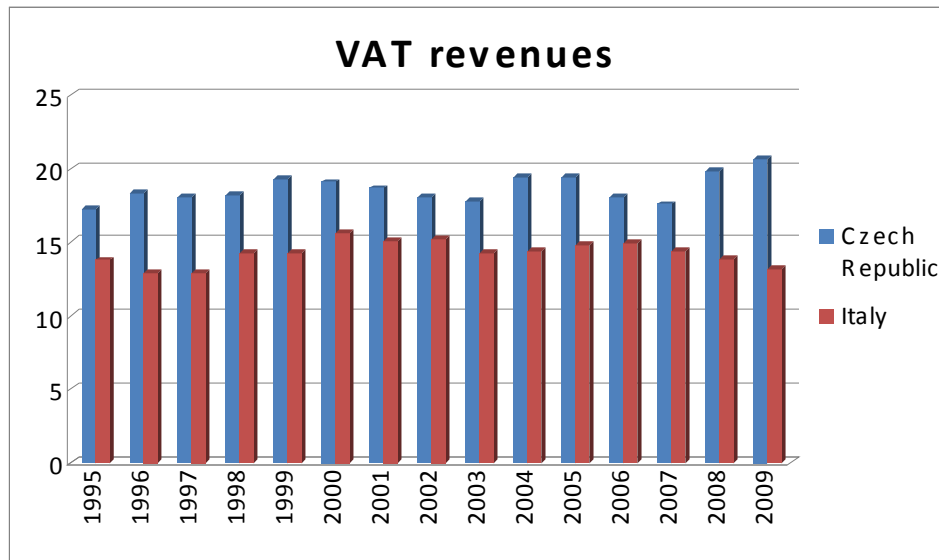
The revenues from the VAT are again stronger in the Czech Republic than in Italy. Their share in the Czech Republic ranges from 17.3% in 1995 to 19.9% in 2008. The changes might seem again linked to the changes in VAT rates, but the direction is rather confusing. We can observe steady decrease in revenues from 1999 to 2003 when the rates remained unchanged, then in 1998 the standard VAT rate was reduced but the share of the revenues increased significantly. In 2008 again revenues rose, this time the reduced VAT rate was enhanced. The revenues reached the top in 2009 when they even exceeded the 20% threshold.

In Italy the revenues are lower and range from 12.9% in 1996-1997 to 15.6% in 2000. During the monitored period Italy experienced only one change in tax rates, in 1997 the standard VAT rate was increased but it brought no significant changes in the revenue level. Therefore in case of VAT in Italy we might expect other economic indicators to play important role in determining the tax revenues.

5.1.3 The development of the tax rates

To make our overview complete we need to consider the development of the tax rates for the four main types of taxes. Firstly we provide the development of the corporate income tax rates in both the Czech Republic and Italy.

Graph 18: Corporate income tax rates (1995-2009)
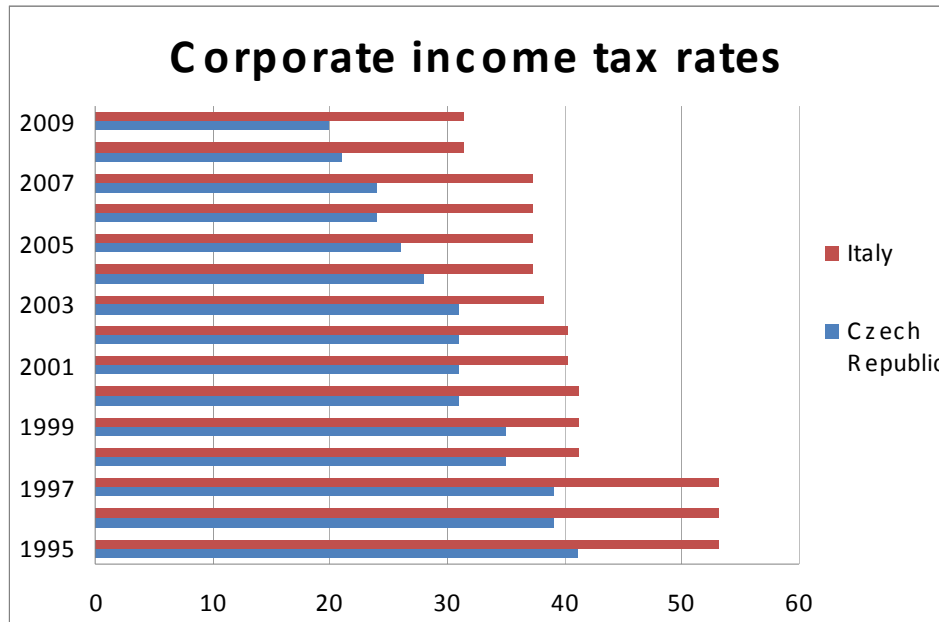
Source: OECD (2011b).

Both countries experienced during the monitored period very significant fall in statutory CIT rates. In case of the Czech Republic the rates reached 41% in 1995 and decreased gradually over the years, reaching 20% in 2009 and further on to current 19%. Major changes can be observed 1998 and 2000 and then since 2004 there has been some reduction nearly each year.

Italy started the period with much higher rates reaching 53.2% in 1995. In 1998 very significant drop to 41.3% came and then again we can observe gradual decrease in CIT rates. It seemed to stop in 2004 when the rate levelled off at 37.3% but then again in 2008 the rate was reduced, this time to 31.4% and it remained constant ever since.

As we mentioned earlier not only tax rates but also the tax bases might have significant impact on the tax revenues collected and therefore we want to present another graph of corporate income taxes, this time the implicit tax rates. Implicit tax rates represent aggregate tax revenues as a percentage of the potential tax base and *measure the effective average tax burden on different types of economic income*

or activities (European Commission, 2011a). Therefore in our further analysis the implicit rates will play an important role as an indicator of the corresponding tax base. This indicator helps us to take into account additional elements of the tax base, thus to evaluate the effective tax burden incurred. The development of the implicit corporate income tax rates, expressed in percentage, is illustrated in the graph below.

Graph 19: Implicit tax rates on corporate income (1995-2009)
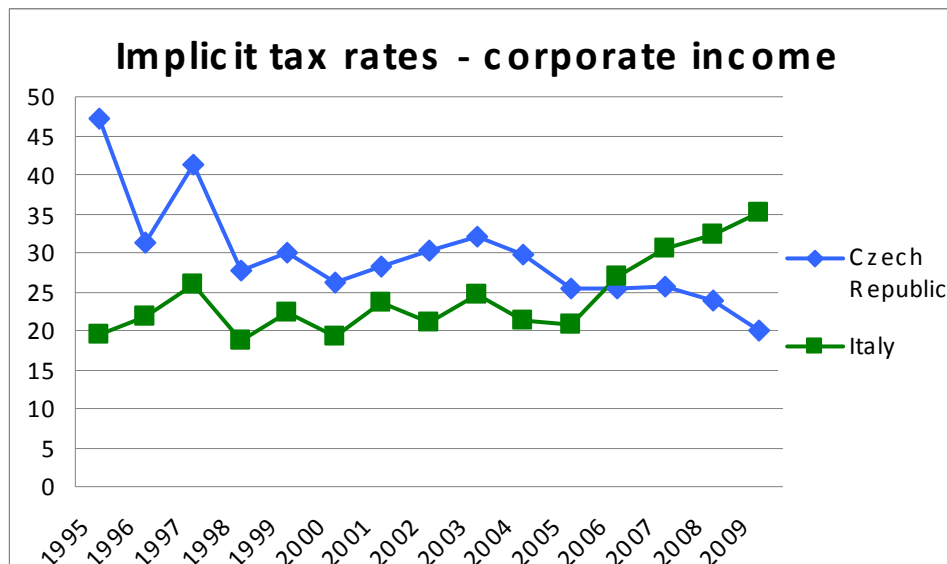
Source: European Commission (2011a).

From the graph above we can see that considering the implicit tax rates, or effective average tax rates, changes the whole perspective. Suddenly there no longer exist gradual decreases in both countries. We can observe the decreasing trend in the Czech Republic, with high initial values. In the period 1998-2003 the rates continuously rose and then from 2005 they decreased again, at first to 25.5% but then again to 23.8% and even to 19.9% in 2008 and 2009, respectively.

In Italy the situation was even more different from the development of the statutory tax rates. In the period 1995–2005 the rates fluctuated between 18.8% (in 1998) and 25.9% (in 1997). But in the last four years of the monitored period the rates started to shift upwards and continuous increase did not finish until 2009 reaching 35.2%. Comparing these two graphs on corporate taxation we can see the important differences and therefore we might expect these rates to play an important role in our further regression analysis.

The complete overview of the personal income tax rates across the income brackets in both the Czech Republic and Italy is illustrated in the following graph.

Graph 20: PIT rates across the income brackets (1993-2011)
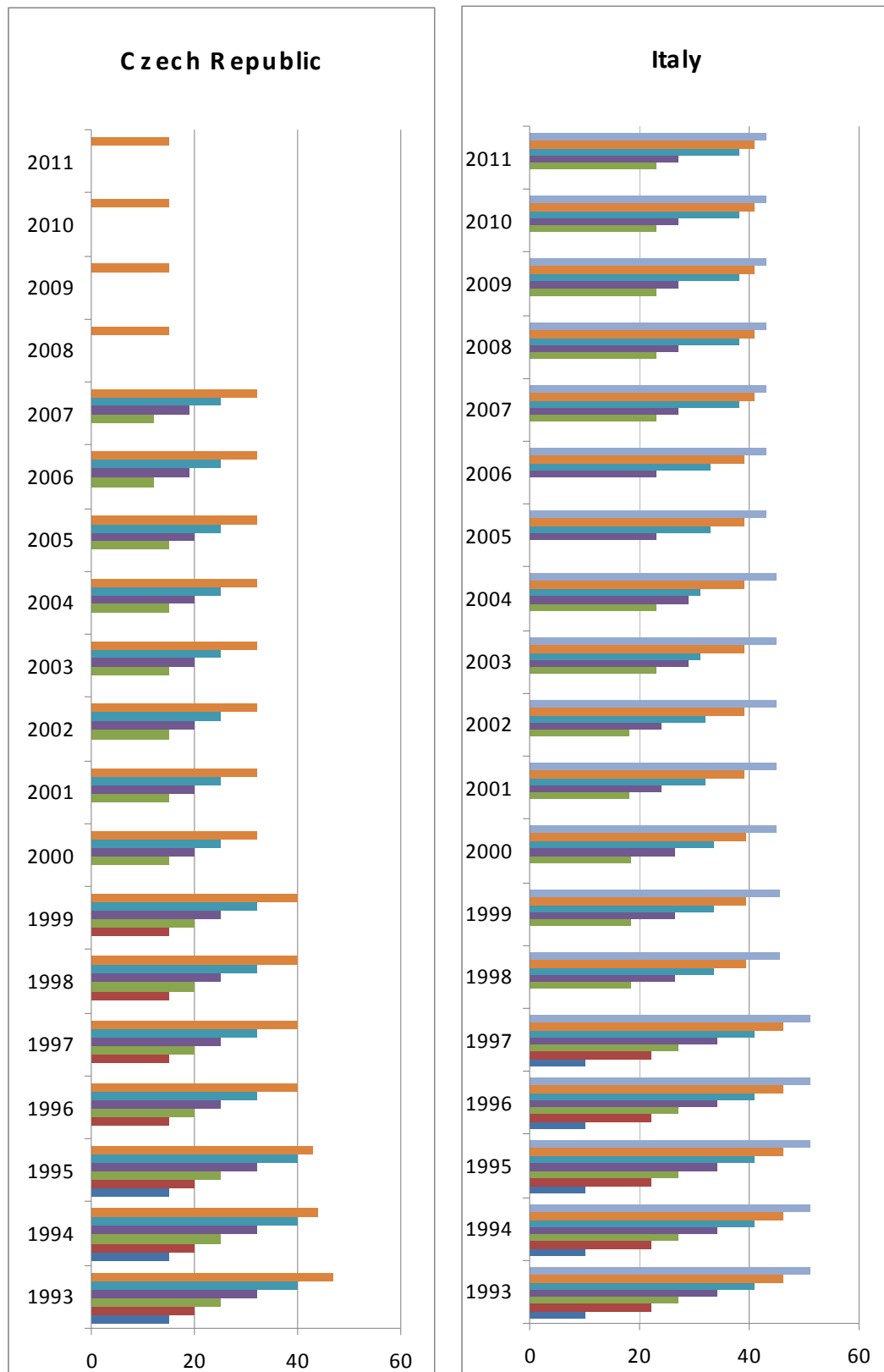
Source: OECD (2011b).

The Czech Republic in 1993 imposed PIT across five income brackets with the lowest rate of 15% and the highest of 47%. Immediately in the following year the tax rate on the highest incomes was reduced to 44%. The reduction continued even in the following years, since 1996 only five brackets were applied with the highest rate of 40%, in 2000 the number of bracket were further reduced to 4 with the highest rate of 32%. In 2006, the lowest and second-lowest rates were slightly decreased and finally in 2008 the flat rate of 15% was introduced.

Italy started in 1993 with seven income brackets with the lowest rate of 10% and the highest of 51%. In 1998 the number of brackets was reduced to five, with the simultaneous reduction in the highest rate to 45.5%. The lowest rate, on the other hand, was set to 18.5%. Further on in 2003 the middle income bracket was reduced to 31% but the two lowest brackets increased to 23% and 29%. The short period between 2005-2006 when only four income brackets were introduced finished in 2007 when again five brackets came into action with the lowest rate of 23% and the highest at 43%, which have not changed ever since.

Because it is pretty complicated to properly orientate in all these rates, we provide another comparison, this time of average personal income tax rates which are applied on average wage, in Italy with both national and regional rates included. These rates are provided by the OECD Tax Database but however only for the period 2000-2010, and therefore it does not fully correspond with the period monitored for other variables.

Graph 21: Average personal income tax rates (2000-2010)

Source: OECD (2011b).

