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MASTER'S THESIS

ANALYSIS OF PUBLIC SECTOR EFFICIENCY IN SOUTH-EASTERN EUROPEAN COUNTRIES

Sarajevo, June 2014 AZEMINA ĐOGIĆ

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INTRODUCTION

Ever since the emergence of the state as a superior organization, government expenditures attract attention of researchers as well as of general public. The both are always concerned with how much government spends. However, the time has come to move the attention from 'how much governments spend' to 'how efficient the governments are'.

There are a number of reasons for this relatively new line of public sector research. The demand for government provided goods and services is constantly on the rise. On the other hand, these raising needs are confronted with governments growing inability to increase necessary revenues. In this situation, the only way to ensure sustainability of public finances is to accomplish more with the current use of resources or to obtain the current level of public output with fewer resources. Therefore, governments should pay more attention to efficiency. The need for public sector efficiency is even more pronounced in the case of developing countries that usually encounter more problems on the revenue side of government balance. Public sector efficiency can be seen as a prerequisite of sustainable public finance and a condition for sustainable economic development.

Due to the availability of data, the analyses of public sector efficiency are usually done for developed countries with only a few researches dealing with this problem in developing countries. By analysing the public sector efficiency in South-Eastern European (hereinafter: SEE) countries, we aim to contribute on this matter. We find this sample to be fairly homogeneous in terms of development and macroeconomic performance. The countries share a common history and have similar aspirations and goals. On the other hand, to our knowledge, this type of analysis with this sample of countries has not been investigated before. The results of the analysis could provide useful information for policy makers as well, by pointing to areas where government spending is inefficient.

The purpose of the thesis is to analyse public sector efficiency in SEE countries in order to determine with how much fewer resources could the current level of public output be achieved. Bearing in mind the problem and purpose of the thesis our main hypothesis is: Public sector spending in SEE countries is not efficient. From previously defined basic hypothesis, auxiliary hypothesis are derived:

- SEE countries could use fewer resources to obtain the current level of public output, and
- public sector efficiency of SEE countries is rather diverse.

The research is based on the following objectives:

- provide an overview of economic environment and government finances of SEE countries,
- determine some stylised facts on public sector efficiency based on previous research,
- examine public sector performance of each SEE country,
- determine public sector efficiency of each SEE country,
- compare SEE countries in order to identify relatively in/efficient ones, and

- if identified, assess the degree of inefficiency.

An empirical analysis will be conducted using panel data for six SEE countries over the period 2005-2010. Public sector efficiency will be analysed using secondary data, mostly taken from databases of the World Bank and International Monetary Fund (hereinafter: IMF). Or more precisely the World Development Indicators (hereinafter: WDI) database and World Economic Outlook (hereinafter: WEO) database, ensuring the same methodology of data collection. Following the most relevant literature, we use composite indicators for performance and efficiency, as well as Data Envelopment Analysis (hereinafter: DEA) that will provide a deeper insight into the public sector efficiency of SEE countries.

The thesis is organized as follows. First, in the Theoretical framework, we provide definitions of government and public sector. We proceed with explanation of the roles that are usually attributed to the government in order to understand the economic reasons behind the need for government and in that line of reasoning to explain the need for some level of government spending. We also introduce the reader to a relatively new idea of the optimal size of public sector and explain the negative effect of government spending on economic growth. We define the concept of technical efficiency and stress out the arguments for the increasing need for government efficiency. In the second chapter, we examine the economic environment and evaluate public finances of SEE countries. We find it useful for deeper understanding of the need for government efficiency in these countries. An overview of previous empirical investigations on given topic is summarized in the third chapter, allowing us to draw certain stylised facts. The fourth chapter is the main part of the thesis. This chapter starts with examination of composite indicators allowing us to get insights on public sector performance and efficiency of SEE countries. Since composite indicators are only partial measures of efficiency, DEA will be performed allowing us to conclude how efficient SEE governments are in terms of input efficiency. Main findings of the analysis are systematically and concisely formulated in Conclusion.

1 THEORETICAL FRAMEWORK

1.1 Defining Government and the Public Sector

The government can be defined as the superior authority of one country that creates laws, acts, and regulation and has certain power over the units, e.g. people, companies, etc., within the area of its authority (European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, & World Bank, 2009). Although broader, closely connected to the term government is the term public sector. Besides government, as previously defined, it also includes public corporations and other types of agencies or organizations through which government exerts its direct and indirect influence. In a broader sense, public sector can be defined as "government activity and its consequences" (Lane, 2000, p. 15). If one sees government activity as primarily executed through government expenditures and revenues, then the definition of public sector can be written as the "impact of government revenues and expenditures on economic activity" (Howard, 2001, p. 1).

Throughout the thesis, the terms 'government' and 'public sector' are used synonymously. The public corporations, which represent the main difference between the government and the public sector, can be seen as another way of governments' influence in the economy. Therefore, the remark is not an odd one. After all, public corporations are a part of government. As Bozeman (2004, p. xi) states: "The term *public* has been used many different ways in many different contexts. One of the most common usages equates public with governmental". It is usual to make this type of assumption. A numerous discussions are written that use the terms synonymously, such as those written by Scully (1998) and Kule and Wenzel (2004). On the other hand, whether analysing government or public sector, almost all of the analyses use general government expenditures for both types of studies, or some more specific category of government expenditures. Even if we tried to make a distinction between the two terms, we are very likely to encounter problems in defining public corporations due to their different treatments in different legislation. Finally, at least in Europe, there is a certain pressure on the governments to privatise all of the public corporations, which effectively indicates that eventually these corporations, or at least in the existing form, will disappear leading to equalization of the government and the public sector.

1.2 Market Failure

Economists believe that a free competitive market will result in Pareto efficiency. Pareto efficiency represents an allocation of resources such that no one else can be made better off without making anyone else worse off. In order to fulfil the Pareto condition markets need to function perfectly. However, this type of market is rarely found in practice so literature often refers to it as the perfect competition or theoretical markets. Due to the nonexistence of the perfect competition in the real world, markets often fail on fulfilment of the Pareto efficiency principle. This collapse of Pareto efficiency is referred to as the market failure and it represents economic rationale for government intervention on the markets. This belief that government is

capable of correcting market failures arises from the fact that it has at its disposal the power to tax, the power to prescribe behaviour, and the power to punish misbehaviour (Moreau, 2004).

The basic market failures that require government intervention are:

- public goods,
- natural monopoly,
- externalities, and
- imperfect information.

The markets have failed in almost every country of the world. However, market failures are more prominent in the case of developing countries such as the SEE countries. The developing countries are more inclined to market failure due to so-called institutional failure or even missing markets (Howard, 2001). Institutions in developing countries are often undeveloped and can lead to a breakdown of Pareto efficiency. Therefore, government intervention and market failure should be analysed with more caution in developing countries.

1.2.1 Public Goods

When thinking of the term public good one would almost inevitably think of a good that is produced by the public sector, but that does not have to be the case. The public good can also be produced by the private sector but financed by the government. Therefore, not all goods that the government provides are necessarily public goods, and not all public goods need to be provided by the government. Hillman (2009) identifies public supply and public finance. The first one stands for government production of the public goods, while public finance refers to the government financing of the public good production. According to the European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, and World Bank (2009, p. 79) "governments are obliged only to assume responsibility for organizing and financing [public good] production".

Public goods are goods that possess two specific characteristics: non-excludability and non-rivalry. Non-excludability means that a person who refuses to pay for the good cannot be excluded from the consumption of the good. Non-rival means that if one person consumes the good other person's consumption of the good is not diminished. Due to these characteristics the market will under provide public goods, therefore government production is required. Classical example of a public good is national defence, streetlights, lighthouse, publicly displayed fireworks, etc.

However, pure public goods are rarely found in the real world. More common are so-called impure public goods that satisfy two, abovementioned conditions up to a certain extent but not entirely (Gruber, 2007).

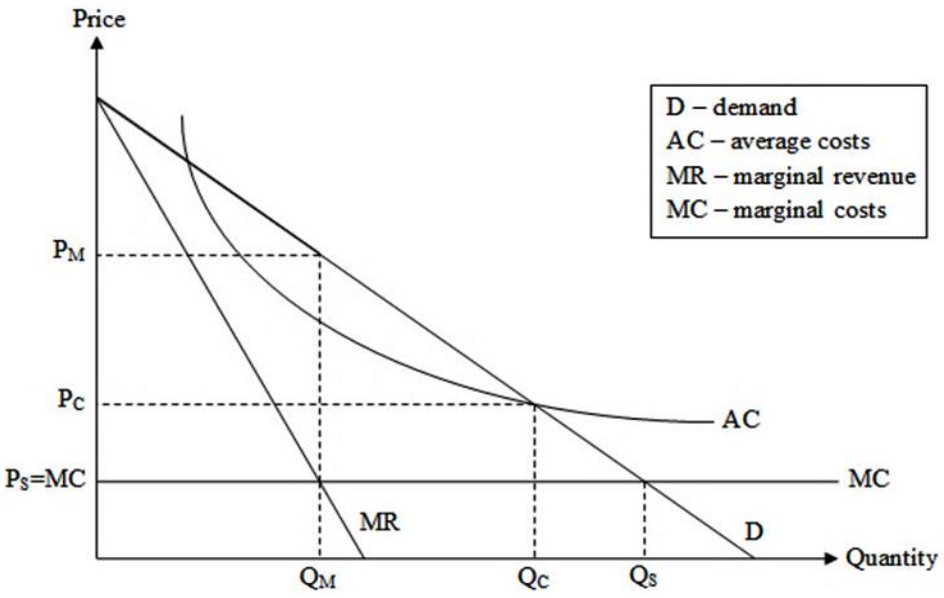
Stiglitz (2004) raises an interesting question. He argues that an efficient state should be considered as a public good. Benefits of an efficient government are available to everyone, and no one can be excluded from enjoying these benefits.

1.2.2 Natural Monopoly

In certain circumstances the most efficient way to produce a good or a service, is if only one producer does it. This situation is referred to as the natural monopoly. Natural monopoly arises due to economies of scale. An example of a natural monopoly is water supply, electricity distribution network, railway network, etc. Nevertheless, technological development has caused an end of various types of natural monopolies (Hillman, 2009). For example, mobile phones have largely replaced fixed telephones; e-mail has replaced traditional written letters, etc. On the other hand, Parkin (2012) identifies four so-called information-age natural monopolies and these are Microsoft (operating system), eBay (Internet auctions), Google (search engines), and Internet Explorer (Web browsers).

In an unregulated market, a monopoly produces where MR curve intersects MC curve, as shown on Figure 1. The producer produces quantity Q_M and charges price P_M. Socially optimal production is at the point where D curve cuts through MC curve; quantity Q_S, and price equal to MC. However, if a producer charges this price it will suffer a loss since AC curve lies above the MC curve. In order to provide an efficient supply, government has to give monopolist a subsidy for difference between AC and MC. According to the European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, and World Bank (2009, p. 148): "*Subsidies are current unrequited payments that government units, including non-resident government units, make to enterprises on the basis of the levels of their production activities or the quantities or values of the goods or services that they produce, sell or import*."

Figure 1. Natural Monopoly



Source: Adapted from M. Parkin, *Microeconomics*, 2012, p. 314, Figure 13.11.

Government gives subsidy by taking money from its budget. The budget is accumulated primarily from taxes on individual income, company's profits, taxes on consumption, etc.

However, people differently value the good or a service provided by the natural monopoly and could see subsidizing monopoly as inappropriate. Therefore, in order to satisfy socially optimal production government takes over the monopoly and produces at the point where AC intersects D curve. Quantity produced is Q_C and the price charged P_C.

1.2.3 Externality

Externality occurs when one unit's actions, e.g. companies or individuals, have a negative or a positive impact on another unit for which the first does not bear the costs nor is compensated for the imposed benefits. Therefore, an externality can be positive or negative. The problem of externality closely relates to the environmental economics as well as to the public goods. Road transportation, industrial processes, and electricity generation all cause negative externalities for the entire population and are identified as the three biggest sources of pollution (Parkin, 2012).

When discussing externalities we have to make a distinction between private and social costs of production/consumption. Private costs are costs of production/consumption incurred by the producer/consumer, while social costs are total costs of production/consumption, incurred by both the producer/consumer and society. On the other hand, we also have to distinguish private and social benefits. Private benefits are benefits obtained by the producer/consumer of a good, while social benefits are total benefits of the production/consumption obtained by the producer/consumer and the society.

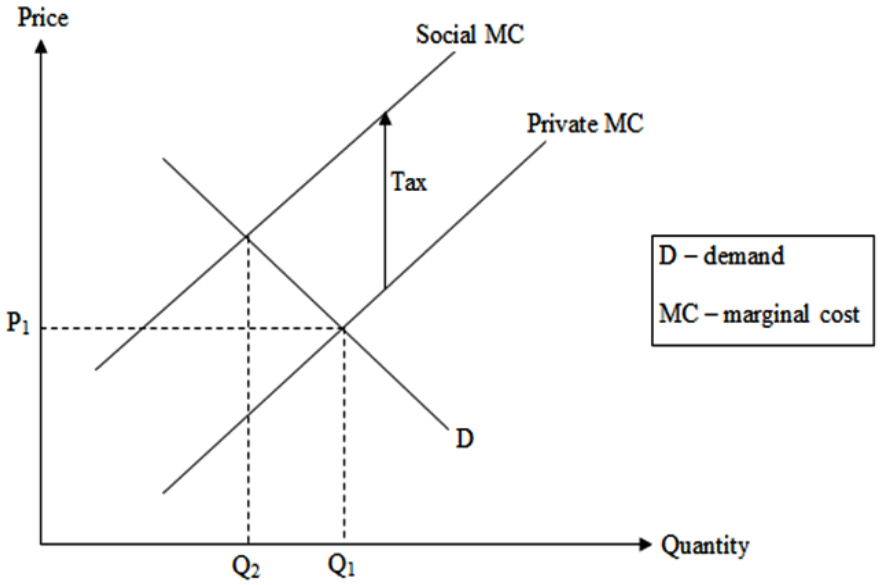
Government has at its disposal following instruments to deal with externalities:

- taxes,
- subsidies, and
- direct regulation.

When social marginal costs are larger than private marginal costs, there is a negative externality, as shown on Figure 2. In an unregulated market, the producer will produce at the point where private MC cuts through D curve, point Q_1. However, if the government introduces a tax equal to the difference between the social and private MC it would equalize them and the producer will produce quantity Q_2, which is socially optimal. With taxes, all of the costs associated with negative externality are borne by the producer while that is not the case with subsidies. Subsidy works the opposite way of taxes. Government gives to the producer a subsidy, in order to equalize the social and private MC, and for the producer to set its production at the optimal level of Q_2. European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, and World Bank (2009, p. 149) recognizes subsidies to reduce pollution and defines it as „subsidies intended to cover some or all of the costs of additional processing undertaken to reduce or eliminate the discharge of pollutants into the environment". However, the money for subsidy can be raised from the producer who causes negative externality, but also from the person who suffers from these negative externalities. Thus, the person damaged could be paying the producer. The public generally prefers polluter-pay-principle (Zorić, 2012).

However, another way to correct the externalities is through mechanisms of direct regulation. The simplest way to regulate externality is to set a pollution standard. The pollution standard, or quotas, allows each unit to emit a certain amount of pollutants, e.g. CO_2. In the case of transferable permits, the polluter is allowed to pollute up to a certain level, but the permits are transferable through the market. Therefore, if a firm uses innovative technology that reduces negative externality it could sell the spare amount of permits. In order to reduce the emission of greenhouse gases the European Union (hereinafter: EU) has developed the system for trading the emission allowances, the so-called European Union Emission Trading System (hereinafter: EU ETS). It is "The first - and still by far the biggest - international system for trading greenhouse gas emission allowances, the EU ETS covers more than 11,000 power stations and industrial plants in 31 countries, as well as airlines" (European Commission, 2014).[1]

Figure 2. Correction of a Negative Externality



Source: Adapted from J. Gruber, *Public Finance and Public Policy*, 2007, p. 134, Figure 5.6.

1.2.4 Imperfect Information

One of the characteristics of perfect competition is a full disclosure of information to all parties involved in the transaction. Even though one may think that, especially in our Internet or information-age society, this condition, necessary for Pareto efficient allocation, is satisfied, one would be wrong. If one party, e.g. individual or a company, has information that is unknown to the other party, a problem of asymmetric information arises.

The asymmetric information leads to four distinct problems:

- moral hazard,
- adverse selection,

[1] For more information on EU ETS one is referred to http://ec.europa.eu/clima/policies/ets/index_en.htm

- principal-agent problem, and
- "lemons problem".

The moral hazard and adverse selection problem is best explained using Perloff's (2012) example of Marge and George which skydive. The life insurance company is unaware of their skydiving activities. Regardless of having a life insurance, George will skydive. Since he knows dangers of skydiving, he is more likely to purchase insurance. This situation represents adverse selection. On the other hand, Marge will skydive only if she has life insurance. This situation represents moral hazard.

In the case of principal-agent problem, the agent has more information than the principal does, and there is a possibility that the agent will not act in the principals' best interest even when he is supposed to. The principal-agent problem arises between voters and politicians, shareholders and management, patient and doctor, etc. One of the simplest cases of asymmetric information is the "lemons problem". It refers to the situation in which a seller has more information about the good then the buyer, which he/she conceals. Usually, the lemons problem is found in the sales of used goods, e.g. a secondhand car.

Although there are some market solutions to these problems, certain actions can be taken by government in order to prevent the problems arising from asymmetric information. For example, government can provide insurance to everyone or mandate buying of insurance policies, such as car insurance. Essentially, when it comes to imperfect information most often the government creates laws and regulation that prevents the emergence previously listed problems.

1.3 Government Failure

So far, we have seen rationale for government intervention, which is the market failure. However, through history it has also been seen that in some cases, due to certain reasons, government also tends to fail. Government failure represents "the inability or unwillingness of the government to act primarily in the interest of its citizens" (Gruber, 2007, p. 244). While Winston (2006, p. 2) states that „*Government* failure [...] arises when government has created inefficiencies because it should not intervened in the first place or when it could have solved a given problem or set of problems more efficiently, that is, by generating greater net benefits".

Stiglitz (2004) identifies the following as the common reasons for government failure:

- lack of adequate information,
- limited control over the reactions of the private market,
- self-maximizing bureaucracy, and
- limitations arising from the political decision-making.

The government usually does not have all of the information necessary for the introduction and implementations of certain programmes, and therefore has only limited control over the consequences of the introduced programme. This information failure is even more pronounced in the case of developing countries since there is usually lack of appropriately developed databases.

Bureaucracy is a rather complex mechanism. As proven in practice, there are forces that influence the bureaucratic mechanism in order to fulfil their own interest rather than the interest of the public. In addition, literature identifies the problem of the so-called self-maximizing bureaucracy. It means that bureaucrats are primarily interested in maximizing their own size in order to gain greater power. When a government adopts, for example, a new law it goes through certain procedure, in many cases a very long procedure, comprised of a numerous legislatures. In addition, procedures are sometimes rather confusing, Kleiman and Teles (2006, p. 637) summarize this problem as „the path dependence of political decision making".

Previously listed sources of government failure are in a certain way conventional government failures encountered in both, developed and developing countries. However, the efficiency of government and its policies is even more questionable in the case of developing countries due to their specific characteristics. Gandhi (in Howard, 2001) identifies several problems specific for developing countries that make the objectives of their governments wider than those of developed countries, and therefore put more constrains on the public policy in developing countries. These characteristics are:

- a strongly skewed distribution of income,
- significant levels of absolute poverty,
- substantial levels of structural unemployment,
- volatility of export prices,
- deficiency of adequate infrastructure, and
- a shortage of adequate human resources.

This overview of both, market and government failures, allows us to conclude that in some cases, due to potential government failure, market failures should be left unregulated. Although it is difficult to say when this solution is the optimal one, Hausman (2008) identifies three specific cases in which it is difficult to justify government intervention:

- when an inappropriate growth of the regulatory and administrative bodies is identified,
- when intervention creates an opportunity for corruption and rent-seeking, and
- when markets are unstable in terms of products, technology, or basic organization.

In line with the most relevant literature and research, we have identified market and government failures. However, in practice when the failure occurs, it is still extremely hard to put it in one or the other group of failures. Even when the markets fail, the reason does not have to be their inefficiency, but rather the inefficiency of government. As Zerbe and McCurdy (2000, p. 14) argue „markets are inefficient, not because of any inherent „failures", but because the government has neglected to provide the appropriate institutional framework".

1.4 Optimal Size of the Public Sector

Currently the debate on the size of government is heated up. While some argue for more government involvement, others argue for the opposite. Discussion on whether the public sector

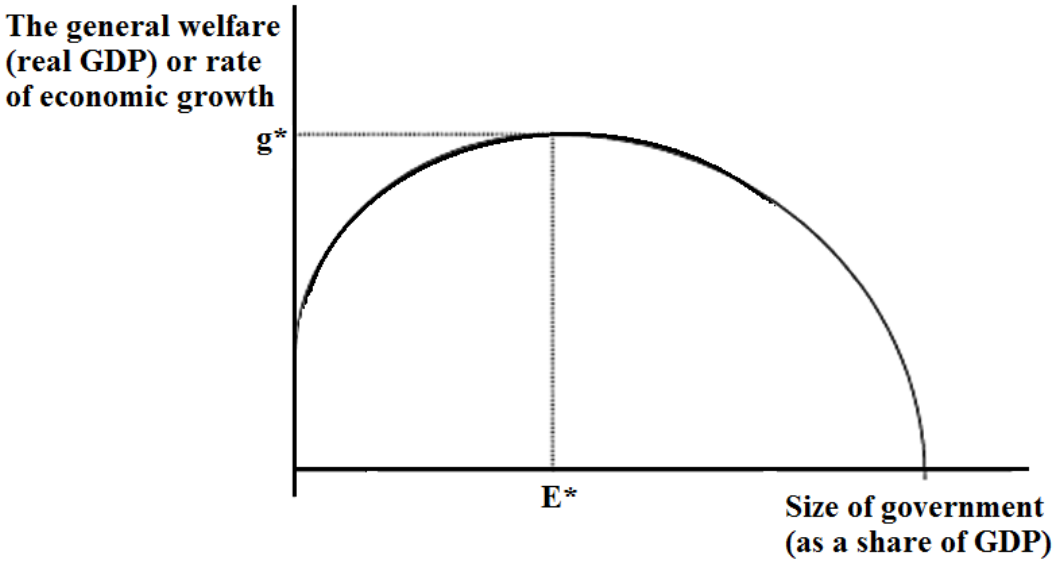
is too big or too small indicates that optimal size of the public sector should exist. The size of the public sector is usually measured in three ways:

- government expenditures as a percentage of Gross Domestic Product (hereinafter: GDP),
- government revenues as a percentage of GDP, and
- government employment as a percentage of total employment.

The above listed measures of government size can further be decomposed. Nevertheless, all of these measures should be taken with a certain caution since they do not take into account government regulation as a part of the public sector. Government can spend a small percentage of public money but still, through certain regulations, exert a great influence on economy in general. Kule and Wenzel (2004) refer to government regulation as hidden costs of government.

The importance of the size of public sector arises from its influence on the economic growth of a country. Armey (1995) argued that the growth of the government expenditures up to a certain point has a beneficial impact on the economic growth, as shown on Figure 3.

Figure 3. Optimal Size of Public Sector



Source: Armey in P. Pevcin, *Does Optimal Size of Government Spending Exist*, 2004, p. 4, Figure 1.

However, an increase of expenditures beyond that point decreases economic growth. Expenditures on infrastructure, research and development, active labour market policies, defence, public order, transport and communication, and the establishment of proper property rights are considered productive expenditures that have positive effect on economic growth (Ferreiro, Garcia del Valle, & Gomez, 2012). However, additional spending on, for example, transfers and subsidies, secondary roads, etc., are seen as non-productive government expenditures. Gwartney, Lawson, and Holcombe (1998) conclude that the negative impact of government size on economic growth is due to:

- disincentive effect of taxes,
- tendency of government to expand into areas that are better suited for the private sector,
- increased rent-seeking activities, and
- crowding-out of private investment.[2]

Numerous researches have been done in order to determine the optimal size of the government. Pevcin (2004) determines the optimal size of public sector for 12 Western European countries to be in range of approximately 37-42% of GDP, suggesting a necessary government expenditure reduction of roughly 19-30%. However, each country has its own specific characteristics, economic and institutional, and separate analysis for eight European countries is also conducted. Repeated analysis shows that countries should reduce their general government spending by approximately 19% in order to get to the optimal level. Balatsky (2012) also proves the existence of the optimal size of the public sector. He finds that the optimal size of government for Sweden is when government spending accounts for around 38% of GDP, while for Russia it is 28%.

Even though, there is no clear measure of the size of public sector, usually general government spending, as a percentage of GDP, is seen as the best proxy. The use of central government spending, as a percentage of GDP, to measure the size of the public sector is generally considered as inappropriate, since today most of the countries worldwide have decentralised governments. Through decentralisation, much of the power and responsibilities is transferred to lower levels of the government, including spending of the public money. However, these expenditures of lower levels of government are not accounted for in the balance of central government expenditures. Therefore, the finding of Husnain (2011) that the optimal size of the public sector in Pakistan is when central government expenditures account for around 21% of GDP, should be considered with great caution. Regardless of the accuracy of the Husnain's (2011) findings, the author did rise up a rather interesting point. He concludes that the higher levels of optimal size of the public sector in developed countries, as compared to developing, could be explained by their higher public sector efficiency. Developed countries, due to their high efficiency in spending of the public money, are able to postpone the negative effect of the government expenditures on economic growth, and therefore the optimal size of their public sector is higher than in developing countries. On the other hand, Rahmayanti and Horn (2011) come to an opposite conclusion. They find that the optimal size of the public sector decreases as the efficiency of government spending increases. Regardless of the accuracy of both analyses, one can conclude that the efficiency of government spending and its optimal size are closely related.

De Witte and Moesen (2010) use the tax burden as a percentage of GDP as measure of the size of public sector and find that the optimal tax burden for 23 Organisation for Economic Co-operation and Development (hereinafter: OECD) countries is approximately 41% of GDP suggesting an average decrease of the public sector by more than 3%. On the other hand, using total general government expenditures as a percentage of GDP, Chobanov and Mladenova

[2] For a more exhaustive explanation of the reasons for downward slope of the cure shown on Figure 3, see Mitchell (2005).

(2009) conclude that the optimal size of government for the 28 OECD countries is at 25%. Using the tax burden as a percentage of gross national product as a measure of the government size, Scully (1994) calculates that the optimal size of the United States (hereinafter: US) government is between 21.5-22.9%.

Mutaşcu and Miloş (2009), using the total amount of public expenditures as a percentage of GDP, find that the optimal size of government for EU-15 is around 30%, while for the EU-12 countries it is roughly 27%. These findings suggest a necessary government spending reduction of 16% for EU-15 and around 13% for EU-12. Although authors use a small data range period of nine years as opposed to 33 years used by De Witte and Moesen (2010), 37 years used by Chobanov and Mladenova (2009) or Pevcin's (2004) 46 years, the results point to the fact that most EU countries need to reduce the size of their public sectors.

However, these empirical analyses of the optimal size of the public sector need to be calculated on the case-to-case basis. The results are country specific as well as time specific. Therefore, we see the analyses of the impact of government expenditures on the economic growth as more meaningful. Using random coefficient model, Dar and AmirKhalkhali (2002) analyse the impact of large government on economic growth. The analysis is performed on a sample of 19 OECD countries over a period 1971-1999. Authors conclude that a larger government affects economic growth through its adverse impact on factor productivity.

The negative impact of the size of government on economic growth is also confirmed in the studies of Afonso and Jalles (2011) and Gwartney et al. (1998). Using a panel of 108 countries over the period 1970-2008, the first authors also find that fiscal rules and institutional quality have a positive impact on economic growth. While the second group of authors, using a sample of 23 OECD countries and covering period 1960-1996, conclude that, a 10% increase in government expenditures, expressed as a share of GDP, will cause around 1% decrease of economic growth. However, Heitger (2001), using a data on 21 OECD countries for the period 1960-2000, finds that a 10% decrease of government size, as measured by total expenditures as a share of GDP, will cause an increase of approximately 0.5% points of the economic growth. On the other hand, Pevcin (2004) finds that a 1% increase in government spending will cause around 0.15% decrease of economic growth.

Analysing EU countries, Tsouhlou and Mylonakis (2011) observe that countries with large governments have economic growth rate of 1.4-3%. Countries with medium-sized governments have an economic growth rate of 1.5-4.6%, while countries with small governments experienced an economic growth rate in range of 3-7%.[3] Using a sample of 72 countries over the period 1960-1985, Barro (1991) finds that public consumption expenditure has a negative effect on economic growth while public investment expenditures affect economic growth and private investments in a positive way. Afonso and Furceri (2008) analyse the impact of overall

[3] Countries in which public expenditures as a share of GDP exceed 50% are said to have large public sector or big governments. If public expenditures as a share of GDP are in a range of 40-50%, country is said to have a medium-sized public sector. Finally, if public expenditures as a percentage of GDP are lower than 40%, public sector is small.

government expenditures and revenues, as well as its different components, on the economic growth using a sample comprised of OECD and EU countries for the period 1970-2004. Authors conclude that an increase of total government revenues and expenditures, as well as their certain categories, has a negative impact on economic growth that is more pronounced in EU countries.

As summarised above, there is a number of research dealing with the impact of public expenditures on economic growth, as well as with the analyses of the optimal size of government.[4] All of the studies suggest that government expenditures, or more precisely public sector size should be much lower than what it currently is in most of the countries. The necessary reduction in government spending effectively implies that more has to be done with fewer resources. In other words, governments need to, if they are not, become efficient.

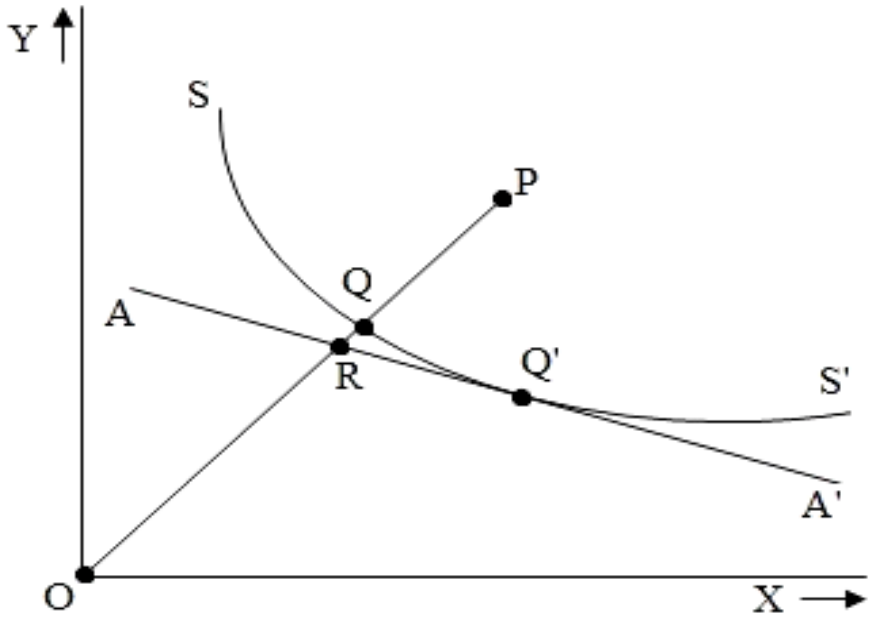
1.5 Technical Efficiency

Efficiency is one of the basic concepts encountered when studying microeconomics. Although usually attributed to the private sector, currently a certain attention has been shifted to the efficiency of governments. When discussing efficiency one has to be aware of its different types. Farrell (1957) states that a firm's efficiency can be divided on technical and allocative efficiency, which together form economic efficiency.[5] Allocative efficiency "measures a firm's success in choosing an optimal set of inputs [in regards to their prices]", while technical efficiency measures a firm's "success in producing maximal output from a given set of inputs" (Farrell, 1957, p. 259). The previous definition of technical efficiency is output oriented; however, technical efficiency can be defined from an input perspective as well. The input oriented technical efficiency can be defined as a firm's success in producing a current level of outputs with the minimal use of inputs.