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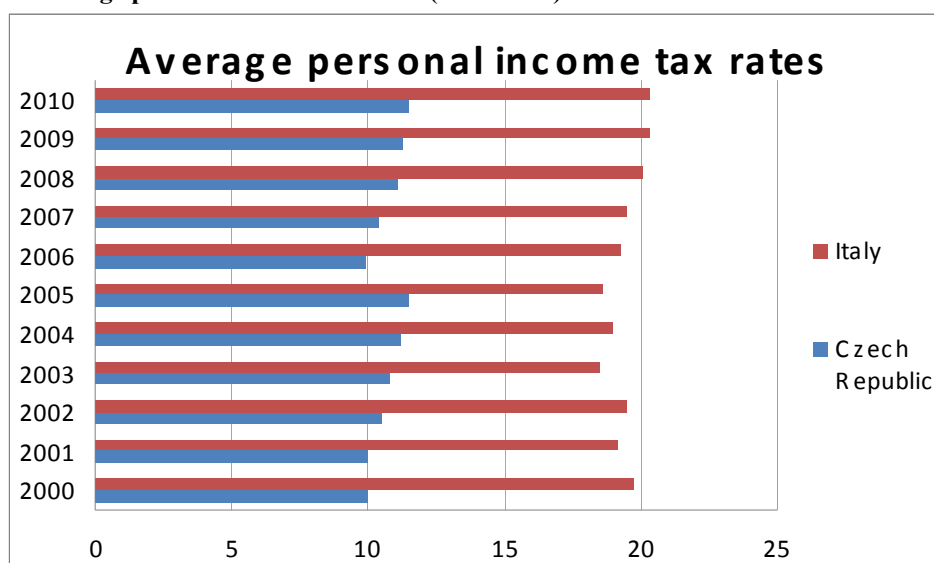
The development in this case is for both states relatively constant. The Czech Republic obviously does not impose such high taxes on personal income, in fact the average rate begins at 10% and reaches the maximum level of 11.5% both in 2005 and 2010.

In Italy the average PIT rates are significantly higher, on average between 19-20%. The lowest average rate was in Italy in 2003 and the highest in the last two years, in 2009 and 2010 when they reached 20.3%.

Considering the taxation of labour we again need to consider social security contributions as well. The development of the SSC rates imposed on employers and employees are provided in the following graph, we illustrate both rates expressed in percentage. For Italy we consider the maximum possible rates imposed.

Graph 22: Social security contribution rates (1995-2009)
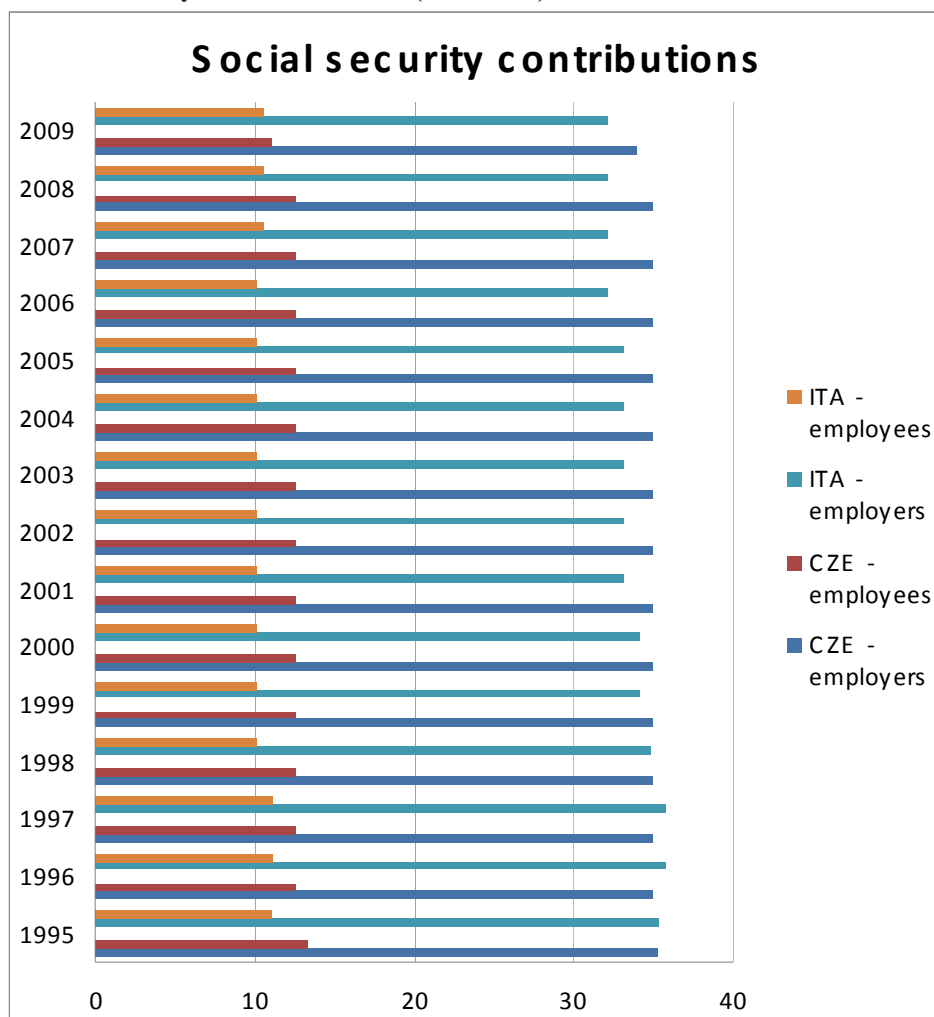
Source: OECD (2011b).

From the graph we can see that the rates levied in the Czech Republic are slightly higher for both employers and employees. Although there was a short period of 1995-1997 when Italian employers' rates exceeded the Czech ones, later on Italy reduced the rates and recently has been keeping the difference of approximately 2%. The same difference is among the employees' rates for all the monitored period. Only in 2009 the Czech Republic reduced the employees' contributions to 11% only, and therefore recently the rates approached a little bit more. Moreover, considering moreover the total burden levied on both employers and employees, the cumulative values are in the Czech Republic again higher than in Italy.

As mentioned above, the tax burden on labour consists of both taxes on personal income and social security contributions. Therefore, we provide the implicit tax rates on labour so that we can again compare the tax burden with respect to the indicator of the corresponding tax base.

Graph 23: Implicit tax rates on labour in the Czech Republic and Italy (1995-2009)
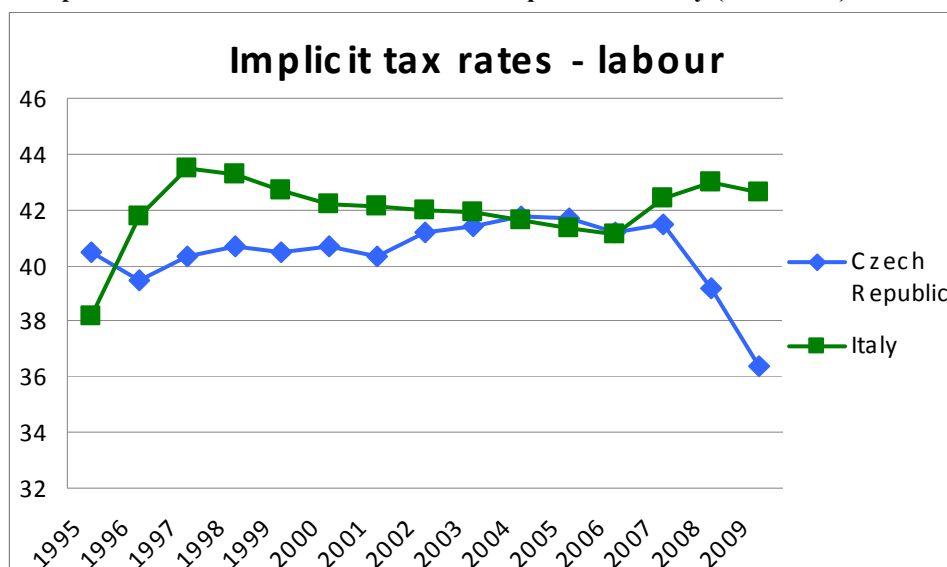
Source: European Commission (2011a).

The implicit tax rates provide an interesting comparison of development in both countries. In the Czech Republic the implicit tax rates report increasing trend, starting in 1996 at the level of 39.5% and reaching the peak in 2004 of 41.8%. The rates remained high until 2007 and then a significant fall to 39.2% came and further to 36.4% in 2008 and 2009, respectively. The fall corresponds with the introduction of the flat PIT rate and the concept of super-gross wage.

On the other hand, Italy experienced sharp increase over the period 1995-1997, reaching the top rates at the level of 43.5%. Then the declining trend can be observed until 2006 when the implicit rate was only 41.1% and in the last three years of that period the implicit rates in Italy were even lower than in the Czech Republic. But in 2007 this trend changed and Italian rates began to rise again reaching 43% in 2008 and then slightly declined to 42.6% in 2009.

The last graph in this section is dedicated to the development in the VAT rates in both countries. As we already know from the previous analysis, the Czech Republic imposes standard and reduced VAT rates while Italy distinguishes three different rates – standard, reduced and super-reduced.

Graph 24: VAT rates in the Czech Republic and Italy (1995-2009)
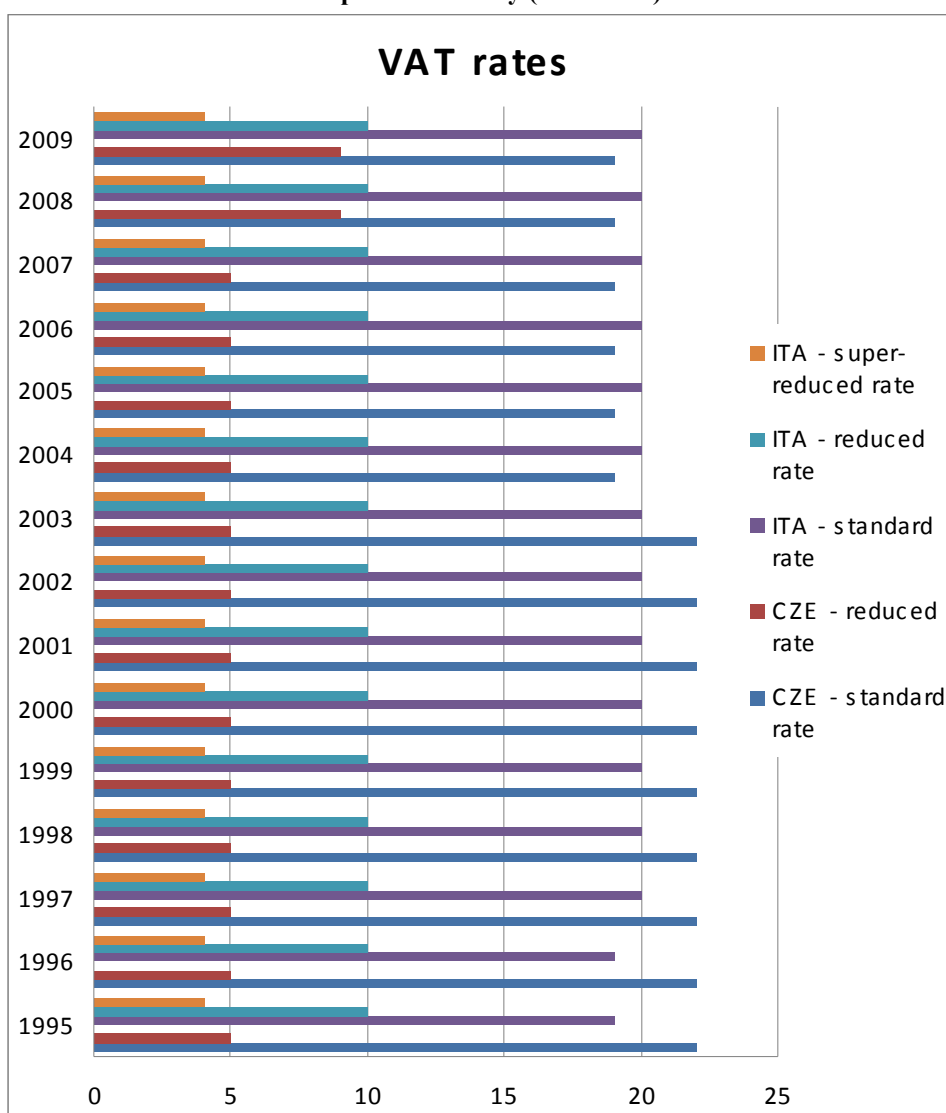
Source: European Commission (2011b).

In the Czech Republic we can see stable values for the reduced rate until 2007, but then they started to grow and the growth is planned for the next years as well as we mentioned earlier. On the other hand, the standard rate was originally set at 22% and then in 2004 with our EU accession the rate was reduced to 19% only.

Italian VAT rates remained more or less unchanged over the whole period. There was 1% increase in standard rate in 1997 but since then Italy has maintained the same values. In comparison with the Czech Republic the Italian standard rate became higher from 2004. This should continue for the next period as well because in 2011 Italy already introduced higher standard VAT rate and further increase is expected. While in the Czech Republic the standard rate levelled-off at 20% but further decrease in standard rate is expected, or more precisely unification of both standard and reduced rate.

Interesting comparison is provided again by the implicit tax rates on consumption as shown in the following graph.

Graph 25: Implicit tax rates on consumption in the Czech Republic and Italy (1995-2009)
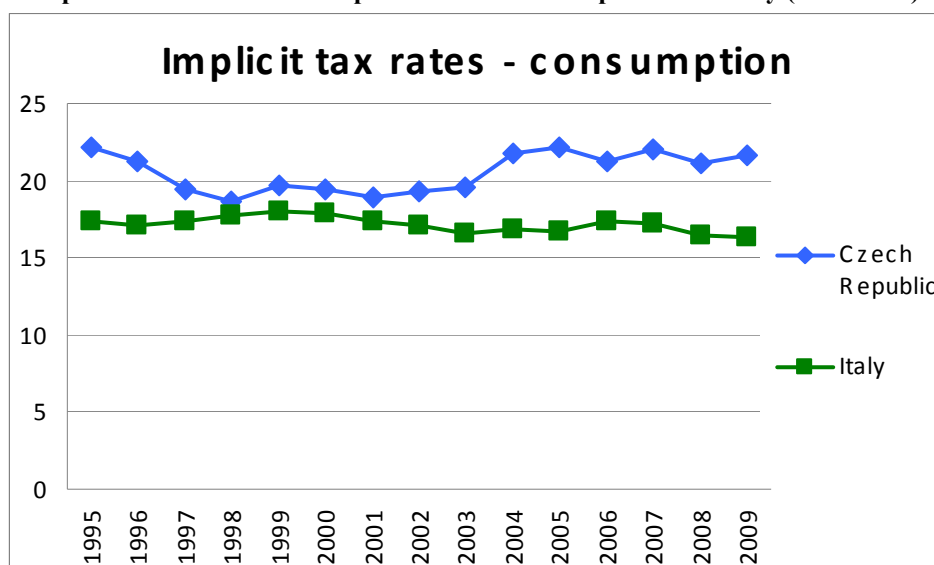
Source: European Commission (2011a).

From the implicit tax rates we can observe that the tax burden on consumption is higher in the Czech Republic than in Italy. The Czech implicit rates experienced downward trend until 1998, starting at 22.1% in 1995 and with the lowest level of 18.6% reached in 1998. Then they remained low until 2003. And again a significant change came after the EU accession in 2004 when the implicit rates rose to approximately 22%. And these values have been achieved ever since.