On the Figure 4, used from the original Farrell's (1957) work, we have a simple production process that uses two inputs, X and Y, to produce one unit of output. The combination of the two inputs, per unit of output, is represented with the point P. The curve SS' is the efficient frontier and it represents "The set of minimum inputs required for a unit of output" (Herrera & Pang, 2005, p. 2). This frontier represents perfectly efficient combinations of the two inputs, per unit of output. Every point on the SS' curve is efficient, such as point Q. Obviously the firm P is not on the SS' curve; hence, it is inefficient in its production of one output. Using the same inputs, firm Q produces OP/OQ times more output then the firm P. From an input orientation, firm Q produces the same amount of output as firm P but uses only OQ/OP as much of each input. Farrell (1957, p. 254) defines the ratio OQ/OP as "the *technical efficiency* of the firm P". This ratio takes the value in range 0-1, with the value of 1 assigned to an efficient firm.

[4] For a more comprehensive overview of research on presented issue, see Chobanov and Mladenova (2009).
[5] Farrell (1957) refers to the allocative efficiency as the price efficiency, while for the economic efficiency he uses the term overall efficiency. Following the most recent literature, we will use terms allocative and economic efficiency (Coelli, 1996).

Figure 4. Technical and Allocative Efficiency



Source: M. J. Farrell, *The Measurement of Productive Efficiency*, 1957, p. 25, Diagram 1.

Due to the available data, or more precisely the lack of information on input prices, we aim to measure the technical efficiency of governments. It is argued that technical efficiency is compatible with the realization of a variety of objectives that are explicitly or implicitly ascribed to the public sector (De Borger, Kerstens, Moesen, & Vanneste, 1994).[6]

1.6 The Need for Public Sector Efficiency

Governments use different kinds of inputs, e.g. money, labour, legislation, etc., to provide different outputs to its citizens such as infrastructure, public goods and services. Therefore, governments are regarded as producers. One of the most valuable principles for any producer is efficiency and this is no different for governments as well, even though they tend to use different inputs and provide different outputs not usually encountered in the private sector.

Public sector efficiency can be defined as its ability to produce the current level of public output with minimal use of inputs. Alternatively, from an output perspective, public sector efficiency represents its ability to produce maximal level of public output with the current level of inputs. However, public sector efficiency can also be defined as "relation between the economic and social effects resulted from implementing a program and effort made to finance that program" (Mihaiu, Opreana, & Cristescu, 2010, p. 136). Although, the second definition may be viewed as more appropriate due to its broader context, the notion of efforts made to finance that program makes it hard for empirical testing. On the other hand, the first definition has its own vagueness

[6] For this reason, we do not provide a detailed explanation of allocative efficiency even though it is represented on Figure 4. For a detailed explanation of allocative and economic efficiency, one is referred to Coelli (1996), Farrell (1957) and Herrera and Pang (2005).

and difficulties such as the precise definition of what actually is public output and how to purify it from the impact of other factors beyond simple government spending. Nevertheless, we are more inclined to the first definition.

There are numerous reasons for government efficiency. Some of them are also encountered in the private sector such as accountability to the financier. Managers of private companies are required to be efficient in terms of spending shareholders money. In the same line of reasoning, governments are accountable to citizens that are their main financiers. However, there are many other reasons for public sector efficiency that arise only in this sector due to its uniqueness. First, government expenditures are found to have negative effect on economic growth.[7] For that reason, governments should be focusing on lowering their spending and accomplishing more with fewer resources. However, even if the governments neglect the negative effect of its expenditures on growth, they face certain difficulties in collecting revenues. Taxes are, as later shown in the subchapter on government finances in SEE countries, the primary source of public revenues. Generally, people are unaware of the amount they pay for taxes. However, this does not imply that tax rates can be raised indefinitely. A high tax rate on salary, saving, or investment will discourage people to work, save or for that matter invest, causing a deterioration of the tax base. Furthermore, due to globalization people are empowered with greater mobility that puts further constraints on collection of public revenues (Afonso, Schuknecht, & Tanzi, 2006). Nevertheless, when governments encounter a lack of public revenues instead of cutting expenditures they usually resort to borrowing. However, even international organizations such as the World Bank and the IMF "often express concern about governmental activities that they consider inefficient or unproductive" (Tanzi, 2004, p. 2).

These are some of the difficulties that countries around the world are already experiencing. However, the future holds even greater problems such as ageing and rapidly declining population, higher spending on life-long learning, pensions and long term care, and the question of environment is not negligible as well (Mandl, Dierx, & Ilzkovitz, 2008; World Bank, 2007).

Confronted with these two opposite forces of decreasing public revenues and increasing demand for public good and services governments are faced with the necessity to become efficient. Furthermore, "a more efficient public sector is considered to be, in many countries, the only way to increase the quantity and quality of provided public goods without deepening budget deficits" (Zugravu & Sava, 2012, p. 423). As regards to developing countries, the need for government efficiency is even more pronounced due to their inherent deficiency of public revenues and, in that line of reasoning, structural budget deficits. The Wagner effect is also important. According to this effect, the demand for publicly provided goods and services increases as the country becomes richer (Hauner & Kyobe, 2010).

[7] The effect on government expenditures on economic growth is explained in more detail in one of the previous subchapters of the thesis.

2 SEE COUNTRIES: AN OVERVIEW

Throughout the thesis, we use the term SEE countries to indicate Albania, Bosnia and Herzegovina (hereinafter: B&H), Croatia, Former Yugoslav Republic of Macedonia (hereinafter: Macedonia), Montenegro, and Serbia. As of 2011, Croatia is mostly excluded from this region in different reports due to its accession to the EU on July 1st, 2013. However, since our empirical analysis is based on the data covering the period 2005-2010 Croatia is included in the analysis. On the other hand, Kosovo, a new country of the SEE, which declared its independence from Serbia in 2008, due to the lack of reliable data is excluded from the analysis.[8] In addition, following the breakdown of the Socialist Federal Republic of Yugoslavia (hereinafter: SFR Yugoslavia), Serbia and Montenegro were one country until 2006, and therefore certain data are presented as aggregates for the two countries.

In the presentation of key economic indicators of SEE countries, in light of better understanding of the overall economic circumstances, occasional comparison to Central-Eastern European (hereinafter: CEE) countries is done. We use the term CEE to indicate Bulgaria, Hungary, Latvia, Lithuania, Poland, and Romania. These are all transition countries but also member states (hereinafter: MS) of the EU. According to IMF, the countries of CEE as well as SEE belong to the group of 'emerging market and developing countries' and due to their similarities we find their comparison more meaningful than a comparison to EU MS, as usually done.

According to the World Bank (2013), SEE countries are upper middle-income countries except Croatia, a high-income country, as shown in Table 1. The SEE market is relatively small, if we take into account that it is comprised of six countries. Croatia is the richest SEE country, while Serbia is the most populated. Montenegro is the smallest country, in terms of population as well as GDP.

Table 1. Country Data

Country	**Income level**	**GDP (in billions of current US$)**	**Population (in millions)**
Albania	Upper middle-income	13.12	3.162
B&H	Upper middle- income	17.05	3.834
Croatia	High-income	56.44	4.267
Macedonia	Upper middle-income	9.62	2.106
Montenegro	Upper middle-income	4.23	0.621
Serbia	Upper middle-income	37.49	7.224
Total SEE		137.95	21.214

Source: World Bank, *Countries and Economies*, 2013.

[8] Until 17th February 2013, 98 countries have recognized Kosovo as an independent state (De Launey, 2013).

2.1 Progress in Transition

According to the transition indicators developed by European Bank for Reconstruction and Development (hereinafter: EBRD), SEE countries have finished their transition in the area of price liberalisation, and trade and Forex system (see Appendix A). The performance in these areas is comparable to those of industrialised countries. The lowest transition is in the areas of government and enterprise restructuring, as well as competition policy. The governments should give more attention to the enforcement of bankruptcy legislation and strengthen competition. The progress in large and small-scale privatization lies somewhere between the two aforementioned areas, although better results are identified in the area of small-scale privatization. However, the countries have announced a second wave of privatization, shown in Table 2. The share of private sector in GDP in 2010 was the largest in Albania (75%), followed by Croatia (70%), while Serbia and B&H both have the lowest share of the private sector in GDP with 60% (EBRD, 2013a). Although CEE countries report better results in transition process, the share of private sector in GDP is only 7.5% points higher than in SEE (EBRD, 2013a).

Table 2. Announced Privatizations in SEE Countries

Country	Company	Sector/Industry
Albania	• Four small hydropower plants: Albpetrol	• Energy
Macedonia	• AD OHIS	• Chemical industry
	• EMO Ohrid	• Electronics industry
	• Tutunski kombinat AD Prilep	• Tobacco industry
	• 11 Oktomvri Eurokompozit Prilep	• Military industry
Montenegro	• AD Montecargo Podgorica	• Transport and logistics
	• Montenegro Airlines AD Podgorica	• Transport
	• AD Kontejnerski terminal i generalni tereti Bar	• Transport and logistics
	• AD Zora Berane	• Food
	• Jadransko Brodogradilište AD Bijela	• Shipyard
	• HG Budvanska rivijera AD Budva	• Tourism
	• HTP Ulcinjska rivijera AD Ulcinj	• Tourism
	• Institut crne metalurgije AD Nikšić	• Metals
	• Fabrika elektroda Piva	• Electronics
Serbia	• Telecom Serbia	• Telecoms
	• JAT Airways	• Air transport
	• Galenika	• Pharmaceuticals
	• Smederevo Steel Mill	• Steel
	• Bor Mining Company (partial)	• Mining

Source: World Bank, *South East Europe Regular Economic Report No.3, From Double-Dip Recession to Accelerated Reforms*, 2012b, p. 31, Table 7.

2.2 Key Economic Indicators

2.2.1 Gross Domestic Product

The data on GDP annual growth rates shows a rather diverse picture of SEE countries (see Appendix B - Figure 1.). Albania's average annual growth rate, for the period 2000-2012, is the highest with more than 5%, while the lowest growth rate is found in Croatia with 2.10%. The negative growth rates are encountered in 2009, the cause of which is the financial crisis of 2007. The sharpest decline of GDP growth rate was in Montenegro, while Albania was the only SEE country that did not experienced negative GDP growth although the annual GDP growth rate did fall sharply. The countries, except Croatia, managed to pull out from the crisis, and experienced positive annual GDP growth rates following years. Although GDP growth rates of CEE countries are higher than in SEE countries, they appear to follow a similar trend of growth. Based on the predictions of IMF, the highest average GDP growth for the period 2013-2018 is expected in Macedonia with more than 3%, followed by B&H with 3%. The lowest average GDP growth is predicted in Croatia with only 1.73%.

However, a more similar situation in SEE countries is evident from the data on GDP per capita (see Appendix B - Figure 2.). Nevertheless, in this case Croatia stands out and can be seen as an outlier, with its GDP per capita almost two times larger than the average for the rest of SEE countries, and even significantly higher than the average for CEE countries. Montenegro, for the past four years, has a GDP per capita higher than the average for SEE, while the rest of the SEE countries lie below the average line.

2.2.2 Unemployment

The unemployment rates are relatively diverse and generally high in SEE countries (see Appendix C - Figure 3.). The average unemployment rate in SEE is more than two times higher than in CEE countries. Macedonia has the highest average unemployment over the last 12 years, followed by B&H. The lowest unemployment is in Croatia. Once again, the impact of 2007 crisis on the region is evident. Before the crisis, every country experienced a decrease in unemployment rates followed by sharp increase in 2008. The countries are struggling with the problem of increasing unemployment over the last four years with only Serbia succeeding on notable lowering of the unemployment rate in 2011. According to the World Bank (2012a), so far, SEE countries economic growth has not been effective in reducing unemployment. The need for labour-absorbing growth is emphasised by the fact that with the current pattern of growth, it would take five years of strong growth of average 5%, or more, to significantly lower unemployment rates, by approximately 5% overall (World Bank, 2012a).

The high unemployment rates in SEE countries can be partially attributed to labour regulations and the legacy of economic transformation of the 1990s, when a substantial share of capital was rendered obsolete (World Bank, 2012b). There is a fine line between protecting the worker and overwhelming regulations, which constrain the creation of new jobs. The Labor Efficiency Index, developed by the World Economic Forum (hereinafter: WEF), reveals moderate labour

efficiency in SEE, signalling a need for easing of regulations (see Appendix C - Figure 4.). Average rankings and score values for the period 2006-2013, show that Montenegro has the highest labour efficiency, followed by Albania, while the worst performers are Serbia and Croatia.

2.2.3 Inflation

The highest average rate of inflation, for the period 2000-2013, is found in Serbia and Montenegro. The rankings stay the same even when data for 2000 and 2001 are excluded as outliers. Average rates of inflation for the rest of the countries are in range 2.76-2.96%. After 2007, the movement of inflation in SEE countries, except in Serbia, follows a rather similar trend and values. The movement of inflation is estimated to continue in the near future, indicating monetary stability of the region (see Appendix D).

2.2.4 Foreign Direct Investment

The analysis of data on Foreign Direct Investment (hereinafter: FDI) in SEE countries allows us to identify a trend of rising investment (see Appendix E - Table 3.). However, the two countries that stand out are Montenegro and Albania. Since 2008, the average inflow of FDI is the highest in Montenegro, and it peaked in 2009. However, next year the inflow of FDI was almost 50% lower. Albania is the only SEE country that avoided the impact of the 2007 crisis, in regards to FDI. Most severe impact of the crisis on FDI was in B&H. If one looks at the data on FDI inflow per capita, Montenegro is still the leader in attracting foreign investors but this data also reveals the Croatians strong position as country attractive for investing over the last 11 years, confirming its superior economy of the region (see Appendix E - Figure 5.).

According to the Doing Business survey, in SEE region it is easiest to do business in Macedonia, which ranks 23rd, and hardest in B&H which ranks 126th (World Bank & International Finance Corporation, 2011). However, recognizing the beneficial effect of FDI on employment and economic growth countries have undertook reforms to make their economies more investment-friendly. Over the past five years, Macedonia in 2006/2007 and in 2008/2009 Doing Business Report, Albania in 2007/2008, and Croatia in 2006/2007 are recognized as the top 10 Doing Business reformers (World Bank, 2008; World Bank & International Finance Corporation, 2011). For investors the most important constrain to FDI inflows into SEE is political instability such as unresolved political status of Kosovo, the political fragmentation of B&H, and ethnic strife in Macedonia, followed by the low level of infrastructure quality and underdeveloped economic policy and regulatory framework (Foreign Investment Advisory Service, 2007).

One of the positive examples of FDI inflow in SEE region is the FIAT investment in Serbia. Serbia's government and FIAT established a joint venture. It is expected that this investment will generate revenue of approximately 2 billion € in 2013, which will account for around 6% of Serbia's GDP (World Bank, 2012b). Although quite simplified, this FDI example provides support to Barro's (1991) finding that public investment influences private investment in a positive way.

2.3 Public Finance

2.3.1 Public Expenditures

SEE governments spend a rather diverse amount of public money. When expressed as a percentage of GDP, general government expenditures are highest in B&H and lowest in Albania (see Appendix F - Figure 6.). If we measure the size of the public sector using government expenditures as a percentage of GDP, we can conclude that, on average, SEE countries have a medium-sized public sector. Or more precisely, Albania and Macedonia have a small public sector, while the rest of SEE have a medium-sized public sector. All of the countries, high and low spending, increased their expenditures prior to the crisis, 2006-2009. After that, a general trend of lowering public spending emerges, however, at different pace in different countries.

In the case of general government final consumption expenditures, Albania can be treated as an outlier with its average final consumption expenditures more than two times smaller than the average for the rest of SEE countries (see Appendix F - Figure 7.). The legacy of the past regime is obvious from the data on government spending on the health sector (see Appendix F - Figure 8.). The public health expenditures as share of GDP account, on average, around 5% of GDP in SEE. Albania, with average health expenditures in the period 2000-2011 being 2.54% of GDP, two times smaller than SEE average, emerges as an outlier in terms of government spending on health. While, Croatia, in the same period, spent more than 6% of GDP on health expenditures and therefore covered more than 84% of total health expenditures. The rest of the SEE governments cover around 65% of total health expenditures, while that percentage is significantly lower in Albania, 41.35% (Public Health Expenditures (percent of total health expenditure), n.d.).

In the category of current expenditures, SEE countries in 2010 spent a significant amount of public money on social benefits, around 14% of GDP. Social awareness is the highest in Serbia. The second largest category of government expenditure is the compensation to employees, on which SEE countries in 2010 spent on average 10% of GDP. Government expenditures on personnel cost are the highest in B&H. B&H complex institutional environment certainly contributes to these costs. It is the only country in our sample with three levels of sub-sovereign governments. The first level are the two entities: Federation of B&H (hereinafter: FB&H), Republic of Srpska and the Brčko District. Second level are cantons, 10 in FB&H, and the third level government are municipalities, 80 in FB&H and 63 in Republic of Srpska (Network Associations of Local Authorities of South East Europe, 2012). Among SEE countries, Albania and Croatia are paying the most on interest. The payment of interest is in line with the country's public debt level. Albania has the highest ratio of public debt to GDP and spends the most on interest payment, while the opposite is true for B&H (see Appendix F - Figure 9.).

2.3.2 Public Revenues

Public revenues have mostly followed the movement of public expenditures in SEE countries however at lower levels (see Appendix G - Figure 10.). Having this problem, countries undertook a serious of different measures. Montenegro increased excise duties, Serbia raised value added tax (hereinafter: VAT) rate and corporate income tax rate, while Macedonia and Montenegro also started to cut public spending, B&H resorted to international lending, and Albania puts hopes in the revenues from announced privatization (World Bank, 2012b).

Taxes are the primary source of public revenues in SEE countries in 2010. They account from roughly 22% of GDP in Croatia, to more than 37% of GDP in B&H. In the category of tax revenues, VAT accounts for the largest share. The highest VAT rate is in Croatia (23%), followed by Albania (20%), Macedonia and Serbia (18%), while B&H and Montenegro have the lowest VAT rate in the region (17%) (Doing Business, 2013). After the taxes, second largest source of government revenues are social security contributions (see Appendix G - Figure 11.).

2.3.3 Public Debt

The review of public expenditures and revenues shows that SEE governments are spending more than they collect public revenues. As in case of individuals or private companies, the government's ability to borrow money allows them to spend more than they actually have. Put simply, public debt is the amount that country owes to its creditors, both internal and external. According to the Maastricht Treaty, public debt should not be higher than 60% of GDP. Although this 60% threshold is generally considered acceptable and sustainable, the countries environment, as well as, borrowing conditions should be taken into account. A new agreement is emerging that the level of public debt for advanced countries should not exceed 60% of GDP, while in developing countries, including SEE, it should not exceed 40% of GDP (World Bank, 2012a).

Structural budget deficit, deficit that appears every year, leads to accumulation of the public debt. Albania and Croatia are the two countries that have never over the period 2000-2013 succeeded to cover their government spending with the collected revenues, and this is predicted to remain in the near future (see Appendix H - Figure 12.). The rest of the SEE countries experienced budget surplus in two or three years, mainly in the period 2004-2007. Over the period 2011-2013, B&H is the only SEE country with the level of budget deficit in line with the Maastricht criteria. According to the predictions, only B&H will manage to break the vicious circle of structural budget deficit after 2016. The rest of the countries will continue to fight with deficits, namely Albania and Serbia, and less severely Croatia. On the other hand, Macedonia and Montenegro should be able to control their budget deficits.

In 2012, Albania and Serbia are the only two SEE countries that have breached the 60% public debt limit, which is predicted to continue to rise over the next five years (see Appendix H - Figure 13.). On the other hand, Croatia is expected to break the Maastricht criteria in 2014, a year after its accession to the EU.

The data allows us to identify two distinct periods in regards to the public debt levels of SEE countries. The first period is 2000-2008 and it is characterised by decreasing debt levels, although by different percentage points in different countries. The second period, after 2008, is characterized by increasing public debt levels in every SEE country, and this trend is likely to continue for most countries in the future. B&H is the only country with predictions of decreasing public debt levels, while the public debt of Macedonia is supposed to remain stable around 30% of GDP. The decreasing levels of B&H public debt can be attributed to its inability of borrowing rather than being a sign of sound public finances. However, all of the countries will need to make considerable efforts to keep the confidence of both, internal and external creditors, in order to be able to roll over their debt (World Bank, 2012b).

2.4 SEE and Integrations

The economic integrations of SEE countries can be analysed through three aspects. The first one is regional; the second one is their integration with the EU; and, finally, their global integration. Regional integration represents the integration of SEE countries among themselves. All of SEE countries as well as Moldova and Kosovo are members of Central European Free Trade Agreement (hereinafter: CEFTA). Due to its accession to EU, Croatia ceases to be a member of this trade agreement. The main objectives of the CEFTA are "to expand trade in goods and services and foster investment by means of fair, stable and predictable rules, eliminate barriers to trade between the Parties, provide appropriate protection of intellectual property rights in accordance with international standards and harmonize provisions on modern trade policy issues such as competition rules and state aid" (CEFTA, 2013). The regional integration is often emphasised as a precondition of further deeper integration of SEE countries with the EU as well as the rest of the world. Penev and Marušić (2011) suggest that deeper integration of SEE countries could be achieved through:

- further strengthening of the regional infrastructure,
- formation of the regions stock exchange, as a substitute for fragmented and non-sustainable national markets, and
- regional collaboration in improvement of legal and regulatory environment in the region.

The progress on global integration of SEE countries is quite diverse. Albania and Croatia are members of the World Trade Organization since 2000, Macedonia is a member since 2003, while Montenegro gained a status of member country in 2012. B&H and Serbia have a status of 'observer country'. Albania and Croatia are the only SEE countries that are members of the North Atlantic Treaty Organization (hereinafter: NATO), as of 2009.

As already stated, SEE countries are giving priority to the EU integration. However, they should recognize that "their relations with the EU will yield greater benefits, if they are pursued within a liberal trade environment towards the rest of the world; and the same is true for their relations with their neighbors which are also on a path to integrate in the European Structures" (Michalopoulos, 2003, p. 1).

3 LITERATURE REVIEW OF EMPIRICAL RESEARCH

The empirical research on public spending efficiency can be divided into three categories. The first one is the analysis of overall public sector efficiency, and this type of analysis is a rather scarce. The second category is the analysis of efficiency of municipalities. Finally, most of the studies of government efficiency focus on analysis of certain categories of government spending, mainly spending on health care and education.

3.1 Efficiency of Overall Public Sector

A great number of papers are written regarding the comparison of efficiency of public and private sector institutions, which we find inappropriate due to significant differences between the two sectors, as shown in Table 3.

Table 3. Public Organisation versus Private Organisation

Public Organisations	Private Organisations
• Are usually monopolies	• Operating on competitive markets
• Serve the citizens	• Maximize the investment's profit
• Are driven directly or indirectly by politicians, which should reflect the interest of the citizens	• Leaders of companies are responsible to shareholders, to the boards; they seek profit maximization
• State organizations are more rigid due to the process of decision making and implementation	• Are more flexible, easier to manage because the decision is taken by a single leader
• Distribute, redistribute and regulate resources	• Produce and distribute resources
• Are sometimes poorly funded, more or less	• Are financed under its productivity or if investment decision is feasible
• Citizens are often poorly informed about suspicious of government	• Investors and shareholders are well informed and the ongoing activities of the company and the market evolve

Source: Kotler and Lee in D. M. Mihaiu, A. Opreana, & M. P. Cristescu, *Efficiency, Effectiveness and Performance of the Public Sector*, 2010, p. 133, Figure 1.

In addition, Pedraja-Chaparro, Salinas-Jiménez, and Smith (2012) identify following characteristics as unique to the public sector:

- absence, or near absence, of market,
- multiple objectives such as efficiency, equity, etc.,
- diversity of principals that need to be satisfied, e.g. politicians, users, public, etc.,
- due to the absence of markets it is difficult to measure public output, and finally,
- absence of entry and exit option, in the sense that inefficient producers will be punished.

On the other hand, the existing studies of public sector efficiency analyse maximally seven areas that are supposed to be under high government influence. However, the modern governments are playing multiple roles ranging from safety to healthcare, economy to social welfare, education to manufacturing, financier to regulator etc., and a wider span of public services need to be taken into account (Pandya, 2012). Aware of the increasing roles of government, however due to rare research and following the previous literature on given topic, we will categorise the empirical research on efficiency of three or more areas under government influence as an analysis of overall public sector efficiency. As long as those studies provide us with an aggregate measure of efficiency, over the sectors in question. For example, Rahmayanti and Horn (2011) analyse public sector efficiency over three sectors; education, health and infrastructure, but also combine the three sectors and provide overall efficiency estimation. In the same way, Angelopoulos, Philippopoulos, and Tsionas (2008) measure government efficiency over education, administration, infrastructure and stabilisation but also provide overall efficiency estimation over the four sectors. Following the previous literature, we will classify such types of analysis as an analysis of overall public sector efficiency.

Afonso et al. (2005) conduct an analysis of overall public sector efficiency for 23 OECD countries for 1990 and 2000. The study reveals disparities in public performance and efficiency among countries. To analyse performance, authors use Public Sector Performance (PSP) and Public Sector Efficiency (PSE) indicator.[9] However, since PSE indicator provides only partial information on efficiency, a non-parametric Free Disposable Hull (hereinafter: FDH) analysis is also used. Main finding of the study indicates that most of the countries spend more than they should and need. On average, the countries could attain the current level of public output with around 80% of inputs currently being used. On the other hand, from an output perspective, with the current level of government spending, countries could attain 15% more public output. Analysis also shows that countries with small governments, report better results in performance and efficiency than big governments. This might be due to certain characteristics of small governments such as fewer policy induced distortions, lower tax burden, stronger impact of market forces and the absence of crowding out effects that distort incentives for capital formation (Pevcin, 2004). Authors confirm this finding in their paper on analysis of public sector performance and efficiency of 24 emerging economies. Afonso et al. (2006) again use PSP and PSE indicators with exception that, due to the lack of data, six sub-indicators are used for the construction of PSP. Novelty of this research paper, as opposed to one previously summarized, is that DEA is used to determine efficiency of emerging economies. Input efficiency results suggest that countries could accomplish same level of output with 45% less public spending, while output oriented efficiency analysis suggest that countries are only delivering around 67% of the output. Emerging markets in Asia are performing rather well with significant performance in administration, education, economic stability and growth, compare to diverse efficiency across new MS.[10] The new MS show significant performance in education and distribution, and weak

[9] A detailed explanation of the PSP and PSE indicator is available in latter chapters.

[10] The term 'new MS' stands for Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovak Republic, and Slovenia.

economic performance and efficiency of spending on stability. Tobit regression extends the analysis to identification of non-fiscal determinants of public sector efficiency using efficiency scores from DEA as the dependent variable.[11] Security of property rights, per capita GDP, competence of civil servants and education level of the population have positive effect on public sector efficiency. However, the data coverage in this paper is rather questionable. For certain categories of government spending such as total government spending, transfers and subsidies, interest payments, etc., average over the period 1999-2003 is used. While for other categories, such as government spending on education and health, average over the periods 1998-2001 and 1998-2002, respectively, is used. The same situation emerges in case of the socio-economic variables used in the construction of the PSP indicator. This diversity of data coverage is one of the main shortcomings of the analysis.

Efficiency of provision of government services in achieving high level of real GDP per capita, a low rate of unemployment and inflation, and a positive trade balance is analysed by Lovell, Pastor, and Turner (1995). They use a sample of 19 OECD countries, with data covering the period 1970-1990. DEA identifies Switzerland, Sweden, and Germany as the most efficient countries. However, even the authors are aware of the deficiencies of their analysis. The deficiency arises from the fact that "countries which attach relatively high weights to objectives other than specified [in the model] are penalized by our omission of such objectives" (Lovell et al., 1995, p. 516). Golany and Thore (1997) overcame this problem by analysing the efficiency of government in pursuing both, the economic and social objectives. The study uses a sample of 72 developed and developing countries, over the period of 1970-1985. Using DEA, authors draw three distinct conclusions. Japan, Canada, and the US are in the group of efficient countries with constant returns to scale, meaning that the increase of public inputs in these countries results in equal increase of public outputs. On the other hand, United Kingdom, Scandinavian countries, Australia, and New Zealand are inefficient countries with decreasing returns to scale, an increase of inputs causes a less than a proportional increase of outputs. The authors refer to these countries as being 'mature', meaning that the additional efforts to improve the analysed public services results in decreasing marginal returns. The average efficiency score of these countries is 0.765, suggesting that they can obtain the current level of public output with almost 24% less public spending. Finally, developing countries are referred to as the 'young' countries, which, although inefficient, experience increasing returns to scale. The marginal returns of investments on for example: health, education, and welfare, in these countries are increasing. Developing countries can attain the current level of public output with approximately 77% of inputs that they are currently using.

The efficiency of 14 OECD countries is also analysed by Adam, Delis, and Kammas (2011) over the period 1980-2000. They use a three stage analysis which is originally developed by Fried, Lovell, Schmidt, and Yaisawarng (2002, p. 164) in order to obtain "evaluation of producer performance couched solely in terms of managerial efficiency, purged of the effects of the

[11] When analysing determinants of public sector efficiency using scores of the DEA as the dependent variable, literature suggest the employment of Tobit regression since DEA results are bound to be in range from 0-1.

operating environment and statistical noise". In the first stage, DEA is used. Since DEA treats every country in the same way, Stochastic Frontier Analysis (hereinafter: SFA) is used in the second stage to separate government efficiency from the impact of macroeconomic conditions and luck. Using adjusted inputs that result from the second stage, DEA is repeated. However, comparison of the results obtained from stage one and three shows no significant differences, allowing general conclusion that "luck and superior socioeconomic environments appear to be less important than sound governance" (Adam et al., 2011, p. 174). Tobit analysis is used to analyse political determinants of public sector efficiency. Democratic participation, strong political leadership, right wing governments, and fiscal decentralization have a positive influence on the efficiency of public sectors.

Angelopoulos et al. (2008) use PSP and PSE indicators as well as SFA in their investigation of public sector efficiency of 64 countries over four five-year periods during a time span of 1980-2000. Switzerland is the most efficient country in the sample with possible government spending reduction of nearly 4%. While the least efficient Yemen, could attain the current level of public output with roughly 71% less public spending. In general, OECD countries are more efficient than the developing. Although PSE indicator is only a partial measure of government efficiency authors conclude that countries rankings do not change substantially with the employment of SFA. Using PSE results for 51 countries from the work of Angelopoulos et al. (2008), Hwang and Akdede (2011) analyse the impact of governance quality on public sector efficiency. The quality of governance is measured with two variables; control of corruption and government effectiveness. Three-Stage Least Square method shows that both variables bear a positive sign leading to a general conclusion that higher level of governance quality increases public sector efficiency. Authors also find that government spending has a negative effect on public sector efficiency.

Henderson and Zelenyuk (2007) use basic DEA model as well as its advancements to analyse efficiency of 52 developed and developing countries in 1965 and in 1990. Argentina, Mauritius, Netherlands, Sierra Leone, Spain, and the US define the 1965 best practice frontier. While Hong Kong, Italy, Mauritius and Sierra Leone define the 1990 frontier. Developed countries are generally more efficient. Authors identify a significant improvement in the efficiency of Hong Kong, South Korea, and Thailand, as well as in some Western European countries, such as Belgium, Ireland, and Italy. The analysis also provides some evidence of efficiency catching up between developed and developing countries, and efficiency convergence within the country groups. Herrera and Pang (2005) also identify the effect of catching up between efficient and less efficient countries in their analysis of efficiency of public spending on health and education.[12]

Rahmayanti and Horn (2011) analyse public sector efficiency as well as its impact on the optimal size of the government using a data on 63 developing countries over the period 1990-2003. In order to measure efficiency, they use output-oriented DEA-Variable Returns to Scale (hereinafter: DEA-VRS) model. Analysis shows that with the current level of government

[12] The finding of the two papers supports one another if one agrees with the assumption that developing countries are the less efficient countries, while developed countries are efficient ones, as suggested by majority of research.

spending, countries could accomplish 11% more public output. Another important conclusion of the analysis is that the optimal size of government for developing countries, with efficiency scores higher than 0.865, is 15% of GDP. Countries identified as being closest to their optimal government size are China, Tajikistan, and Costa Rica. Analysis also implies more general conclusion "that the optimal government size decreases when the efficiency of government spending increases" (Rahmayanti & Horn, 2011, p. 53).

Although central government expenditures cannot capture the entire public spending and are seen as a partial measure of government size, Rayp and van de Sijpe (2007) use it as input in their analysis of public sector efficiency using DEA. Out of 52 developing countries China, Malawi, and Russia are the efficient ones. However, results show that, on average, countries are delivering only 70% of output they could deliver if they were fully efficient. In the second stage of their analysis, authors identify certain determinants of public sector efficiency using General to Specific approach. Low adult literacy and a large share of youth in total population have a negative effect on public sector efficiency. While the efficiency increases with a high degree of urbanization, a good governance, and development aid. In general, structural country variables that reflect past policy and efficiency are main determinants of public sector efficiency. One of the main conclusions of the study is that, on average, Asian countries are more efficient than low-income European ones. Our main critique of this analysis is the different time coverage of used variables. Health and education indicators are analysed in the period 1995-1999. While government performance indicators are observed over a one-year period, in 1996.