Italian implicit rates remain constant over the whole period, which is consistent with nearly no changes in statutory tax rates as well. The level of implicit tax rates of consumption ranges in Italy from 18% to 16.5%. The lowest level was observed in 2009 at the level of 16.3%.

5.2 Current Trends

As documented by Eurostat, the European Commission, its Directorate-General for Taxation and Customs Union (European Commission, 2011a) the economic recession have brought certain new trends and emphasized some recent trends in taxation. The cut in CIT rates continued though was slowed down by the recession. After the beginning of the slowdown in 2008, the crisis continued to reduce tax revenues in 2009. Moreover, direct taxes as highly cyclical taxes, i.e. sensitive to the economic cycle, declared significant fall in revenues, more significant than in the case of indirect taxes. Considering the economic function of the taxes, revenues from taxes on profits suffered substantial fall while revenues from taxes on consumption experienced modest reduction only. This reduction was also promoted by the shift in consumption towards primary goods, which are usually subject to reduced VAT rates.

Countries in general have introduced two main approaches to deal fiscally with the crisis – revenue raising or tax cutting. Most governments introduced special spending programmes and therefore the effect of the crisis was more felt at the expenditure side than on the revenue side. The effort to raise revenues was in many countries supported by increase in consumption taxes, VAT rates or excise duties. Some countries also introduced increased top PIT rates. In general the overall level of taxation is expected to increase in connection to crisis and this trend is expected to last even in the medium term.

However, the changes in the tax structures are hard to predict. *Systems based on the indirect taxes are friendlier towards capital accumulation and foreign competitiveness, while on the other hand provides only limited possibilities for redistribution policies* (European Commission, 2011a). NMS were, compared to the original EU-15 members, characterized by lower share of direct taxes and lower rates of CIT and PIT right at the time of their accession, with higher stress on social contributions. Whether the tax systems in general will tend more to be based on direct or indirect taxes remains the question of the recovery, its speed and political pressures.

The development of the total tax revenues in USD for both the Czech Republic and Italy in the early years of the crisis is illustrated in the following table.

Table 14: Total tax revenues in USD (2007-2009)

	2007	*2008*	*2009*
Czech Republic	USD 64 910	USD 77 856	USD 66 250
Italy	USD 918 513	USD 991 927	USD 919 596

Source: OECD (2011a).

In 2009 both countries experienced a significant decrease in tax revenues compared to the previous year. The Czech values reached only 85% of the 2008 revenues. In Italy the decline was not that significant, but still it suffered 8% fall compared to 2008. As we already mentioned, in 2008 both countries collected the maximum amounts on taxes, and due to the current financial crisis the tax revenues experienced a fall. Compared to 2007, the year before the crisis started, the 2009 data does not seem that severe. In 2009 despite the decline both countries achieved better tax collection than in 2007.

5.2.1 The distribution of fiscal burden

The reaction on the crisis in terms of the total tax ratio was very different in the Czech Republic and in Italy. Both countries experienced the decrease in GDP the values in 2009 reached approximately 98% compared to the year 2008 in both countries. The 2010 decrease was more profound in Italy, where GDP reached 95% of the GDP of 2008, while in the Czech Republic the level was slightly higher of 97,4% for the same period.

The tax-to-GDP ratio on the other hand reacted diversely. In the Czech Republic the trend of decreasing fiscal burden continued even at the beginning of the crisis. Moreover, in 2009 the total tax ratio reached 34.78%, the lowest value ever. In Italy, where in the years before the crisis the ratio began to rise again, this increase had continued. In 2009 the tax-to-GDP ratio reached the peak at the level of 43.52%.

Table 15: Tax-to-GDP ratio (2007-2009)

	2007	*2008*	*2009*
Czech Republic	37.25%	36.04%	34.78%
Italy	43.39%	43.27%	43.52%

Source: OECD (2011a).

The total tax burden in the Czech Republic continued to decrease and in Italy rose in the first year of the crisis. The distribution of the burden experienced following changes.

Graph 26: The distribution of the fiscal burden in the Czech Republic in 2009
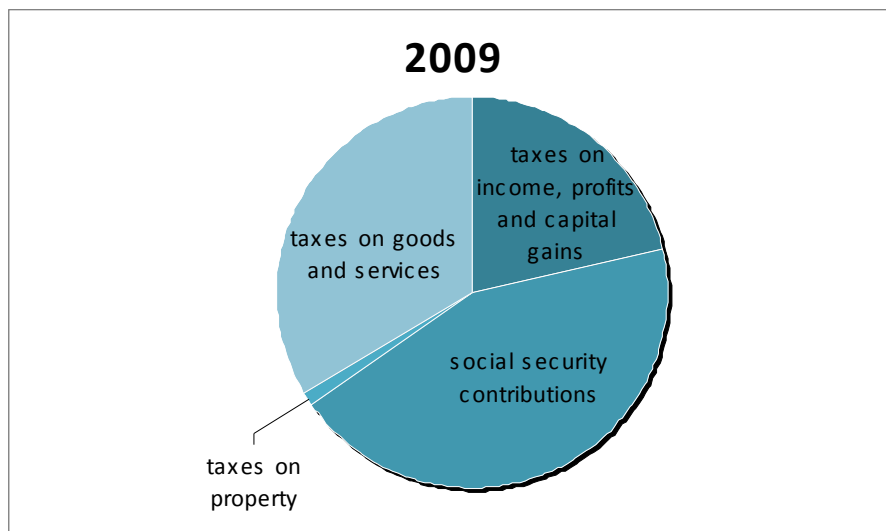
Source: OECD (2011a).

In the Czech Republic the most important component of the total tax revenues remained the social security contributions. Compared to the year 2008, the share decreased significantly and composed only 35% of the total tax revenues, in comparison with 44% in 2008 it was a significant fall. More than due to crisis this change is due to the system change in personal income tax and social security contributions together with the concept of super-gross wage concept and reduction of SSC rates which came into existence right in 2009. The share of taxes on goods and services increased to the 33% (compared to 32% in 2008), what is interesting in this context is the raising share even though the tax rates remained the same, which only confirms our expectations of rising importance of the indirect taxes in times of the recession. On the third place the taxes on income, profits and capital gains remained, which continued to decrease and participated with 21% on the total tax revenues.

In Italy the most important component still remains the taxes on income profits, and capital gains, although their share decreased again and was less than 33%. The share of social security contributions, on the other hand, rose nearly to 32%, thus it is very close to the revenues from the income taxes. The third position is steadily taken by the taxes on goods and services, their share slightly decreased and reached 24% of the total tax revenues.

In Italy the situation as of 2009 is documented in the following graph.

Graph 27: The distribution of the fiscal burden in Italy in 2009
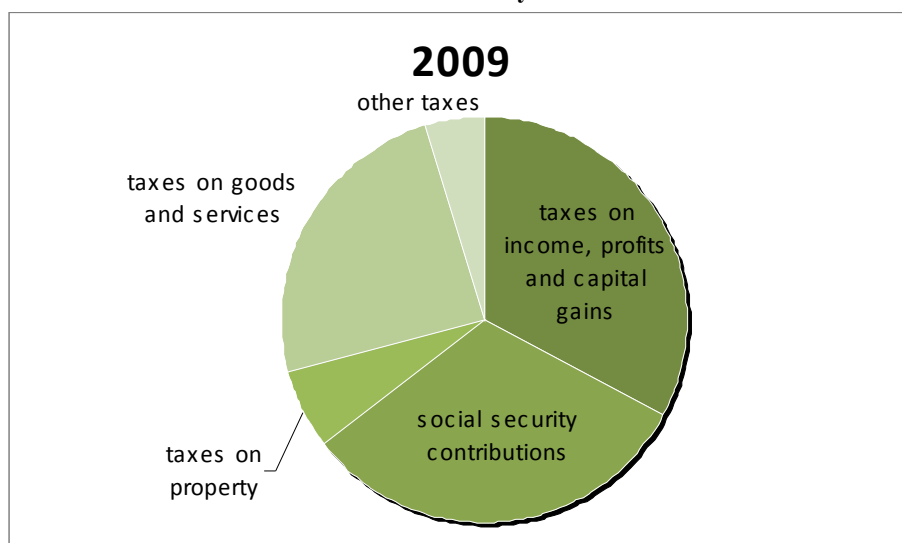
2009

Source: OECD (2011a).

For comparison of the total fiscal burden we also include the absolute values of the revenues collected in different categories over the period 2007-2009. We expected the revenues from direct taxes decrease more significantly than from indirect taxes. Therefore, revenues from indirect taxes, i.e. taxes on goods and services, might play a more important role in filling the states' budget and their revenues should be proportionally higher than in the years before the crisis.

Table 16: Revenues from different taxes in the Czech Republic and Italy (2007-2009)

CZECH REPUBLIC			
	2007	*2008*	*2009*
Taxes on income, profits and capital gains	USD 16 297	USD 17 018	USD 14 027
Social security contributions	USD 28 159	USD 34 747	USD 29 065
Taxes on property	USD 764	USD 891	USD 741
Taxes on goods and services	USD 19 372	USD 24 829	USD 22 114
ITALY			
	2007	*2008*	*2009*
Taxes on income, profits and capital gains	USD 310 062	USD 340 776	USD 299 556
Social security contributions	USD 274 845	USD 309 109	USD 292 174
Taxes on property	USD 44 690	USD 42 712	USD 57 186
Taxes on goods and services	USD 231 878	USD 243 306	USD 224 217

Source: OECD (2011a).

With a deeper look on the changes in the tax revenues in 2009 and compared with the previous year we have to state that all tax revenues, except for the property taxes in Italy, decreased, though different types of revenues decreased diversely.

In case of the Czech Republic the strongest decrease was in taxes on incomes, profits and capital gains. The 2009 values reached only 82.4% of the amount of the previous year. On the other hand, the less pronounced decrease was in case of taxes on goods and services, where the 2009 value reached 89.1% of the 2008 value.

In Italy the decline was not that distinctive, and in case of property taxes the revenues even rose in 2009. But if we compare the revenues from income taxes and taxes on goods and services they both decreased. The revenues from taxes on income, and profits and capital gains reached in 2009 only 87.9% of the level of the previous year. In case of taxes on goods and services the revenues reached higher level again in 2009, this time of 92.2% of the 2008 level. So it really seems that the taxes on income are more vulnerable and sensitive to the productivity of the economy and the economic cycle. On the other hand, the indirect taxes, or taxes on consumption, are not affected that much because the consumption is in general less elastic.

5.2.2 Main types of taxes

In the further analysis we will again focus on the four main types of taxes or payments – corporate income tax, personal income tax, social security contributions and value added tax.

The changes in the revenues from the corporate income taxes are illustrated in the table. The values are indicated as a percentage of total taxation.

Table 17: Revenues from corporate income taxes in the Czech Republic and Italy (2007-2009)

	2007	2008	2009
Czech Republic	13.4%	11.7%	10.5%
Italy	7.6%	7.1%	5.6%

Source: European Commission (2011a).

Both countries followed the same trend of decreasing revenues from CIT starting already in 2008. The Czech Republic experienced the more significant decrease between 2007 and 2008 while the difference in the following year was not that great. But we definitely have to add that Czech Republic decreased the tax rates both in 2008 and 2009 and therefore it is hard to judge, at least now, whether the economic development or the changes in the tax rates have the strongest influence.

On the other hand, Italian revenues decreased in 2008 only slightly and more distinctive drop came in 2009. As for the tax rate changes, Italy reduced the tax rate significantly in 2008 but for 2009 the rate remained the same. Therefore, now the impact of the economic development on the CIT revenues would seem more obvious.

The changes in personal income tax revenues are provided in the following table. Through the initial years of the crisis they reacted very differently.

Table 18: Revenues from personal income taxes in the Czech Republic and Italy (2007-2009)

	2007	*2008*	*2009*
Czech Republic	11.7%	10.4%	10.5%
Italy	26.4%	27.4%	27.1%

Source: European Commission (2011a).

In the Czech Republic the share of the personal income tax revenues on the total taxation again decreased in the period 2007-2009. The major drop was recorded in 2008. But it might be as well associated with the change in taxation structure of personal income taxes. For the 2009 the revenues increased of 1% in comparison to the previous year, but still compared to 2007 the share of the PIT revenues declined.

In Italy, on the other hand, the tax rates remained the same over this period. The revenues in 2008 were higher compared to the previous year and in the following year declined slightly. If we try to compare the decrease in corporate taxation and personal taxation, we can say that with no changes in tax rates for 2009 the decrease in revenues from CIT was more significant than the decrease in PIT.

In the following table there are changes in the revenues from social security contributions, again expressed as the percentage of the total taxation.

Table 19: Revenues from social security contributions in the Czech Republic and Italy (2007-2009)

	2007	*2008*	*2009*
Czech Republic	43.7%	45.6%	44.7%
Italy	30.2%	31.4%	32.1%

Source: European Commission (2011a).

In each country the revenues from mandatory contributions experienced different development. In the Czech Republic they rose until 2008 and then in 2009 decreased slightly. But still the 2009 level was higher than the 2007 one. Therefore, common sense suggests that the economic performance had the major effect on the final revenues, because in 2007 with higher contribution rates the revenues did not reached such a high level.

In Italy the revenues from mandatory contributions continued to rise over the whole monitored period. And this development occurred despite the economic crisis and the rates that remained unchanged. Therefore, we can conclude that the revenues from mandatory contributions only strengthen their dominant position in the total taxation.

In the last table we provide the development of the revenues from the value added taxes, as a percentage of the total taxation.

Table 20: Revenues from value added taxes in the Czech Republic and Italy (2007-2009)

	2007	2008	2009
Czech Republic	17.6%	19.9%	20.7%
Italy	14.4%	13.9%	13.2%

Source: European Commission (2011a).

The revenues from VAT had in both countries right the opposite development. In the Czech Republic they rose continuously, both in 2008 and 2009. More distinctive increase is recorded in 2008 but it might be as well related to the increase in the reduced VAT rate. In 2009 despite the economic crisis and the same tax rates the share of the VAT revenues continued to rise, thus the revenues increased their share on the total taxation in comparison with other taxes.

In Italy the share of the revenues from VAT continuously decreased in both 2008 and 2009. Tax rates remained unchanged over the monitored period, therefore the changes in the tax revenues are hard to assess. The decrease in 2008 should be attributed to a changing structure of the total tax revenues only while the decrease in 2009 should be attributed also to the worst economic performance of the country.

5.2.3 The development of the tax rates

Considering the changes in the tax revenues it is important to assess the changes in the tax rates as well. We provide the review of complete changes in the tax rates for the four main types of taxes in this section.

The changes in the statutory corporate income tax rates are provided below.