Chong, La Porta, Lopez-de-Silanes, and Shleifer (2012) do a rather interesting analysis of government efficiency. As a measure of government efficiency authors use the efficiency of postal offices of 159 countries. They sent a letter to non-existent addresses and kept track of returned letters, as well as the time needed to get the letter back. Although authors see their analysis of one of the universal and traditional services of government, i.e. postal service, as an advantage of their analysis of government efficiency, we disagree. The overall government efficiency cannot be measured by a single public service no matter how universal it is. In order to gauge the true government efficiency one has to take into account as much as possible areas of government involvement. However, the overall efficiency shows that high-income countries returned most of the letters and in the smallest time range. Indicating that, the most efficient countries are high-income countries, namely Canada, Norway, Germany, and Japan. While African countries, as least developed countries, are the least efficient. The authors did not receive any letters from Tajikistan, Cambodia, and Russia. As the determinants of government's efficiency, or more precisely postal service efficiency, authors find inputs, technology, and management. This comes as no surprise since traditional mail has been widely replaced by e-mail, fax-mail, etc. Therefore, governments around the world are hardly investing any money in postal services due to their obsolescence. This actually provides another reason for the inadequacy of the analysis of government efficiency by measuring postal service efficiency.

Using the methodology of opportunity and "Musgravian" indicators of Afonso et al. (2005), Chan and Karim (2012) analyse public sector efficiency of East Asian countries for the period 2000-2007 using DEA.[13] Among the sample countries, China is the most efficient with the highest efficiency scores in four out of seven analysed areas, namely education, health, economic performance, and stability. In terms of public spending on infrastructure Japan is the most efficient. In terms of spending on administration, Singapore is the most efficient East Asian country. Using Tobit regression authors find that political stability and financial freedom have a positive impact on public sector efficiency. On the other hand, voice and accountability, and trade freedom have a negative effect on public sector efficiency.

Lovell (1995) performs analysis of efficiency of 10 Asian countries for the period 1970-1988 and employs the FDH method.[14] Author uses four indices of macroeconomic performance as output measure, while macroeconomic decision-making apparatus is used as input.[15] The Asian countries report an average efficiency score of 0.909, suggesting that countries waste around 10% of public money. With possible government spending reduction of 1.20% and 3.10%, Taiwan and Japan are the most efficient countries. Philippines and Australia are the inefficient countries in the sample, with possible input reduction of approximately 24% and 15%, respectively. The sample countries are, on average, more efficient in terms of public spending on controlling employment and maintaining price stability than at promoting growth and trade.

Wang and Alvi (2011) analyse the efficiency of government spending in raising GDP. Although one might question the classification of this analysis as an analysis of overall public sector efficiency, we find it to represent exactly that. GDP is an indicator of economic development of a country and it is inevitable in the studies of macroeconomics. The countries that report higher GDP are supposed to have less unemployment, better living standards, etc. In essence, aren't these the primary goals of every country? Moreover, in that line of reasoning, isn't a higher GDP a basic goal of every country?[16] For the analysis, a sample of seven East Asian countries is used with data coverage over the period 1986-2007.[17] For efficiency estimation, DEA is used. On average, Asian governments waste around 50% of their expenditures when promoting the growth of their economies. The least efficient is Thailand, which wastes 77% of resources. The opposite is true for Japan, with a waste of resources of around 34%. In the second stage of analysis, using Tobit regression, determinants of government efficiency are identified. Authors find that a higher share of private activities in the economy increases government efficiency. On the other hand, higher corruption, and monetary expansion, increase inefficiency of government. However, government size does not have any significance for the efficiency scores obtained. On the other hand, authors find that government efficiency is higher in times of recession.

[13] East Asian countries according to Chan and Karim (2012) are Indonesia, Malaysia, Philippines, Singapore, Thailand, China, Japan, and South Korea.
[14] The 10 Asian countries are Hong Kong, Singapore, South Korea, Taiwan, Thailand, Japan, Australia, Indonesia, Malaysia, and the Philippines.
[15] For a detailed elaboration of input and output variables used see Lovell (1995, p. 166).
[16] Mandl et al. (2008) argue that public spending should be directed to main goals of a country that are stabilisation, adjustment, sustainability, growth, and equity. While Lovell et al. (1995) names higher GDP per capita, low rate of inflation and unemployment, and a favourable trade balance as primary macroeconomic goals of government.
[17] The seven East Asian countries are Japan, Singapore, Taiwan, Honk Kong, Malaysia, Thailand, and Korea.

The impact of restrictive fiscal and budgetary policy in the form of public wage cuts, a more rigid control of government consumption expenditures, and the reform of education and social expenditure on public sector efficiency is analysed by Zugravu and Sava (2012). The analysis is performed for Romania's public sector with comparison of 2008 and 2011 efficiency results. Although authors only calculate PSP and PSE indicators, without the employment of a more valuable method of efficiency estimation, e.g. DEA or SFA, with a rather narrow data observation we find the analysis interesting. The analysis sheds some light on notion whether lower spending necessarily implies higher efficiency. Authors conclude that even though PSP indicator did improve after the new, tighter, government measures, the same conclusion cannot be drawn in the case of PSE indicator. Although efficiency decreased, it is not entirely due to the restrictive fiscal and budgetary policy but authors argue, due to the inadequate measures implemented to cut government expenditures and the lack of long-term assessment of introduced measures. The findings of this analysis can be seen as opposite to the finding of Wang and Alvi (2011) that government efficiency is higher in times of recession.

The literature review of empirical analysis of government efficiency allows drawing of certain conclusion. In general, governments all around the world are spending more than needed to obtain the current level of public output. A possible reduction of government expenditures ranges from, for example, 1.20% for Taiwan to 29.20% for Yemen. On average, developed countries report higher efficiency scores than developing ones. Analysis of efficiency of OECD governments shows that non-European are more efficient than the European governments. On the other hand, analysis of public sector efficiency in developing countries shows that Asian governments are more efficient in terms of spending public money than their European counterparts. The studies also identify certain determinants of public sector efficiency. Political stability, rule of law, democratic participation, less civil liberties, education level and other variables have a positive effect on government efficiency.

3.2 Efficiency of Municipalities

Besides the analyses of government efficiency on international basis, there are also analyses of public sector efficiency in a single country. Barankay and Lockwood (2007, p. 1198) argue that "fiscal decentralization, the allocation of tax and spending powers to lower levels of government, is now an established policy objective in many developed and developing countries". Literature predicts positive influence of decentralization on public sector efficiency, since government is supposed to have better information about the needs and problems of local inhabitants, population has greater influence over local politicians, and there is significant competition between local governments. In addition, comparison of municipalities' efficiency has more meaning since they are under the same socio-economic environment, data is usually provided by the national statistical agency ensuring the same methodology, cost of inputs is relatively homogenous, etc. However, empirical results, as summarised below, generally do not confirm these predictions.

The sectors over which efficiency of municipalities is analysed are rather diverse. While some authors analyse efficiency over sectors which can be treated as under local as well as under general government control such as education and health sector. Others analyse municipal efficiency over sectors that are under explicit jurisdiction of local government. In addition, the analyses that use DEA employ different models in terms of number of input and output measures used. For example, one model uses only one input variable and one output variable, a second model uses two input measures and five output measures etc., this increase of number of input and output variables used in DEA leads to higher efficiency scores.[18]

Hauner (2008) analyses efficiency of 79 subnational governments in Russia using data for 2004, while in the case of variables with significant variations, average over several years is used. Efficiency analysis is performed using PSP and PSE indicator as well as DEA. Although regions spend significantly different amount of money, the PSP levels are relatively similar while PSE scores indicate significant public inefficiency in most of Russia's regions. Overall, analysis shows that Russia's regions could produce the same level of outcome with 50-70% of input currently used. In the second part of the analysis, Ordinary Least Square (hereinafter: OLS) method is used to analyse determinants of efficiency of subnational governments in Russia. Out of 19 variables, only higher per capita income, a smaller share of federal transfers in subnational government revenue, better governance, stronger democratic control, and less public spending have a positive impact on public efficiency.

Efficiency of municipalities is analysed by Afonso and Fernandes (2006) on a sample of 52 Portuguese municipalities. Authors develop composite indicator of municipal performance, the so-called Total Municipal Output Indicator (hereinafter: TMOI).[19] This composite indicator is later used as output in DEA, while per capita municipal expenditures are used as input measure. Analysis shows that Portuguese municipalities could produce the current level of public output with around 41% less resources. In addition, lower efficiency scores are generally found in municipalities with higher levels of per capita expenditures, while greater efficiency is registered in metropolitan municipalities.

A rather great number of research deals with the efficiency of Belgian local governments. De Borger et al. (1994) using 589 Belgian municipalities and data for 1985 perform one such study. FDH method is used, with input and output orientation, as well as the Farrell's graph measure that combines the two orientations. Authors also employ Tobit analysis to determine whether structural characteristics and institutional environment has influence on municipality's efficiency. Population size and level of education of inhabitants have a positive impact on municipality's efficiency, average personal income has a negative effect, as well as the number of parties in a municipal coalition, presence of the liberals, and block grants. On average, Belgian municipalities could produce current level of public goods and services with around 3-14% less spending, depending on the specification of the number of outputs and the particular

[18] For a detailed review of empirical studies of local government efficiency with the listing of input and output variables used one is referred to Nikolov and Hrovatin (2013, p. 746).
[19] For a more detailed explanation of the TMOI see Afonso and Fernandes (2006, p. 43).

efficiency measure used. On the other hand, from an output perspective, depending on the specifications of the analysis, with current level of resources used the municipalities could attain roughly 0.90-3% more output. Geys and Moesen (2008) perform an assessment of efficiency of 304 municipalities in Belgian region Flanders, over a broader area of government services for year 2000. The three measures, i.e. DEA, FDH, and SFA, show a certain scope for possible increase of municipal efficiency. Although quantitatively different results are obtained depending on the method used, they support similar conclusion as to the relative efficiency of the municipalities. In that line of reasoning, municipalities' waste, on average, around 5-50% of resources used, depending on the method employed.

Ashworth, Geys, Heyndels, and Wille (n.d.) also use the sample of 308 Flanders municipalities in their analysis of the influence of political competition on public sector efficiency. Analysis using OLS, Tobit, and Instrumental Variable (IV) estimation methods shows that political competition at election leads to higher government efficiency, while, on the other hand, a more fragmented government is less efficient.[20] Although the two findings are in contradiction, authors conclude that the positive effect of political competition outweighs the negative of government fragmentation, while income distribution and population density do not have any effect on municipalities efficiency, whereas results on grants are not robust. On the other hand, budget surplus from previous period and right wing government have a positive effect on efficiency. However, debt from previous period, larger government as measured by tax burden, and higher income per capita increase local government inefficiency.

Sampaio de Sousa and Stošić (2005) analyse efficiency of 4 796 Brazilian municipalities. Since both, DEA and FDH, methods are sensitive to the presence of outliers and data errors authors use the so-called Jackstrap method to eliminate these problems. The analysis shows that out of 3 434 municipalities, with up to 19 999 inhabitants, only 1.11% are efficient under DEA. Relatively same results are obtained using FDH method. Authors conclude that municipal efficiency is positively related to their size, indicating that larger the municipality, the higher the efficiency. According to DEA-Constant Returns to Scale (hereinafter: DEA-CRS), municipalities could produce the current level of public output with around 33% less spending. The efficiency scores under DEA-VRS are slightly lower, suggesting that municipalities waste on average 34% of resources. However, the efficiency estimation under the FDH method gives significantly different results, suggesting a necessary input reduction of only 6.30%.

Šťastná and Gregor (2011) perform an analysis of efficiency of 202 Czech municipalities, for the periods 2003-2008 and 1994-1996. Input oriented DEA shows that municipalities are able to attain the current level of output using only around 52-79% of inputs currently being used, depending on the DEA specification of returns to scale. Authors also find that population size, distance to regional centre, share of university-educated citizens, capital expenditures, subsidies per capita and the share of self-generated revenues increase inefficiency. On the other hand,

[20] This finding is also robustly confirmed in Borge, Falch, and Tovmo (2008) analysis of Norwegian municipalities using Herfindahl-Hirschman index to measure the degree of party fragmentation. Authors even quantify the relationship, „If the Herfindahl-Hirschman index is reduced by 10 percentage points (indicating more party fragmentation), efficiency is expected to be reduced by 2.4 percentage points" (Borge et al., 2008, p. 486).

political variables with a positive impact on efficiency of municipalities are increase in party fragmentation, voters' involvement, and local council with a lower share of left-wing representatives. The comparison of efficiency scores of the two periods shows that efficiency of small municipalities increased significantly more than the efficiency of large municipalities.

Geys, Heinemann, and Kalb (2010) focus on the impact of voter involvement on municipalities' efficiency. They use a sample of 987 German municipalities and data for the years 1998, 2002, and 2004. Besides confirming the positive impact of voter involvement on efficiency, authors also find that this relationship is not automatic "rather, it is stronger when the degree of fiscal autonomy of the municipality is higher" (Geys et al., 2010, p. 274).

Using DEA and SFA, Nikolov and Hrovatin (2013) analyse the efficiency of Macedonian municipalities. Analysis reveals that the municipalities could attain the current level of public output with 40% less resources. Determinants that have negative effect on efficiency are population and its density, self-generated revenues, and ethnic fragmentation. On the other hand, if the major has same affiliation as the central government the municipal efficiency increases.

Loikkanen and Susiluoto (2006) find significant differences in efficiency of 353 Finnish municipalities in the period 1994-2002. Using DEA, authors conclude that, on average, 10-15% more output can be attained with the current resources used, depending on the specification of the number of outputs used. In the second stage of analysis, using the OLS method, determinants of efficiency are identified. Peripheral location, diverse service structure, big share of services bought from other municipalities, unemployment, grants, income level, and big population cause inefficiency of Finnish municipalities. While, on the other hand, big share of services bought from the private sector, higher education level of inhabitants and dense urban structure increase the efficiency. Even though useful, this analysis however, does not cover the full range of government activities in the municipalities.

The analysis by Balaguer-Coll, Prior, and Tortosa-Ausina (2007) reveal disparities in efficiency scores resulting from DEA and FDH. Out of 414 Spain municipalities, around 8% are efficient under DEA, while FDH identifies nearly 70% of municipalities as efficient. The stringency of DEA over FDH is confirmed with the average efficiency scores as well. Under DEA, municipalities waste almost 47% of resources. On the other hand, FDH shows significantly lower waste of resources of less than 10%. In the second stage of analysis, authors identify self-generated revenues, grants, deficit, and governing party voters over total population to have a negative impact on municipal efficiency. Novelty of this research paper is that through the analysis, in the first stage and the second stage, nonparametric methods are used ensuring the consistency of methodology.

The previous presentation of some of the empirical research on efficiency of municipalities allows drawing of some general conclusions. First, the supposed beneficial influence of government decentralisation on efficiency of municipalities is not confirmed. According to the analyses, local governments waste from approximately 14-50% of resources. Although efficiency scores differ significantly depending on the measurement technique used, all of them

suggest that municipal spending should be lower taking into account produced outputs. In addition, the specification of number of inputs and outputs has a significant influence on efficiency scores obtained. These conclusions stress out the importance of specification of the overall method used to estimate efficiency as well as the number of variables taken into account. We are in favour of a more stringent analysis, using DEA with a lower number of inputs and outputs. This type of analysis will, in most cases, detect even the slightest inefficiency, and signal a need for caution in terms of spending public money. The analyses of municipal efficiency are usually performed using a two-stage analysis. The second stage reveals certain determinants of municipal efficiency. As suggested by Hauner (2008) the identification of determinants of local government efficiency is essential for the improvement of general government efficiency. Some of the variables that have a negative effect on local government efficiency are grants form higher levels of government, a higher share of self-generated revenues, deficit, ethnic fragmentation, etc. On the other hand, better governance, stronger democratic control, and in general less public spending increase municipal efficiency.[21]

3.3 Efficiency of Government Spending on Health and Education

Education and health are two sectors in which government provides most of the services. Therefore, two of the largest categories of government expenditures are usually expenditures on education and health.

Hauner and Kyobe (2010) conduct an analysis of health and education spending efficiency on a sample of 114 advanced and developing countries over the period 1980-2004. Authors calculate PSP and PSE indicators and use DEA. Average DEA efficiency score shows that the current level of education output could be obtained with 80% less public spending. While in the case of health spending efficiency, countries waste on average 90% of resources. Authors find that European countries have high efficiency in education but low in health sector. However, the lowest education efficiency is found in developing African countries including, for example, Ethiopia and Senegal. The US and Germany are the least efficient in terms of health spending; they could obtain current health outputs with 14% and 12% of inputs currently being used. Emerging countries of Asia have the highest efficiency scores. An interesting result of the study is that while between performance and spending in health sector a strong relationship exists, such a conclusion could not be drawn in the case of education. An increase of government spending on education does not necessarily result in increase of performance. However, the analysis has a certain drawback. The relevance of a time span of 25 years is questionable since it is very likely that some countries have undergone structural changes, especially in health and education sector, dealt with certain natural catastrophes or even wars, and this can significantly influence government spending and achieved outcomes.

Hsu (2012) conducts an analysis of government health spending in 46 European and Central Asian countries for the period 2005-2007. Although data coverage is small, authors compensate

[21] For a detailed overview of variables that influence municipal efficiency one is referred to Nikolov and Hrovatin (2013, p. 754).

it with a large sample and the employment of various efficiency methods. DEA shows that the countries could attain 1.20% more output with the current inputs used. On average, Asian countries are more efficient in terms of spending public money on health sector than the European ones. The author argues that the cause of Asian superiority could be the performed deregulation and introduction of the modern technology.

Gupta and Verhoeven (2001) analyse efficiency of government spending on education and health of African countries for the period 1984-1995 with comparison to countries in Asia and the Western Hemisphere. The sample consists of over 80 countries. Authors use FDH analysis. Analysis shows that, even though African countries on average spend more on education, they have lower efficiency compared to Asian and Western Hemisphere countries. Or more precisely, African countries could attain the current level of health outcome with 90% less resources, Asian with 38% less resource, and Western Hemisphere countries with 83% less resources. On the other hand, regarding education, African, Asian, and Western Hemisphere countries waste 93%, 68%, and 65% of resources, respectively. One of the main findings of the paper is the fast growth of public inefficiency with the increase of expenditure suggesting that every increase of public spending should be well thought-out, especially when the initial point of expenditure is already high. Usual remark to cross-country comparison of public sector efficiency is the possible difference in production costs among countries. Using OLS method on a sample of 23 countries authors try to analyse whether these differences in efficiency levels are related to the cost of providing education and health services. Results indicate that high wages could be source of education inefficiency in Africa, but that could not be confirmed in the case of health inefficiency. However, Šťastná and Gregor (2011) also analyse the impact of wages on efficiency of 202 Czech municipalities and conclude that only several extreme efficiency scores can be described by wage levels. To avoid the possible influence of the input costs on the efficiency results, Afonso and Aubyn (2005, p. 228) analyse health and education spending efficiency using quantitative measures of inputs, instead of the commonly used public expenditures, believing that "a country may well be efficient from a technical point of view but appear as inefficient [...] if the inputs it uses are expensive". Analysis is performed on selected OECD countries, 24 for health efficiency, and 17 for education, using both FDH and DEA with input and output orientation. Analysed countries, as regards to education sector, waste on average 11-14% of resources, depending on the method. However, as regards to health sector, countries waste around 5-17% of resources, depending on the method employed. Korea, Japan, and Sweden are efficient no matter which method is used or which sector is analysed.

Aristovnik (2011) analyses efficiency of government spending on education on a sample of EU and OECD countries. Four models are used to measure the efficiency of education system; a model for primary, secondary, and tertiary education, as well as for overall education. DEA reveals that in primary education most efficient countries are Denmark, Hungary, and Portugal. In the case of secondary education, on average, countries are able to produce 7% more output with the current level of spending, while in the case of tertiary education 6% more. Among the new EU MS Hungary is recommended as a role model country for primary education, Estonia

for secondary education and Slovenia for tertiary. However, if analysed on an overall basis, Japan, Korea, and Finland are the most efficient countries in terms of spending on education.

Lavado and Cabanda (2009) are interested in the efficiency of public spending on health and education within a single country. Therefore, they analyse the efficiency of health and education spending of more than 70 Philippine provinces, in periods 1995-1997 and 1999-2000 using DEA and FDH method. Significant disparities of provinces efficiencies are identified. Analysis shows that, on average, provinces could attain 4% more outputs in health and education sector with the current level of spending according to FDH result. DEA is more stringent and shows that with the current level of spending provinces could attain 6% more outputs. From an input perspective, provinces waste around 47-58% of public resources. In the second stage of analysis, authors use Tobit regression to identify determinants of efficiency. Higher levels of income inequality and fiscal grants have a negative impact on the efficiency of government spending on health and education.[22] Johnes (2006) performs the same kind of analysis. He analyses the efficiency of 109 higher education institutions in England for the academic year 2000/01. The analysis, using multiple input-multiple outputs DEA, shows that the England education system is relatively efficient. On average, 5-7% more output could be produced with the current level of inputs.

The efficiency of government spending on higher education for the period 1999-2007 for 37 countries, both EU MS and OECD countries, is analysed by Obadić and Aristovnik (2011). Authors use DEA-VRS model with output orientation. Special emphasis is put on comparison of results obtained for Slovenia and Croatia. The efficiency of government spending on higher education in Slovenia is higher than in Croatia, as well as in many others countries in the sample. In order to become efficient in terms of spending on higher education, Croatia should decrease its spending on education, per student, by 6.30-10%, depending on the model specification. Jafarov and Gunnarsson (2008) also confirm the existence of significant inefficiencies of public spending on health and education in Croatia. Authors use output oriented DEA-VRS to analyse the efficiency of EU and OECD countries. The analysis points to possible rationalization of government expenditures on health and education. Taking a one-step forward authors even suggest some reforms to increase the efficiency of analysed sectors such as: introduction or an increase of existing fees for the use of health and education services, introduction of competition in the two sectors, improving the administration of government expenditures, etc.

The review of analyses suggests that countries are mainly inefficient in terms of spending public money on health and education. Although most of the studies analyse the health and education efficiency using a one-stage analysis, some key determinants of efficiency can be identified. Higher per capita income, population density, better institutions, higher government accountability, and access to safe water have a positive impact on health and education efficiency. While, on the other hand, higher income inequality and fiscal grants have a negative effect on efficiency of public spending on health and education.

[22] The negative impact of income inequality as measured by Gini coefficient is also found in the analysis of efficiency of government spending on health and education by Herrera and Pang (2005).

4 SEE PUBLIC SECTOR EFFICIENCY: EMPIRICAL ANALYSIS

In this chapter, we explain the methodology of our analysis, PSP and PSE indicator, as well as the non-parametric DEA. We then conduct an analysis of public sector efficiency in SEE countries and explain the results. The composite indicators as well as DEA will be calculated using secondary data mostly taken from WDI and WEO database, ensuring the same methodology of data collection.

4.1 Composite Indicators of Public Sector Performance and Efficiency

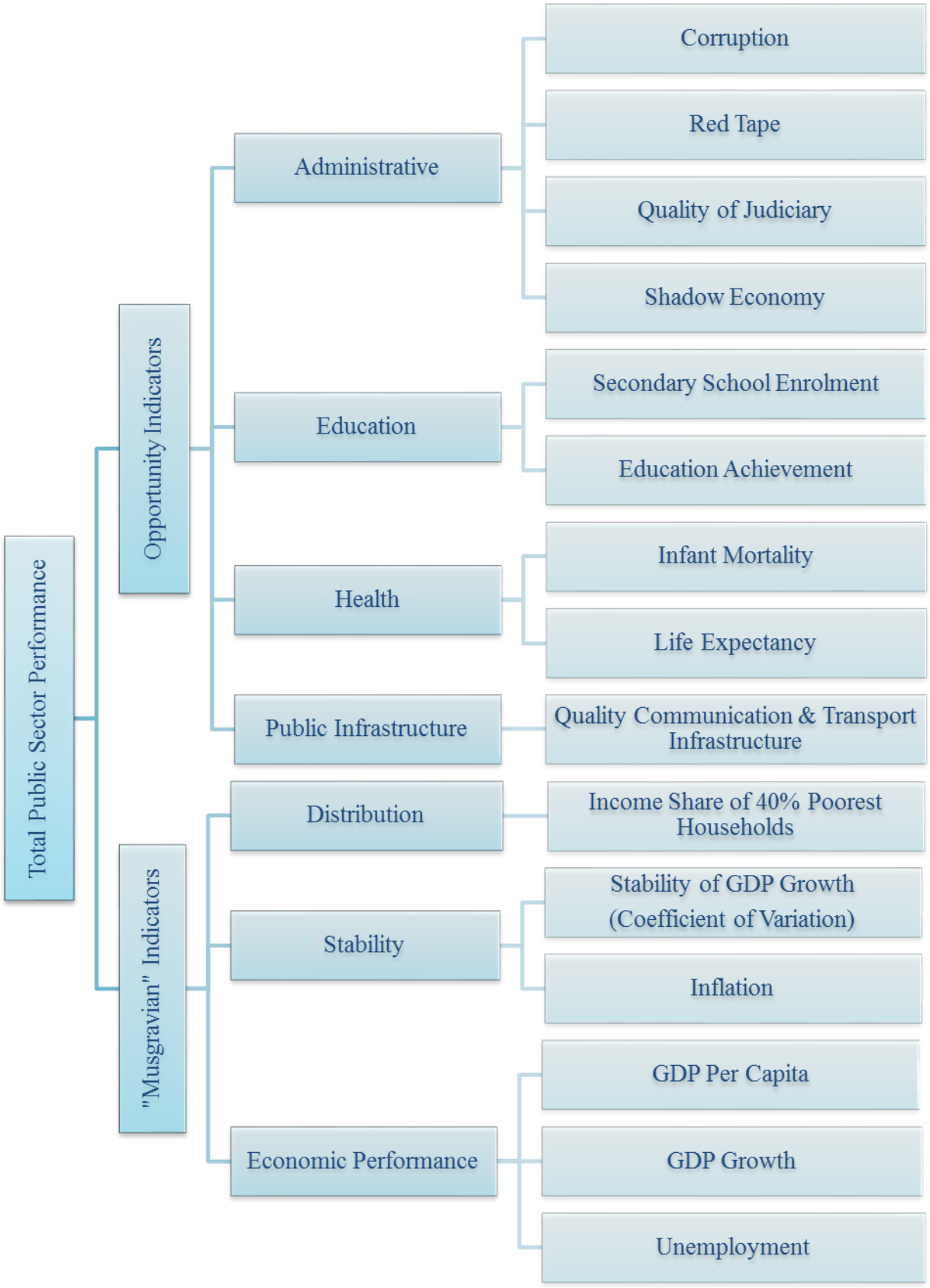
Our analysis of public sector efficiency in SEE countries starts with composite indicators, PSP and PSE indicator. Afonso et al. (2003) develop these indicators at international scale. The value of the indicators has been confirmed with their wide use. Adam et al. (2011) use the indicators for analysis of overall public sector efficiency of OECD countries, while Angelopoulos et al. (2008) apply them on a sample of both developed and developing countries. Beside the analysis of overall public sector efficiency across countries, the indicators are also used in the analysis of specific categories of government spending such as the analysis of health and education spending by Hauner and Kyobe (2010). On the other hand, Zugravu and Sava (2012) use them for the analysis of efficiency of government spending within a single country, Romania. With the employment of PSP and PSE indicator Hauner (2008) analyses the efficiency of Russia's regions. Mihaiu et al. (2010) and Opreana and Mihaiu (2010) use the PSP indicator for the analysis of efficiency of EU countries, and the analysis of relationship between the public debt and a country's performance, respectively. De Witte and Moesen (2010) show a broader usefulness of the indicators with their employment in the analysis of optimal size of OECD governments.

The key advantage of these composite indicators lies in their “simplicity and logical coherence, which allows a meaningful comparison across countries” (Angelopoulos et al., 2008, p. 248). This surely contributes to their wide use. However, these indicators, as any other, have certain shortcomings as well. The most severe weakness is their subjective nature that leads to sensitiveness to bias (Mandl et al., 2008). The subjective nature is primarily evident in the choice of socio-economic variables used for the construction of the PSP indicator.

4.1.1 PSP Indicator

In its most basic form, PSP indicator can be defined as the outcome of government activities. It measures the performance of the public sector. As shown on Figure 5, the PSP indicator is comprised of two categories of indicators, the opportunity and the “Musgravian” indicators. The two categories cover in total seven sub-indicators. Furthermore, sub-indicators are defined by the value of certain socio-economic variables. For example, opportunity indicator is comprised of four sub-indicators: indicator on administrative, education, health, and performance of government in the area of public infrastructure. The sub-indicator of government performance in, for instance, education is defined by the values of certain socio-economic variables, such as secondary school enrolment and education achievement. Therefore, the PSP indicator depends on the values of these socio-economic variables (Afonso et al., 2003).

Figure 5. PSP Indicator



Source: A. Afonso, L. Schuknecht, & V. Tanzi, *Public Sector Efficiency: An International Comparison*, 2003, p. 10, Figure 1.

The second category of indicators is the "Musgravian" indicators. These are the indicators of government performance over the roles of government proposed by Musgrave; the distribution role of government, stabilization, and economic performance. The opportunity indicators "try to reflect the quality of the interaction between fiscal policies and the market process and the influence on individual opportunities this has", while "Musgravian" indicators "try to measure the outcomes of the interaction with and reactions to the market process by government" (Afonso et al., 2005, p. 323).

It is supposed that these two categories of indicators cover all areas over which government exhibits significant influence and therefore are able to capture the overall outcome of government activities.

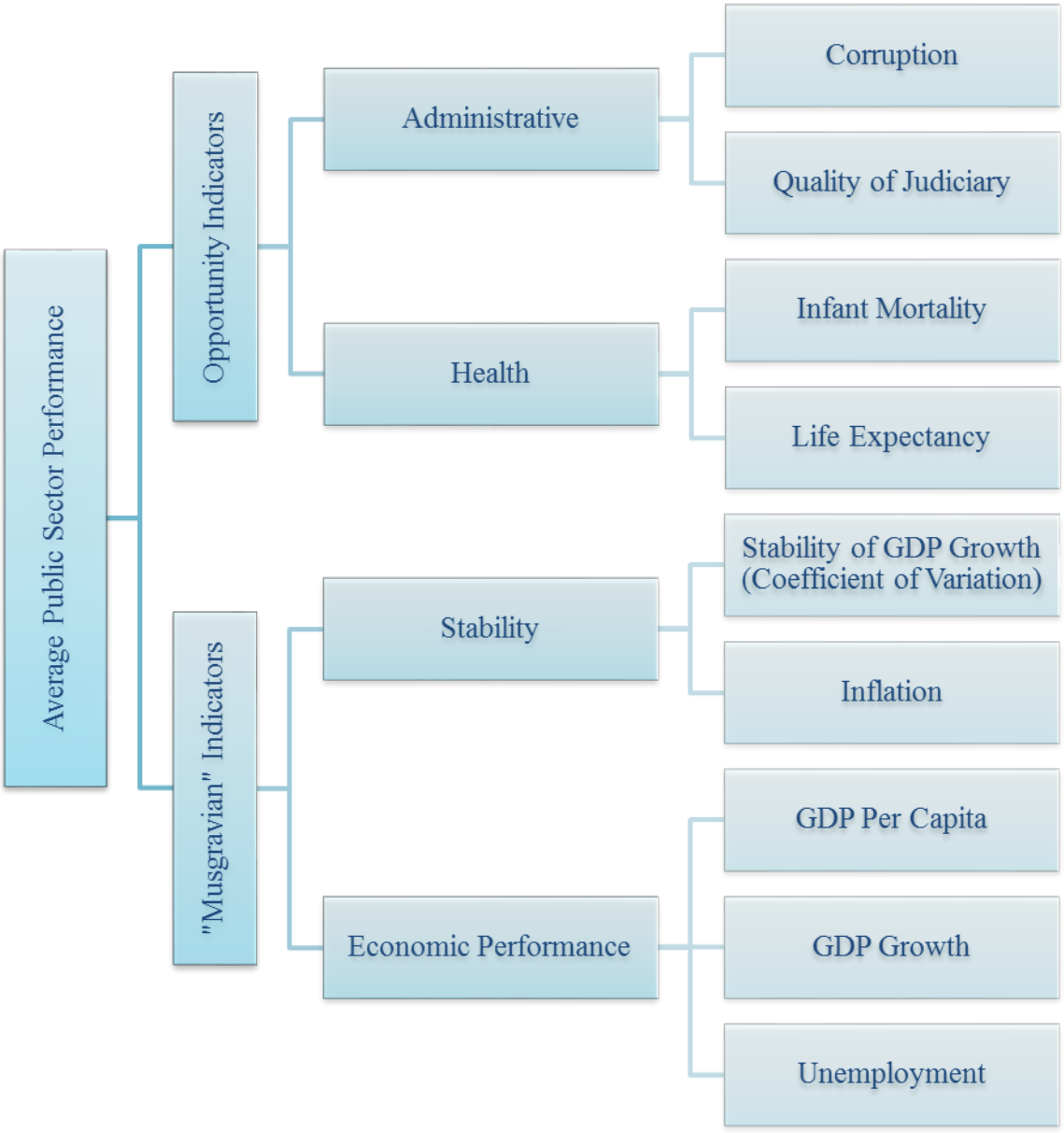
Although our intention was to construct PSP indicator over the same sectors and using the same socio-economic variables as those proposed by Afonso et al. (2003), the construction of a such versatile PSP indicator for SEE countries encounters certain data limitations. Therefore, our PSP indicator covers only four areas of government involvement. We measure government performance in administration and health sector, in regards to the opportunity indicators used. While in the case of "Musgravian" roles of government, we measure government performance in maintaining stability and economic performance. In addition, the socio-economic variables used are to some extent different but remain in line with the other relevant research in this area. The composition of PSP indicator for SEE countries is shown in Figure 6.

For all socio-economic variables we use six-year averages, over the period 2005-2010 (see Appendix I). Afonso et al. (2003) for certain socio-economic variables such as inflation rate, GDP growth, etc., use a 10 years averages while for others a one year observation is used, such as for education achievement, Gini coefficient, etc.

In the construction of PSP indicator, we follow the principle of equal weights. Each sub-indicator contributes evenly to the construction of the overall PSP indicator. In that line of reasoning, each socio-economic variable contributes evenly to the construction of related sub-indicator. There are, however, researchers that assign different weights to sub-indicators. For example, Opreana and Mihaiu (2010) and Mihaiu et al. (2010) in the construction of the PSP indicator assign weights in this order, highest to lowest: health, economic performance, education, public infrastructure, administration, distribution, and stabilisation. On the other hand, Borge et al. (2008) in their analysis of determinants of municipal efficiency give priority to the care for elderly, second most important sector under municipal control is education, third day care, then welfare benefits, etc. The authors even assign different weights to the socio-economic variables used to construct the indicators. The assignment of different weights to different sectors is rather questionable. The weights are usually determined based on the composition of public expenditures. If a country spends more on health sector than on infrastructure, for example, it is supposed that the health care is the primary concern of a country. Even though we can find ground for such rankings of government objectives within a single country, the rankings are inappropriate in the case of international comparison. One country may see education as its most important sector, while for other it may be public infrastructure, third may concentrated on

income distribution, etc. Due to the different goals of different governments, weighting of governments objectives will cause one country to report better results and other worse due to their different priorities. Based on this argument and finding of Afonso et al. (2005) that different weights have only a minor influence on PSP score, we use equal weights.

Figure 6. Composition of PSP Indicator for SEE Countries



Following the methodology of Afonso et al. (2003), the PSP indicator is calculated through four simple steps. Firstly, since PSP indicator is expressed in a matter that 'more is better', for certain socio-economic variables reciprocal values are used. For example, since higher rate of inflation is undesirable we use its reciprocal value in the calculation of the PSP indicator. Another way of transforming some of the data is by simple subtraction. For example, if variable is measured on a scale 1 to 5, good to bad, one can simply subtract the value of variable from 5, the worst score. As regards to the variable infant mortality rate (IMR), certain studies use the infant survival rate

(ISR) by simply subtracting infant mortality rate from 1000, or by applying the equation (1) (Afonso & Aubyn, 2005; Alexander, Busch, & Stringer, 2003).

$$ISR = \frac{1000 - \text{IMR}}{\text{IMR}} \qquad (1)$$

After all of the variables are transformed, in the second step, the data for socio-economic variables is normalised. The third step is reserved for calculation of sector specific PSP indicator, by calculating average of the socio-economic variables used as an indicator of government performance in that sector (see Appendix J). Finally, in the fourth step, the overall PSP indicator is found by calculating the average of sector specific PSP indicators obtained in the preceding step.

The values of the PSP indicator, on overall basis as well as for certain sub-indicators, for SEE countries in the period 2005-2010 are presented in Table 4. The first conclusion is that there are certain differences among the performance of SEE countries in delivering public services. The overall PSP indicator takes values from 0.84-1.21, and suggests that differences are not extremely large. Overall government performance is the best in Albania, with PSP equal to 1.21.

Table 4. PSP Indicator (2005-2010)

Country	**Opportunity indicators**		**"Musgravian" indicators**		**Average PSP**
	Administrative	**Health**	**Stability**	**Economic performance**	
Albania	0.95	0.77	1.97	1.16	1.21
B&H	1.05	1.04	0.86	0.75	0.93
Croatia	1.00	1.28	0.65	1.43	1.09
Macedonia	1.06	0.87	1.28	0.77	0.99
Montenegro	0.95	1.00	0.77	1.04	0.94
Serbia	0.99	1.04	0.47	0.85	0.84
Average	1.00	1.00	1.00	1.00	1.00
Small governments	1.01	0.82	1.63	0.96	1.10
Big governments	1.00	1.09	0.69	1.02	0.95

The position of the Albanian government as the top performer is primarily driven by its high performance in maintaining stability and economic performance. Its success is evident from the stable and high GDP growth rates, which exceed 5% for the analysed period, and it has second lowest unemployment rate. However, Albania performs relatively poor in opportunity indicators. It has quality problems in the judiciary system and the second most corrupted administration, while in regards to health sector it has the highest IMR. Closely behind Albania is Croatia with overall PSP score of 1.09. Croatia has the best economic and health performance. Its administrative performance is on average, while it is second worst performer in maintaining stability. Croatia has generally low and unstable GDP growth rates, which is a reflection of economic fluctuations experienced in the country in the analysed period, and could be seen as its

most severe problem. However, sensitivity to economic fluctuations could have come outside the country due to its high integration with the rest of the world.

Close to the average performance is Macedonia with PSP indicator of 0.99. Performance of Macedonian government over the analysed sectors is rather diverse. In some sectors, it is among the best, while in others among the worst performers. It seems that its strengths lie in administrative sector although her second best performance in maintaining stability is not negligible. Major improvements are necessary in health sector, and it should focus on translating its stabile GDP growth into labour-absorbing.

B&H and Montenegro with PSP values 0.93 and 0.94, respectively, perform relatively the same in overall terms. However, sector specific PSP scores reveal that the major problems that hinder the performance of Montenegro's government are corruption, which is the highest among SEE countries, significant variations of GDP growth, and high level of inflation, second highest among SEE countries. B&H performers rather well in opportunity indicators but seems to experience significant macroeconomic problems such as high unemployment, low GDP growth rates and high inflation, at least compared to the rest of SEE. Finally, Serbia is the worst overall performer. Regarding sector specific performance, it is worst in maintaining stability, second worst in administrative performance, and third worst in economic performance. However, with second place in health care it seems to performer rather well in this area.

In terms of overall governments performance we can conclude that Albanian and Croatian governments report above average performance, while the rest of the SEE governments report below average performance. Furthermore, although our sample is fairly small, comprised of six countries, we divide it according to the level of government spending. According to this criterion our sample is comprised of small and medium-sized public sectors, however we will refer to the second ones as the big governments. Based on this simple categorisation of the countries we are able to draw certain conclusions regarding the effect of government size on its performance. However, due to the aforementioned characteristics of our sample, the conclusion should be taken with certain caution and are not intended to provide powerful conclusion but rather to shed some light on this matter and deepen the analysis. In that line of reasoning, the average results suggest that small governments report better performance than the big ones.

The analysis of PSP sub-indicator values confirms the quite diverse performance of SEE government in delivering different public services. In administration, the performance of SEE countries is relatively the same with PSP indicator values in range 0.95-1.06. However, that is not the case for the remaining sub-indicators. The values of PSP health sub-indicator are in range 0.77-1.28 suggesting notable differences among the SEE governments. The difference of PSP scores is the highest in maintaining stability, suggesting that in this area the performance of SEE governments differs enormously. The PSP stability sub-indicator is in range of 0.47-1.97. The best performer is Albania; with PSP equal to 1.97, one might even consider it an outlier. The economic performance of SEE countries shows significant differences. Croatia, Albania, and

Montenegro report above average performance. The rest of the SEE countries perform relatively the same, below the average.

Our finding on public sector performance differences between SEE countries comes as no surprise. On the other hand, the ranking of countries is a bit unexpected. Probably, one would see Croatia and not Albania on the first place, where our finding does tell us a different story.

4.1.2 PSE Indicator

The PSE indicator provides the first insight into the government efficiency in terms of spending public money. It essentially represents the relation between government expenditures as a percentage of GDP and the PSP indicator, which resulted from the previous analysis. In other words, it is a relation of inputs to outputs, the most basic definition of efficiency. In calculating the PSE indicator, following the methodology of Afonso et al. (2003), the data on government expenditures is normalised.

The PSE indicator for SEE countries is calculated for the period 2005-2010, for general as well as sector specific basis (see Appendix K). The results are shown in Table 5. First, there exists an enormous difference in the efficiency of government spending in SEE countries with PSE indicator taking the values of minimal 0.75 to maximal 1.92. The most efficient SEE country is Albania.

Table 5. PSE Indicator (2005-2010)

Country	**Opportunity indicators**		**"Musgravian" indicators**		**Average PSE**
	Administrative	**Health**	**Stability**	**Economic performance**	
Albania	1.99	1.52	2.63	1.54	1.92
B&H	0.95	0.93	0.73	0.64	0.81
Croatia	0.94	1.05	0.62	1.39	1.00
Macedonia	1.08	1.02	1.55	0.93	1.14
Montenegro	0.73	0.90	0.70	0.94	0.82
Serbia	0.93	0.88	0.43	0.77	0.75
Average	1.10	1.05	1.11	1.03	1.07
Small governments	1.53	1.27	2.09	1.24	1.53
Big governments	0.89	0.94	0.62	0.93	0.84

The position of Albania as the most efficient SEE country is strongly confirmed with its identification as the most efficient country in every sub-indicator: administration, health, stability, and economic performance. Macedonia takes the second place. With PSE equal to 1.00, Croatia is the third country in regards to overall government efficiency. B&H and Montenegro take the fifth and fourth place, respectively, with difference in PSE value of only 0.01 points. The least efficient SEE country is Serbia. The comparison of the PSP and PSE scores leads to the conclusion that the best performers are also the most efficient ones, while governments with bad performance are also inefficient. The comparison also gives some information on how things are

done by SEE governments. While PSP only focuses on government outcomes, it does not take into account resources used to accomplish those outcomes. For example, in terms of administrative performance Albanian government is the second worst while in the case of efficiency of public spending on administrative sector it is the most efficient country. It seems that Albania spends money efficiently but has certain problems in transforming the good spending in good outcomes, at least in this sector. On the other hand, Serbia and Montenegro hold the second and third place in terms of health performance, however, examination of PSE scores shows that the performance is paid too much, governments are inefficient in obtaining those outcomes.

However, we have to stress out that the primary and ultimate goal of our analysis is to analyse efficiency, the way that things are done and not to question whether the right things are being done. We are interested in pure efficiency and not to determine whether it is efficiency with right or wrong goals.

The country level PSE scores for administration allow us to conclude that the efficiency of public spending on administration in SEE countries differs extremely. On the other hand, efficiency of public spending on healthcare in SEE countries shows significant but not particularly large differences. Although B&H is the second country in terms of government performance in delivering health services, the PSE indicator reveals that in terms of spending to achieve that performance B&H is not efficient. These results suggest that with current amount of resources B&H should be able to deliver and perform better in health care sector.

The only sub-indicator for which the rankings of the countries are the same for both PSP and PSE indicator is the stability. In regards to maintaining stability, the worst performers are also the least efficient countries, and vice versa, the best performers are identified as the most efficient countries. This is the worst combination. Besides having poor performance, countries are also spending much more than they should and need. In addition, as in the case of PSP scores, the efficiency of public spending on maintaining stability differs enormously among the SEE countries. Large differences in the efficiency of spending public money on economic performance are also identified.

Once more, the division of the sample based on the criterion of government spending as a share of GDP reveals that, on average, small-size government report better results in terms of efficiency than the bigger governments.

4.2 Methodology: DEA

Since PSP and PSE indicators are only partial measures of public sector performance and efficiency, we also analyse public sector efficiency by estimating the best practice frontier. Methods used for the estimation of the best practice frontier fall into two categories: parametric and non-parametric. As opposed to PSE indicator, these methods provide a global measure of efficiency (Pedraja-Chaparro et al., 2012).

The best-known non-parametric method for estimating efficiency is DEA. Although initially developed for microeconomic efficiency analysis it is highly appropriate for an analysis of overall efficiency of nations (Lovell et al., 1995; Luptáčik, 2010). Its parametric rival is the SFA method for efficiency estimation. DEA is based on mathematical programming, while SFA is based on econometric methods. The comparison of the two methods is provided in Table 6.

Table 6. Comparison of DEA and SFA

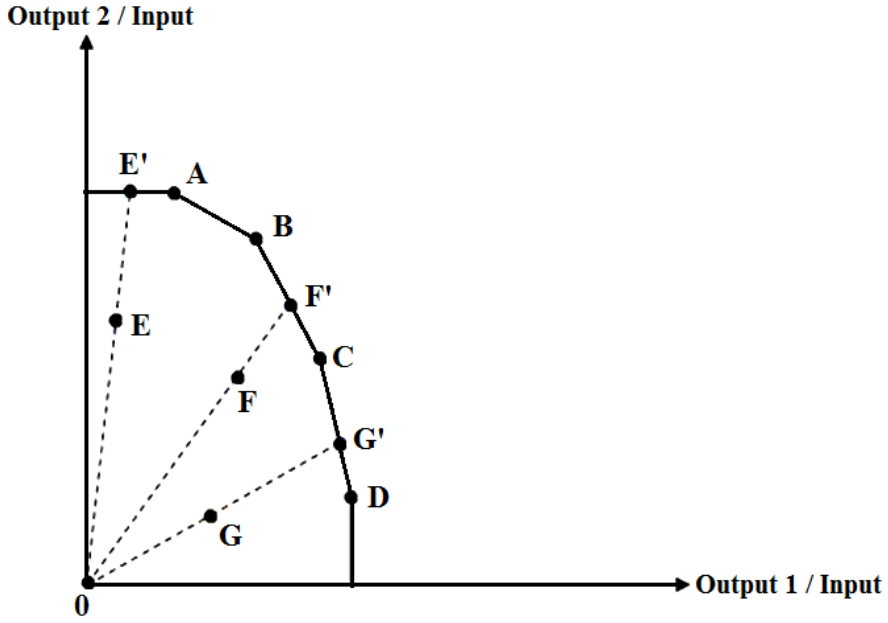
Problem	DEA	SFA
• Multiple inputs and outputs	• Simple	• Complex - rarely undertaken
• Specification of the functional form	• Not required	• Required and may be incorrect
• Outliers	• Inaccurate efficiency assessment	• Not as sensitive
• Sample size	• Small sample size can be adequate	• Large sample size required
• Explanatory factors highly collinear	• Better discrimination	• Possible misleading interpretation of relationships
• Explanatory factors have a low correlation	• All efficiency scores tend to be close to unity	• No problem
• Noise (e.g., measurement error)	• Highly sensitive	• Specifically modelled, although strong distributional assumptions are required
• Testing, including variable selection	• Sensitivity analysis is possible but complex, so is more subjective	• Straightforward statistical testing

Source: R. Bhat, B. B. Verma, & E. Reuben, *Data Envelopment Analysis (DEA)*, 2001, p. 320, Table 2.

The DEA-CRS model was developed by Charnes, Cooper, and Rhodes (1978) based on Farrell's (1957) work on the measurement of productive efficiency. In literature, the model is also referred to as the CCR model of DEA, after its developers, and seen as the basic DEA model. Charnes, Cooper, and Rhodes (1978) also introduced the term DMU, which stands for any organization involved in converting inputs into outputs. It can be used to indicate classical production companies, but also governments, hospitals, schools, etc., or in more general terms, it can stand for any for-profit organization, public organization, as well as for not-for-profit organization. The advantages of DEA are numerous but two of them make it especially suitable for analysis of public sector efficiency. These are the possibility to estimate the efficiency based on multiple input and outputs as well as the fact that the method does not require any assumption about the underlying production function.

The inner work of DEA is simple, easily understood, and can be explained with a couple of sentences. Based on the available data on inputs and outputs DEA constructs the best practice frontier, as shown on Figure 7. The best practice frontier is constructed of DMUs, one or more, that are found to be operating efficiently and assigns them an efficiency score of 1. The efficient DMUs are A, B, C, and D. The frontier envelopes the rest of the DMUs that are inefficient and assigns them an efficiency score in range 0 to 1. These are DMUs E, F, and G. Therefore, the location and the shape of the best practice frontier when using DEA is defined only by extreme observations (Anderson, 2003; Smith & Street, 2005). The inefficiency of the rest of the DMUs is determined relative to the DMUs deemed efficient. This is one of the main differences between parametric and non-parametric methods. The first ones estimate inefficiency relative to the average of all, inefficient and efficient, units, while the non-parametric methods look only at the efficient DMUs.

Figure 7. DEA



Source: Adapted from W. W. Cooper, L. M. Seiford, & K. Tone, *Introduction to Data Envelopment Analysis and Its Uses*, 2006, p. 9, Figure 1.7.

For example, the efficiency of DMU F is found by its projection on the best practice frontier. The point F', which lies on the best practice frontier, is the efficient equivalent of the DMU F. The efficiency of DMU F can be written as equation (2) shows, and it will take the value in range 0-1.

$$Efficiency\ od\ DMU\ F = \frac{OF}{OF'} \qquad (2)$$

The point F' is referred to as the target of the DMU F. It is the production point that F strives to achieve. While DMUs B and C are peers of the DMU F, since the target of the DMU F lies on

the portion of the best practice frontier between these two DMUs.[23] The inefficiency of the DMU F is calculated relative to its peers, and therefore point F' represents a linear combination of points B and C.

The DMU E is also inefficient. Its projection on the best practice frontier shows that its target is point E', that lies on the horizontal part of the best practice frontier. So, both points, E' and A, are on the best practice frontier and therefore efficient. However, a closer look at the graph reveals that the efficiency of E' can be further improved since DMU A is producing the same amount of output 2 but more output 1, then the DMU E'. In this case, we have output slack. The output slack represents additional augmentation of output, besides the proportional increase suggested by the efficiency score in range 0-1. Essentially, DMU E' is on the frontier, but not on the efficient part of the frontier. Cook and Seiford (2009) refer to this situation as an improperly enveloped DMU. After all, the production of output 1 can be increased by the amount E'A without using more inputs. Aware of this situation Koopmans (1951) defines a technically efficient DMU as the DMU operating on the frontier and for which all input and output slacks are equal to zero, while Farrell (1957) does not take into account the slacks. Input slacks also occure in the efficiency analysis. They represent additional input reduction besides the one suggested by the efficiency score.

Based on the existence of input and output slacks, two types of efficiency can be identified. A DMU is fully efficient if its efficiency score is 1 and all input and output slacks are equal to zero, on our graph those are DMUs A, B, C, D, F', and G'. On the other hand, a DMU is said to be weakly efficient if it is assigned an efficiency score of one but at least one of the input or output slacks in not equal to zero, on our graph that is DMU E'.

4.2.1 Models

The basic DEA model is the DEA-CRS. As the name suggests, the assumption of this model is that all units are operating at constant returns to scale, effectively indicating that the size of the analysed DMUs is not taken into account (Bhat et al., 2001). This shortcoming of DEA-CRS model is corrected for in the DEA-VRS model, which is developed by Banker, Charnes, and Cooper (1984) and was the most commonly used DEA model in the 1990s (Coelli, 1996). This model is referred to in literature, after its developers, as the BCC model of DEA. The model is quite reasonable since in reality it is very likely that DMUs are operating at decreasing or increasing returns to scale due to "imperfect competition, government regulations, constraints on finance, etc." (Coelli, Rao, O'Donnell, & Battese, 2005, p. 172). When using VRS model, efficiency of a country is measured relative to other countries that are similar in size (Coelli et al., 2005; Rahmayanti & Horn, 2011).

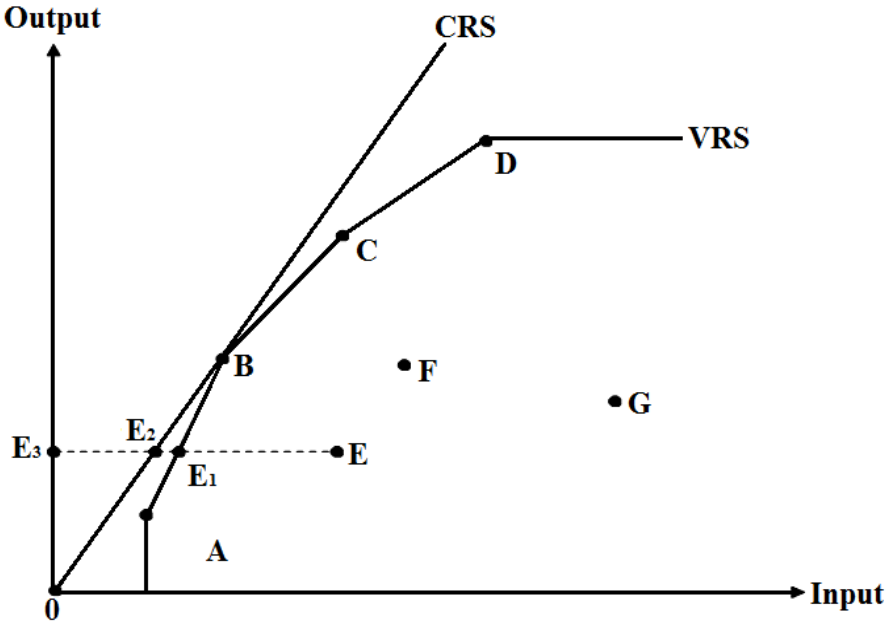
The DEA-VRS model envelopes the data more tightly than the DEA-CRS model, leading to efficiency scores that are equal to or higher then under the assumption of constant returns to scale. The employment of both models allows the breakdown of DMUs efficiency into efficiency

[23] In literature we encounter different terms used to mark peers, such as 'reference set' (Cooper et al., 2006; El-Mahgary & Lahdelma,1995), or 'reference point(s)' (Kalb, 2010).

resulting from pure technical efficiency (PTE), and scale efficiency (SE). The PTE is actually efficiency of managerial practices, that is "[efficient] operation of the DMU itself", while SE points to the inefficiency arising from the "disadvantageous conditions under which the DMU is operating" (Cooper et al., 2006, p. 140). Cooper et al. (2006) and Luptáčik (2010, p. 162) refer to the BCC model as indication of the local PTE, while the CCR score represents global technical efficiency, "therefore, comparisons of the CCR and BCC scores provide deeper insight into the sources of inefficiency that a DMU might have".

For better understanding of the DEA-CRS and DEA-VRS models, we illustrate them on the same graph, Figure 8. While DEA-CRS is represented with straight line from the origin through point B, due to its convexity constraint the efficiency frontier of DEA-VRS is "spanned by the convex hull of the existing DMUs. The frontiers have piecewise linear and concave characteristics" (Cooper et al., 2006, p. 83).

Figure 8. DEA-CRS and DEA-VRS Model



Source: Adapted from A. Kalb, *Public Sector Efficiency: Applications to Local Governments in Germany*, 2010, p. 11, Figure 2.

Under DEA-CRS model only DMU B is found efficient, while under DEA-VRS, besides DMU B, A, C and D are also the efficient ones. Since, as we see on Figure 8, DEA-VRS envelopes the data as tightly as possible. Therefore, this model will always result in equal or higher efficiency scores and identify the same or more DMUs as the efficient ones compared to DEA-CRS model. Technical efficiency of DMU E, under the assumption of constant returns to scale, can be written as shown in equation (3).

$$Efficiency\ of\ DMU\ E_{CRS} = \frac{E_3E_2}{E_3E} \qquad (3)$$

While, under DEA-VRS it is:

$$Efficiency\ of\ DMU\ E_{VRS} = \frac{E_3E_1}{E_3E} \qquad (4)$$

This difference in efficiency of the DMU E under DEA-CRS and DEA-VRS is due to scale inefficiency. The technical efficiency under DEA-CRS is actually the product of technical efficiency under DEA-VRS and SE. DMU B is a peer of the DMU E under DEA-CRS, while E_2 is its efficiency target. Meanwhile, under DEA-VRS both, DMU A and B are the peers of the DMU E, while E_1 is the target.

The choice of model deals with the question of how output changes when all inputs increase proportionally. If output increases more than the proportionate increase in inputs then the unit is exhibiting increasing returns to scale. If the increase in output is less than the proportionate increase of inputs then the unit is operating at decreasing returns to scale. Finally, if the output increases in the same proportion as the proportionate increase in inputs then the unit is exhibiting constant returns to scale. Anderson (2003) proposes answering two questions to make the decision on returns to scale. These two questions are:

- If a DMU doubles its inputs, will it cause doubling of its outputs?
- If a DMU uses half of its inputs, will it produce half of its outputs?

If the answer to both questions is positive then the DEA-CRS model should be used. If the answer to both questions is negative then the DEA-VRS model should be used. However, if the answer to one of the two previously listed questions is positive while for the other it is negative then DEA Non-Increasing Returns to Scale (hereinafter: DEA-NIRS) or DEA-Non-Decreasing Returns to Scale (hereinafter: DEA-NDRS) should be used. During our research, however, we find that only a couple of authors distinguish between DEA-NIRS and DEA-NDRS such as Anderson (2003) and Cook and Zhu (2005), while the prevailing literature does not make such a distinction. On the other hand, Cooper et al. (2007) suggests that if there are large differences in the numeric values of the sample data, e.g. comparing big and small companies, DEA-VRS model should be used. However, if the data set consists of normalized numbers, e.g. per capita acre and hour, then DEA-CRS should be used.

Since we use DEA-VRS and DEA-CRS model, which we have already explained, we will only describe with a couple of sentences some of the other models of the DEA.

Additive DEA model "considers possible input decrease as well as output increase simultaneously", while Assurance Region model "introduce additional restrictions on the values that the multipliers can assume" (Cook & Zhu, 2005, p. 10). If one eliminates the traditional convexity assumption of the basic DEA model, one would end up with the FDH model. The Slacks-Based Measure is a DEA model "which is invariant to the units of measurement and is monotone increasing in each input and output slack" (Cook & Seiford, 2009, p. 5). One of the usually named weaknesses of DEA is its deterministic nature. It means that DEA treats all of the deviation from the best practice frontier as inefficiency regardless of the sources of the

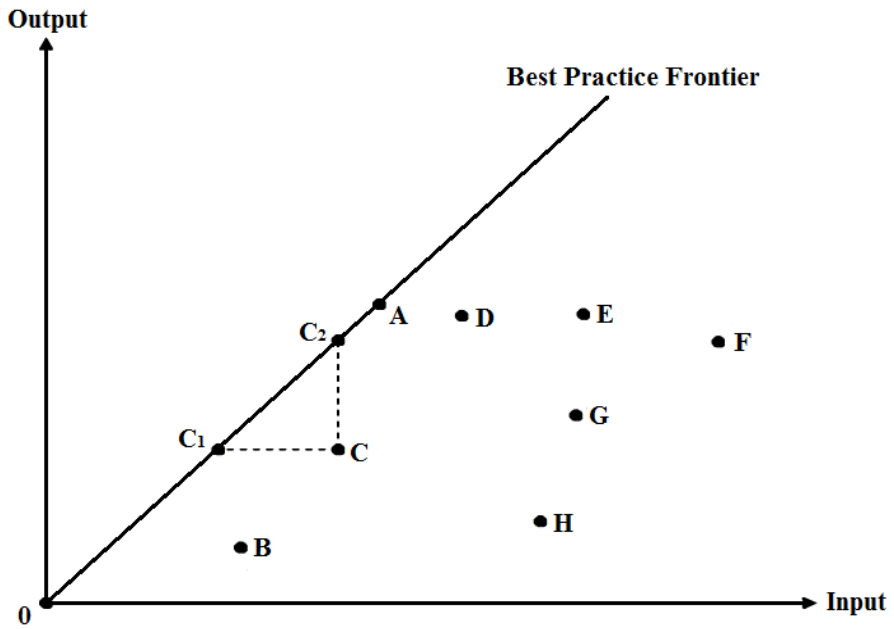
inefficiency, whether they are under control of DMU or not. The chance-constrained DEA model deals with this problem. It enables a DMU to be identified as efficient or inefficient, as well as 'probably efficient' and 'probably not efficient' (Cooper, Huang, & Li, 2011).

4.2.2 Input and Output Orientation

Another specification when using DEA, besides the choice of returns to scale, is the choice of orientation. One has to decide whether to use an input or an output oriented DEA. Input oriented DEA points to possible input savings without affecting the output levels. On the other hand, output oriented DEA points to possible output augmentation while keeping the current level of inputs used. If a DMU is inefficient in the case of input orientation, it will also be identified as inefficient from the output perspective. It is only the view of DMUs inefficiency that differs.

Using a simple production process, of one input and one output, we illustrate the input and output orientations of DEA on Figure 9. The line from the origin through DMU A is the best practice frontier. The frontier envelopes the rest of the DMUs deemed inefficient, namely DMUs B, C, D, E, F, G, and H. The DMU C is found to be inefficient, lying below the frontier. In order to become efficient DMU C has at its disposal two options. First, DMU C can reduce the input used while producing the same level of output. This action moves DMU C to point C_1 on the frontier. The second option is that DMU C increases the level of output while keeping the same level of input. This option moves DMU C to point C_2 on the frontier. In this case, points C_1 and C_2 are targets of the DMU C, while DMU A is its peer. Under DEA-CRS, both input and output orientation will give exactly the same efficiency scores.

Figure 9. Input and Output Orientation



Source: Adapted from W. W. Cooper, L. M. Seiford, & K. Tone, *Introduction to Data Envelopment Analysis and Its Uses*, 2006, p. 5, Figure 1.3.

Based on our research, the choice of orientation is not an easy one, as postulated in literature. On the other hand, the question of importance of orientation is also relatively vague in literature. While Coelli et al. (2005) argue that the efficiency scores are only inconsiderably affected with the choice of orientation, Anderson (2003) claims the opposite, that the choice of orientation is important. One group of authors follows a strain that orientation should be based on the criteria of control. If a DMU has more control over the inputs, then input oriented DEA should be used. On the other hand, if a DMU has more control over the outputs, an output oriented DEA should be used. However, in literature, another criterion emerges, the one that we refer to as the goal or target criteria. Kalb (2010, p. 10) defines it as "the behavioural objective of the decision-making units". According to this criterion, an orientation should be chosen based on the goal of DMU. Or more specifically, whether the DMUs primary goal is to reduce its inputs or increase its outputs.

Following the relevant literature, and based on the criteria of control, we will use input oriented DEA, based on the assumption that governments have greater control over the inputs, e.g. public money or budget, than over the outputs, e.g. unemployment rates, inflation, GDP, etc.

4.2.3 Strengths and Weaknesses

As any other method, DEA also has its strengths and weaknesses and one has to be aware of them. Among DEA advantages, most pronounced is its ability to handle multiple inputs and outputs. After all, rarely, if any, production process requires only one input. On the other hand, DMUs are diversifying more and more their production processes in order to produce two or more outputs. Second important advantage of DEA lies in the fact that the inefficiency of DMUs is measured relative to the most efficient ones. In this case we are capable of explicitly stating who is the best and who is the worst performer, we can make decisions on whose behaviour to follow and which one to avoid. Another important advantage of DEA for our analysis of public sector efficiency is that this method does not require any assumption about the underlying production process. As already mentioned, DEA can handle multiple inputs and outputs. Closely related to this advantage is another one. The DEA allows the inputs and outputs to be represented in different units of measurement, money, time, kilometres, kilograms, etc. This advantage is referred to as the 'unit invariance'. Finally yet importantly, DEA method explicitly quantifies the degree of the estimated inefficiency. It tells us by how much output level could be increased without altering the level of resources employed, or by how much inputs can be reduced without reducing the amount of output produced.