Table 21: Corporate income tax rates in the Czech Republic and Italy (2007-2011)

	2007	2008	2009	2010	2011
Czech Republic	24%	21%	20%	19%	19%
Italy	37.3%	31.4%	31.4%	31.4%	31.4%

Source: OECD (2011b).

In the previous chapters we identified the overall trend of decreasing corporate taxation. Both the Czech Republic and Italy followed this trend in past. From the recent development of the corporate tax rates we can see that the Czech Republic kept this trend even in 2009 and 2010 when the tax rates were systematically reduced. On the other hand, Italy reduced the tax rate significantly in 2008 for the last time and the rate has not changed ever since.

The development of the personal income tax rates is provided next. For both countries the tax rates over all income brackets are provided, where necessary.

Table 22: Personal income tax rates in the Czech Republic and Italy (2007-2011)

CZECH REPUBLIC				
2007	*2008*	*2009*	*2010*	*2011*
12%				
19%	15%	15%	15%	15%
25%				
32%				
ITALY				
2007	*2008*	*2009*	*2010*	*2011*
23%	23%	23%	23%	23%
27%	27%	27%	27%	27%
38%	38%	38%	38%	38%
41%	41%	41%	41%	41%
43%	43%	43%	43%	43%

Source: OECD (2011b).

We can see that over the period 2007-2011 there has been only one significant change in tax rates in the Czech Republic, which effective as of 2008 introduced the flat personal income tax rate of 15%. Italy, on the other hand, did not change the rates of personal taxation at all.

The development of the rates for mandatory contributions is summarized in the following. In case of Italy we provide both the lowest and the highest possible rates for employee contributions.

Table 23: Social security contributions rates in the Czech Republic and Italy (2007-2009)

Czech Republic	*2007*	*2008*	*2009*
employer	35%	35%	34%
employee	12.5%	12.5%	11%
Italy	*2007*	*2008*	*2009*
employer	32.08%	32.08%	32.08%
employee	9.49% 10.49%	9.49% 10.49%	9.49% 10.49%

Source: OECD (2011b).

In the Czech Republic the rates for mandatory contributions were reduced for both employees and employers in 2009. This should affect the overall tax burden on labour in that sense that the tax rates on personal income was reduced in 2008 for the first time and then in 2009 the further reduction in mandatory contributions came. This could be seen well on the development of the implicit tax rates which will be provided at the end of this section. In Italy the rates of mandatory contributions remained unchanged, as well as the rates of personal income taxes therefore the tax burden of labour should remain constant recently.

In the last table we provide the development of the VAT rates in both the Czech Republic and Italy.

Table 24: Value added tax rates in the Czech Republic and Italy (2007-2011)

Czech Republic	2007	2008	2009	2010	2011
Standard rate	19%	19%	19%	20%	20%
Reduced rate	5%	9%	9%	10%	10%
Italy	2007	2008	2009	2010	2011
Standard rate	20%	20%	20%	20%	21%
Reduced rate	10%	10%	10%	10%	10%
Super-reduced rate	4%	4%	4%	4%	4%

Source: European Commission (2011b).

Recently both countries have increased the value added tax rates to some extent. The increase in the Czech Republic has begun already in 2008 when the reduced rate was increased and then in 2010 both the standard and the reduced rate were increased. In the future perspective, as already mentioned above, Czech government further plan to increase the reduced rate and then finally unify the reduced and the standard rates on the same level. In Italy the rising of the VAT rates begun in 2011 when the standard rate was increased, but further increase is planned for 2012 as well.

Whether or not the increase in statutory tax rates brings the desired increase in the revenues or if the revenues should be affected by other economic or cyclical factors are the questions which we aim to address in the last chapter. Before doing so we provide the development of the implicit tax rates on corporate taxation, labour and consumption, which contains jointly the information about the tax rates and the tax bases and will be relevant for our further analysis.

The implicit tax rates for the Czech Republic are provided in the first graph.

Graph 28: Implicit tax rates in the Czech Republic (2007-2009)
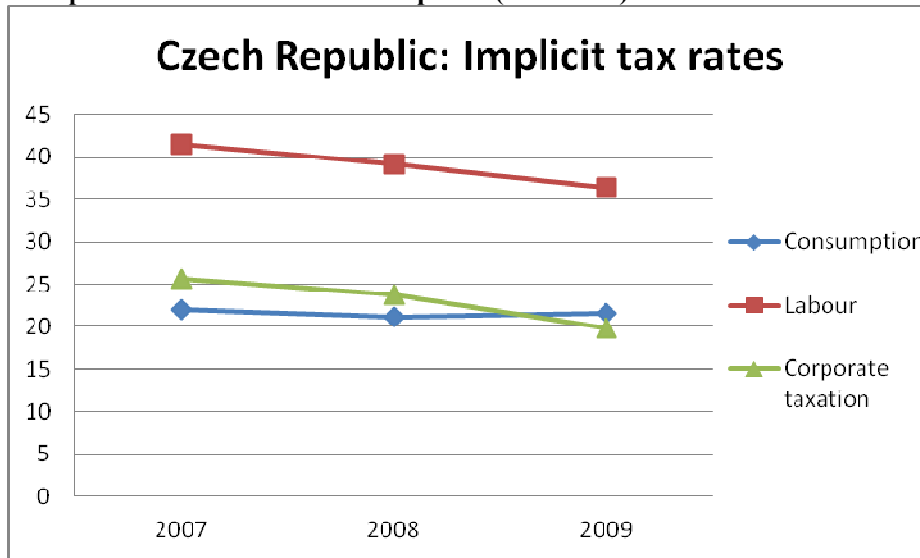
Source: European Commission (2011a).

We can see that in the Czech Republic the implicit tax rates on labour are clearly the highest and dominate over the corporate taxation and consumption. Over the monitored period both implicit tax rates on income, i.e. on corporate income and on income from labour experienced the declining trend. This development corresponds with the changes in the tax rates and also with the changes in the corresponding tax bases. The implicit tax rate on consumption decreased in 2008 but then in 2009 rose, thus surpassed the implicit rate on corporate taxation and became the second highest one.

In Italy the implicit tax rates on labour are clearly the highest again. And it remained quite constant all over the monitored period, as we expected. The implicit rates on corporate taxation are on the second position and have been rising over time, still getting closer to the rates on labour. The implicit rates on consumption are in Italy the lowest and remain again constant over the whole monitored period.

The development is illustrated in the final graph.

Graph 29: Implicit tax rates in Italy (2007-2009)
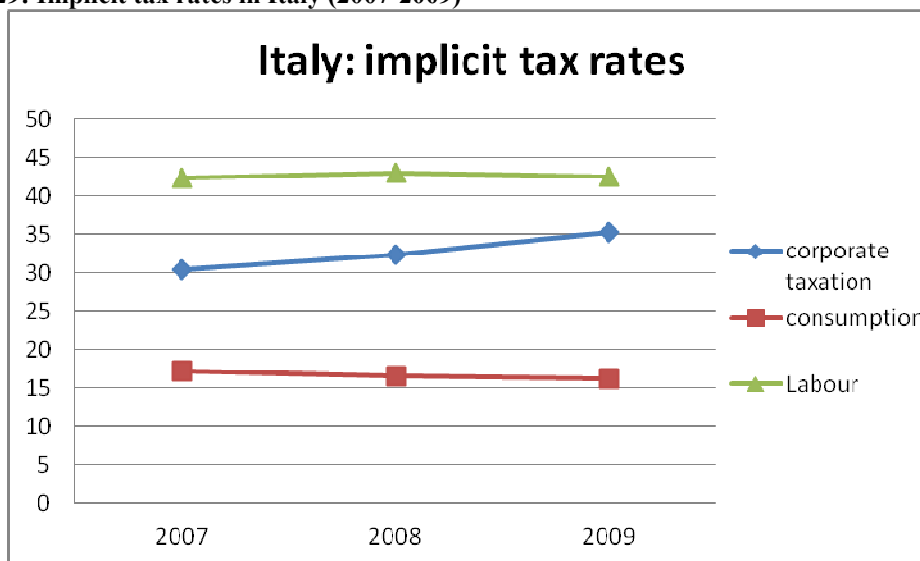
Source: European Commission (2011a).

6. Regression models

There exist already several works that deal with the tax revenues and the variables that influenced them the most. Most of these works deal specifically with corporate taxation and often concentrate on particular effects only, such as foreign investments or transfer pricing and their influence on tax revenues. Other works address the tax rates and their setting. Two papers examined the general relationship between the tax rates and tax revenues. Devereux (2006), who concentrates on the determinants of the corporate income tax revenues, explores the contradicting tendency of rising revenues despite falling statutory tax rates. Based on the data collected from 19 OECD countries, he derives the resulting effects of tax revenues as broadening of corporate income base, growing size and profitability of the corporate sector. The second important paper dealing with tax revenues is Clausing (2007) who provides complex survey of OECD countries and develops a framework that explains corporate tax revenues as a function of economic and policy variables. Her model is based on country's individual circumstances, such as the size or openness of the economy, and then tax related variables, such as tax rate, tax rate^2, type of tax system (credit or exemption) etc. Her major finding was the parabolic relationship between tax rates and tax revenues, i.e. at low tax rates, increases in the tax rate are likely to increase revenues. At higher tax rates, the elasticity of taxable income with respect to the tax rate may exceed one, causing revenues to fall as tax rates increase.

Our goal is not to provide such a deep analysis, but rather concentrate on the question whether setting of the tax rates and specific characteristics of the tax system are relevant for the amount of revenues collected. Or if other economic indicators linked directly to business cycle and the state and performance of the economy are more important. In our work we focused on both tax-related and tax-non-related indicators that in our perspective might affect the amount of tax revenues. We do not restrict on the corporate taxation, but in our models we include four main types of taxes that we identified in the above analysis as those with the major shares on total tax revenues.

Data used for modelling are based on three sources: 1) European Commission's publication Taxation trends in the European Union – for the revenues from particular types of taxes and implicit tax rates, 2) OECD Tax Database – for the statutory tax rates, and 3) OECD Statistics – for other economic variables.

We present four different models for different sets of tax revenues – those from corporate income tax, personal income tax, social security contributions and value added tax. Each model is tested for both the Czech Republic and Italy. Together we have a complete dataset for period 1995-2009, therefore 15 observations for all the variables. For the required calculations we used the statistical software Gretl.

In all the equations we set the corresponding tax revenues as a percentage of total taxation as the dependent variable. Prior to testing we prepared a table with possible determinants of the simulated tax revenues. They are either connected with the tax system setting – the statutory tax rates or implicit rates with respect to the tax base; or linked to the profitability and performance of the country and the economic cycle. List of determinants with the expected effects on the revenues and explanation of the reasons why to include them in the model are provided in the table.

Table 25: Possible determinants of the simulated tax revenues

Statutory tax rate	Positive effect	Higher tax rate should increase revenues.
(Statutory tax rate)^2	Negative effect	Non-linear relationship between tax rate and tax revenues – to assess harmful effects of excessive level of taxation.
Implicit tax rate	Positive effect	Effective tax burden with respect to corresponding tax base.
(Implicit tax rate)^2	Negative effect	Non-linear relationship between tax rate and tax revenues – to assess harmful effects of excessive level of taxation.
GDP per capita	Positive effect	Indicator of the profitability and the performance of the economy.
GDP growth	Positive effect	Indicator of the profitability and the performance of the economy – cyclical factor to assess the impact of the economic cycle.
Unemployment rate	Negative effect	The higher the unemployment is the worse the performance of the economy is – cyclical factor to assess the impact of the economic cycle.
Consumer price index	Negative effect	The higher inflation or CPI is, lower the revenues are – again cyclical factor.

Source: Clausing (2007), Kubátová, Říhová (2009).

Sometimes, when there are more tax rates imposed, such as standard and reduced rate in case of VAT or different employers' and employees' rate of social security contributions, we included more than one statutory tax rates. On the other hand, when the income brackets are applied, with the PIT or the SSC employees' rates in Italy in particular, we used only the rates for top-income brackets.

6.1 Corporate income tax revenues

At first we modelled the revenues from the corporate income tax. In the regression model the response variable are the revenues and the explanatory variables are indicated in the equation, with u_i being the disturbance term and $i = 1\ldots15$.

$$
\begin{aligned}
CITrevenues_i = {} & \alpha + \beta_1(TaxRate_i) + \beta_2(TaxRate_i)^2 \\
& + \beta_3(imlicitTaxRate_i) + \beta_4(implicitTaxRate_i)^2 \\
& + \beta_5(GDPpercapita_i) + \beta_6(GDPgrowth_i) \\
& + \beta_7(Unemployment_i) + \beta_8(CPI_i) + u_i
\end{aligned}
\tag{1}
$$

Firstly we applied Eq. (1) on the Czech data. Unfortunately we did not get the significant coefficients and therefore we need to eliminate the least significant variables. We were able to obtain a satisfying model with 5 significant coefficients and the intercept, all of them significant at 10% level of significance at least (complete results are provided in Appendix).

To be able to use the OLS estimation method we need to test our data for the necessary assumptions[10]. At first we checked the correlation coefficients to identify possible collinearity of explanatory variables. Collinearity occurs when correlation coefficient of two explanatory variables exceeds 0.8 and in our case we found out that we have to eliminate $(TaxRate)^2$ variable which was correlated

---

10 In general there are four main assumptions or conditions, which need to be satisfied if we want to use OLS method for estimating the coefficients:
  1) Explanatory variable is not a random variable hence it is not correlated with the disturbances = collinearity.
  2) Disturbances have zero mean, which is necessary to ensure that on average we are always on the true line.
  3) Disturbances have constant variance, which ensures that every observation is equally reliable = homoscedasticity.
  4) Disturbances are not correlated, which means there is no pattern in disturbances.
The first condition, i.e. collinearity, can be rejected by the values of correlation coefficients in correlation matrix. The second condition can be verified by testing the data for normal distribution of residuals.
For the third and fourth conditions we shall run special tests to verify them, i.e. the White test for homoscedasticity and Durbin-Watson test for autocorrelation in disturbances.

with both the TaxRate and (implicitTaxRate)[2]. After getting rid of collinearity we were able to obtain the final model with 3 significant variables and the intercept, all coefficients significant at 5% level.

$$CITrevenues_i = \alpha + \beta_1(TaxRate_i) + \beta_2(implicitTaxRate_i)^2$$
$$+ \beta_3(GDPgrowth_i) + u_i \tag{2}$$

We get satisfying values for the coefficient of determination, i.e. R^2 and therefore we can say that the data in this model are explained from 68.6%. We performed the test for normal distribution of disturbances, the White test with the null hypothesis of homoscedastic disturbances and the Durbin-Watson test with null hypothesis of no autocorrelation in disturbances. All the tests came out well and in any case we could not reject the null hypotheses at the 10% levels of significance. We also tested our data for the collinearity again, this time by the variance inflation factor (VIF). We did not get any values higher than 10 and therefore we can reject the hypothesis of possible collinearity definitively. Thus we verified the necessary assumptions and can perform the OLS method. Complete results for the model are provided in the table.