However, besides these strengths certain weaknesses of the DEA need to be stressed out. As Pedraja-Chaparro et al. (2012 p. 351) state, „most serious shortcomings of DEA arises from the non-parametric and deterministic nature of the model". Authors identify the following weaknesses as the most important ones:

- results are sensitive to model specification,
- results are sensitive to the use of inadequate data,
- DEA efficiency estimates are point estimates, and

- lack of appropriate methods for treating missing data.

The weakness of DEA regarding model specification refers to the choice of returns to scale and choice of variables used as input and outputs. When using DEA, one has to be particularly careful regarding measurement errors and outliers. Since DEA is an extreme point method, outliers may be hard to detect. One can easily replace an outlier, or a data error for an extreme point that could have significant implications for the obtained results. Missing data represent serious problem for DEA.

4.3 Analysis of Public Sector Efficiency in SEE Countries Using DEA

For our analysis of public sector efficiency in SEE countries we use DEA. The method appears appropriate for the "multidimensional character of public output, and its flexibility is particularly attractive given the lack of knowledge and the uncertainty involved in the public sector production process" (Pedraja-Chaparro et al., 2012, p. 348). Utilization of DEA will allow us to:

- determine public sector efficiency of each SEE country,
- compare SEE countries in order to identify relatively in/efficient ones, and
- determine the degree of the in/efficiency.

Although our sample of six countries is relatively small, the one input-one output framework allows us to satisfy a general rule that the number of DMUs should be at least three times the number of input and output variables used in the analysis. The rule can be written as equation (5) shows.

$$DMU \geq 3x\ (I+O) \qquad (5)$$

Where DMU is the number of DMUs, i.e. countries, I stands for the number of inputs, and O is the number of outputs. The empirical research shows that the average efficiency as well as the number of efficient units increases as the number of variables in the model increases. Therefore, our simple DEA model has a greater discrimination potential for identification of efficient and inefficient DMUs (Epstein & Henderson, 1989).

In the analysis of efficiency on any DMU, the first important decision is the choice of inputs and outputs. Although this is not a difficult task in the case of traditional private production units, it is a rather challenging task in the case of public sectors.

The literature suggests the use of government expenditures as inputs in the production of public good and services. If one is interested in the analysis of the efficiency of overall government then the use of general government expenditures is the most appropriate. In that line of reasoning, we use general government expenditures expressed as a percentage of GDP as an input variable in the overall analysis of government efficiency. However, to grasp the full in/efficiency of SEE governments, we also perform the analysis of efficiency of SEE governments in terms of spending public money on certain sectors over which the government is supposed to have a great

control. In that case, we use relevant categories of general government expenditures as inputs, such as general government final consumption expenditures, public health expenditures, etc.[24]

The determination of inputs of the public production process is a relatively simple procedure compared to the problem of selecting appropriate outputs, due to their economic along with social nature (Opreana & Mihaiu, 2010; Mihaiu et al., 2010). As output, we use the overall PSP indicator of government performance, previously determined and explained. While, in the analysis of specific areas of government involvement we use PSP indicators of government performance in those areas.

The DEA method is performed using DEAP Version 2.1 computer program developed by Tim Coelli. The World Bank also recommends the use of this software.[25]

4.3.1 The Overall Public Sector Efficiency in SEE Countries

In our analysis of government efficiency, we first employ the basic input oriented DEA-CRS model (see Appendix L). The results are presented in Table 7. The average efficiency of SEE governments is 64.7%. This means that on average, SEE governments could reduce their expenditures by 35.3% without lowering their overall performance. Or, in other words, SEE governments are wasting 35.3% of the public money.

The analysis identifies Albania as the efficient country in the sample. The superior position of Albania is confirmed by the fact that it acts as a peer for the rest of the countries, and it is referred to as being fully efficient due to the absence of any input or output slacks. The second most efficient SEE government in terms of spending public money is the Macedonian with the efficiency score of 0.745. This efficiency score means that Macedonian government can reduce its expenditures by 25.5% and still obtain the same level of performance.

In the efficiency ranking, Croatia holds the third place with a waste of resources of 34.6%. The least efficient SEE governments are those of Montenegro, B&H, and Serbia. They can reduce their government expenditures by 47.1, 51.4, and 53%, respectively, while keeping the level of government performance unchanged.

We divide our sample based on the size of the government in order to come to certain conclusions on whether the big or the small governments are more efficient. We are able to confirm the findings of previous research that in general small governments are more efficient. In addition, the analysis shows that conventional thinking that the wealthier governments' performer better is not accurate. Croatia, the richest SEE country, in terms of GDP, and the only EU MS in our sample, takes the third place in efficiency ranking. It wastes 34.6% of the public

[24] A problem of determining public sector inputs is the overlapping nature of government expenditures. Rayp and van de Sijpe (2007) argue that health outputs are influenced by government health expenditures as well as government expenditures on education and infrastructure. Therefore, authors argue that it is better to use a broader category of government spending. In that line of reasoning, Angelopoulos et al. (2008) use total government expenditures as an input variable of infrastructure outcome.

[25] A free download of the program is available at http://www.uq.edu.au/economics/cepa/deap.php

money. On the other hand, if a country is poor it does not have to mean that the government is inefficient in transforming its expenditures into public output. Albania, the third poorest SEE country, is actually the most efficient one. In that line of reasoning, Henderson and Zelenyuk (2007, p. 1011) argue that "hypothetically, if those poor but more efficient countries were able to increase all inputs by the same proportion, while maintaining their current efficiency levels and constant returns to scale, then they would obtain higher productivity levels then the less efficient developed countries".

Table 7. Overall Public Sector Efficiency using DEA-CRS

Country	**CRS TE**	**Rank**	**Waste of resources (in %)**	**Output slack**	**Input slack**	**Peers**
Albania	1.000	1	0.0	0.000	0.000	Albania
B&H	0.486	5	51.4	0.000	0.000	Albania
Croatia	0.654	3	34.6	0.000	0.000	Albania
Macedonia	0.745	2	25.5	0.000	0.000	Albania
Montenegro	0.529	4	47.1	0.000	0.000	Albania
Serbia	0.470	6	53.0	0.000	0.000	Albania
Average	0.647		35.3	0.000	0.000	
Small governments	0.873		12.8	0.000	0.000	
Big governments	0.535		46.5	0.000	0.000	

Following the reasoning of Rayp and van de Sijpe (2007) that the positive effect of government expenditures weakness as the expenditures increase, the overall efficiency of SEE governments is also analysed using DEA-VRS model (see Appendix M). We also encountered the diminishing returns of government expenditures in the examination of the optimal size of the public sector. As predicted by the theory, due to tighter envelopment, efficiency scores using this model are higher than those obtained under DEA-CRS model, as shown in Table 8.

Table 8. Overall Public Sector Efficiency using DEA-VRS

Country	**VRS TE**	**Rank**	**Waste of resources (in %)**	**Output slack**	**Input slack**	**Peers**
Albania	1.000	1	0.0	0.000	0.000	Albania
B&H	0.633	6	36.7	0.280	0.000	Albania
Croatia	0.726	3	27.4	0.120	0.000	Albania
Macedonia	0.911	2	8.9	0.220	0.000	Albania
Montenegro	0.681	4	31.9	0.270	0.000	Albania
Serbia	0.677	5	32.3	0.370	0.000	Albania
Average	0.771		22.9	0.210	0.000	
Small governments	0.956		4.5	0.110	0.000	
Big governments	0.679		32.1	0.260	0.000	

In this case, the average efficiency score of SEE governments is 0.771, while under the DEA-CRS it is 0.647. This means that the SEE governments can, on average, reduce their expenditures by 22.9% and still obtain the same level of performance.

Under this model, Albania is again identified as the most efficient. Its efficiency superiority is again confirmed with its role as a peer for all other countries in the sample. Albanian government is also fully efficient since there is no input or output slacks. The ranking of the first four countries remains unchanged. As mentioned, Albanian government is the most efficient. Followed by Macedonian government, which, in order to become efficient, needs to reduce its expenditures by 8.9%. The third place is reserved for Croatia, which can reduce government expenditures by 27.4% and still attain the same level of government performance. While Montenegro's government wastes 31.9% of its expenditures. The only change in governments ranking is that B&H and Serbia have switched places. Under DEA-VRS, the least efficient SEE government is that of B&H, which could reduce its expenditures by 36.7% and attain the same government performance. Slightly more efficient is Serbian government, which wastes 32.3% of government expenditures.

A further examination of the DEA-VRS analysis reveals the presence of slacks. Or more precisely, output slacks. Output slacks are found for all of the SEE governments except for Albanian, which is fully efficient. The rest of the SEE governments are said to be radially and mix inefficient. This means that besides the necessary proportional reduction of inputs, radial inefficiency, a further additional augmentation of output, mix inefficiency, is needed in order for governments to become efficient. Without this additional enhancement of output, SEE governments will be only weakly efficient, lying on the best practice frontier but not on the efficient part. They will be on the part of the frontier that is parallel to the axis.

Therefore, besides reducing expenditures, SEE governments should, on average, increase their outputs by 0.21 units. For example, in order to become fully efficient Macedonian government needs to reduce its expenditures by 8.9% and also increase its performance by 0.20 units. Croatia will be fully efficient if it reduces government expenditures by 27.4% and increases government performance by 0.22 units. While B&H and Montenegro need to, besides cutting government expenditures, augment their output by 0.28 and 0.27 units, respectively. Finally, the highest output slack is found for Serbian government of 0.37 units confirming its rather low government efficiency.

With the division of the sample based on the size of government, we again confirm the previous finding that small governments are more efficient. Small governments need to reduce their expenditures by 4.4% and additionally increase their performance by 0.11 units. While, on the other hand, big governments need to reduce expenditures by 32.1% and increase their performance by 0.26 units in order to become fully efficient.

The employment of both DEA-CRS and DEA-VRS models allows us to determine how much of the overall or global government inefficiency in SEE countries is due to the inefficient operations of the government itself or, in other words, due to pure technical inefficiency. And

how much of the overall government inefficiency is due to disadvantageous conditions under which governments are operating, or more precisely, how much of the inefficiency is attributed to the scale inefficiency.

The average SE is higher than the average PTE of the SEE governments, as shown in Table 9. It means that the inefficiency of public sectors in SEE is primarily caused by the inefficient operations of the governments and to a lesser extent by the disadvantageous conditions under which governments are operating. Only Albania and Macedonia can be treated as the special cases. Albanian government is assigned SE score of 1, meaning that it operates at most productive scale size. On the other hand, the inefficiency of Macedonian government is primarily caused by the disadvantageous conditions under which it operates while it has a relatively high PTE, at least compared to the rest of SEE governments. It means that the Macedonian government is operating relatively efficiently.

Table 9. Decomposition of Overall Public Sector Efficiency

Country	**Overall efficiency**	**PTE**	**SE**
Albania	1.000	1.000	1.000
B&H	0.486	0.633	0.769
Croatia	0.654	0.726	0.901
Macedonia	0.745	0.911	0.818
Montenegro	0.529	0.681	0.777
Serbia	0.470	0.677	0.694
Average	0.647	0.771	0.827
Small governments	0.873	0.956	0.909
Big governments	0.535	0.679	0.785

The division of the sample on big and small governments shows that government inefficiency of the small governments is more attributed to the disadvantageous conditions under which the governments are operating than to the pure technical inefficiency of the government itself. The opposite is true for the big governments.

4.3.2 Public Sector Efficiency in Administration

In the analysis of government efficiency in terms of spending public money on administration we use general government final consumption expenditures as a share of GDP as an input variable, while PSP indicator for administrative sector is used as output.

Under DEA-CRS model, current administrative performance of SEE countries could be obtained with 44.4% less government consumption expenditures, as shown in Table 10. This efficiency score allows us to conclude that SEE governments are significantly inefficient in terms of spending on administration (see Appendix N). Furthermore, all of the input and output slacks are equal to zero. In terms of individual country efficiency scores, Albania is the most efficient, with an efficiency score of 1, and it is also a peer DMU for the rest of the SEE governments.

Macedonian government is the second most efficient SEE government in spending on administration. B&H and Croatia share a third place, while Serbian government holds the fourth place. The least efficient SEE government, in terms of spending public money on administration, is that of Montenegro.

Small governments report, on average, higher efficiency. They could reduce government expenditures by 22.8% and attain the current level of administrative performance. While big governments need to reduce their expenditures more than two times as much, 55.3%.

The efficiency scores under DEA-VRS model are quite higher than under DEA-CRS but the countries remain substantially inefficient, as shown in Table 10 (see Appendix O). Only the efficiency score of Montenegro remains unchanged, confirming its label as the most inefficient SEE government in terms of spending on administration. Under DEA-VRS model, SEE governments could attain, on average, the same level of administrative performance with 25% less general government final consumption expenditures. This 25% expenditure reduction is almost two times lower than expenditure reduction proposed by DEA-CRS model.

Table 10. Public Sector Efficiency in Administration

Country	**DEA-CRS**			**DEA-VRS**		
	Score	**Rank**	**Waste of resources (in %)**	**Score**	**Rank**	**Waste of resources (in %)**
Albania	1.000	1	0.0	1.000	1	0.0
B&H	0.475	3	52.5	0.839	2	16.1
Croatia	0.475	3	52.5	0.666	3	33.4
Macedonia	0.544	2	45.6	1.000	1	0.0
Montenegro	0.367	5	63.3	0.367	5	63.3
Serbia	0.472	4	52.8	0.626	4	37.4
Average	0.556		44.5	0.750		25.0
Small governments	0.772		22.8	1.000		0.0
Big governments	0.447		55.3	0.625		37.6

This model identifies two countries as being fully efficient, Albania and Macedonia. Albania appears in a role of a peer for another country four times, while Macedonia holds that role three times. All of the input and output slacks are equal to zero indicating that all what is needed for public sectors to become efficient is the previously explained input reduction.

The decomposition of efficiency scores on PTE and SE reveals that, on average, this government inefficiency is primarily, although not significantly, caused by the pure technical inefficiency of the government operation. Countries found to be operating at the most productive scale size are Albania and Montenegro. Therefore, the overall low efficiency of Montenegro's government in spending on administration is entirely caused by the inefficient operations of the government itself. On the other hand, the inefficiency of Macedonian government in spending on

administration is purely due to the disadvantageous conditions under which government is operating. In the case of B&H, the inefficiency is more due to significant scale inefficiency than due to the inefficient government. The opposite is true for Croatia and Serbia.

In the case of administrative efficiency, small SEE governments are 100% technically efficient in their operations, and that their overall inefficiency is caused by the disadvantageous conditions under which the government operates. While, in the case of big governments, the overall inefficiency in administrative spending is primarily caused by the pure technical inefficiency of the government itself, and to a lesser extent by the disadvantageous conditions under which the governments operate. Big governments waste on average 37.5% of their expenditures on administration.

The administrative inefficiency of SEE governments is quite worrying. The administrative sector can be seen as the bureaucratic apparatus through which all of the activities of the government and therefore other categories of government spending are executed.

4.3.3 Public Sector Efficiency in the Health Sector

Health care and education are two of the most important categories of government spending. As regards to the SEE governments, with aging population, deteriorating labour force, and outward migration they face the prospect of one of the worst demographic changes in the next several decades that will impose significant constrains on public finances in general (World Bank, 2012a).[26] Therefore, we present the efficiency analysis of government health spending. Unfortunately, due to the unavailability of data, such an analysis cannot be performed for public spending on education. For the analysis of efficiency of health spending in SEE, as output, we use PSP for health sector, and as inputs public health expenditures as a share of GDP.

Under the DEA-CRS model, the current level of health output in SEE countries could be attained with 31% less public health spending, as shown in Table 11 (see Appendix P). Again, Albania is the most efficient SEE government in terms of spending public money on health care and acts as a peer DMU for other SEE governments. The second most efficient SEE government in health spending is Croatia, followed by Macedonia, and B&H. The two least efficient SEE governments in terms of health spending are Montenegro and Serbia, respectively. The analysis did not detect any input or output slacks.

With a waste of resources of more than 38%, big governments are significantly more inefficient then the small ones, which waste around 17% of the public health expenditures.

The efficiency scores under DEA-VRS model are significantly higher than those obtained using the DEA-CRS model (see Appendix Q). The average efficiency under DEA-CRS model is 0.690, while under the DEA-VRS model it is 0.147 points higher. Under this model both, Albania and Croatia are identified as efficient and they both act as a peer DMU for other country four times. The identification of Albanian government as being efficient in terms of spending on

[26] This report uses the abbreviation SEE6 to indicate Albania, B&H, Kosovo, Macedonia, Montenegro, and Serbia.

health care is also confirmed in the analysis of this category of government spending by Hsu (2012). In the analysis, using DEA-VRS model, with 10 other countries Albania is identified as efficient among the sample of 46 countries. However, other SEE countries were not so successful.

Under DEA-VRS the difference in the efficiency of big and small SEE governments is quite small, only 0.059.

Decomposition of the efficiency score shows that, on average, the inefficiency of SEE government in public health care spending is primarily caused by disadvantageous conditions under which governments are operating, although the inefficiency of the government itself is not negligible, since the difference between SE and PTE is not significant.

Table 11. Public Sector Efficiency in Health Sector

Country	**DEA-CRS**			**DEA-VRS**		
	Score	**Rank**	**Waste of resources (in %)**	**Score**	**Rank**	**Waste of resources (in %)**
Albania	1.000	1	0.0	1.000	1	0.0
B&H	0.610	4	39.0	0.785	2	21.5
Croatia	0.695	2	30.5	1.000	1	0.0
Macedonia	0.667	3	33.3	0.751	5	24.9
Montenegro	0.591	5	40.9	0.741	4	25.9
Serbia	0.577	6	42.3	0.742	3	25.8
Average	0.690		31.0	0.837		16.4
Small governments	0.834		16.7	0.876		12.5
Big governments	0.618		38.2	0.817		18.3

Only Albania is operating at the most productive scale size. While the overall Croatian government inefficiency in health spending is entirely caused by disadvantageous conditions under which government operates. The inefficiency of B&H government is also more attributed to the scale inefficiency than to the inefficient operations of the government. While, on the other hand, the inefficiency of the rest of the SEE governments, is more attributed to the inefficiency of the government itself.

The inefficiency of small governments is primarily caused by the inefficient operations of the government, while they report a rather high SE. The opposite is true for the big governments.

4.3.4 Public Sector Efficiency in Maintaining Stability

In the analysis of efficiency of specific sectors, SEE governments are most inefficient in terms of spending public money on maintaining stability. They could, on average, reduce government expenditures by 57.7% and still obtain the current level of economic stability. In this analysis, general government expenditures are used as inputs, while as output we use PSP indicator for stability.

Albania, once more, confirms its superior position with an efficiency score of 1 and a peer role, as shown in Table 12. The second most efficient SEE government in terms of government spending on maintaining stability is Macedonian. The rest of the governments waste more than 70% of the expenditures in trying to maintain economic stability. This is a case of an extreme inefficiency. Furthermore, analysis shows no input or output slacks (see Appendix R).

The division of the sample on big and small governments shows a considerable difference in their efficiency in spending on stability. Small governments could attain the current level of economic stability with 20.4% less government spending. While, big governments are wasting, on average, 76.4% of their expenditures on maintaining stability.

Table 12. Public Sector Efficiency in Maintaining Stability

Country	**DEA-CRS**			**DEA-VRS**		
	Score	**Rank**	**Waste of resources (in %)**	**Score**	**Rank**	**Waste of resources (in %)**
Albania	1.000	1	0.0	1.000	1	0.0
B&H	0.276	3	72.4	0.633	6	36.7
Croatia	0.240	5	76.0	0.726	3	27.4
Macedonia	0.592	2	40.8	0.911	2	8.9
Montenegro	0.266	4	73.4	0.681	4	31.9
Serbia	0.162	6	83.8	0.677	5	32.3
Average	0.423		57.7	0.771		22.9
Small governments	0.796		20.4	0.956		4.5
Big governments	0.236		76.4	0.679		32.1

However, under DEA-VRS model countries report higher efficiency with the average efficiency score increasing from 0.423, under DEA-CRS, to 0.771 (see Appendix S). The suggested input reduction under DEA-VRS model is more than two times smaller than the one suggested by the DEA-CRS model. Once more, Albanian government is identified as the most efficient. Macedonia keeps its second place, with a relatively high efficiency score of 0.911. Surprisingly, B&H has fallen from the third place in the case of DEA-CRS model to the last place under the DEA-VRS model.

The presence of output slacks confirms the overall extreme inefficiency of SEE government in terms of spending on stability. In order to become fully efficient the countries need to, aside from decreasing their expenditures, increase their outputs by, on average, 0.97 units. Albania is the only country found fully efficient, without any input or output slacks. Big governments need to reduce their expenditures by 32.1% and increase the stability, or more specifically PSP indicator for stability, by 1.28 units in order to become fully efficient. While small governments' need to reduce expenditures by 4.4% and augment the output by 0.35 units. It is a significant difference.

The decomposition of the efficiency scores reveals that this extreme government inefficiency is primarily caused by significant scale inefficiencies, which are disadvantageous conditions under which governments operate. Moreover, this is true for every SEE government. However, the impact of pure technical inefficiency of the SEE governments is not negligible. The disadvantageous conditions are more pronounced in the case of big governments than in the case of the small ones.

4.3.5 Public Sector Efficiency in Economic Performance

In this subchapter, we analyse government efficiency in terms of spending on economic performance of the country. As inputs, general government expenditures as a share of GDP are used, while as output we use PSP indicator for economic performance.

DEA-CRS model shows that SEE governments could obtain, on average, the current economic performance with 33.1% less government expenditures (see Appendix T). The Albanian government is the most efficient one, followed by Croatian with a waste of resources of 10.5%, as shown in Table 13. Once more, small governments show a higher level of efficiency than the big ones. Also, there are no input or output slacks.

Again, countries may favour DEA-VRS model due to its generally higher efficiency scores (see Appendix U). Besides Albania, under the employment of this model, Croatia is also identified as the efficient one. The governments of both countries are found to be fully efficient, although Albania holds a stronger position since it takes a role of peer for another country four times. On the other hand, Croatia appears as peer country only for itself.

Table 13. Public Sector Efficiency in Economic Performance

Country	**DEA-CRS**			**DEA-VRS**		
	Score	**Rank**	**Waste of resources (in %)**	**Score**	**Rank**	**Waste of resources (in %)**
Albania	1.000	1	0.0	1.000	1	0.0
B&H	0.409	6	59.1	0.633	5	36.7
Croatia	0.895	2	10.5	1.000	1	0.0
Macedonia	0.604	4	39.6	0.911	2	8.9
Montenegro	0.611	3	38.9	0.681	3	31.9
Serbia	0.496	5	50.4	0.677	4	32.3
Average	0.669		33.1	0.817		18.3
Small governments	0.802		19.8	0.956		4.5
Big governments	0.603		39.7	0.748		25.2

However, a further examination of the DEA-VRS results shows that the suggested government expenditure reduction will move SEE governments on the frontier but not on the efficient part. In order to become fully efficient a further output augmentation is also required.

The higher efficiency of small government is once more confirmed. The decomposition of efficiency scores reveals that, on average, government inefficiency in terms of spending on economic performance is primarily caused by disadvantageous conditions under which governments are operating. However, the difference between PTE and SE is relatively small. While the inefficiency of small governments in spending on economic performance is mainly caused by disadvantageous conditions under which they operate, the opposite is true for the big governments.

4.4 Robustness of the DEA Results

The comparison of the country scores and ranks across the three efficiency measures used, PSE indicator, DEA-CRS and DEA-VRS model, affords evidence of the robustness of the analysis. The three methods have a strong and positive correlation coefficient for both, the efficiency scores obtained as well as for countries' rankings, as shown in Table 14. Therefore, we can conclude that the methods provide rather similar results. This conclusion further provides evidence of the robustness of the analysis. The rankings are the same under the PSE and DEA-CRS model that sheds some light on the accuracy of the usage of this composite indicator as an efficiency measure. Despite its accuracy, the PSE indicator is still only a partial efficiency measure which points to in/efficiency but provides no information regarding the degree of the identified in/efficiency.

Table 14. Comparison of Country Scores and Ranks across Methods

Country	**Average PSE**		**DEA**			
			CRS		**VRS**	
	Score	**Rank**	**Score**	**Rank**	**Score**	**Rank**
Albania	1.921	1	1.000	1	1.000	1
B&H	0.812	5	0.486	5	0.633	6
Croatia	1.002	3	0.654	3	0.726	3
Macedonia	1.136	2	0.745	2	0.911	2
Montenegro	0.815	4	0.529	4	0.681	4
Serbia	0.754	6	0.470	6	0.677	5
Correlation			Score	Rank	Score	Rank
PSE - DEA CRS Model			0.975	1	-	-
PSE - DEA VRS Model			-	-	0.907	0.943

One of the pointed weaknesses of DEA is its sensitivity to outliers. Due to our relatively small sample size, we are able to notice outliers even with simple manual inspection of the data used. Nevertheless, due to the extraordinary efficiency results of the Albanian government, which is identified as the efficient country in terms of overall public sector as well as in the separately analysed four sectors, we repeat the DEA analysis without it, treating it as an outlier. However, although higher efficiency scores are obtained without Albania being in the sample, the efficiency rankings did not change under DEA-CRS model, while under DEA-VRS model some

changes in countries ranking occur but we find it insignificant suggesting that Albanian efficiency is the superior (see Appendix V and Appendix W). This is also confirmed with it being identified as the peer DMU for the rest of the countries in the sample. The frequency with which Albania takes the role of a peer DMU is of interest since "a low frequency suggests that it has an extreme characteristic (for example size) which makes it an unsuitable peer to emulate" (Athanassopoulos & Shale in Johnes, 2006, p. 280). The calculation of the DEA without Albania included in the sample provides further evidence for the robustness of the analysis.

Closely related to the problem of outliers is the problem of measurement errors. However, since we use, for every variable, an average for the period 2005-2010 we find that this problem is avoided. According to Pedraja-Chaparro et al. (2012) calculation of variables averages over a certain period of time is one of the ways to alleviate the problem of measurement errors that have influence on DEA results.

This type of analysis is also supposed to be sensitive to the variables used. Due to the current lack of available data, we are not able to perform the analysis using different public input and output indicators. However, in this regards we have followed the most relevant previous empirical research on the given topic and believe that in this matter problems should not occur. Nevertheless, the repetition of our analysis using different variables as input and output indicators is a fruitful area for future research.

The results of the government actions, especially structural reforms, are not experienced immediately. It can often take a number of years before the results of public expenditures are evident. Therefore, public sector efficiency can be analysed with a so-called lag effect. It means that public inputs, in our case public expenditures, are taken for previous years, while public outputs, in our case the PSP indicators, are taken for the subsequent years. Although literature predicts the lag effect of the government spending to be particularly pronounced in the case of health and education sectors, other areas of government influence are not immune to this effect (Gupta & Verhoeven, 2001; Pedraja-Chaparro et al., 2012). However, the review of literature allows a categorisation of performed analysis on ones assuming the insignificance of the impact of lags of government spending, and the ones that take into account the lag effect. Analysis of Hauner and Kyobe (2010) falls in first category, while for example, analyses such as those performed by Wang and Alvi (2011), and Afonso et al. (2005) fall into second category. Thus, we perform analysis of public sector efficiency with inputs taken as average for the period 2000-2005, while the output indicators are taken as an average for the period 2005-2010.[27]

The analysis of overall government efficiency using DEA-CRS model shows no significant difference between the model that takes account of the lagged effect, and the one that does not (see Appendix X). The average efficiency score is only by 0.025 points lower under the model that takes account of the lagged effect. Furthermore, there are some changes in the rankings of the three most inefficient countries. Generally, DEA-CRS model without the lagged effect

[27] Due to the observation of the government expenditures over the period 2000-2005, our classification of SEE governments based on the size of their public sectors changes. In this case, besides Albania and Macedonia, Montenegro is also a country with small public sector.

reports higher efficiency scores, on average as well as for individual countries, except for Serbia. Its efficiency score is higher under DEA-CRS model with the lagged effect.

The same conclusions are drawn in the case of employment of DEA-VRS model, with and without the lagged effect (see Appendix Y). The efficiency scores are generally higher under the model without the lagged effect. The difference is slightly higher than under the DEA-CRS models, 0.029, probably due to generally higher scores obtained under the assumption of variable returns to scale. However, this difference in the obtained results is not significant. There are, again, some differences in the efficiency rankings, although under all of the models Albania is the most efficient SEE country, followed by Macedonia.

The decomposition of the efficiency scores on the SE and PTE shows that under the both models, with and without the lagged effect, the overall inefficiency of SEE governments is mostly caused by the inefficient operations of the government itself and to a lesser extent by the disadvantageous conditions under which the governments operate. Average SE value is same under the both models, 0.827.

Since significant differences in DEA models with and without the lag effect of government expenditures are not identified in the case of analysis of overall public sector efficiency, there is no reason to proceed with such an analysis of public sector efficiency, with the lag effect, for the previously analysed specific sectors. Therefore, we are able to conclude that the lag effect of public spending is not significant in the analysis of public sector efficiency.

Based on the determined similarity of the results across different methods used, repeated DEA analysis and other investigation of the applied methods and used data, we are able to conclude that our analysis of public sector efficiency in SEE countries is relatively robust.

4.5 The Main Findings of the Empirical Analysis

The preceding analysis allows us to conclude that SEE governments are significantly inefficient in terms of spending public money. They waste more than 35% of public expenditures. Even if one is inclined to the results of the DEA-VRS model, which are generally higher, the wastefulness of resources remains significant at 23%. However, besides being generally characterized as inefficient there are also significant differences in the level of the identified inefficiency among SEE countries. For example, second ranked Macedonia wastes more than 25% of public money, while the least efficient Serbian government wastes more than two times as much. Even though DEA-VRS model reports higher efficiency scores, the difference remains significant. Due to the employment of the two models of the DEA analysis, we are able to decompose the identified inefficiency into the pure technical inefficiency of the government and the inefficiency resulting from the disadvantageous conditions. The overall inefficiency of SEE governments is primarily due to the inefficient operation of the government itself. However, the disadvantageous conditions impact on the identified inefficiency is not negligible.

With regards to sector specific analysis, SEE governments are the least efficient in spending on maintaining stability and administration, the two sectors switch places depending on the DEA model used. Spending on economic performance takes the third place in efficiency ranking, while, on average, among the analysed sectors the countries report the highest efficiency scores in terms of spending on health care. On the other hand, the greatest discrepancy in the results occurs in the case of maintaining stability, followed by spending on economic performance, administration, and health care. However, the list changes slightly under DEA-VRS model. In this case, the highest gap in the efficiency scores among the SEE governments is in spending on administration, followed by spending on maintaining stability and economic performance, and health.

With regards to country efficiency scores, Albania is identified as the efficient country in terms of overall public sector, as well as in the separately analysed four sectors. Second most efficient public sector is the Macedonian, followed by Croatia. Montenegro holds the fourth place in efficiency ranking. The least efficient SEE governments are those of B&H and Serbia. The first four countries take the same rankings under both, DEA-CRS and DEA-VRS, models while, on the other hand, B&H and Serbia switch places depending on the model employed.

4.6 The Main Limitations of the Analysis

A rather short time period, 2005-2010, is the main limitations of the analysis. Our analysis uses data on public spending in the construction of the PSE indicators and in DEA. Public spending, as shown in the review of key economic indicators in SEE countries, is influenced by the financial crisis of 2007. This may have impact on the obtained results on public sector efficiency. However, the use of averages for the analysed period should have alleviated this problem. Nevertheless, the analysis of public sector efficiency in SEE countries could be investigated after these economies stabilise, i.e. comparing pre-post with the crisis period. Further limitations concern the number of sectors over which public efficiency is analysed as well as the choice of socio-economic variables used in the construction of the PSP indicator. Once again, we call upon the lack of available data.

Although we have already stressed out that the main problem encountered during the analysis is data availability or more precisely their lack, we find that its severity cannot be exaggerated. Undeveloped database are not unusual in the case of developing countries such as the SEE ones. We have tried to mitigate this problem by using international databases that allowed us to ensure the same methodology of data collection.