Table 26: Czech Republic – model of the corporate income tax revenues

Model CIT_CZE: OLS, observations 1995-2009 (T = 15) Dependent variable: CIT_revenues_CZE					
	Coefficient	Std. Error	t-statistics	p-value	
const	14,2122	1,10591	12,8511	<0,00001	***
CIT_rate_CZE	-0,159488	0,0487438	-3,2720	0,00744	***
Implicit_rate2_CZE	0,00190819	0,000692842	2,7542	0,01875	**
GDP_growth_CZE	0,193946	0,0656925	2,9523	0,01315	**
Additional tests results					
	Null hypothesis	t-statistics	p-value	Reject	Our model
R^2		0,685610			OK
Adjusted R^2		0,599867			OK
Normality test	Normal distribution	1,56444	0,457389	no	OK
White test	No heteroscedasticity	11,5036	0,24276	no	OK
Durbin-Watson test	No autocorrelation	1,69696	0,110568	no	OK
VIF	Collinearity	<10		yes	OK

Source: author.

We applied the same original model, i.e. Eq. (1), on the Italian data as well. Again we did not get the significant coefficients for all the variables and therefore we eliminated the variables until all the coefficients came out significant. We were able to obtain a model with 5 significant coefficients and the intercept, all of them again significant at 10% level of significance, some of them even at 5% level (for complete results see Appendix).

At first we tested our data for possible collinearity. Based on the correlation matrix we need to eliminate $(implicitTaxRate)^2$ which was correlated with implicitTaxRate variable. Then we obtained the final model for the CIT revenues in Italy with 3 explanatory variables and the intercept. Two explanatory variables and the intercept are significant at 1% level, but the unemployment coefficient is only significant at 34% level.

$$CITrevenues_i = \alpha + \beta_1(TaxRate_i) + \beta_2(GDPpercapita_i)$$
$$+ \beta_3(Unemployment_i) + u_i \qquad (3)$$

But we decided to use this model because we obtained high value of the coefficient of determination, the model explains Italian data from 86.9%. Moreover, this value would decrease if we rejected other variables. We also tested necessary assumptions for OLS estimation method and all the tests came out well, we have data with normally distributed and homoscedastic disturbances with no autocorrelation present. When checking for collinearity again with the VIF we observed small possible correlation of GDP per capita variable, which may lead to extreme reaction of corresponding coefficient to small changes in data. Because the parameter is the least important, we decided to keep that in mind but still maintain the variable in the model. The complete results are again provided in the table.

Table 27: Italy – model of the corporate income tax revenues

Model CIT_ITA: OLS, observations 1995-2009 (T = 15) Dependent variable: CIT_revenues_ITA					
	Coefficient	Std. Error	t-statistics	p-value	
const	-22,7803	6,65903	-3,4210	0,00571	***
CIT_rate_ITA	0,339454	0,0451849	7,5126	0,00001	***
GDP_percapita_ITA	0,00051728	0,000138921	3,7236	0,00336	***
unemployment_ITA	0,21305	0,210125	1,0139	0,33240	
Additional tests results					
	Null hypothesis	t-statistics	p-value	Reject	Our model
R^2		0,868533			OK
Adjusted R^2		0,832678			OK
Normality test	Normal distribution	1,33751	0,512345	no	OK
White test	No heteroscedasticity	11,2647	0,258002	no	OK
Durbin-Watson test	No autocorrelation	2,93329	0,880041	no	OK
VIF	Collinearity	>10	GDP_percapita	yes	Not OK

Source: author.

Based on the results we can finally present the model for the corporate income tax revenues for both the Czech Republic and Italy.

$$CITrevenues\_CZE = 14.21 - 0.16(TaxRate) + 0.0019(implicitTaxRate)^2 + 0.19(GDPgrowth)$$
(3)

$$CITrevenues\_ITA = -22.78 + 0.34(TaxRate) + 0.00052(GDPpercapita) + 0.21(Unemployment)$$
(4)

In the Czech Republic, as illustrated by the Eq. (3), the strongest component of the corporate income tax revenues is the GDP growth. We need to take into account the positive influence, which only confirms the importance of the economic growth to the profitability of corporate sector. Therefore, the revenues are higher with the better performance of the whole country. The other important variable is the corporate income tax rate and the fact, worth mentioning, is that it affects the revenues negatively. Therefore the Czech government should not increase the statutory rate but rather decrease it to raise more money from corporate taxation, and better concentrate on the economic growth.

On the other hand, in Italy, according to Eq. (4), the most important component is the corporate income tax rate. Its influence is positive and therefore increasing the tax rate should bring more money into the state's budget. But two other factors in our model are the cyclical components, with unemployment being nearly as important as the tax rate. Unfortunately the estimate of its influence is also positive and this would suggest that the government should obtain higher revenues from corporate taxes with higher unemployment rate, which we find at least questionable.

6.2 Personal income tax revenues

The possible determinants of the personal income tax revenues are very similar to those of corporate income tax revenues. Only this time we have at disposal the implicit tax rate on labour, which is common for both personal income taxes and social security contributions. Otherwise the original equation is nearly the same.

$$
\begin{aligned}
PITrevenues_i = {} & \alpha + \beta_1\left(TaxRate_i\right) + \beta_2\left(TaxRate_i\right)^2 \\
& + \beta_3\left(imlicitTaxRate_i\right) + \beta_4\left(implicitTaxRate_i\right)^2 \\
& + \beta_5\left(GDPpercapita_i\right) + \beta_6\left(GDPgrowth_i\right) \\
& + \beta_7\left(Unemployment_i\right) + \beta_8\left(CPI_i\right) + u_i
\end{aligned}
\tag{5}
$$

At first again we applied Eq. (5) on Czech dataset. From the original equation we obtained only three significant coefficients and therefore again we need to eliminate the coefficients until we get only the significant ones. We were able to get a model with 5 explanatory variables and the intercept, all variables significant at least at the 10% level (for the complete results see the Appendix).

We checked for the possible collinearity and needed to eliminate two variables – $(TaxRate)^2$ and GDP_percapita, because of their correlation with both PIT revenues and the TaxRate. The final model for the Czech Republic contains again three variables and the intercept, with all the coefficients significant at least at the 21% level.

$$
\begin{aligned}
PITrevenues_i = {} & \alpha + \beta_1\left(TaxRate_i\right) + \beta_2\left(GDPgrowth_i\right) \\
& + \beta_3\left(Unemployment_i\right) + u_i
\end{aligned}
\tag{6}
$$

We obtained the satisfying level of R^2 of 78.6%, which means that the model explains our data quite well. Other tests result came out well again, we cannot reject the hypotheses of normality and homoscedasticity at the 10% levels and the null hypothesis of Durbin-Watson test at the 5% level. Also the collinearity no longer occurs in our data. Therefore, we can use the OLS estimation method again. In the following table there are the necessary results for the final model.

Table 28: Czech Republic – model of the personal income tax revenues

Model PIT_CZE: OLS, observations 1995-2009 (T = 15) Dependent variable: PIT_revenues_CZE					
	Coefficient	Std. Error	t-statistics	p-value	
const	7,84971	0,961622	8,1630	<0,00001	***
PIT_rate_CZE	0,131178	0,0208774	6,2833	0,00006	***
GDP_growth_CZE	-0,0892926	0,0559606	-1,5956	0,13888	
unemployement_CZE	0,13169	0,0969473	1,3584	0,20155	
Additional tests results					
	Null hypothesis	t-statistics	p-value	Reject	Our model
R^2		0,785681			OK
Adjusted R^2		0,727230			OK
Normality test	Normal distribution	0,525921	0,768772	no	OK
White test	No heteroscedasticity	9,3366	0,406801	no	OK
Durbin-Watson test	No autocorrelation	1,66211	0,0620377	no	OK
VIF	Collinearity	<10		yes	OK

Source: author.

We applied the same model of personal income tax revenues, i.e. Eq. (5), on the Italian dataset. From the general model we obtained only three significant coefficients and therefore we continued to eliminate the variables until we obtained the significant coefficients only. With the standard level of significance (commonly used 5% or 10%) we would be only able to obtain four significant coefficients in this case. We obtained the model with 5 dependent variables and the intercept, with levels of significance of coefficients at least of 20% (complete results can be find in Appendix).

Checking for collinearity we needed to eliminate GDP_percapita variable, because of correlation with TaxRate and Unemployment. An important problem in this model is the significance of the coefficients and the coefficient of determination of the whole model. Best results were obtained in case of 3 variables and the intercept again, but still the coefficients were not satisfying.

The level of significance for the variable of GDP growth was only 72%, which means that only in 28% of cases this variable is significant. The model came out as follows.

$$PITrevenues_i = \alpha + \beta_1(TaxRate_i) + \beta_2(GDPgrowth_i)$$
$$+ \beta_3(Unemployment_i) + u_i \qquad (7)$$

The coefficient of determination is very low, only of 41.6% which we did not consider sufficient enough. As for the tests results for OLS assumptions we cannot reject the hypotheses of normality and homoscedasticity and we no longer have to deal with collinearity of explanatory variables. Unfortunately, we had to reject the null hypothesis of Durbin-Watson test, even at 1% level of significance, and therefore there is now autocorrelation in disturbances. But still we decided to use the OLS estimates because the autocorrelation in disturbances should not affect the values of estimates themselves. It affects the standard errors, which might be under-estimated, and t-statistics, which might be over-estimated.

Table 29: Italy – model of the personal income tax revenues

Model PIT_ITA: OLS, observations 1995-2009 (T = 15) Dependent variable: PIT_revenues_ITA					
	Coefficient	Std. Error	t-statistics	p-value	
const	34,6364	3,13871	11,0352	<0,00001	***
PIT_rate_ITA	-0,232977	0,0883676	-2,6365	0,02314	**
GDP_growth_ITA	-0,0312561	0,0825776	-0,3785	0,71226	
unemployement_ITA	0,264898	0,142997	1,8525	0,09096	*
Additional tests results					
	Null hypothesis	t-statistics	p-value	Reject	Our model
R²		0,415669			Not OK
Adjusted R²		0,256306			Not OK
Normality test	Normal distribution	0,131117	0,936544	no	OK
White test	No heteroscedasticity	10,7162	0,295667	no	OK
Durbin-Watson test	No autocorrelation	1,04684	0,00221925	yes	Not OK
VIF	Collinearity	<10		yes	OK

Source: author.

Now that we have the results for both monitored countries we can provide the final models for personal income tax revenues.

$$PITrevenues\_CZE = 7.85 + 0.13(TaxRate) - 0.089(GDPgrowth)$$
$$+ 0.13(Unemployment)$$

(8)

$$PITrevenues\_ITA = 34.64 - 0.23(TaxRate) - 0.031(GDPgrowth)$$
$$+ 0.26(Unemployment)$$

(9)

In this case, in comparison with CIT revenues, both models contain the same explanatory variables, two of them being the cyclical components. This might suggest that revenues from personal income taxes are more sensitive to economic cycle and the performance of the country's economy.

In case of the Czech Republic there are two the most important indicators, tax rate and unemployment rate, whose coefficients are roughly the same. The model estimated the positive influence of the tax rate, which suggests that more revenues can be raised with the higher tax rate on personal income. With the two cyclical components the coefficients influence the revenues in right the opposite way than we expected. With higher unemployment the revenues should rise and with higher economic growth they should decrease, which we unfortunately find highly unlikely.

In Italy the most important factor to affect the revenues from personal income tax is the unemployment rate. Again the coefficient came out positive, which is now for the third time. Other important factor is the tax rate which deals with negative influence in this model. This suggests that Italian tax rates on personal income are very high already and further increase would only bring harmful effects.

6.3 Revenues from social security contributions

In case of revenues from the social security contributions we extended the number of possible determinants. We included both rates levied on employers and employees and from these rates we placed their squares as well. The implicit rates, as already mentioned above, is the implicit tax rate on labour, i.e. common for both personal income taxes and social security contributions. The initial model is composed as follows

$$
\begin{aligned}
SSCrevenues_i = &\ \alpha + \beta_1\left(EmployerRate_i\right) + \beta_2\left(EmployerRate_i\right)^2 \\
&+ \beta_3\left(EmployeeRate_i\right) + \beta_4\left(EmployeeRate_i\right)^2 + \beta_5\left(imlicitTaxRate_i\right) \\
&+ \beta_6\left(implicitTaxRate_i\right)^2 + \beta_7\left(GDPpercapita_i\right) + \beta_8\left(GDPgrowth_i\right) \\
&+ \beta_9\left(Unemployment_i\right) + \beta_{10}\left(CPI_i\right) + u_i
\end{aligned}
\tag{10}
$$

At first we applied the model equation on the revenues in the Czech Republic. We were able to obtain 4 significant coefficients and the intercept. But still we have 4 other coefficient insignificant. Moreover we had to omit two variables right from the beginning – EmployeeRate and its square, because of their exact collinearity. So we eliminated some other variables to get the significant coefficients only. This time the model contains 6 significant coefficients and the intercept, all with 10% level of significance (for the complete results see Appendix).

Checking further for collinearity in explanatory variables, based on the values in correlation coefficients, we had to eliminate (implicitTaxRate)^2, which was correlated with the implicitTaxRate, and also GDP_percapita, which was correlated with SSC revenues. Finally we obtained the model with 3 explanatory variables and the intercept, with all the coefficients significant at the level of 5%.

$$
\begin{aligned}
SSCrevenues_i = &\ \alpha + \beta_1\left(EmployerRate_i\right) + \beta_2\left(imlicitTaxRate_i\right) \\
&+ \beta_3\left(GDPgrowth_i\right) + u_i
\end{aligned}
\tag{11}
$$

The data in this case are explained by the model from 58.8% which means again a quite satisfying coefficient of determination. We cannot reject the hypothesis of normal distribution of disturbances at the 5% level of significance. Other tests came out better, both homoscedasticity and absence of autocorrelation cannot be rejected even at 10% level, and again we were able to get rid of the collinearity. Complete results are provided in the table.

Table 30: Czech Republic – model of the revenues from social security contributions

Model SSC_CZE: OLS, observations 1995-2009 (T = 15) Dependent variable: SSC_revenues_CZE					
	Coefficient	Std. Error	t-statistics	p-value	
const	181,041	52,9495	3,4191	0,00573	***
employer_rate_CZE	-4,9812	1,52872	-3,2584	0,00762	***
implicit_rate_CZE	0,817549	0,309608	2,6406	0,02297	**
GDP_growth_CZE	0,450263	0,161273	2,7919	0,01753	**
Additional tests results					
	Null hypothesis	t-statistics	p-value	Reject	Our model
R^2		0,588496			OK
Adjusted R^2		0,476268			OK
Normality test	Normal distribution	5,96269	0,0507246	no	OK
White test	No heteroscedasticity	10,5545	0,159266	no	OK
Durbin-Watson test	No autocorrelation	2,13953	0,386622	no	OK
VIF	Collinearity	<10		yes	OK

Source: author.

Again we applied the initial model, i.e. Eq. (10), on the Italian revenues. The model provided six significant coefficients in this case and no variables needed to be omitted as collinear right from the beginning. But still we had 4 insignificant coefficients left and therefore we had to eliminate some of them from the equation. In the end we obtained the model with 5 significant coefficients and the intercept, all of them moreover significant at the 10% level (for the complete results see Appendix).

Checking for collinearity using the correlation coefficients we eliminated the (EmployeeRate)^2 which was correlated with EmployerRate and the SSC revenues as well. Further we needed to eliminate other variables in order to obtain significant coefficients and finally we were able to obtain the model with 3 explanatory variables and the intercept and all coefficients significant even at 1% level.

$$SSCrevenues_i = \alpha + \beta_1(EmployerRate_i) + \beta_2(GDPgrowth_i)$$
$$+ \beta_3(Unemployment_i) + u_i \tag{12}$$

This time our R^2 reached the level of 85.7% which is very high and satisfying. As for the OLS method assumptions, we cannot reject the hypothesis of the normality only at 4% level of significance. Hypotheses of homoscedasticity and no autocorrelation cannot be rejected on the 10% significance level. And again the explanatory variables are not correlated any more and therefore we can use the OLS estimates for this model.

Table 31: Italy – model of the revenues from social security contributions

Model SSC_ITA: OLS, observations 1995-2009 (T = 15) Dependent variable: **SSC_revenues_ITA**					
	Coefficient	Std. Error	t-statistics	p-value	
const	-60,7704	11,8361	-5,1343	0,00033	***
employer_rate_ITA	3,22888	0,426522	7,5703	0,00001	***
GDP_growth_ITA	-0,60742	0,10453	-5,8110	0,00012	***
unemployement_ITA	-1,83323	0,297562	-6,1608	0,00007	***
Additional tests results					
	Null hypothesis	t-statistics	p-value	Reject	Our model
R^2		0,864798			OK
Adjusted R^2		0,827924			OK
Normality test	Normal distribution	6,13245	0,0465968	no	OK
White test	No heteroscedasticity	11,9066	0,218626	no	OK
Durbin-Watson test	No autocorrelation	2,17924	0,344242	no	OK
VIF	Collinearity	<10		yes	OK

Source: author.

Now that we have results for both countries we can finally provide the models for revenues from social security contributions. First equation is for the Czech Republic, second one being for Italy.

$$SSCrevenues\_CZE = 181.04 - 4.98(EmployerRate) + 0.82(imlicitTaxRate)$$
$$+ 0.45(GDPgrowth) \tag{13}$$

$$SSCrevenues\_ITA = -60.77 + 3.23(EmployerRate) - 0.61(GDPgrowth)$$
$$-1.83(Unemployment) \tag{14}$$

In the Czech Republic, based on the Eq. (13), the employers' rate has clearly the strongest impact. Moreover, the coefficient is negative, which can be interpreted that the burden on employers is already very high and that further increase will only bring harmful effects. The second important variable is the implicit tax rate on labour. Because the tax burden on labour comprises of both the personal income taxation and the mandatory contributions, this variable might suggest that the government should try to raise more revenues not only by declining the rate but also by changing the structure of the corresponding tax base, which could even be broadened.

In Italian model, as demonstrated by Eq. (14), the explanatory variables are in this case the same as in the model for personal income tax revenues. The most important factor is the rate levied on employers, which in this case provides the positive influence, and therefore if the Italian government wanted to increase the tax revenues from labour taxation, it should do so by lowering the PIT rates and increasing the rates of mandatory contributions. The two other important factors are cyclical again, with unemployment being more relevant. This time the declining unemployment should promote the revenues collected from social security contributions.

6.4 Value added tax revenues

The last model is dedicated to the revenues from value added taxes. To the original equation we again included all the rates levied (standard, reduced, and super-reduced in case of Italy) and their squares although we now expect that some of them will be omitted again. The implicit rates in this case are the common rates for consumption taxes, therefore not only VAT but the effect of excise duties and other taxes is included as well. The initial equation is composed of 10 variables or 12 in case of Italy.

$$
\begin{aligned}
VATrevenues_i = {} & \alpha + \beta_1\left(S\tan dardRate_i\right) + \beta_2\left(S\tan dardRate_i\right)^2 \\
& + \beta_3\left(\mathrm{Re}\,ducedRate_i\right) + \beta_4\left(\mathrm{Re}\,ducedRate_i\right)^2 + \beta_5\left(imlicitTaxRate_i\right) \\
& + \beta_6\left(implicitTaxRate_i\right)^2 + \beta_7\left(GDPpercapita_i\right) + \beta_8\left(GDPgrowth_i\right) \\
& + \beta_9\left(Unemployment_i\right) + \beta_{10}\left(CPI_i\right) + u_i
\end{aligned}
\tag{15}
$$

At first we used Czech data and tested the model. For the full model we obtained only one significant coefficient and moreover two variables were omitted for the exact collinearity, in this case squares of both standard and reduced rates. Again we needed to eliminate variables until we were able to obtain significant coefficients only. We were able to obtain 4 explanatory variables and the intercept, all the coefficients significant at the 1% level (for the complete results see the Appendix). Checking for further collinearity we did not observe any correlation among the explanatory variables and therefore we can present the final model with those 4 explanatory variables and the intercept.

$$VATrevenues_i = \alpha + \beta_1 \left(S \tan dardRate_i \right) + \beta_2 \left(\mathrm{Re}\, ducedRate_i \right)$$
$$+ \beta_3 \left(GDPpercapita_i \right) + \beta_4 \left(Unemployment_i \right) + u_i \qquad (16)$$

Czech model for VAT revenues has very good coefficient of determination (R^2) of 88.6%. The tests for the assumptions for the OLS estimates came out well again. Homoscedasticity, normal distribution and no autocorrelation in residuals cannot be rejected at 10% of significance in any case and no correlation was proved. The results are provided in the following table.

Table 32: Czech Republic – model of the value added tax revenues

Model VAT_CZE: OLS, observations 1995-2009 (T = 15) Dependent variable: VAT_revenues_CZE					
	Coefficient	Std. Error	t-statistics	p-value	
const	26,6663	3,96502	6,7254	0,00005	***
standard_rate_CZE	-0,50591	0,153517	-3,2955	0,00808	***
reduced_rate_CZE	0,761469	0,107902	7,0570	0,00003	***
GDP_percapita_CZE	-0,000209578	6,07264e-05	-3,4512	0,00621	***
unemployement_CZE	0,320679	0,0628045	5,1060	0,00046	***
Additional tests results					
	Null hypothesis	t-statistics	p-value	Reject	Our model
R²		0,885662			OK
Adjusted R²		0,839927			OK
Normality test	Normal distribution	3,43245	0,179743	no	OK
White test	No heteroscedasticity	9,1664	0,164434	no	OK
Durbin-Watson test	No autocorrelation	2,51466	0,498697	no	OK
VIF	Collinearity	<10		yes	OK

Source: author.

Then we applied the original equation, i.e. Eq. (15), on the Italian dataset. The results did not provide us with any significant coefficients and simultaneously we had to omit 5 variables due to exact collinearity – square of standard rate and then reduced and super-reduced rates and their squares as well. We needed to further eliminate variables to be able to get the significant coefficients. In the end we obtained the model with 5 explanatory variables and no intercept, with the coefficients significant at the 20% level (for complete results see the Appendix).

Based on the correlation matrix we checked for the collinearity and we eliminated the implicitTaxRate, which was correlated with both its square and CPI. Finally we obtained the model with 4 explanatory variables, this time without the intercept. Three variables are significant at the level of 5% but the last one is significant only at the 42% level. The model came out as follows.

$$
\begin{aligned}
VATrevenues_i = {} & \beta_1 \left(S \tan dardRate_i \right) + \beta_2 \left(implicitTaxRate_i \right)^2 \\
& + \beta_3 \left(Unemployment_i \right) + \beta_4 \left(CPI_i \right) + u_i
\end{aligned}
\tag{17}
$$

The model gained a very high level of R^2 of 99.9% which only decreased when we tried to eliminate other variables, therefore we decided to use the model in this form. Testing other assumptions necessary for OLS estimates we cannot reject the hypotheses of normal distribution and homoscedasticity in disturbances at the significance level of 10%. We also got rid of the collinearity among the explanatory variables. Unfortunately we had to reject the hypothesis of Durbin-Watson test at the 1% level of significance. When using the OLS estimation method again we obtained results provided in the table.

Table 33: Italy – model of the value added tax revenues

Model VAT_ITA: OLS, observations 1995-2009 (T = 15) Dependent variable: **VAT_revenues_ITA**					
	Coefficient	Std. Error	t-statistics	p-value	
standard_rate_ITA	0,356731	0,154638	2,3069	0,04153	**
implicit_rate2_ITA	0,0331279	0,0127284	2,6027	0,02458	**
unemployment_ITA	-0,325151	0,128748	-2,5255	0,02820	**
CPI_ITA	0,143258	0,167799	0,8537	0,41145	
Additional tests results					
	Null hypothesis	t-statistics	p-value	Reject	Our model
R^2		0,998584			OK
Adjusted R^2		0,998198			OK
Normality test	Normal distribution	1,42408	0,490643	no	OK
White test	No heteroscedasticity	6,78982	0,81584	no	OK
Durbin-Watson test	No autocorrelation	0,894344	0,00190535	yes	Not OK
VIF	Collinearity	<10		yes	OK

Source: author.

Now with complete results we can provide the models for value added tax revenues in the Czech Republic and in Italy, respectively.

$$VATrevenues\_CZE = 26.67 - 0.51(S\tan dardRate) + 0.76(\mathrm{Re}\,ducedRate)$$
$$- 0.00021(GDPpercapita) + 0.32(Unemployment) \tag{18}$$

$$VATrevenues\_ITA = 0.36(S\tan dardRate) + 0.033(implicitTaxRate)^2$$
$$- 0.33(Unemployment) + 0.14(CPI) \tag{19}$$

The Czech revenues from the value added tax are mostly influenced by the tax rates. Both standard and reduced rates play an important role. What is interesting is the estimate that the impact of the standard rate is negative while the impact of the reduced rate is positive. This corresponds with the development of the rates in the Czech Republic recently and in upcoming years. The government first increased the reduced rate and for the future plans to further increase it and decrease the standard rate as well. This would, according to our model, bring the highest VAT revenues possible. Two variables out of four in the model are represented by the cyclical factors – GDP per capita and unemployment rate, but their impact is less relevant than in case of tax rates.

In Italy, according to Eq. (19), again two variables out of four are represented by the cyclical factors, and their coefficients are together higher than in case of the tax rates components. This might suggest a strong influence of the cyclical factors on the VAT revenues. The most important influence has the standard tax rate and the model estimated a positive influence of increasing rate. Therefore again, the Italian government, which increased the standard VAT rate in 2011 and plans further increase as well, made a good decision in order to raise tax revenues. On the other hand, other strong variable is the unemployment rate, here with negative impact, therefore further support to employment and reduction of unemployment might help to gain more tax revenues from VAT.

6.5 Summary of results

Finally we can present the summary of results obtained by the regression models in our empirical analysis. The first table summarizes the models for the diverse tax revenues and their determinants in the Czech Republic.

Table 34: Tax revenues in the Czech Republic

Corporate income tax revenues		
Coefficient	Variable	!!!
-0.16	tax rate	
0.0019	(implicit tax rate)^2	
0.19	GPD growth	
Personal income tax revenues		
0.13	tax rate	GDP growth and unemployment significant at 22% level only
-0.089	GDP growth	
0.13	unemployment	
Revenues from social security contributions		
-4.98	rate levied on employers	
0.82	implicit tax rate	
0.45	GDP growth	
Value added tax revenues		
-0.51	standard rate	
0.76	reduced rate	
-0.00021	GDP per capita	
0.32	unemployment	

Source: author.

In the Czech Republic we can observe three the most important indicators. The statutory tax rate, which came out as significant to some extent in every equation, and then GDP growth and unemployment – one of these two variables appears in all the equations, in case of PIT revenues, there are even both of them.

Tax system setting, which was represented by the statutory rates, their squares and implicit tax rates, came out as more important in case of revenues from social security contributions and the value added tax revenues. This observation is based on the joint relevance of these variables appearing in the equations. The profitability and performance of the economy, in our models represented by the cyclical factors, i.e. GDP per capita, GDP growth, unemployment or CPI, came out as more relevant in case of corporate income tax and personal income tax revenues.

Considering the tax rates we found out that in three cases the tax rates are already very high and further increase of the statutory rates would bring only harmful effects and would decrease the tax revenues. This applies to corporate income tax rate, social security contribution levied on employers and standard rate of VAT.

Having a more detailed look on the revenues from different types of taxes, we can conclude that if the Czech government wanted to raise more revenues from CIT they should concentrate on the GDP growth and definitely not increase the tax rate. Raising the PIT rate on the other hand should bring more revenues to the state's budget, although again the country's performance, in this case GDP growth and unemployment, seems relevant even more. More tax revenues should come from social security contributions in case of changes in the implicit tax rate, i.e. the setting of overall tax burden on labour. From this point of view the burden can even be higher. But considering the rates levied on employers they had better be reduced. As for the VAT revenues further decrease in standard rate and increase in reduced rate should bring more revenues, which is exactly what Czech government plans to introduce in the upcoming years.

The following table is dedicated to the summary of results obtained for Italian tax revenues.

Table 35: Tax revenues in Italy

Corporate income tax revenues		
Coefficient	Variable	!!!
0.34	tax rate	GDP per capita significant at 34% only, slight collinearity
0.00052	GDP per capita	
0.21	unemployment	
Personal income tax revenues		
-0.23	tax rate	R^2 at 41.6%, GDP growth significant at 72% only, possible autocorrelation
-0.031	GDP growth	
0.26	unemployment	
Revenues from social security contributions		
3.23	rate levied on employers	
-0.61	GDP growth	
-1.83	unemployment	
Value added tax revenues		
0.36	standard rate	CPI coefficient significant at 42% level only, possible autocorrelation
0.033	(implicit tax rate)^2	
-0.33	unemployment	
0.14	CPI	

Source: author.

In Italy again three variables came out as the most common to affect the tax revenues, being the statutory tax rate, GDP growth and unemployment, which means the same as in case of the Czech Republic. Statutory tax rate and unemployment are relevant to some extent in all the models and GDP growth appears together with them in two models out of four.