A number of questions could be further investigated. For example, different methods of efficiency estimation, primary parametric as well as other non-parametric could be applied to our data to test the robustness of the results. In the same line of reasoning, the use of other variables, as public sector input and output indicators, might be interesting to test the sensitivity of the results to the choice of input and output variables. On the other hand, regarding the upgrades of our findings, one could use our results to try to explain identified in/efficiency with different determinants. Among the different types of public sector efficiency determinants, e.g. economic,

social, demographic, etc., we find the political and institutional ones particularly interesting. Some of the political variables that increase public sector efficiency are political stability and strong political leadership. On the other hand, security of property rights and rule of law, are institutional variables that have a positive impact on public sector efficiency. However, SEE countries perform relatively bad on these variables and this could be one of the sources of their inefficiency. As mentioned in the presentation of key economic indicators for SEE countries, five out of six countries were, not so long ago, one country. The aftermath of SFR Yugoslavia breakdown is evident even today, more than 20 years later. For these reasons, SEE countries are young democracies that are politically fragile with weak institutional environment. Also, since we conduct the analysis on national level, a different strain of future work could be to analyse the efficiency of local governments in SEE countries. Hauner (2008, p. 1746) argues that „understanding of what explains efficiency differences at the subnational level will be essential to improve efficiency on the general government level". In that line of reasoning, determinants of municipal efficiency in spending public money can also shed some light regarding the efficiency of an overall public sector.

Aware of the deficiencies of the research, however the uniqueness of the performed analysis cannot be neglect. To our knowledge, the public sector efficiency in SEE countries with such empirical approach has never been analysed. Therefore, without a doubt, the thesis contributes to the research on the topic in question. This research also provides valuable information to the policy makers as well.

CONCLUSION

The overall objective of this study was to analyse public sector efficiency in SEE countries. We aimed to identify with how much fewer resources could the current level of public output be attained. The hypothesis is stated as follows: Public sector spending in SEE countries is not efficient. Our auxiliary hypotheses are SEE countries could use fewer resources to obtain current level of public output; and public sector efficiency of SEE countries is rather diverse.

The performed analysis of public sector efficiency in SEE countries allows us to conclude that we do not have enough evidence to reject the main hypothesis. The SEE governments are inefficient in terms of spending public money - our main finding is that they waste 23-35% of public expenditures, on average. This waste of resources is in line with our first auxiliary hypothesis; SEE countries could use fewer resources and still obtain the same level of public output. However, there are significant heterogeneities between different SEE governments. This means that we cannot reject our second auxiliary hypothesis that the efficiency of SEE public sectors is rather diverse. For example, second ranked Macedonia wastes more than 25% of public money, while the least efficient Serbian government wastes more than two times as much.

Next, we decomposed the identified inefficiency into the pure technical inefficiency of the government and the inefficiency resulting from the disadvantageous conditions. The results suggest that overall inefficiency of SEE governments is primarily due to the inefficient operation of the government itself. However, the impact of disadvantageous conditions, under which governments operate, is not negligible.

Our sector specific analysis suggests that, SEE governments are the least efficient in spending on maintaining stability and administration. Spending on economic performance takes the third place in efficiency ranking, while countries report the highest efficiency scores in terms of spending on health care. On the other hand, the greatest discrepancy in the results occurs in the case of maintaining stability, followed by spending on economic performance, administration, and health care. Finally, we confirmed the findings of majority of previous studies that bigger governments tend to be less efficient. We also find that the lag effect of government expenditures does not have significant impact on obtained efficiency scores.

REFERENCE LIST

1. Adam, A., Delis, M., & Kammas, P. (2011). Public Sector Efficiency: Leveling the Playing Field between OECD Countries. *Public Choice, 146*(1), 163-183.
2. Afonso, A., & Aubyn, S. M. (2005). Non-Parametric Approaches to Education and Health Efficiency in OECD Countries. *Journal of Applied Economics, 8*(2), 227-246.
3. Afonso, A., & Fernandes, S. (2006). Measuring Local Government Spending Efficiency: Evidence for the Lisbon Region. *Regional Studies, 40*(1), 39-53.
4. Afonso, A., & Furceri, D. (2008). *Government Size, Composition, Volatility and Economic Growth* (Working Paper No. 849). Frankfurt am Main: European Central Bank.
5. Afonso, A., & Jalles, J. T. (2011). *Economic Performance and Government Size* (Working Paper No. 1399). Frankfurt am Main: European Central Bank.
6. Afonso, A., Schuknecht, L., & Tanzi, V. (2003). *Public Sector Efficiency: An International Comparison* (Working Paper No. 242). Frankfurt am Main: European Central Bank.
7. Afonso, A., Schuknecht, L., & Tanzi, V. (2005). Public Sector Efficiency: An International Comparison. *Public Choice, 123*(3/4), 321-347.
8. Afonso, A., Schuknecht, L., & Tanzi, V. (2006). *Public Sector Efficiency: Evidence for New EU Member States and Emerging Markets* (Working Paper No. 581). s.l.: European Central Bank.
9. Alexander, C. A., Busch, G., & Stringer, K. (2003). Implementing and Interpreting a Data Envelopment Analysis Model to Assess the Efficiency of Health Systems in Developing Countries. *Journal of Management Mathematics, 14*(1), 49-63.
10. Anderson, T. (2003). Data Envelopment Analysis. In H. Bidgoli (Ed.), *Encyclopedia of Information Systems* (pp. 445-454). s.l.: Academic Press.
11. Angelopoulos, K., Philippopoulos, A., & Tsionas, E. (2008). Does Public Sector Efficiency Matter? Revisiting the Relationship between Fiscal Size and Economic Growth in a World Sample. *Public Choice, 137*(1), 245-278.
12. Aristovnik, A. (2011). An Analysis of the Efficiency of Education Spending in Central and Eastern Europe. *Management, Knowledge and Learning International Conference 2011* (pp. 277-286). Celje: International School for Social and Business Studies.
13. Armey, D. (1995). *The Freedom Revolution.* Washington, D.C.: Regnery Publishing.
14. Ashworth, J., Geys, B., Heyndels, B., & Wille, F. (n.d.). Political Competition and Local Government Performance: Evidence from Flemish Municipalities. Retrieved October 31, 2013, from http://www.wzb.eu/sites/default/files/personen/geys.benny.328/political_competition_and_efficiency.pdf
15. Balaguer-Coll, M. T., Prior, D., & Tortosa-Ausina, E. (2007). On the Determinants of Local Government Performance: A Two-Stage Nonparametric Approach. *European Economic Review, 51*(2), 425-451.
16. Balatsky, E. (2012). Wagner's Law, the Armey-Rahn Curve, and the Paradox of Wealth. *Problems of Economic Transition, 54*(12), 40-54.

17. Banker, R. D., Charnes, A., & Cooper, W. W. (1984). Some Models for Estimating Technical and Scale Inefficiencies in Data Envelopment Analysis. *Management Science, 30*(9), 1078-1092.
18. Barankay, I., & Lockwood, B. (2007). Decentralization and the Productive Efficiency of Government: Evidence from Swiss Cantons. *Journal of Public Economics, 91*(5/6), 1197-1218.
19. Barro, R. J. (1991). A Cross-Country Study of Growth, Saving, and Government. In B. Bernheim & J. Shoven (Eds.), *National Saving and Economic Performance* (pp. 271-304). Chicago: University of Chicago Press.
20. Bhat, R., Verma, B. B., & Reuben, E. (2001). Data Envelopment Analysis (DEA). *Journal of Health Management, 3*(2), 309-328.
21. Borge, L. E., Falch, T., & Tovmo, P. (2008). Public Sector Efficiency: The Roles of Political and Budgetary Institutions, Fiscal Capacity, and Democratic Participation. *Public Choice, 136*(3/4), 475-495.
22. Bozeman, B. (2004). *All Organizations are Public: Comparing Public and Private Organizations.* Washington, D.C.: Beard Books.
23. Central European Free Trade Agreement (CEFTA). (2013). *Central European Free Trade Agreement - CEFTA 2006*. Retrieved October 12, 2013, from http://www.cefta.int/
24. Chan, S.-G., & Karim, M. Z. A. (2012). Public Spending Efficiency and Political and Economic Factors: Evidence from Selected East Asian Countries. *Economic Annals, 57*(193), 7-23.
25. Charnes, A., Cooper, W. W., & Rhodes, E. (1978). Measuring the Efficiency of Decision Making Units. *European Journal of Operational Research, 2*(6), 429-444.
26. Chobanov, D., & Mladenova, A. (2009). What is the Optimum Size of Government. Retrieved February 14, 2013, from http://ime.bg/uploads/335309_OptimalSizeOfGovernment.pdf
27. Chong, A., La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (2012). *Letter Grading Government Efficiency* (Working Paper No. 18268). Cambridge: National Bureau of Economic Research.
28. Coelli, T. J. (1996). *A Guide to DEAP Version 2.1: A Data Envelopment Analysis (Computer) Program.* Armidale: Centre for Efficiency and Productivity Analysis (CEPA).
29. Coelli, T. J., Rao, D. S. P., O'Donnell, C. J., & Battese, G. E. (2005). Data Envelopment Analysis. In *An Introduction to Efficiency and Productivity Analysis* (pp. 161-181). New York: Springer.
30. Cook, W. D., & Seiford, L. M. (2009). Data Envelopment Analysis (DEA) - Thirty Years On. *European Journal of Operational Research, 192*(1), 1-17.
31. Cook, W. D., & Zhu, J. (2005). Data Envelopment Analysis. In *Modeling Performance Measurement: Applications and Implementation Issues in DEA* (pp. 1-27). New York: Springer.
32. Cooper, W. W., Huang, Z., & Li, S. X. (2011). Chance-Constrained DEA. In W. W. Cooper, L. M. Seiford & J. Zhu (Eds.), *Handbook on Data Envelopment Analysis* (pp. 211-240). New York: Springer.

33. Cooper, W. W., Seiford, L. M., & Tone, K. (2006). *Introduction to Data Envelopment Analysis and Its Uses.* New York: Springer.
34. Cooper, W. W., Seiford, L. M., & Tone, K. (2007). *Data Envelopment Analysis: A Comprehensive Text with Models, Applications, References and DEA-Solver Software* (2nd ed.). New York: Springer.
35. Dar, A. A., & AmirKhalkhali, S. (2002). Government Size, Factor Accumulation, and Economic Growth: Evidence from OECD Countries. *Journal of Policy Modelling, 24*(7/8), 679-692.
36. De Borger, B., Kerstens, K., Moesen, W., & Vanneste, J. (1994). Explaining Differences in Productive Efficiency: An Application to Belgian Municipalities. *Public Choice, 80*(3/4), 339-358.
37. De Launey, G. (2013). Kosovo Marks Fifth Year of Independence from Serbia. Retrieved January 20, 2014, from http://www.bbc.co.uk/news/world-europe-21492473
38. De Witte, K., & Moesen, W. (2010). Sizing the Government. *Public Choice, 145*(1/2), 39-55.
39. Doing Business. (2013). *Paying Taxes*. Retrieved October 17, 2013, from http://www.doingbusiness.org/data/exploretopics/paying-taxes
40. El-Mahgary, S., & Lahdelma, R. (1995). Data Envelopment Analysis: Visualizing the Results. *European Journal of Operational Research, 83*(3), 700-710.
41. Epstein, M. K., & Henderson, J. C. (1989). Data Envelopment Analysis for Managerial Control and Diagnosis. *Decision Sciences, 20*(1), 90-119.
42. European Bank for Reconstruction and Development (EBRD). (2005). *Transition Report 2005: Business in Transition.* London: European Bank for Reconstruction and Development.
43. European Bank for Reconstruction and Development (EBRD). (2006). *Transition Report 2006: Finance in Transition.* London: European Bank for Reconstruction and Development.
44. European Bank for Reconstruction and Development (EBRD). (2013a). *Structural Change Indicators*. Retrieved October 8, 2013, from http://www.ebrd.com/pages/research/economics/data/macro.shtml#structural
45. European Bank for Reconstruction and Development (EBRD). (2013b). *Transition Indicators*. Retrieved October 8, 2013, from http://www.ebrd.com/pages/research/economics/data/macro.shtml#ti
46. European Commission. (2014). *The EU Emission Trading System (EU ETS)*. Retrieved November 23, 2013, from http://ec.europa.eu/clima/policies/ets/index_en.htm
47. European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, & World Bank. (2009). *System of National Accounts 2008.* New York: European Communities, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, & World Bank.
48. Farrell, M. J. (1957). The Measurement of Productive Efficiency. *Journal of the Royal Statistical Society. Series A (General), 120*(3), 253-290.

49. Ferreiro, J., Garcia del Valle, M., & Gomez, C. (2012). Similarities and Differences in the Composition of Public Expenditures in European Union. *Journal of Economic Issues, 46*(3), 633-660.
50. Foreign Investment Advisory Service. (2007). *Attracting Investment to South East Europe: Survey of FDI Trends and Investor Perceptions.* Washington D.C.: The World Bank Group.
51. Freedom House. (2013). *Rating Tables*. Retrieved August 1, 2013, from http://www.freedomhouse.org/sites/default/files/NIT%202010%20Ratings%20Tables.pdf
52. Fried, H. O., Lovell, C. A. K., Schmidt, S. S., & Yaisawarng, S. (2002). Accounting for Environmental Effects and Statistical Noise in Data Envelopment Analysis. *Journal of Productivity Analysis, 17*(1/2), 157-174.
53. GDP Growth (annual percentage). (n.d.) In *World Development Indicators*. Retrieved October 9, 2013, from http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=worlw-development-indicators#
54. GDP Per Capita (current prices in US$). (n.d.) In *World Economic Outlook Database October 2013*. Retrieved October 10, 2013, from http://www.imf.org/external/pubs/ft/weo/2013/02/weodata/weorept.aspx?pr.x=73&pr.y=12&sy=2000&ey=2012&scsm=1&ssd=1&sort=country&ds=.&br=1&c=914%2C946%2C963%2C962%2C918%2C943%2C960%2C964%2C944%2C968%2C942%2C941&s=NGDPDPC&grp=0&a
55. GDP Per Capita (current US$). (n.d.) In *World Development Indicators*. Retrieved October 9, 2013, from http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=world-development-indicators#s_g
56. GDP (constant prices, percent change). (n.d.) In *World Economic Outlook Database October 2013*. Retrieved October 10, 2013, from http://www.imf.org/external/pubs/ft/weo/2013/02/weodata/weorept.aspx?pr.x=56&pr.y=10&sy=2000&ey=2018&scsm=1&ssd=1&sort=country&ds=.&br=1&c=914%2C946%2C963%2C962%2C918%2C943%2C960%2C964%2C944%2C968%2C942%2C941&s=NGDP_RPCH&grp=0&a
57. General Government Final Consumption Expenditure (percent of GDP). (n.d.) In *World Development Indicators*. Retrieved October 9, 2013, from http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=world-development-indicators#s_g
58. General Government Gross Debt (percent of GDP). (n.d.) In *World Economic Outlook Database October 2013*. Retrieved October 10, 2013, from http://www.imf.org/external/pubs/ft/weo/2013/02/weodata/weorept.aspx?pr.x=78&pr.y=9&sy=2000&ey=2018&scsm=1&ssd=1&sort=country&ds=.&br=1&c=914%2C946%2C963%2C962%2C918%2C943%2C960%2C964%2C944%2C968%2C942%2C941&s=GGXWDG_NGDP&grp=0&a
59. General Government Net Lending/Borrowing (percent of GDP). (n.d.) In *World Economic Outlook Database October 2013*. Retrieved October 10, 2013, from

http://www.imf.org/external/pubs/ft/weo/2013/02/weodata/weorept.aspx?pr.x=84&pr.y=7&sy=2000&ey=2018&scsm=1&ssd=1&sort=country&ds=.&br=1&c=914%2C946%2C963%2C962%2C918%2C943%2C960%2C964%2C944%2C968%2C942%2C941&s=GGXCNL_NGDP&grp=0&a

60. General Government Revenues (percent of GDP). (n.d.) In *World Economic Outlook Database October 2013*. Retrieved October 10, 2013, from http://www.imf.org/external/pubs/ft/weo/2013/02/weodata/weorept.aspx?sy=2000&ey=2018&scsm=1&ssd=1&sort=country&ds=.&br=1&pr1.x=54&pr1.y=15&c=914%2C946%2C963%2C962%2C918%2C943%2C960%2C964%2C944%2C968%2C942%2C941&s=GGR_NGDP&grp=0&a
61. General Government Total Expenditure (percent of GDP). (n.d.) In *World Economic Outlook Database October 2013*. Retrieved October 10, 2013, from http://www.imf.org/external/pubs/ft/weo/2013/02/weodata/weorept.aspx?pr.x=90&pr.y=8&sy=2000&ey=2018&scsm=1&ssd=1&sort=country&ds=.&br=1&c=914%2C946%2C963%2C962%2C918%2C943%2C960%2C964%2C944%2C968%2C942%2C941&s=GGX_NGDP&grp=0&a
62. Geys, B., & Moesen, W. (2008). *Measuring Local Government Technical (In)Efficiency: An Application and Comparison of FDH, DEA and Econometric Approaches* (Discussion Paper No. 2008-21). Berlin: WZB, Schwerpunkt Märkte und Politik, Abteilung Marktprozesse und Steuerung.
63. Geys, B., Heinemann, F., & Kalb, A. (2010). Voter Involvement, Fiscal Autonomy and Public Sector Efficiency: Evidence from German Municipalities. *European Journal of Political Economy, 26*(2), 265-278.
64. Golany, B., & Thore, S. (1997). The Economic and Social Performance of Nations: Efficiency and Returns to Scale. *Socio-Economic Planning Sciences, 31*(3), 191-204.
65. Gruber, J. (2007). *Public Finance and Public Policy.* New York: Worth Publishers.
66. Gupta, V., & Verhoeven, M. (2001). The Efficiency of Government Expenditures: Experiences from Africa. *Journal of Policy Modeling, 23*(4), 433-467.
67. Gwartney, J., Lawson, R., & Holcombe, R. (1998). *The Size and Functions of Government and Economic Growth.* Washington, D.C.: Joint Economic Committee.
68. Hauner, D. (2008). Explaining Differences in Public Sector Efficiency: Evidence from Russia's Regions. *World Development, 36*(10), 1745-1765.
69. Hauner, D., & Kyobe, A. (2010). Determinants of Government Efficiency. *World Development, 38*(11), 1527-1542.
70. Hausman, D. M. (2008). Market Failure, Government Failure, and the Hard Problems of Cooperation. *Ethics and Economics, 6*(1), 1-6.
71. Heitger, B. (2001). *The Scope of Government and Its Impact on Economic Growth in OECD Countries* (Working Paper No. 1034). Kiel: Kiel Institute of World Economics.
72. Henderson, D. J., & Zelenyuk, V. (2007). Testing for (Efficiency) Catching-Up. *Southern Economic Journal, 73*(4), 1003-1019.
73. Herrera, S., & Pang, G. (2005). *Efficiency of Public Spending in Developing Countries: An Efficiency Frontier Approach*. s.l.: World Bank.

74. Hillman, A. L. (2009). *Public Finance and Public Policy: Responsibilities and Limitations of Government* (2nd ed.). Cambridge: Cambridge University Press.
75. Howard, A. L. (2001). *Public Sector Economics for Developing Countries.* Barbados: University of the West Indies Press.
76. Hsu, Y-C. (2012). Efficiency in Government Health Spending: A Super Slacks-Based Model. Retrieved February 28, 2013, from http://link.springer.com.nukweb.nuk.uni-lj.si/article/10.1007/s11135-012-9753-9
77. Husnain, M. I. (2011). Is the Size of Government Optimal in Pakistan? *Journal of Economics and Economic Education Research, 12*(2), 41-49.
78. Hwang, J., & Akdede, S. H. (2011). The Influence of Governance on Public Sector Efficiency: A Cross-Country Analysis. *The Social Science Journal, 48*(4), 735-738.
79. Infant Mortality Rate (per 1.000 live births). (n.d.) In *World Development Indicators*. Retrieved August 1, 2013, from http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=world-development-indicators
80. Inflation (average consumer prices, percent change). (n.d.) In *World Economic Outlook Database October 2013*. Retrieved October 10, 2013, from http://www.imf.org/external/pubs/ft/weo/2013/02/weodata/weorept.aspx?pr.x=75&pr.y=15&sy=2000&ey=2018&scsm=1&ssd=1&sort=country&ds=.&br=1&c=914%2C946%2C963%2C962%2C918%2C943%2C960%2C964%2C944%2C968%2C942%2C941&s=PCPIPCH&grp=0&a
81. International Monetary Fund (IMF). (2002). *IMF Press Release No. 02/25*. Retrieved September 19, 2013, from http://www.imf.org/external/np/sec/pn/2002/pn0256.htm
82. International Monetary Fund (IMF). (2008). *Bosnia and Herzegovina: 2008 Article IV Consultation.* Washington D.C.: International Monetary Fund.
83. International Monetary Fund (IMF). (2011). *Republic of Serbia: Request for Stand-By Arrangement.* Washington D.C.: International Monetary Fund.
84. International Monetary Fund (IMF). (2012a). *Bosnia and Herzegovina: 2012 Article IV Consultation and Request for Stand-by Arrangement.* Washington D.C.: International Monetary Fund.
85. International Monetary Fund (IMF). (2012b). *Former Yugoslav Republic of Macedonia 2011 Article IV Consultation.* Washington D.C.: International Monetary Fund.
86. International Monetary Fund (IMF). (2012c). *Montenegro 2012 Article IV Consultation.* Washington D.C.: International Monetary Fund.
87. International Monetary Fund (IMF). (2012d). *The Republic of Croatia 2012 Article IV Consultation.* Washington D.C.: International Monetary Fund.
88. International Monetary Fund (IMF). (2013a). *Albania 2012 Article IV Consultation.* Washington D.C.: International Monetary Fund.
89. International Monetary Fund (IMF). (2013b). *IMF Executive Board Concludes 2013 Article IV Consultation with Montenegro.* Retrieved October 21, 2013, from http://www.imf.org/external/np/sec/pr/2013/pr13315.htm

90. Inward FDI Per Capita (US$ at current prices and current exchange rates). (n.d.) In *UNCTADStat*. Retrieved October 9, 2013, from http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx
91. Inward FDI (percent of GDP). (n.d.) In *UNCTADStat*. Retrieved October 9, 2013, from http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx
92. Jafarov, E., & Gunnarsson, V. (2008). *Government Spending on Health Care and Education in Croatia: Efficiency and Reform Options* (Working Paper No. 08/136). s.l.: International Monetary Fund.
93. Johnes, J. (2006). Data Envelopment Analysis and Its Application to the Measurement of Efficiency in Higher Education. *Economics of Education Review, 25*(3), 273-288.
94. Kalb, A. (2010). *Public Sector Efficiency: Applications to Local Governments in Germany* (1st ed.). Germany: Gabler.
95. Kleiman, M. A. R., & Teles, S. M. (2006). Market and Non-market Failures. In M. Moran, M. Rein & R. Goodin (Eds.), *The Oxford Handbook of Public Policy* (pp. 624-650). Oxford: Oxford University Press.
96. Koopmans, T. (1951). Analysis of Production as an Efficient Combination of Activities. In T. Koopmans (Ed.), *Activity Analysis of Production and Allocation* (pp. 33-97). New York: John Willey & Sons.
97. Kule, D., & Wenzel, H. D. (2004). The Size of the Public Sector. *The Albanian Economy: Performance and Policy Challenges* (pp. 257-276). s.l.: Bank of Albania.
98. Labor Market Efficiency. (n.d.) In *Global Competitiveness Index Data Platform*. Retrieved October 8, 2013, from http://spotfire.weforum.org/embed/ViewAnalysis.aspx?file=/users/tgeiger/Public/GCI_data_platform&waid=c7f788332c64b961e5dd0-20084827bfccba&options=2-0%2C10-0%2C9-0
99. Lane, J-E. (2000). *The Public Sector: Concepts, Models, and Approaches* (3rd ed.). London: Sage Publications.
100. Lavado, R. F., & Cabanda, E. C. (2009). The Efficiency of Health and Education Expenditures in the Philippines. *Central European Journal of Operations Research, 17*(3), 275-291.
101. Life Expectancy at Birth (total, years). (n.d.) In *World Development Indicators*. Retrieved August 1, 2013, from http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=world-development-indicators#
102. Loikkanen, H. A., & Susiluoto, I. (2006). *Cost Efficiency of Finnish Municipalities in Basic Service Provision 1994-2002* (Discussion Paper No. 96). Helsinki: Helsinki Center of Economic Research.
103. Lovell, C. A. K. (1995). Measuring the Macroeconomic Performance of the Taiwanese Economy. *International Journal of Production Economics, 39*(1/2), 165-178.
104. Lovell, C. A. K., Pastor, J. T., & Turner, J. A. (1995). Measuring Macroeconomic Performance in the OECD: A Comparison of European and Non-European Countries. *European Journal of Operational Research, 87*(3), 507-518.

105. Luptáčik, M. (2010). Data Envelopment Analysis. In *Mathematical Optimization and Economic Analysis* (pp. 135-186). New York: Springer.
106. Mandl, U., Dierx, A., & Ilzkovitz, F. (2008). *The Effectiveness and Efficiency of Public Spending* (Economic Paper No. 301). Brussels: European Commission, Directorate-General for Economic and Financial Affairs.
107. Michalopoulos, C. (2003). The Western Balkans in World Trade. In World Bank, *Trade Policies and Institutions in the Countries of South Eastern Europe in the EU Stabilization and Association Process* (pp. 1-20). s.l.: The World Bank.
108. Mihaiu, D. M., Opreana, A., & Cristescu, M. P. (2010). Efficiency, Effectiveness and Performance of the Public Sector. *Romanian Journal of Economic Forecasting, 13*(4), 132-147.
109. Mitchell, D. J. (2005). *The Impact of Government Spending on Economic Growth.* Washington, D.C.: The Heritage Foundation.
110. Moreau, F. (2004). The Role of the State in Evolutionary Economics. *Cambridge Journal of Economics, 28*(6), 847-874.
111. Mutaşcu, M., & Miloş, M. (2009). Optimal Size of Government Spending. The Case of European Union Member States. *Annales Universitatis Apulensis Series Oeconomica, 1*(11), 447-456.
112. Network Associations of Local Authorities of South East Europe. (2012). *Fiscal Decentralisation Indicators: South East Europe.* Retrieved September 19, 2013, from http://nalas.eu/cms/Content_Data/Dokumenti/NALAS-FDIndicators.pdf
113. Nikolov, M., & Hrovatin, N. (2013). Cost Efficiency of Macedonian Municipalities in Service Delivery: Does Ethnic Fragmentation Matter? *Journal of Local Self-Government, 11*(3), 743-775.
114. Obadić, A., & Aristovnik, A. (2011). Relative Efficiency of Higher Education in Croatia and Slovenia: An International Comparison. *The Amfiteatru Economic Journal, 13*(30), 362-376.
115. Opreana, A., & Mihaiu, D. M. (2010). Correlation between the Public Sector's Performance and the Sovereign Debt, in the Context of the Current Economic Crisis. *Romanian Economic and Business Review, 5*(3), 271-283.
116. Pandya, J. (2012). Changing Role of Governments. In *The Global Age* (pp. 131-137). Netherlands: Springer.
117. Parkin, M. (2012). *Microeconomics* (10th ed.). Boston: Addison-Wesley.
118. Pedraja-Chaparro, F., Salinas-Jiménez, J., & Smith, P. C. (2012). Assessing Public Sector Efficiency: Issues and Methodologies. *SSRN Working Paper Series*, 343-359.
119. Penev, S., & Marušić, A. (2011). *Progress in Transition and Reform Implementation in Serbia: Comparing to other Western Balkan Countries, With Main Focus on Regulatory Reform.* Washington D.C.: International Finance Corporation & The World Bank.
120. Perloff, J. M. (2012). *Microeconomics* (6th ed.). Boston: Addison-Wesley.
121. Pevcin, P. (2004). Does Optimal Size of Government Spending Exist? Retrieved November 20, 2012, from http://soc.kuleuven.be/io/egpa/fin/paper/slov2004/pevcin.pdf

122. Public Health Expenditures (percent of total health expenditure). (n.d.) In *World Development Indicators*. Retrieved October 9, 2013, from http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=worlw-development-indicators#s_h
123. Public Health Expenditure (percent of GDP). (n.d.) In *World Development Indicators*. Retrieved October 9, 2013, from http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=world-development-indicators#c_c
124. Rahmayanti, Y., & Horn, T. (2011). Expenditure Efficiency and the Optimal Size of Government in Developing Countries. *Global Economy and Finance Journal, 4*(2), 46-59.
125. Rayp, G., & van de Sijpe, N. (2007). Measuring and Explaining Government Efficiency in Developing Countries. *Journal of Development Studies, 43*(2), 360-381.
126. Sampaio de Sousa, M. D. C., & Stošić, B. (2005). Technical Efficiency of the Brazilian Municipalities: Correcting Nonparametric Frontier Measurements for Outliers. *Journal of Productivity Analysis, 24*(2), 157-181.
127. Scully, G. W. (1994). *What is the Optimal Size of Government in the United States?* (Policy Report No. 188). Dallas: National Center for Policy Analysis.
128. Scully, G. W. (1998). *Measuring the Burden of High Taxes* (Policy Report No. 215). Dallas: National Center for Policy Analysis.
129. Smith, P. C., & Street, A. (2005). Measuring the Efficiency of Public Services: The Limits of Analysis. *Journal of the Royal Statistical Society. Series A (Statistics in Society), 168*(2), 401-417.
130. Statistical Office of Montenegro. (n.d.). *Labour Force Survey*. Retrieved August 8, 2013, from http://www.monstat.org/eng/page.php?id=22&pageid=22
131. Stiglitz, J. E. (2004). *Ekonomija javnog sektora* [Economics of the Public Sector] (3rd ed.). Beograd: Ekonomski fakultet Beograd.
132. Šťastná, L., & Gregor, M. (2011). *Local Government Efficiency: Evidence from the Czech Municipalities* (Working Paper No. 14). Prague: Faculty of Social Sciences, Charles University.
133. Tanzi, V. (2004). Measuring Efficiency in Public Expenditure. *Paper Presented in Conference on Public Expenditure Efficiency and Growth.* s.l.: The World Bank.
134. Tsouhlou, A., & Mylonakis, J. (2011). Public Expenditure, Public Sector Size and Growth: The European Union Marked Structural Differences. *Review of European Studies, 3*(2), 33-51.
135. Unemployment Rate (percent of total labor force). (n.d.) In *World Economic Outlook Database October 2013*. Retrieved October 10, 2013, from http://www.imf.org/external/pubs/ft/weo/2013/02/weodata/weorept.aspx?pr.x=54&pr.y=7&sy=2000&ey=2018&scsm=1&ssd=1&sort=country&ds=.&br=1&c=914%2C946%2C963%2C962%2C918%2C943%2C960%2C964%2C944%2C968%2C942%2C941&s=LUR&grp=0&a
136. Wang, E. C., & Alvi, E. (2011). Relative Efficiency of Government Spending and Its Determinants: Evidence from East Asian Countries. *Eurasian Economic Review, 1*(1), 3-28.

137. Winston, C. (2006). *Government Failure versus Market Failure.* Washington D.C.: AEI - Brookings Joint Center for Regulatory Studies.
138. World Bank. (2007). *Public Expenditure Policies in Southeast Europe.* Washington D.C.: World Bank.
139. World Bank. (2008). *Doing Business in South East Europe 2008.* Washington D.C.: The World Bank Group.
140. World Bank. (2012a). *South East Europe Regular Economic Report.* Washington D.C.: World Bank.
141. World Bank. (2012b). *South East Europe Regular Economic Report No.3, From Double-Dip Recession to Accelerated Reforms.* Washington D.C.: World Bank.
142. World Bank. (2013). *Countries and Economies*. Retrieved October 8, 2013, from http://data.worldbank.org/country
143. World Bank & International Finance Corporation. (2011). *Doing Business in South East Europe 2011*. Washington D.C.: The World Bank Group.
144. Zerbe, R. O., Jr., & McCurdy, H. E. (2000). The End of Market Failure. *Regulation, 23*(2), 10-14.
145. Zorić, J. (2012). *Environmental Regulation.* Lectures for the Class Economics of Regulation. Sarajevo: School of Economics and Business
146. Zugravu, B. G., & Sava, A. S. (2012). Recent Changes in Public Sector Efficiency in Romania: Determinants and Implications. *Social and Behavioral Sciences, 58*, 423-433.

APPENDIXES

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Appendix A: Transition Indicators

Table 1. Transition Indicators, 2000-2012*

Country	Indicator	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
ALBANIA	Large scale privatisation	2,7	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,3	3,7	3,7	3,7	3,7
	Small scale privatisation	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0
	Governance and enterprise restructuring	2,0	2,0	2,0	2,0	2,0	2,0	2,3	2,3	2,3	2,3	2,3	2,3	2,3
	Price liberalisation	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3
	Trade & Forex system	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3
	Competition Policy	1,7	1,7	1,7	1,7	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,3	2,3
B&H	Large scale privatisation	2,0	2,3	2,3	2,3	2,3	2,7	2,7	3,0	3,0	3,0	3,0	3,0	3,0
	Small scale privatisation	2,3	2,7	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0
	Governance and enterprise restructuring	1,7	1,7	1,7	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0
	Price liberalisation	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0
	Trade & Forex system	3,0	3,0	3,0	3,7	3,7	3,7	3,7	3,7	4,0	4,0	4,0	4,0	4,0
	Competition Policy	1,0	1,0	1,0	1,0	1,0	1,0	1,7	2,0	2,0	2,0	2,3	2,3	2,3
CROATIA	Large scale privatisation	3,0	3,0	3,0	3,3	3,3	3,3	3,3	3,3	3,3	3,3	3,3	3,3	3,3
	Small scale privatisation	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3
	Governance and enterprise restructuring	2,7	2,7	2,7	2,7	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,3	3,3
	Price liberalisation	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0
	Trade & Forex system	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3
	Competition Policy	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,7	2,7	3,0	3,0	3,0	3,0

(table continues)

continued

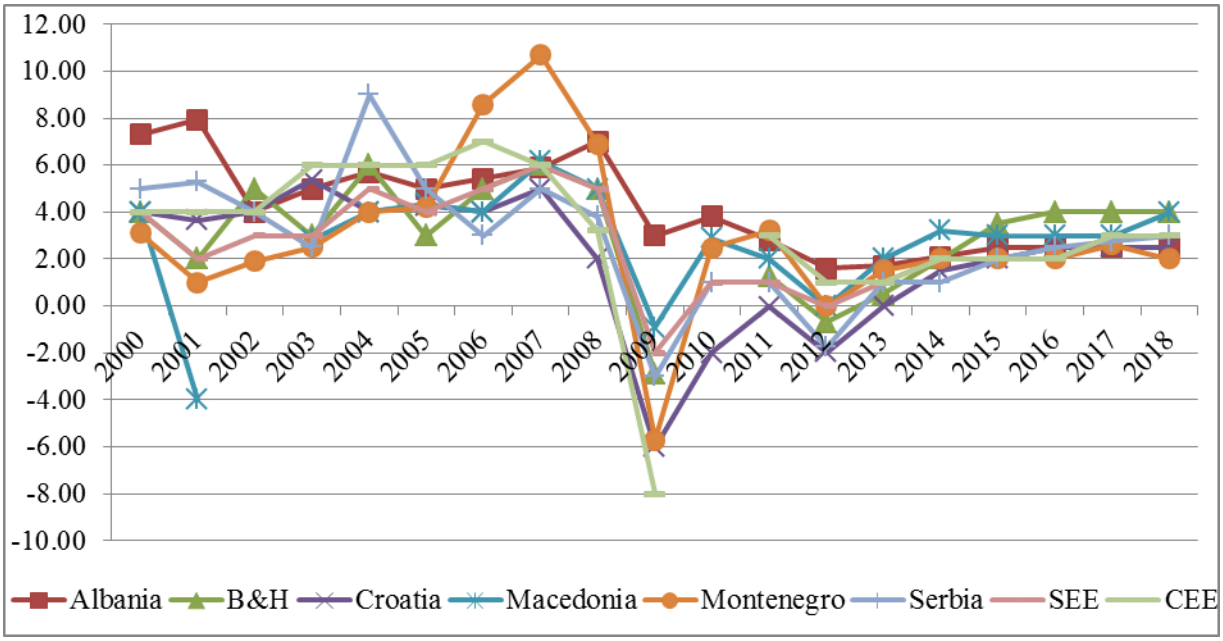
Country	Indicator	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
MACEDONIA	Large scale privatization	3,0	3,0	3,0	3,0	3,3	3,3	3,3	3,3	3,3	3,3	3,3	3,3	3,3
	Small scale privatisation	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0
	Governance and enterprise restructuring	2,3	2,3	2,3	2,3	2,3	2,3	2,7	2,7	2,7	2,7	2,7	2,7	2,7
	Price liberalisation	4,0	4,0	4,0	4,0	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3
	Trade & Forex system	4,0	4,0	4,0	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3
	Competition Policy	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,3	2,3	2,3	2,3	2,7	2,7
MONTENEGRO	Large scale privatisation	1,7	1,7	2,7	2,7	2,7	3,3	3,3	3,3	3,3	3,0	3,3	3,3	3,3
	Small scale privatisation	2,0	2,0	3,0	3,3	3,3	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7
	Governance and enterprise restructuring	1,0	1,0	1,7	1,7	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,3	2,3
	Price liberalisation	3,7	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0
	Trade & Forex system	2,3	2,7	3,0	3,0	3,0	3,7	3,7	4,0	4,0	4,0	4,0	4,0	4,3
	Competition Policy	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,7	1,7	2,0	2,0	2,0	2,0
SERBIA	Large scale privatisation	1,0	1,0	2,0	2,3	2,3	2,7	2,7	2,7	2,7	2,7	2,7	2,7	2,7
	Small scale privatisation	3,0	3,0	3,0	3,0	3,3	3,3	3,7	3,7	3,7	3,7	3,7	3,7	3,7
	Governance and enterprise restructuring	1,0	1,0	2,0	2,0	2,0	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3
	Price liberalisation	2,3	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0
	Trade & Forex system	1,0	2,7	3,0	3,0	3,0	3,3	3,3	3,3	3,7	4,0	4,0	4,0	4,0
	Competition Policy	1,0	1,0	1,0	1,0	1,0	1,0	1,7	2,0	2,0	2,0	2,3	2,3	2,3

Note. * The values of the indicators are expressed in a matter that higher value is better (see http://www.ebrd.com/pages/research/economics/data/macro/ti_methodology.shtml).

Source: EBRD, *Transition Indicators*, 2013b.

Appendix B: GDP

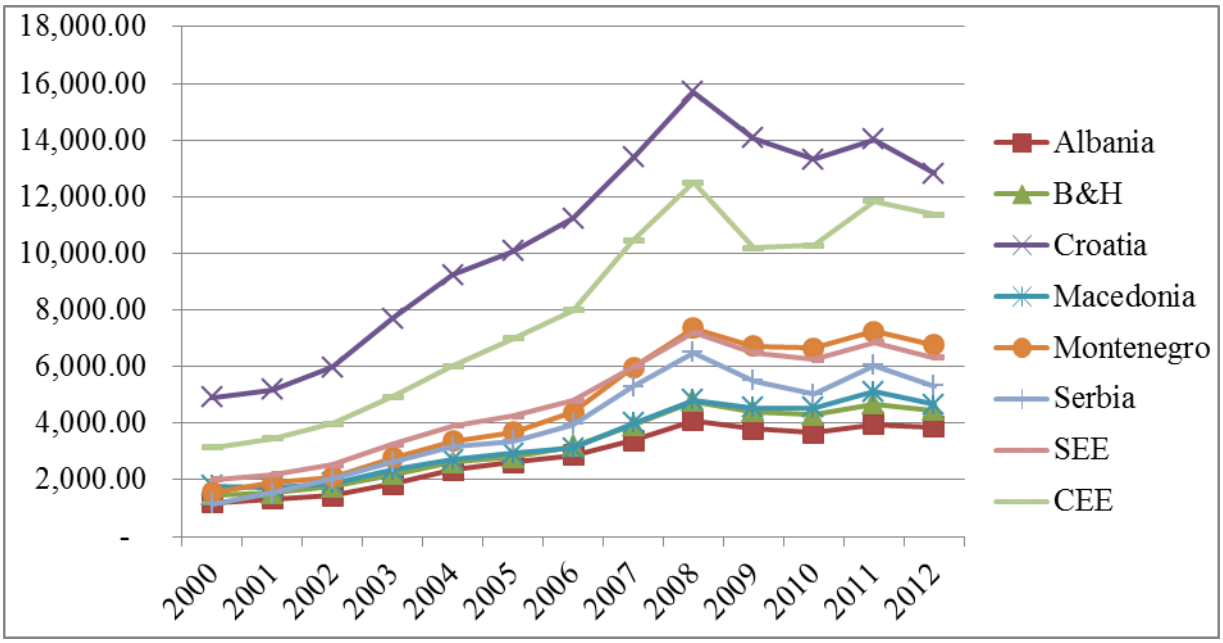
Figure 1. Annual Growth of GDP, 2000-2018 (in %)*



Note. * Estimated data: Albania (after 2008); Montenegro, and Serbia (after 2011).

Source: *GDP Growth (annual percentage)*, n.d.; *GDP (constant prices, percent change)*, n.d.

Figure 2. GDP Per Capita, 2000-2012 (in current prices and US$)*

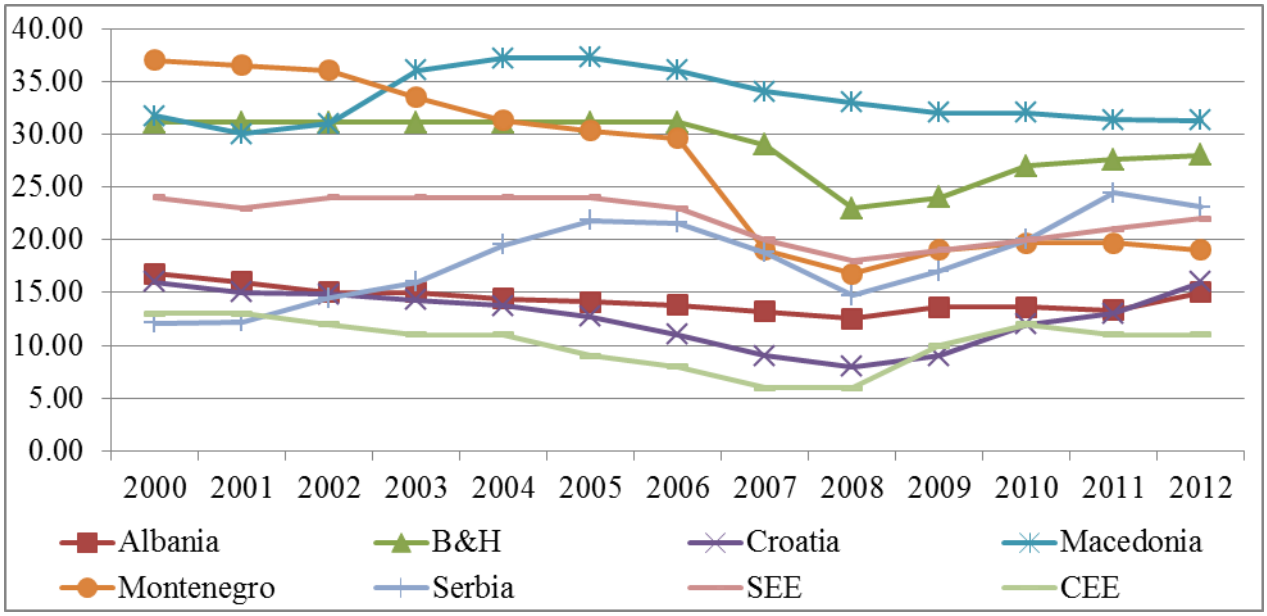


Note. * Estimated data: Albania (after 2008); Macedonia, Montenegro, and Serbia (after 2011).

Source: *GDP Per Capita (current prices in US$)*, n.d.; *GDP Per Capita (current US$)*, n.d.

Appendix C: Unemployment

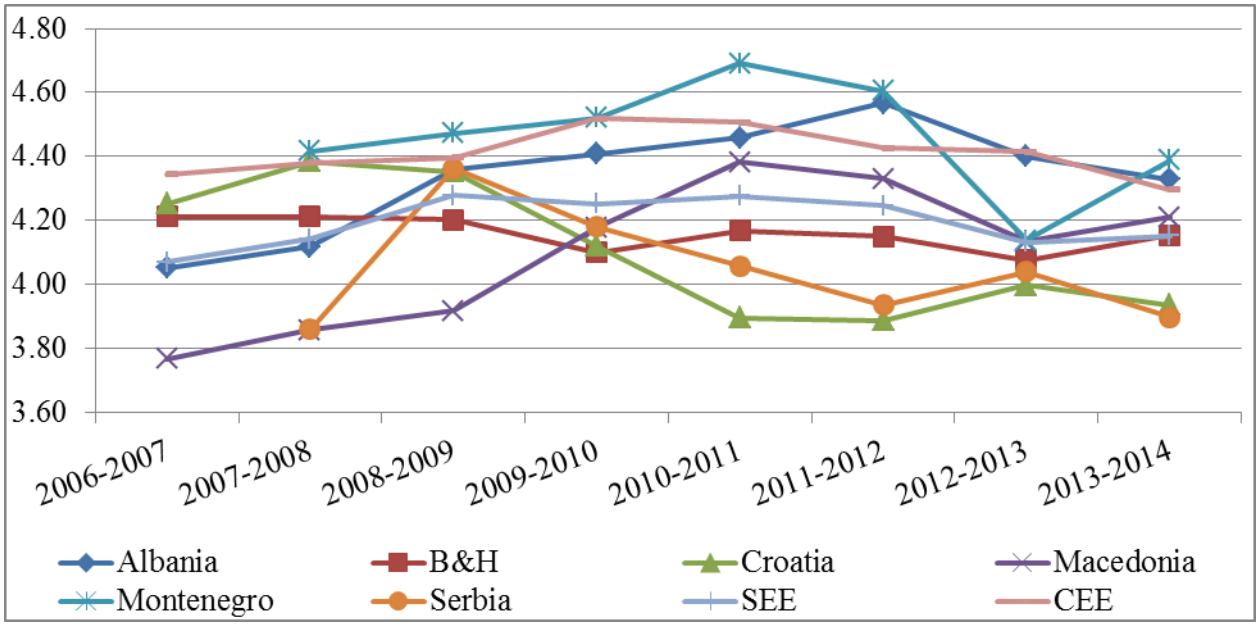
Figure 3. Unemployment Rate, 2000-2012 (in % of total labour force)*



Note.* Estimated data for Albania and Macedonia (after 2011).

Source: EBRD, *Transition Report 2006: Finance in Transition*, 2006, p. 157; IMF, *IMF Executive Board Concludes 2013 Article IV Consultation with Montenegro*, 2013b; Statistical Office of Montenegro, *Labour Force Survey*, 2013; *Unemployment Rate (percent of total labor force)*, n.d.

Figure 4. Labor Efficiency Index*



Note. * The scores are presented in a way that higher value is better (1 is the worst score, the score of 7 is the best score).

Source: *Labor Market Efficiency*, n.d.

Appendix D: Inflation

Table 2. Inflation, 2000-2018 (average consumer prices, % change)*

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Albania	0.04	3.12	5.22	2.34	2.87	2.36	2.37	2.94	3.36	2.27	3.55	3.43	2.02	2.17	2.73	3.00
B&H	4.97	4.57	0.31	0.55	0.28	3.58	6.13	1.50	7.43	-0.38	2.12	3.68	2.05	1.80	1.80	1.90
Croatia	4.63	3.76	1.68	1.77	2.03	3.34	3.21	2.87	6.07	2.38	1.05	2.26	3.43	2.99	2.50	2.70
Macedonia	6.39	5.54	2.18	1.20	-0.43	0.49	3.21	2.26	8.36	-0.81	1.51	3.90	3.31	2.80	2.10	2.00
Montenegro	94.88	23.73	19.70	7.50	3.10	3.45	2.12	3.52	8.99	3.60	0.66	3.08	3.65	2.83	2.92	2.28
Serbia	70.00	80.60	8.86	2.91	10.61	16.24	10.73	6.90	12.43	8.10	6.15	11.15	7.35	8.48	5.05	4.88
SEE	30.15	20.22	6.32	2.71	3.08	4.91	4.63	3.33	7.77	2.53	2.51	4.58	3.63	3.51	2.85	2.79
CEE	13.26	10.09	6.30	4.17	5.95	5.06	4.90	6.46	9.44	3.87	2.76	4.29	3.44	1.94	2.25	2.49

Note. * Estimated data for Macedonia starts after 2011, while for the rest of the countries after 2012.

Source: *Inflation (average consumer prices, percent change)*, n.d.

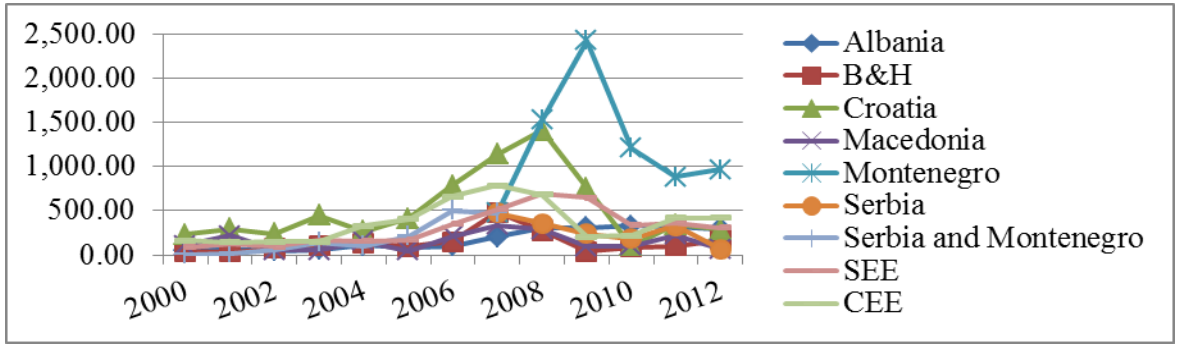
Appendix E: FDI

Table 3. Inward Flows of FDI, 2000-2012 (in % of GDP)

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Albania	3.96	5.08	3.04	3.13	4.73	3.24	3.61	6.15	7.50	8.22	8.79	7.97	7.64
B&H	2.63	2.06	3.95	4.50	5.05	3.21	4.47	11.90	5.53	0.87	1.95	2.11	3.66
Croatia	4.88	5.70	4.04	5.83	2.88	4.07	6.96	8.50	8.94	5.37	0.73	2.40	2.19
Macedonia	6.00	13.01	2.78	2.38	5.87	1.60	6.60	8.49	5.96	2.16	2.27	4.61	1.43
Montenegro								10.53	21.25	36.88	18.50	12.27	14.05
Serbia								10.53	6.54	5.17	4.25	6.85	1.57
Serbia and Montenegro	0.45	1.17	2.92	6.17	3.67	7.08	14.64	10.53					
SEE	3.59	5.40	3.35	4.40	4.44	3.84	7.26	9.52	9.29	9.78	6.08	6.03	5.09
CEE	5.13	4.07	3.78	3.69	6.54	6.48	9.82	9.48	6.77	2.47	2.23	3.52	3.63

Source: *Inward FDI (percent of GDP)*, n.d.

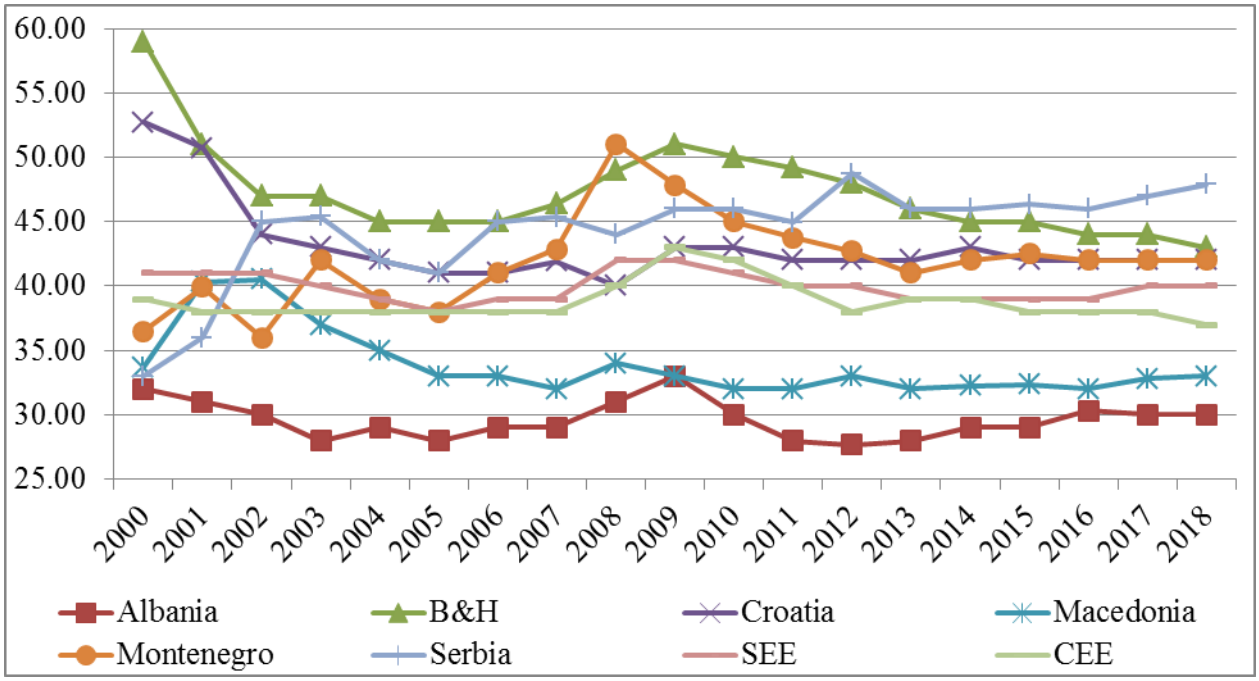
Figure 5. Inward Flows of FDI Per Capita, 2000-2012 (in US$ at current prices and current exchange rates)



Source: *Inward FDI Per Capita (US$ at current prices and current exchange rates)*, n.d.

Appendix F: Government Expenditures

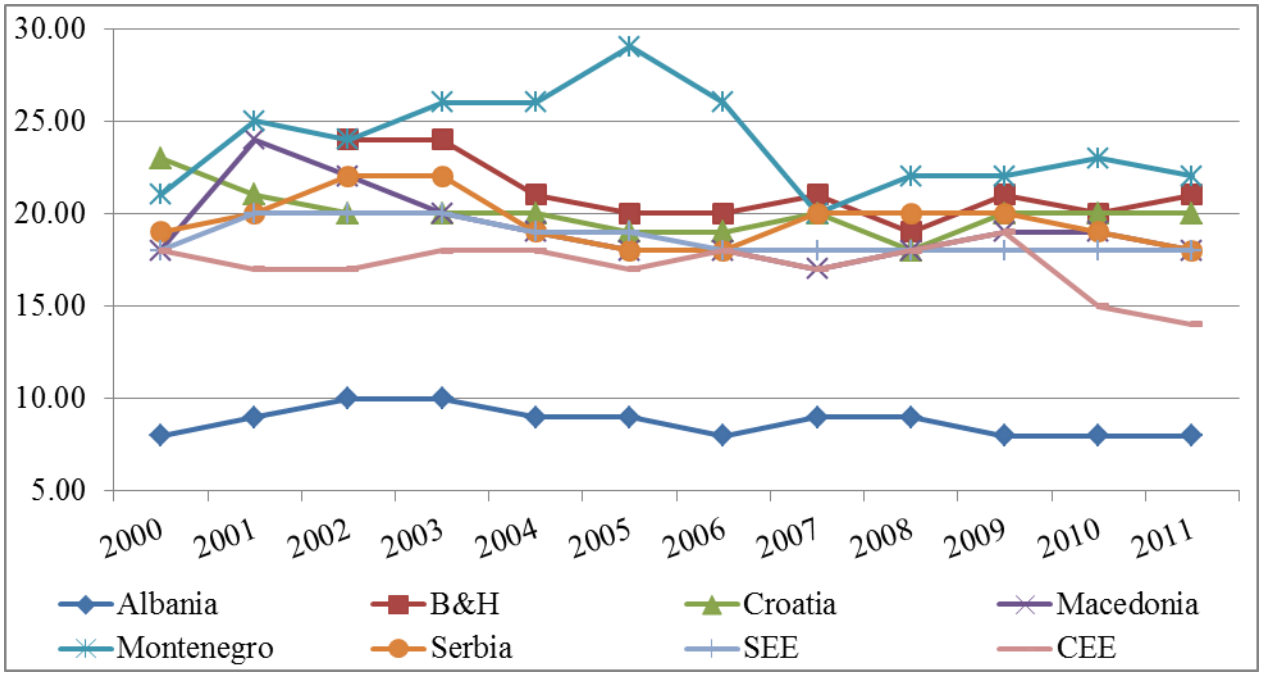
Figure 6. General Government Expenditures, 2000-2018 (in % of GDP)*



Note. * Estimated data after 2012, except for Macedonia for which data estimations start after 2011.

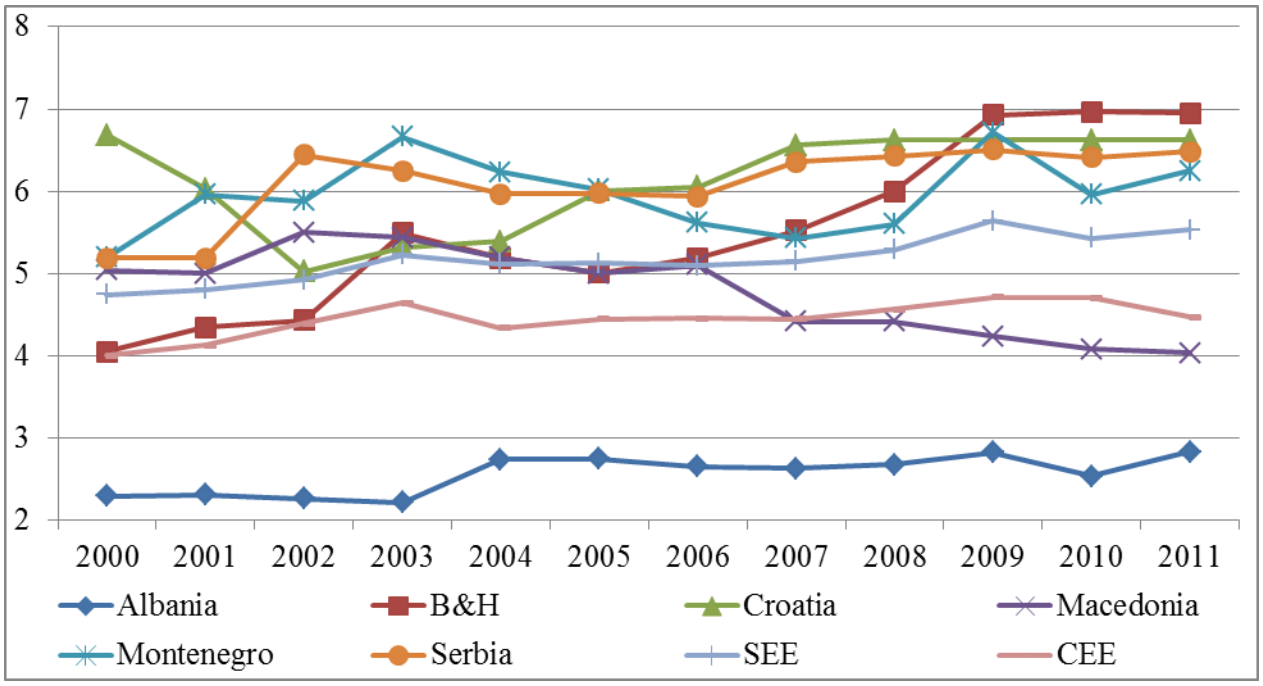
Source: EBRD, *Transition Report 2005: Business in Transition*, 2005, p. 121; EBRD, *Transition Report 2006: Finance in transition*, 2006, p. 157; *General Government Total Expenditure (percent of GDP)*, n.d.

Figure 7. General Government Final Consumption Expenditures, 2000-2011 (in % of GDP)



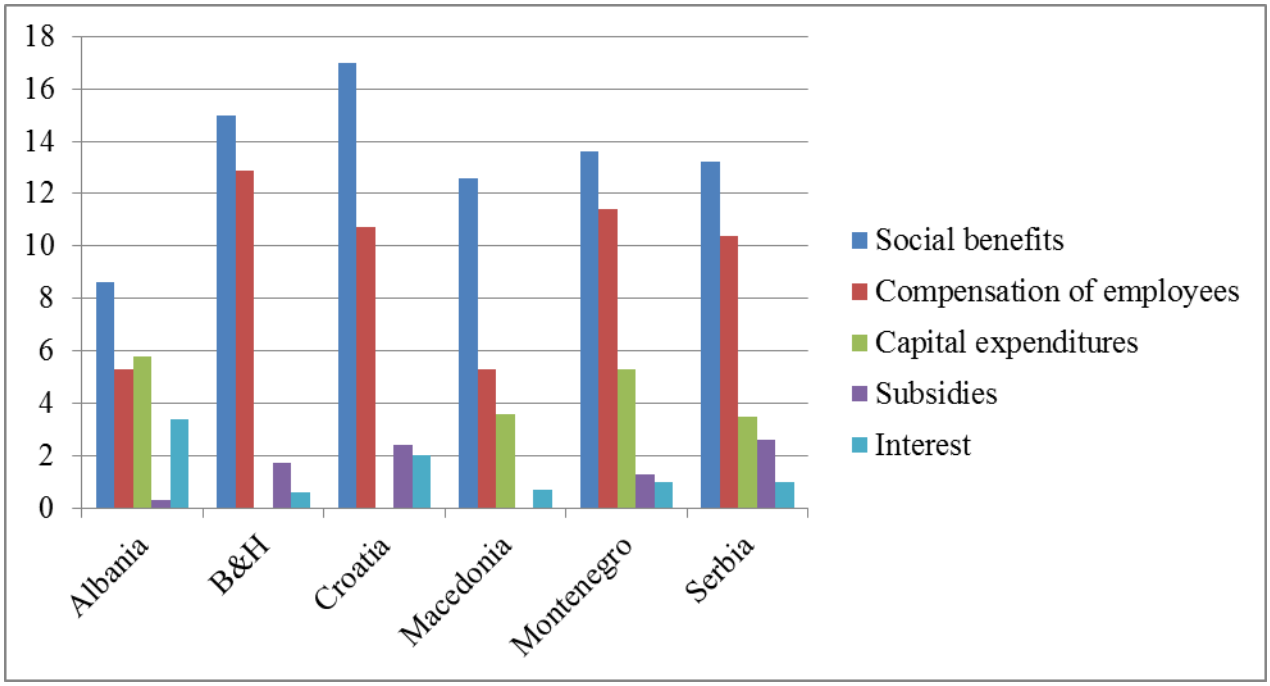
Source: *General Government Final Consumption Expenditure (percent of GDP)*, n.d.

Figure 8. Public Health Expenditures, 2000-2011 (in % of GDP)



Source: *Public Health Expenditure (percent of GDP)*, n.d.

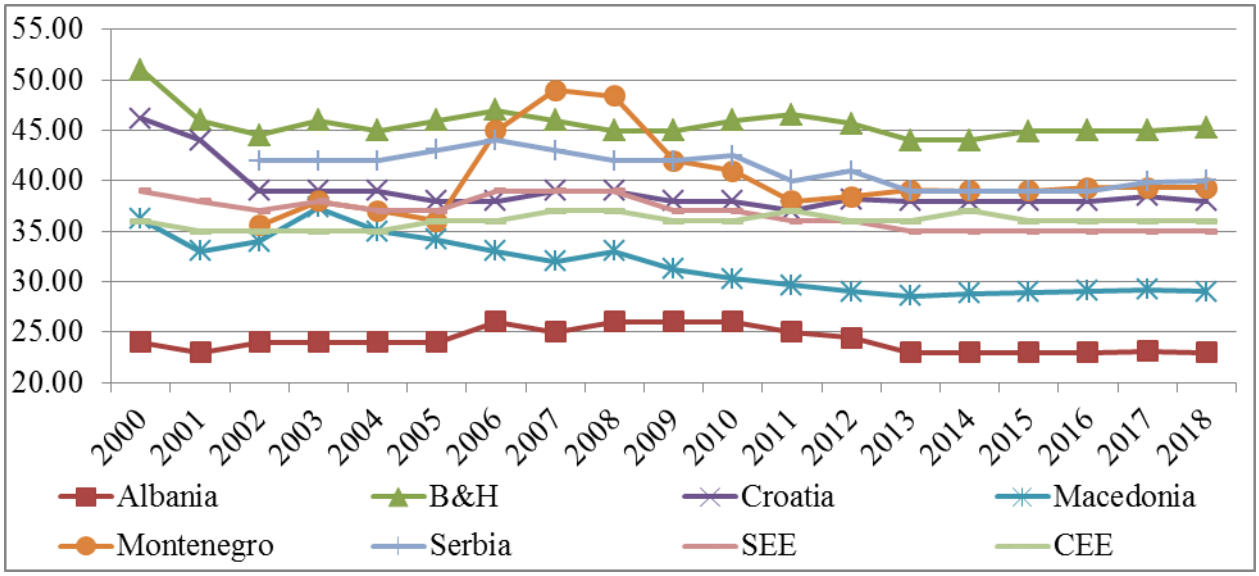
Figure 9. Composition of Current Government Expenditures in SEE Countries, in 2010 (in % of GDP)



Source: IMF, *Republic of Serbia: Request for Stand-By Arrangement*, 2011, p. 35, Table 11b.; IMF, *Bosnia and Herzegovina: 2012 Article IV Consultation and Request for Stand-by Arrangement*, 2012a, p. 36, Table 4.; IMF, *Former Yugoslav Republic of Macedonia 2011 Article IV Consultation*, 2012b, p. 27, Table 2.; IMF, *Montenegro 2012 Article IV Consultation*, 2012c, p. 30, Table 5b.; IMF, *The Republic of Croatia 2012 Article IV Consultation*, 2012d, p. 31, Table 3.; IMF, *Albania 2012 Article IV Consultation*, 2013a, p. 28, Table 2a.