Tax system setting seems to be more important in case of the revenues from corporate income tax and social security contributions. The cyclical variables indicate that profitability and performance of the economy have the stronger impact in case of personal income taxes and the value added tax.

Based on the estimates with the single tax rates we can see that Italy taxes excessively the personal incomes and that further increase in the statutory tax rates in this case would only lead to lower tax revenues. The other three types of tax revenues, on the other hand, might be effectively enhanced by the higher statutory tax rates.

In more detail the best way to raise more revenues from corporate income tax is to increase the statutory tax rate. The personal income tax rate is, based on our results, highly recommended to be reduced, but in this case more revenues seem to be obtained by the promotion of the economic growth and unemployment. Revenues from social security contributions are strongly dependent on the tax rate setting and they can be increased particularly by increasing the employers' rate. VAT revenues might also increase with the higher standard tax rate, which government plans to increase in upcoming period, but according to our model better performance, lower unemployment and higher CPI would bring more revenues instead.

If we consider the results of other works in which we found inspiration our findings are consistent with the work of Clausing (2007) or Kubátová, Říhová (2009) who examined the corporate income tax revenues and their determinants. Both works came to a conclusion that the tax rates are primarily not the most important factors to determine the tax revenues from corporate taxation, and that cyclical factors, GDP growth and unemployment included, are statistically significant. We were able to extend similar observations on other types of taxes as well in our models, although we are familiar with limitations of our results.

As for the possible determinants provided in the table 25 our models provided us in some cases with inconsistent estimates of coefficients of cyclical variables in comparison with previous literature. We would like to emphasize the ambiguous effects of the following variables in particular:

- GDP per capita – we expected positive impact on the tax revenues. This variable proved to be significant in two equations, in one case the effect was estimated positive but in the other one negative.

- GDP growth – we again expected positive impact. This variable came out significant in 5 equations. In two cases it complied with our expectations, but in the rest of them unfortunately the negative effect was observed.

- Unemployment – the expected effect was negative. This variable was estimated as significant in six provided models out of eight however, in two cases only with the negative effect, in the rest of them the estimated coefficients came out positive.

- CPI – we expected negative impact. CPI proved to be significant in a single equation and with positive effect only.

Despite these alarming observations, we also noticed that in case of a single cyclical variable in the model, its impact is precisely as we expected it, e.g. the positive impact of the GDP growth on the Czech revenues from CIT or SSC. Moreover, when two cyclical variables occur in the equation the opposite effect is often estimated with both of these variables, e.g. the negative impact of GDP growth and positive impact of unemployment on the both Czech and Italian PIT revenues.

7. Conclusion

Two general trends were addressed in the introduction to our work - a decline in the corporate tax rates and a shift of the tax burden onto the consumption basis. Within the empirical analysis the decline in the corporate tax rates was documented in both the Czech Republic and Italy. The empirical evidence, however, was not able to confirm any considerable shift to indirect taxation. Neither the share of taxes on goods and services changed much, nor had the revenues from these taxes followed any significant trend.

If we consider the absolute values of the tax revenues and their changes especially at the beginning of the crisis we observed that both in the Czech Republic and in Italy the revenues from incomes, profits and capital gains decreased dramatically in the past years while the decrease in the revenues from taxes on goods and services was not that substantial. Thus we confirmed our first hypothesis that the revenues from indirect taxes decreased less than revenues from income taxes due to the recent crisis.

Italy has in general much higher tax burden than the Czech Republic. The development over the last 20 years indicates that in the Czech Republic the overall tax burden decreased while in Italy it rather fluctuated or might be even considered increasing. In contrast with these findings we identified that in Italy only personal income taxation seems to be excessive and that reduction of statutory rates should be convenient. Excessive PIT rates confirmed our fourth hypothesis, but we also expected to find the social security contribution rates excessive. Moreover, based on our model especially the rate levied on employers provides in Italy an effective tool to raise the SSC revenues. On the other hand, in the Czech Republic up to three tax rates proved to be very high, bringing harmful effects in case of their further increase. These are in particular corporate income tax rate, employers' social security contributions and standard VAT rate. The excessive social security contribution rate is consistent with our hypothesis and standard VAT rate, which with its 20% reaches the limit of the European average, could have been expected. But the occurrence of the CIT rate in this category, which is with its 19% well below the European average, we found quite surprising.

Regression models that we developed provide us with the conclusion that statutory tax rates, GDP growth and unemployment are the key indicators to affect tax revenues in both the Czech Republic and Italy although for different types of taxes each variable affects the corresponding tax revenues diversely. We found out that in both countries the tax rates have the strongest impact on the revenues in case of social security contributions. Personal income taxes are, on the other hand, affected in both countries more strongly by the economic performance and the cyclical factors. With VAT and CIT we observed different behaviour for each country.

In our hypotheses we expected the CIT revenues to be influenced by the performance of the country's economy and the revenues from value added taxes to be affected by the tax system setting and the tax rates in particular. This proved to be correct only in case of the Czech Republic. In Italy in contrast to our hypotheses the tax revenues from CIT and VAT were influenced in exactly the opposite manner.

As the major contribution of our work we consider the final conclusions provided at the end of the sixth chapter. Based on our models, although we are well aware of the limitations of our results, we were able to indicate the opportunities to increase the tax revenues from different types of taxes and also to define the potential excessive tax burden and cases where further increases in tax rates are inconvenient.

Bibliography

Alm, J. *What is an "optimal" tax system?* [online]. National Tax Journal. Vol 49 no. 1 pp. 117-33. March 1996. [2. 11. 2011] Available from: <http://ntj.tax.org/wwtax/ntjrec.nsf/0/7163f9ee52a5158985256863004b1f3c/$FILE/v49 n1117.pdf>.

Auerbach, A. *Public Finance in Practice and Theory* [online]. Berkeley: University of California, 2009. [31. 10. 2011] Available from: <http://elsa.berkeley.edu/~auerbach/pfpt_7_09.pdf>.

Auerbach, A. *The theory of excess burden and optimal taxation* [online]. NBER Working Paper No. 1025. Cambridge: National Bureau of Economic Research, 1982. [6. 10. 2011] Available from: <http://www.nber.org/papers/w1025.pdf?new_window=1>.

Bernardi, L. *Note sull´evoluzione recente e sulle prospective future dei sistemi tributari* [online]. Studi e note di economia 1/2000. Universita di Pavia, Dipartimento di Economia pubblica e territoriale, 2000. [8. 11. 2011] Available from: <http://www.mps.it/NR/rdonlyres/B1E8E235-0631-42DD-A64C-7685635E6D3E/34347/m2_bernardi.pdf>.

Bernardi, L. - Chandler, M. - Gandullia, L. *Tax systems and tax reforms in new EU members. Part 7 The Czech Republic.* Abingdon: Routledge, 2005. 258 pp. ISBN 0-415-34988-5.

Bernardi, L. - Profeta, P. *Tax systems and tax reforms in Europe. Part 8 Italy*. London: Routledge, 2004. 305 pp. ISBN 0-415-32251-0.

Clausing, K. A. *Corporate tax revenues in OECD countries* [online]. International Tax and Public Finance 14:115-133. Springer Science + Business Media, 2007. [7. 12. 2011] Available from: <http://www.clangmann.net/2007_July_13/Corporate_Tax_Revenues_in_OECD.pdf>.

Deloitte Touche Tohmatsu. *Czech Republic International Tax and Business Guide* [online]. Prague: Deloitte Czech Republic, 2010. [22. 5. 2011] Available from: <http://www.deloitte.com/assets/Dcom-Global/Local%20Assets/Documents/Tax/ Intl%20Tax%20and%20Business%20Guides/dtt_tax_guide_czechrepublic_2010.pdf>.

Deloitte Touche Tohmatsu. *Italy International Tax and Business Guide* [online]. Milan: Deloitte Italy, 2008. [26. 9. 2011] Available from: <http://www.deloitte.com/assets/Dcom-Global/Local%20Assets/Documents/dtt_tax_guide_italy.pdf >.

Devereux, M. P. *Developments in the taxation of corporate profit in the OECD since 1965: rates, bases and revenues* [online]. Working Papers 07/04. Oxford: Oxford University Centre for Business Taxation, 2006. [7. 12. 2011] Available from: <http://www.sbs.ox.ac.uk/centres/tax/Documents/working_papers/WP0704.pdf >.

European Communities. *Structures of the Taxation Systems in the European Union* [online]. Luxembourg: Office for Official Publications of the European Communities, 2006. ISBN 92-79-01850-7. [2. 9. 2011] Available from: <http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-DU-06-001/EN/KS-DU-06-001-EN.PDF>.

European Commission. *Taxation trends in the European Union. Data for the EU Member States, Iceland and Norway* [online]. Luxembourg: Publications Office of the European Union, 2011. ISBN 978-92-79-19644-7. [3. 9. 2011] Available from: <http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/economic _analysis/tax_structures/2011/report_2011_en.pdf>.

European Commission. *VAT Rates Applied in the Member States of the European Union* [online]. Brussels: Taxation and Customs Union, 2011. [7. 12. 2011] Available from: <http://ec.europa.eu/taxation_customs/resources/documents/taxation/vat/how_vat_work s/rates/vat_rates_en.pdf>.

Griffith, R. – Klemm, A. *What has been the Tax Competition Experience of the Last 20 Years?* London: Institute for Fiscal Studies and University College London, 2004.

The International Bank for Reconstruction and Development / The World Bank. *Doing Business 2011: Making a Difference for Entrepreneurs. Czech Republic* [online]. Washington: The World Bank, 2010. 79 p. E-ISBN: 978-0-8213-8630-9. [29. 5. 2011] Available from: <http://www.doingbusiness.org/ ~/media/fpdkm/doing%20business/documents/profiles/country/db11/cze.pdf>.

The International Bank for Reconstruction and Development / The World Bank. *Doing Business 2011: Making a Difference for Entrepreneurs. Italy* [online].Washington: The World Bank, 2010. 74 p. E-ISBN: 978-0-8213-8630-9. [29. 5. 2011] Available from: <http://www.doingbusiness.org/~/media/fpdkm/doing%20business/documents/profiles/ country/db11/ita.pdf>.

KPMG International. *Corporate and Indirect Tax Survey 2011* [online]. KPMG International Cooperative, a Swiss entity, 2011. [4. 12. 2011] Available from: <http://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/Documents/c orporate-and-indirect-tax-rate-survey-2011.pdf>.

KPMG International. *KPMG´s Corporate and Indirect Tax Rate Survey 2007* [online]. KPMG International Cooperative, a Swiss entity, 2007. [4. 12. 2011] Available from: <http://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/Documents/ Corporate-and-Indirect-Tax-Rate-Survey-2007.pdf>.

KPMG International. *KPMG´s Individual Income Tax and Social Security Rate Survey 2011* [online]. KPMG International Cooperative, a Swiss entity, 2011. [4. 12. 2011] Available from <http://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/Documents/i ndividual-income-tax-social-security-rate-survey-September-2011.pdf>.

Economic. *Adam Smith and the Canons of Taxation* [online]. History of economic theory and thought. Economic, 2009. [6. 9. 2011] Available from: <http://www.economictheories.org/2008/11/adam-smith-and-canons-of-taxation.html>.

KPMG International. *Italy. Taxation of International Executives.* [online]. KPMG International, Studio Associato Consulenza legale e tributaria, 2010. [13. 11. 2011] Available from: <http://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/TIES/Documents/ITALY_2010_TIES.pdf>.

Kubátová, K. - Říhová, L. *Regresní analýza faktorů ovlivňujících výnosy korporativní daně v zemích OECD* [online]. Politická ekonomie 4/2009. [8. 12. 2011] Available from: <http://www.vse.cz/polek/abstrakt.php3?IDcl=693>.

Ministerstvo financí. *Konvergenční program ČR (duben 2011). Část 3. Hospodaření vládního sektoru – deficit a dluh.* [online]. Praha: Ministerstvo financí ČR, 2011. [6. 9. 2011] Available from: <http://www.mfcr.cz/cps/rde/xbcr/mfcr/Konvergencni-program-CR_2011-04_cast-3_pdf.pdf>.

Ministerstvo financí. *Konvergenční program ČR (duben 2011). Část 6. Kvalita veřejných financí – příjmy a výdaje.* [online]. Praha: Ministerstvo financí ČR, 2011. [6. 10. 2011] Available from: <http://www.mfcr.cz/cps/rde/xbcr/mfcr/Konvergencni-program-CR_2011-04_cast-6_pdf.pdf>.

Musgrave, R. - Musgrave P. *Veřejné finance v teorii a praxi. Kap. 16 Nadměrné daňové břemeno a efektivní daňový systém*. Praha: Management Press, 1994. 581 s. ISBN 80-85603-764.

Organisation for Economic Co-operation and Development. *Definition of Taxes. (Note by the Chairman)* [online]. Negotiating Group on the Multilateral Agreement on Investment (MAI), OECD, 1996. [26. 5. 2011] Available from: <http://coin.wne.uw.edu.pl/gkula /OECD%20Definition%20of%20taxes.pdf>.

Organisation for Economic Co-operation and Development. *OECD Statistics* [online]. OECD, 2011. [4. 12. 2011] Available from: <http://stats.oecd.org/Index.aspx>.

Organisation for Economic Co-operation and Development. *OECD Tax Database* [online]. OECD, 2011. [4. 12. 2011] Available from: <www.oecd.org/ctp/taxdatabase>.

PKF. *Italy Tax Guide 2011* [online]. PKF International Limited, 2011. [6. 10. 2011] Available from: <http://www.claytonmckervey.com/attach/worldwide-tax-guide-italy.pdf>.

PricewaterhouseCoopers and the World Bank Group. *Paying Taxes 2011. The global picture.* [online]. PricewaterhouseCoopers and the World Bank Group, 2010. [2. 9. 2011] Available from: < http://www.pwc.com/gx/en/paying-taxes/pdf/paying-taxes-2011.pdf>.

PricewaterhouseCoopers. *Pocket Tax Book. Czech Republic 2010 edition* [online]. Prague: PricewaterhouseCoopers Česká republika, 2010. [4. 6. 2011] Available from: <http://www.pwc.com/en_CZ/cz/danove-a-pravni-sluzby/pocket-tax-book-2010.pdf>.

Slemrod, J. B. *Progressive Taxes* [online]. The Concise Encyclopedia of Economics. Library of Economics and Liberty, 1993. [7. 11. 2011] Available from: <http://www.econlib.org/library/Enc1/ProgressiveTaxes.html>.

Široký, J. a kolektiv. *Tvoříme a publikujeme odborné texty*. Brno: Computer Press, 2011. 208 p. ISBN 978-80-251-3510-5.

Vančurová, A. - Láchová, L. *Daňový systém ČR 2010*. Praha: 1.VOX, 10. vydání. 355 p. ISBN 978-80-86324-86-9.

Walby, K. *What is the difference between statutory, average, marginal and effective tax rates?* [online]. Americans For Fair Taxation, 2010. [7. 11. 2011] Available from: <http://www.fairtax.org/PDF/WhatIsTheDifferenceBetweenTaxRates.pdf>.

Wilson, J. D. *Theories of Tax Competition* [online]. National Tax Journal. Vol 52 no. 2. pg 269. June 1999. [3. 11. 2011] Available from: <http://socserv.mcmaster.ca/cuffk/wilson.pdf>.

Zákon č. 586/1992 Sb., o daních z příjmů, ve znění pozdějších předpisů - Act No. 586/1992 Coll., on Income Taxes, as amended. [online]. [3. 11. 2011] Available from: <http://business.center.cz/business/pravo/zakony/dprij/>.

Testo Unico delle Imposte sui Redditi, il D.P.R. del 22 dicembre 1986, n. 917, aggiornato – Income Tax Act, Presidential Decree of 22 December 1986, No 917, as amended. [online]. [8. 11. 2011] Available from: <http://normativo.inail.it/bdninternet/docs/dpr91786.htm>.

List of models in appendix

Appendix

Model 1: Czech Republic – model of the corporate income tax revenues_1,
OLS, observations 1995-2009 (T = 15), dependent variable: CIT_revenues_CZE

	Coefficient	Std. Error	t-statistics	p-value	
const	-24,7292	18,0587	-1,3694	0,21992	
CIT_rate_CZE	1,72863	1,00385	1,7220	0,13585	
CIT_rate2_CZE	-0,0252758	0,0138732	-1,8219	0,11831	
implicit_rate_CZE	-0,268652	0,511604	-0,5251	0,61833	
implicit_rate2_CZE	0,00623184	0,00696345	0,8949	0,40529	
GDP_percapita_CZE	0,000523897	0,000363528	1,4411	0,19962	
GDP_growth_CZE	0,100692	0,0570476	1,7650	0,12800	
unemployement_CZE	0,106141	0,35377	0,3000	0,77428	
CPI_CZE	-0,0115589	0,108288	-0,1067	0,91847	

Model 2: Czech Republic – model of the corporate income tax revenues_2,
OLS, observations 1995-2009 (T = 15), dependent variable: CIT_revenues_CZE

	Coefficient	Std. Error	t-statistics	p-value	
const	-17,603	9,51843	-1,8494	0,09745	*
CIT_rate_CZE	1,36937	0,391842	3,4947	0,00678	***
CIT_rate2_CZE	-0,0221743	0,00528405	-4,1965	0,00232	***
implicit_rate2_CZE	0,00278673	0,000565163	4,9308	0,00081	***
GDP_percapita_CZE	0,000341413	0,000150015	2,2759	0,04889	**
GDP_growth_CZE	0,0951238	0,0479322	1,9846	0,07848	*

Model 3: Italy – model of the corporate income tax revenues_1,
OLS, observations 1995-2009 (T = 15), dependent variable: CIT_revenues_ITA

	Coefficient	Std. Error	t-statistics	p-value	
const	-46,8542	21,7497	-2,1542	0,07467	*
CIT_rate_ITA	0,235598	0,605451	0,3891	0,71062	
CIT_rate2_ITA	0,0012201	0,00658833	0,1852	0,85918	
implicit_rate_ITA	1,02351	0,435506	2,3502	0,05705	*
implicit_rate2_ITA	-0,0208459	0,00957922	-2,1762	0,07244	*
GDP_percapita_ITA	0,000852276	0,000381814	2,2322	0,06706	*
GDP_growth_ITA	-0,0321119	0,148451	-0,2163	0,83591	
unemployement_ITA	0,744777	0,381464	1,9524	0,09873	*
CPI_ITA	0,150384	0,19323	0,7783	0,46599	

Model 4: Italy – model of the corporate income tax revenues_2,
OLS, observations 1995-2009 (T = 15), dependent variable: CIT_revenues_ITA

	Coefficient	Std. Error	t-statistics	p-value	
const	-45,5462	13,3184	-3,4198	0,00763	***
CIT_rate_ITA	0,3596	0,0630509	5,7033	0,00029	***
implicit_rate_ITA	0,83653	0,317272	2,6366	0,02706	**
implicit_rate2_ITA	-0,0169098	0,00630411	-2,6823	0,02511	**
GDP_percapita_ITA	0,000814186	0,000284423	2,8626	0,01870	**
unemployement_ITA	0,657868	0,30974	2,1239	0,06264	*

Model 5: Czech Republic – model of the personal income tax revenues_1,
OLS, observations 1995-2009 (T = 15), dependent variable: PIT_revenues_CZE

	Coefficient	Std. Error	t-statistics	p-value	
const	55,2389	117,858	0,4687	0,65584	
PIT_rate_CZE	0,432739	0,143727	3,0108	0,02367	**
PIT_rate2_CZE	-0,00736258	0,00254828	-2,8892	0,02772	**
implicit_rate_CZE	-2,13085	5,79443	-0,3677	0,72569	
Implicit_rate2_CZE	0,0262614	0,0710131	0,3698	0,72423	
GDP_percapita_CZE	-0,000229684	5,4421e-05	-4,2205	0,00556	***
GDP_growth_CZE	-0,0664741	0,065597	-1,0134	0,34999	
unemployement_CZE	-0,120038	0,10286	-1,1670	0,28749	
CPI_CZE	-0,00435861	0,0589895	-0,0739	0,94350	

Model 6: Czech Republic – model of the personal income tax revenues_2,
OLS, observations 1995-2009 (T = 15), dependent variable: PIT_revenues_CZE

	Coefficient	Std. Error	t-statistics	p-value	
const	12,1471	1,48508	8,1795	0,00002	***
PIT_rate_CZE	0,421368	0,091571	4,6015	0,00129	***
PIT_rate2_CZE	-0,00710215	0,00162092	-4,3816	0,00177	***
GDP_percapita_CZE	-0,000225481	3,78598e-05	-5,9557	0,00021	***
GDP_growth_CZE	-0,0781199	0,034292	-2,2781	0,04872	**
unemployement_CZE	-0,124086	0,0662227	-1,8738	0,09373	*

Model 7: Italy – model of the personal income tax revenues_1,
OLS, observations 1995-2009 (T = 15), dependent variable: PIT_revenues_ITA

	Coefficient	Std. Error	t-statistics	p-value	
const	-52,7963	111,093	-0,4752	0,65142	
PIT_rate_ITA	-0,384812	2,3502	-0,1637	0,87532	
PIT_rate2_ITA	0,00308763	0,0241578	0,1278	0,90247	
implicit_rate_ITA	3,2694	4,76168	0,6866	0,51797	
implicit_rate2_ITA	-0,0422573	0,0584804	-0,7226	0,49712	
GDP_percapita_ITA	0,000611199	0,000166711	3,6662	0,01050	**
GDP_growth_ITA	0,185428	0,077779	2,3840	0,05447	*
unemployement_ITA	1,18628	0,250905	4,7280	0,00323	***
CPI_ITA	0,0979717	0,166969	0,5868	0,57875	

Model 8: Italy – model of the personal income tax revenues_2,
OLS, observations 1995-2009 (T = 15), dependent variable: PIT_revenues_ITA

	Coefficient	Std. Error	t-statistics	p-value	
const	8,85939	5,53713	1,6000	0,14406	
PIT_rate_ITA	-0,0830123	0,0577699	-1,4369	0,18457	
implicit_rate2_ITA	-0,00275993	0,00102086	-2,7035	0,02425	**
GDP_percapita_ITA	0,000591102	0,000107372	5,5052	0,00038	***
GDP_growth_ITA	0,188978	0,0609883	3,0986	0,01275	**
unemployement_ITA	1,11926	0,173752	6,4417	0,00012	***

Model 9: Czech Republic – model of the revenues from social security contributions_1,
OLS, observations 1995-2009 (T = 15), dependent variable: SSC_revenues_CZE

	Coefficient	Std. Error	t-statistics	p-value	
const	-29976	13467	-2,2259	0,06765	*
employer_rate_CZE	1768,64	802,456	2,2040	0,06971	*
employer_rate2_CZE	-25,6013	11,6287	-2,2016	0,06995	*
employee_rate_CZE	Omitted because of exact collinearity				
employee_rate2_CZE	Omitted because of exact collinearity				
implicit_rate_CZE	-24,4487	19,1126	-1,2792	0,24807	
implicit_rate2_CZE	0,281837	0,226892	1,2422	0,26052	
GDP_percapita_CZE	0,000394844	4,60679e-05	8,5709	0,00014	***
GDP_growth_CZE	-0,261834	0,127487	-2,0538	0,08579	*
unemployement_CZE	0,111049	0,107041	1,0374	0,33952	
CPI_CZE	0,0988213	0,0675706	1,4625	0,19393	

Model 10: Czech Republic – model of the revenues from social security contributions_2,
OLS, observations 1995-2009 (T = 15), dependent variable: SSC_revenues_CZE

	Coefficient	Std. Error	t-statistics	p-value	
const	-35801,5	12978,4	-2,7586	0,02473	**
employer_rate_CZE	2119,04	772,662	2,7425	0,02535	**
employer_rate2_CZE	-30,6783	11,1971	-2,7398	0,02546	**
implicit_rate_CZE	-34,8393	17,4038	-2,0018	0,08029	*
implicit_rate2_CZE	0,406023	0,205943	1,9715	0,08414	*
GDP_percapita_CZE	0,000363101	4,09977e-05	8,8566	0,00002	***
GDP_growth_CZE	-0,259841	0,124557	-2,0861	0,07044	*

Model 11: Italy – model of the revenues from social security contributions_1,
OLS, observations 1995-2009 (T = 15), dependent variable: SSC_revenues_ITA

	Coefficient	Std. Error	t-statistics	p-value	
const	345,48	327,402	1,0552	0,35084	
employer_rate_ITA	22,4313	9,80985	2,2866	0,08417	*
employer_rate2_ITA	-0,303364	0,14458	-2,0982	0,10386	
employee_rate_ITA	-157,69	50,1351	-3,1453	0,03467	**
employee_rate2_ITA	7,59192	2,36364	3,2120	0,03253	**
implicit_rate_ITA	4,45873	4,96593	0,8979	0,42002	
implicit_rate2_ITA	-0,0593749	0,0604143	-0,9828	0,38135	
GDP_percapita_ITA	0,000553866	0,000171045	3,2381	0,03173	**
GDP_growth_ITA	-0,363995	0,0616999	-5,8994	0,00413	***
unemployement_ITA	-0,507817	0,212808	-2,3863	0,07547	*
CPI_ITA	-0,0824357	0,12088	-0,6820	0,53271	

Model 12: Italy – model of the revenues from social security contributions_2,
OLS, observations 1995-2009 (T = 15), dependent variable: SSC_revenues_ITA

	Coefficient	Std. Error	t-statistics	p-value	
const	487,05	223,696	2,1773	0,05743	*
employer_rate_ITA	1,16336	0,507192	2,2937	0,04748	**
employee_rate_ITA	-94,6172	41,0057	-2,3074	0,04643	**
employee_rate2_ITA	4,58964	1,94008	2,3657	0,04221	**
GDP_growth_ITA	-0,412431	0,078798	-5,2340	0,00054	***
unemployement_ITA	-0,911891	0,264843	-3,4431	0,00735	***

Model 13: Czech Republic – model of the value added tax revenues_2,
OLS, observations 1995-2009 (T = 15), dependent variable: VAT_revenues_CZE

	Coefficient	Std. Error	t-statistics	p-value	
const	-24,5581	106,047	-0,2316	0,82456	
standard_rate_CZE	-0,461176	0,602403	-0,7656	0,47297	
standard_rate2_CZE	Omitted because of exact collinearity				
reduced_rate_CZE	0,633412	0,322205	1,9659	0,09690	*
reduced_rate2_CZE	Omitted because of exact collinearity				
Implicit_rate_CZE	4,82945	8,79744	0,5490	0,60285	
Implicit_rate2_CZE	-0,115811	0,207043	-0,5594	0,59616	
GDP_percapita_CZE	-0,000175665	0,000233564	-0,7521	0,48044	
GDP_growth_CZE	-0,0466981	0,097953	-0,4767	0,65041	
unemployement_CZE	0,356621	0,331726	1,0750	0,32367	
CPI_CZE	0,0282994	0,193991	0,1459	0,88879	

Model 14: Czech Republic – model of the value added tax revenues_2,
OLS, observations 1995-2009 (T = 15), dependent variable: VAT_revenues_CZE

	Coefficient	Std. Error	t-statistics	p-value	
const	26,6663	3,96502	6,7254	0,00005	***
standard_rate_CZE	-0,50591	0,153517	-3,2955	0,00808	***
reduced_rate_CZE	0,761469	0,107902	7,0570	0,00003	***
GDP_percapita_CZE	-0,000209578	6,07264e-05	-3,4512	0,00621	***
unemployement_CZE	0,320679	0,0628045	5,1060	0,00046	***

Model 15: Italy – model of the value added tax revenues_1,
OLS, observations 1995-2009 (T = 15), dependent variable: VAT_revenues_ITA

	Coefficient	Std. Error	t-statistics	p-value	
const	257,232	317,91	0,8091	0,44507	
standard_rate_ITA	2,05011	1,15491	1,7751	0,11914	
standard_rate2_ITA	Omitted because of exact collinearity				
reduced_rate_ITA	Omitted because of exact collinearity				
reduced_rate2_ITA	Omitted because of exact collinearity				
superreduced_rate_ITA	Omitted because of exact collinearity				
superreduced_rate2_ITA	Omitted because of exact collinearity				
implicit_rate_ITA	-32,5269	36,0182	-0,9031	0,39650	
implicit_rate2_ITA	0,986491	1,04467	0,9443	0,37646	
GDP_percapita_ITA	-0,000346723	0,000285402	-1,2149	0,26380	
GDP_growth_ITA	-0,126453	0,312869	-0,4042	0,69815	
unemployement_ITA	-0,9075	0,566522	-1,6019	0,15322	
CPI_ITA	0,549617	0,39064	1,4070	0,20225	

Model 16: Italy – model of the value added tax revenues_2,
OLS, observations 1995-2009 (T = 15), dependent variable: VAT_revenues_ITA

	Coefficient	Std. Error	t-statistics	p-value	
standard_rate_ITA	1,61939	0,850521	1,9040	0,08605	*
implicit_rate_ITA	-3,02343	2,00616	-1,5071	0,16271	
implicit_rate2_ITA	0,119245	0,0583992	2,0419	0,06843	*
unemployement_ITA	-0,255495	0,130365	-1,9598	0,07846	*
CPI_ITA	0,457203	0,261982	1,7452	0,11155	