Appendix G: Government Revenues

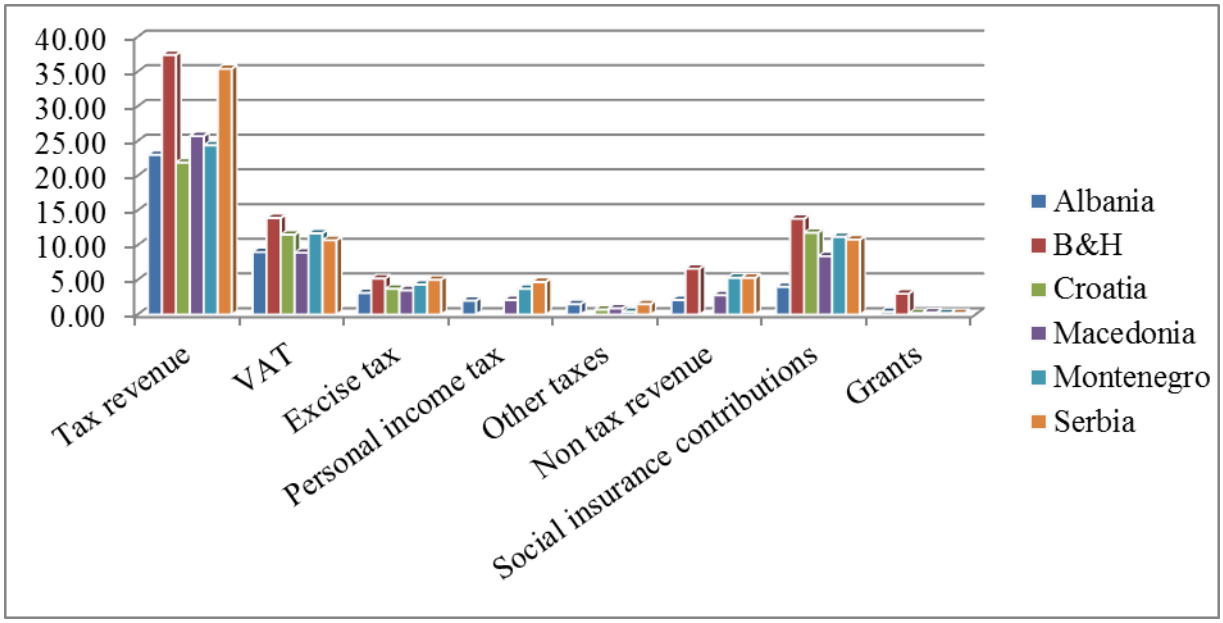
Figure 10. General Government Revenues, 2000-2018 (in % of GDP)*



Note. * Estimated data after 2012, except for Macedonia for which data estimations are after 2011.

Source: *General Government Revenues (percent of GDP)*, n.d.

Figure 11. Composition of Government Revenues in SEE countries, in 2010 (in % of GDP)*

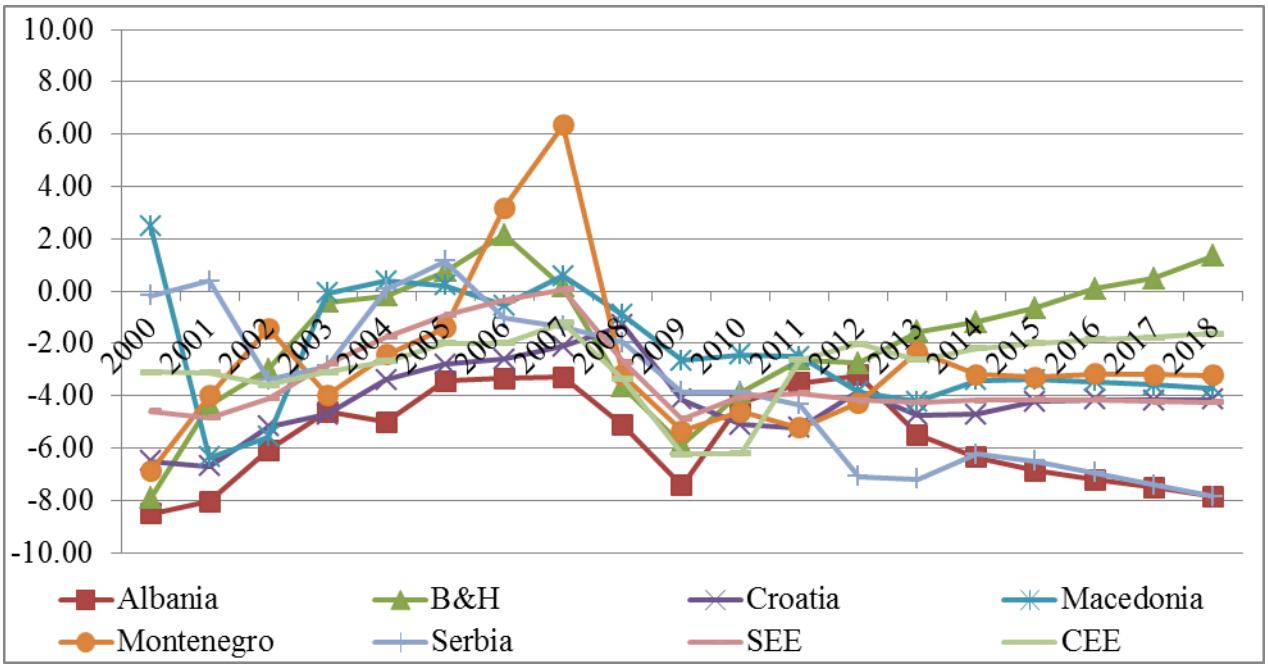


Note. * Data for B&H are projections.

Source: IMF, *Bosnia and Herzegovina: 2008 Article IV Consultation*, 2008, p. 34, Table 4.; IMF, *Republic of Serbia: Request for Stand-By Arrangement*, 2011, p. 35, Table 11b.; IMF, *Former Yugoslav Republic of Macedonia 2011 Article IV Consultation*, 2012b, p. 27, Table 2.; IMF, *Montenegro 2012 Article IV Consultation*, 2012c, p. 30, Table 5b.; IMF, *The Republic of Croatia 2012 Article IV Consultation*, 2012d, p. 31, Table 3.; IMF, *Albania 2012 Article IV Consultation*, 2013a, p. 28, Table 2a.

Appendix H: Public Debt

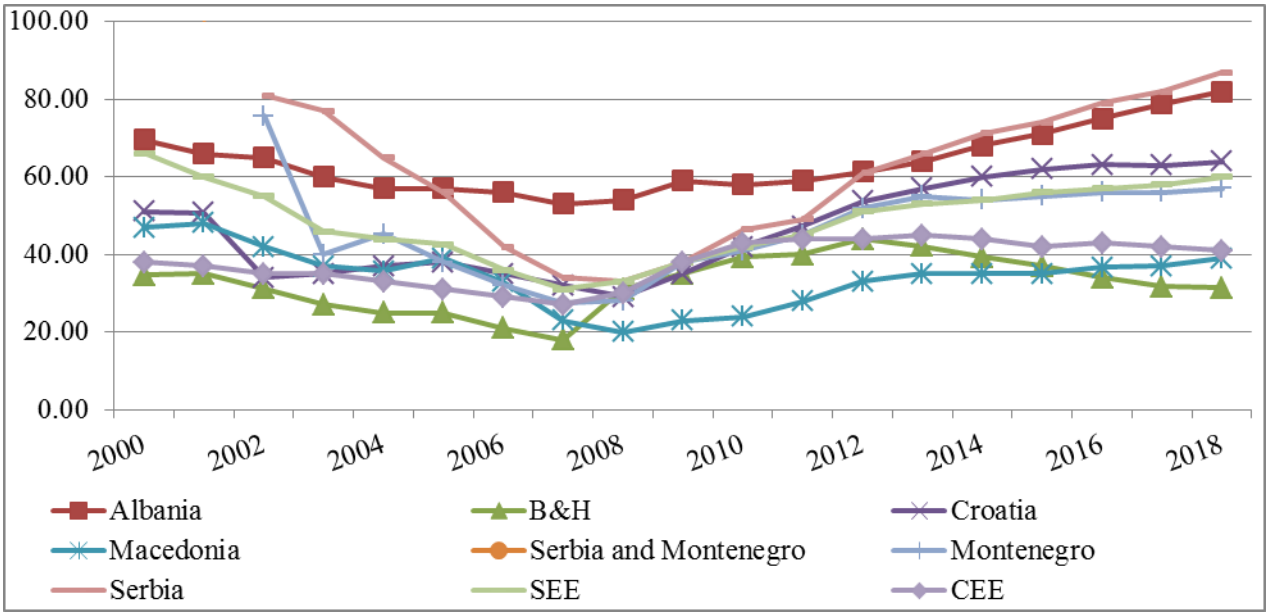
Figure 12. General Government Deficit/Surplus, 2000-2018 (in % of GDP)*



Note. * Estimated data after 2012, except for Macedonia for which data estimations are after 2011.

Source: EBRD, *Transition Report 2005: Business in Transition*, 2005, p. 121; EBRD, *Transition Report 2006: Finance in Transition*, 2006, p. 157; *General Government Net Lending/Borrowing (percent of GDP)*, n.d.

Figure 13. General Government Gross Debt, 2000-2018 (in % of GDP)*



Note. * Estimated data after 2012, except for Macedonia for which data estimations are after 2011.

Source: EBRD, *Transition Report 2005: Business in Transition*, 2005, p. 121; IMF, *IMF Press Release No. 02/25*, 2002; *General Government Gross Debt (percent of GDP)*, n.d.

Appendix I: Socio-economic Variables used for the Construction of PSP Indicator

Table 4. Socio-economic Variables used for the Construction of PSP Indicator

	Administrative sector													
	Judicial framework and independence							Corruption						
Country	2005	2006	2007	2008	2009	2010	Average	2005	2006	2007	2008	2009	2010	Average
Albania	4.50	4.25	4.00	4.00	4.25	4.25	4.25	5.25	5.25	5.00	5.00	5.00	5.00	5.08
B&H	4.25	4.00	4.00	4.00	4.00	4.00	4.04	4.50	4.25	4.25	4.25	4.50	4.50	4.38
Croatia	4.50	4.25	4.25	4.25	4.25	4.25	4.29	4.75	4.75	4.75	4.50	4.50	4.50	4.63
Macedonia	3.75	3.75	3.75	4.00	4.00	4.00	3.88	5.00	4.75	4.75	4.50	4.25	4.00	4.54
Montenegro	4.25	4.25	4.25	4.00	4.25	4.00	4.17	5.25	5.25	5.50	5.25	5.00	5.00	5.21
Serbia	4.25	4.25	4.25	4.50	4.50	4.50	4.38	5.00	4.75	4.50	4.50	4.50	4.50	4.63
	Health sector													
	IMR							Life expectancy						
Country	2005	2006	2007	2008	2009	2010	Average	2005	2006	2007	2008	2009	2010	Average
Albania	17.60	16.70	15.90	15.10	14.10	13.40	15.47	76.11	76.31	76.47	76.62	76.76	76.90	76.53
B&H	7.70	7.60	7.40	7.30	7.10	6.90	7.33	74.72	74.83	74.97	75.11	75.25	75.40	75.05
Croatia	5.80	5.50	5.20	5.00	4.80	4.60	5.15	75.24	75.84	75.71	75.91	76.17	76.48	75.89
Macedonia	11.80	11.30	10.70	10.20	9.70	9.20	10.48	73.75	73.92	74.09	74.27	74.44	74.62	74.18
Montenegro	8.90	8.40	8.00	7.60	7.20	6.80	7.82	74.02	73.96	73.97	74.03	74.15	74.31	74.07
Serbia	8.00	7.60	7.30	7.00	6.70	6.40	7.17	72.63	73.16	73.38	73.64	73.69	73.94	73.41
	Stability													
	GDP growth							Inflation						
Country	2005	2006	2007	2008	2009	2010	Average	2005	2006	2007	2008	2009	2010	Average

(table continues)

continued

	Stability													
	GDP growth							Inflation						
Country	2005	2006	2007	2008	2009	2010	Average	2005	2006	2007	2008	2009	2010	Average
Albania	5.76	5.43	5.90	7.54	3.32	3.80	5.29	2.36	2.37	2.94	3.36	2.27	3.55	2.81
B&H	3.87	5.95	6.12	5.58	-2.91	0.72	3.22	3.58	6.13	1.50	7.43	-0.38	2.12	3.40
Croatia	4.28	4.94	5.06	2.08	-6.95	-2.27	1.19	3.34	3.21	2.87	6.07	2.38	1.05	3.15
Macedonia	4.35	5.00	6.15	5.00	-0.92	2.90	3.75	0.49	3.21	2.26	8.36	-0.81	1.51	2.50
Montenegro	4.20	8.60	10.70	6.90	-5.70	2.46	4.53	3.45	2.12	3.52	8.99	3.60	0.66	3.72
Serbia	5.40	3.56	5.38	3.82	-3.51	1.01	2.61	16.24	10.73	6.90	12.43	8.10	6.15	10.09

	Economic performance						
	GDP per capita						
Country	2005	2006	2007	2008	2009	2010	Average
Albania	2,613.80	2,860.47	3,384.08	4,086.61	3,799.50	3,660.50	3,400.83
B&H	2,793.31	3,190.92	3,927.59	4,767.95	4,403.02	4,304.68	3,897.91
Croatia	10,082.16	11,231.26	13,385.75	15,694.08	14,055.59	13,321.89	12,961.79
Macedonia	2,943.97	3,127.21	3,997.87	4,827.83	4,548.13	4,551.69	3,999.45
Montenegro	3,673.42	4,382.67	5,965.41	7,360.43	6,715.06	6,648.85	5,790.97
Serbia	3,368.46	3,957.21	5,304.36	6,485.41	5,497.17	5,030.10	4,940.45

	Economic performance						
	Unemployment						
Country	2005	2006	2007	2008	2009	2010	Average
Albania	14.10	13.80	13.20	12.55	13.62	13.60	13.48
B&H	31.10	31.10	29.01	23.41	24.07	27.20	27.65
Croatia	12.71	11.12	9.41	8.27	9.05	12.21	10.46

(table continues)

continued

Economic performance							
	Unemployment						
Country	2005	2006	2007	2008	2009	2010	Average
Macedonia	37.25	36.03	34.93	33.78	32.18	32.05	34.37
Montenegro	30.30	29.60	19.40	16.80	19.10	19.70	22.48
Serbia	21.83	21.56	18.80	14.70	17.40	20.00	19.05

Source: Freedom House, *Rating Tables*, 2013, pp.42-43, Table 7., Table 8.; *GDP Per Capita (current prices in US$)*, n.d.; *GDP (constant prices, percent change)*, n.d.; *Infant Mortality Rate (per 1.000 live births)*, n.d.; *Inflation (average consumer prices, percent change)*, n.d.*; Life Expectancy at Birth (total, years)*, n.d.; Statistical Office of Montenegro, *Labour Force Survey*, 2013; *Unemployment Rate (percent of total labor force)*, n.d.

Appendix J: Calculation of PSP Indicator

Table 5. Step-by-Step Calculation of Administrative PSP Indicator

Administration							
Country	Judicial framework and independence			Corruption			**PSP Administrative**
	Data	Reciprocal	Normalised	Data	Reciprocal	Normalised	
Albania	4.25	0.24	0.98	5.08	0.20	0.93	0.95
B&H	4.04	0.25	1.03	4.38	0.23	1.08	1.05
Croatia	4.29	0.23	0.97	4.63	0.22	1.02	1.00
Macedonia	3.88	0.26	1.07	4.54	0.22	1.04	1.06
Montenegro	4.17	0.24	1.00	5.21	0.19	0.91	0.95
Serbia	4.38	0.23	0.95	4.63	0.22	1.02	0.99
Average	4.17	0.24	1.00	4.74	0.21	1.00	1.00

Table 6. Step-by-Step Calculation of Health PSP Indicator

Health						
Country	IMR			Life expectancy		**PSP Health**
	Data	Reciprocal	Normalised	Data	Normalised	
Albania	15.47	0.06	0.51	76.53	1.02	0.77
B&H	7.33	0.14	1.08	75.05	1.00	1.04
Croatia	5.15	0.19	1.54	75.89	1.01	1.28
Macedonia	10.48	0.10	0.76	74.18	0.99	0.87
Montenegro	7.82	0.13	1.01	74.07	0.99	1.00
Serbia	7.17	0.14	1.10	73.41	0.98	1.04
Average	8.90	0.13	1.00	74.85	1.00	1.00

Table 7. Step-by-Step Calculation of Stability PSP Indicator

Stability								
Country	GDP growth				Inflation			**PSP Stability**
	Data	Coefficient of variation	Reciprocal	Normalised	Data	Reciprocal	Normalised	
Albania	5.29	0.29	3.45	2.72	2.81	0.36	1.23	1.97
B&H	3.22	1.13	0.89	0.70	3.40	0.29	1.02	0.86
Croatia	1.19	4.07	0.25	0.19	3.15	0.32	1.10	0.65
Macedonia	3.75	0.67	1.49	1.17	2.50	0.40	1.38	1.28
Montenegro	4.53	1.29	0.78	0.61	3.72	0.27	0.93	0.77
Serbia	2.61	1.30	0.77	0.61	10.09	0.10	0.34	0.47
Average	3.43	1.46	1.27	1.00	4.28	0.29	1.00	1.00

Table 8. Step-by-Step Calculation of Economic Performance PSP Indicator

Economic Performance								
Country	GDP per capita		GDP growth		Unemployment rate			**PSP Economic Performance**
	Data	Normalised	Data	Normalised	Data	Reciprocal	Normalised	
Albania	3,400.83	0.58	5.29	1.54	13.48	0.07	1.34	1.16
B&H	3,897.91	0.67	3.22	0.94	27.65	0.04	0.65	0.75
Croatia	12,961.79	2.22	1.19	0.35	10.46	0.10	1.73	1.43
Macedonia	3,999.45	0.69	3.75	1.09	34.37	0.03	0.53	0.77
Montenegro	5,790.97	0.99	4.53	1.32	22.48	0.04	0.80	1.04
Serbia	4,940.45	0.85	2.61	0.76	19.05	0.05	0.95	0.85
Average	5,831.90	1.00	3.43	1.00	21.25	0.06	1.00	1.00

Appendix K: Calculation of PSE Indicator

Table 9. Step-by-Step Calculation of PSE Indicator

Opportunity PSE								
	Administrative PSE				Health PSE			
Country	PSP Administrative	General government final consumption expenditures (% of GDP)		**PSE Administrative**	PSP Health	Public health expenditures (% of GDP)		**PSE Health**
		Data	Normalised			Data	Normalised	
Albania	0.95	8.90	0.48	1.99	0.77	2.68	0.51	1.52
B&H	1.05	20.73	1.12	0.95	1.04	5.93	1.12	0.93
Croatia	1.00	19.73	1.06	0.94	1.28	6.41	1.21	1.05
Macedonia	1.06	18.24	0.98	1.08	0.87	4.54	0.86	1.02
Montenegro	0.95	24.22	1.30	0.73	1.00	5.89	1.11	0.90
Serbia	0.99	19.63	1.06	0.93	1.04	6.27	1.19	0.88
Average	1.00	18.57	1.00	1.10	1.00	5.29	1.00	1.05
"Musgravian" PSE								
	Stability PSE				Economic Performance PSE			
Country	PSP Stability	General government total expenditures (% of GDP)		**PSE Stability**	PSP Economic Performance	General government total expenditures (% of GDP)		**PSE Economic Performance**
		Data	Normalised			Data	Normalised	
Albania	1.97	30.44	0.75	2.63	1.16	30.44	0.75	1.54
B&H	0.86	48.10	1.19	0.73	0.75	48.10	1.19	0.64
Croatia	0.65	41.91	1.03	0.62	1.43	41.91	1.03	1.39
Macedonia	1.28	33.43	0.82	1.55	0.77	33.43	0.82	0.93
Montenegro	0.77	44.69	1.10	0.70	1.04	44.69	1.10	0.94

(table continues)

continued

"Musgravian" PSE								
	Stability PSE				Economic Performance PSE			
Country	PSP Stability	General government total expenditures (in % of GDP)		**PSE Stability**	PSP Economic Performance	General government total expenditures (% of GDP)		**PSE Economic Performance**
		Data	Normalised			Data	Normalised	
Serbia	0.47	44.94	1.11	0.43	0.85	44.94	1.11	0.77
Average	1.00	40.59	1.00	1.11	1.00	40.59	1.00	1.03

Appendix L: Results for Overall Public Sector Efficiency using DEA-CRS*

```
Results from DEAP Version 2.1

Instruction file = ove-ins.txt
Data file        = ove-dta.txt

 Input orientated DEA
 Scale assumption: CRS
 Slacks calculated using multi-stage method

 EFFICIENCY SUMMARY:
  firm     te
    1  1.000
    2  0.486
    3  0.654
    4  0.745
    5  0.529
    6  0.470
 mean  0.648

SUMMARY OF OUTPUT SLACKS:
firm  output:          1
    1               0.000
    2               0.000
    3               0.000
    4               0.000
    5               0.000
    6               0.000
 mean               0.000

SUMMARY OF INPUT SLACKS:
firm  input:           1
    1               0.000
    2               0.000
    3               0.000
    4               0.000
    5               0.000
    6               0.000
 mean               0.000

SUMMARY OF PEERS:
  firm  peers:
    1      1
    2      1
    3      1
    4      1
    5      1
    6      1

 PEER COUNT SUMMARY:
   (i.e., no. times each firm is a
peer for another)
  firm  peer count:
    1       5
    2       0
    3       0
    4       0
    5       0
    6       0
```

Note. * The remaining printout removed for the reason of space (for all performed DEA analyses). The author will make the full printout available upon any request.

Appendix M: Results for Overall Public Sector Efficiency using DEA-VRS

```
Results from DEAP Version 2.1

Instruction file = ove-ins.txt
Data file        = ove-dta.txt

 Input orientated DEA
 Scale assumption: VRS
 Slacks calculated using multi-stage method

EFFICIENCY SUMMARY:
  firm  crste  vrste  scale
    1  1.000  1.000  1.000  -
    2  0.486  0.633  0.769 irs
    3  0.654  0.726  0.901 irs
    4  0.745  0.911  0.818 irs
    5  0.529  0.681  0.777 irs
    6  0.470  0.677  0.694 irs
 mean  0.648  0.771  0.826

Note: crste = technical efficiency from CRS DEA
      vrste = technical efficiency from VRS DEA
      scale = scale efficiency = crste/vrste
Note also that all subsequent tables refer to VRS results

 SUMMARY OF OUTPUT SLACKS:
firm  output:          1
    1               0.000
    2               0.280
    3               0.120
    4               0.220
    5               0.270
    6               0.370
 mean               0.210

SUMMARY OF INPUT SLACKS:
firm  input:           1
    1               0.000
    2               0.000
    3               0.000
    4               0.000
    5               0.000
    6               0.000
 mean               0.000

SUMMARY OF PEERS:
  firm  peers:
    1      1
    2      1
    3      1
    4      1
    5      1
    6      1

PEER COUNT SUMMARY:
   (i.e., no. times each firm is a
peer for another)
  firm  peer count:
    1       5
    2       0
    3       0
    4       0
    5       0
    6       0
```

Appendix N: Results for Public Efficiency in Administration using DEA-CRS

```
Results from DEAP Version 2.1

Instruction file = adm-ins.txt
Data file        = adm-dta.txt

 Input orientated DEA
 Scale assumption: CRS
 Slacks calculated using multi-stage method

EFFICIENCY SUMMARY:
  firm     te
    1  1.000
    2  0.475
    3  0.475
    4  0.544
    5  0.367
    6  0.472
 mean  0.556

SUMMARY OF OUTPUT SLACKS:
firm  output:          1
    1               0.000
    2               0.000
    3               0.000
    4               0.000
    5               0.000
    6               0.000
 mean               0.000

SUMMARY OF INPUT SLACKS:
firm  input:           1
    1               0.000
    2               0.000
    3               0.000
    4               0.000
    5               0.000
    6               0.000
 mean               0.000

SUMMARY OF PEERS:
  firm  peers:
    1      1
    2      1
    3      1
    4      1
    5      1
    6      1

PEER COUNT SUMMARY:
   (i.e., no. times each firm is a
peer for another)
  firm  peer count:
    1       5
    2       0
    3       0
    4       0
    5       0
    6       0
```

Appendix O: Results for Public Efficiency in Administration using DEA-VRS

```
Results from DEAP Version 2.1

Instruction file = adm-ins.txt
Data file        = adm-dta.txt

 Input orientated DEA
 Scale assumption: VRS
 Slacks calculated using multi-stage method

EFFICIENCY SUMMARY:
  firm  crste  vrste  scale
    1  1.000  1.000  1.000  -
    2  0.475  0.839  0.566 drs
    3  0.475  0.666  0.713 drs
    4  0.544  1.000  0.544 drs
    5  0.367  0.367  1.000  -
    6  0.472  0.626  0.754 drs
 mean  0.556  0.750  0.763

Note: crste = technical efficiency from CRS DEA
      vrste = technical efficiency from VRS DEA
      scale = scale efficiency = crste/vrste
Note also that all subsequent tables refer to VRS results

SUMMARY OF OUTPUT SLACKS:
firm  output:          1
    1               0.000
    2               0.000
    3               0.000
    4               0.000
    5               0.000
    6               0.000
 mean               0.000

SUMMARY OF INPUT SLACKS:
firm  input:           1
    1               0.000
    2               0.000
    3               0.000
    4               0.000
    5               0.000
    6               0.000
 mean               0.000

SUMMARY OF PEERS:
  firm  peers:
    1      1
    2      4    1
    3      4    1
    4      4
    5      1
    6      4    1

PEER COUNT SUMMARY:
   (i.e., no. times each firm is a
peer for another)
  firm  peer count:
    1       4
    2       0
    3       0
    4       3
    5       0
    6       0
```

Appendix P: Results for Public Efficiency in Health Sector using DEA-CRS

```
Results from DEAP Version 2.1

Instruction file = hlt-ins.txt
Data file        = hlt-dta.txt

 Input orientated DEA
 Scale assumption: CRS
 Slacks calculated using multi-stage method

EFFICIENCY SUMMARY:
  firm     te
    1  1.000
    2  0.610
    3  0.695
    4  0.667
    5  0.591
    6  0.577
 mean  0.690

SUMMARY OF OUTPUT SLACKS:
firm  output:          1
    1               0.000
    2               0.000
    3               0.000
    4               0.000
    5               0.000
    6               0.000
 mean               0.000

SUMMARY OF INPUT SLACKS:
firm  input:           1
    1               0.000
    2               0.000
    3               0.000
    4               0.000
    5               0.000
    6               0.000
 mean               0.000

SUMMARY OF PEERS:
  firm  peers:
    1      1
    2      1
    3      1
    4      1
    5      1
    6      1

PEER COUNT SUMMARY:
   (i.e., no. times each firm is a
peer for another)
  firm  peer count:
    1       5
    2       0
    3       0
    4       0
    5       0
    6       0
```

Appendix Q: Results for Public Efficiency in Health Sector using DEA-VRS

```
Results from DEAP Version 2.1

Instruction file = hlt-ins.txt
Data file        = hlt-dta.txt

 Input orientated DEA
 Scale assumption: VRS
 Slacks calculated using multi-stage method

EFFICIENCY SUMMARY:
  firm  crste  vrste  scale
    1  1.000  1.000  1.000  -
    2  0.610  0.785  0.778 drs
    3  0.695  1.000  0.695 drs
    4  0.667  0.751  0.888 drs
    5  0.591  0.741  0.798 drs
    6  0.577  0.742  0.778 drs
 mean  0.690  0.837  0.823

Note: crste = technical efficiency from CRS DEA
      vrste = technical efficiency from VRS DEA
      scale = scale efficiency = crste/vrste
Note also that all subsequent tables refer to VRS results

SUMMARY OF OUTPUT SLACKS:
firm  output:          1
    1               0.000
    2               0.000
    3               0.000
    4               0.000
    5               0.000
    6               0.000
 mean               0.000

SUMMARY OF INPUT SLACKS:
firm  input:           1
    1               0.000
    2               0.000
    3               0.000
    4               0.000
    5               0.000
    6               0.000
 mean               0.000

SUMMARY OF PEERS:
  firm  peers:
    1      1
    2      3    1
    3      3
    4      1    3
    5      1    3
    6      1    3

PEER COUNT SUMMARY:
   (i.e., no. times each firm is a
peer for another)
  firm  peer count:
    1       4
    2       0
    3       4
    4       0
    5       0
    6       0
```

Appendix R: Results for Public Efficiency in Maintaining Stability using DEA-CRS

```
Results from DEAP Version 2.1

Instruction file = stb-ins.txt
Data file        = stb-dta.txt

 Input orientated DEA
 Scale assumption: CRS
 Slacks calculated using multi-stage method

EFFICIENCY SUMMARY:
  firm     te
    1  1.000
    2  0.276
    3  0.240
    4  0.592
    5  0.266
    6  0.162
 mean  0.423

SUMMARY OF OUTPUT SLACKS:
firm  output:          1
    1               0.000
    2               0.000
    3               0.000
    4               0.000
    5               0.000
    6               0.000
 mean               0.000

SUMMARY OF INPUT SLACKS:
firm  input:           1
    1               0.000
    2               0.000
    3               0.000
    4               0.000
    5               0.000
    6               0.000
 mean               0.000

SUMMARY OF PEERS:
  firm  peers:
    1      1
    2      1
    3      1
    4      1
    5      1
    6      1

PEER COUNT SUMMARY:
   (i.e., no. times each firm is a
peer for another)
  firm  peer count:
    1       5
    2       0
    3       0
    4       0
    5       0
    6       0
```

Appendix S: Results for Public Efficiency in Maintaining Stability using DEA-VRS

```
Results from DEAP Version 2.1

Instruction file = stb-ins.txt
Data file        = stb-dta.txt

 Input orientated DEA
 Scale assumption: VRS
 Slacks calculated using multi-stage method

EFFICIENCY SUMMARY:
  firm  crste  vrste  scale
    1  1.000  1.000  1.000  -
    2  0.276  0.633  0.437 irs
    3  0.240  0.726  0.330 irs
    4  0.592  0.911  0.650 irs
    5  0.266  0.681  0.391 irs
    6  0.162  0.677  0.239 irs
 mean  0.423  0.771  0.508

Note: crste = technical efficiency from CRS DEA
      vrste = technical efficiency from VRS DEA
      scale = scale efficiency = crste/vrste
Note also that all subsequent tables refer to VRS results

SUMMARY OF OUTPUT SLACKS:
firm  output:          1
    1               0.000
    2               1.110
    3               1.320
    4               0.690
    5               1.200
    6               1.500
 mean               0.970

SUMMARY OF INPUT SLACKS:
firm  input:           1
    1               0.000
    2               0.000
    3               0.000
    4               0.000
    5               0.000
    6               0.000
 mean               0.000

SUMMARY OF PEERS:
  firm  peers:
    1      1
    2      1
    3      1
    4      1
    5      1
    6      1

PEER COUNT SUMMARY:
   (i.e., no. times each firm is a
peer for another)
  firm  peer count:
    1       5
    2       0
    3       0
    4       0
    5       0
    6       0
```

Appendix T: Results for Public Efficiency in Economic Performance using DEA-CRS

```
Results from DEAP Version 2.1

Instruction file = ecp-ins.txt
Data file        = ecp-dta.txt

 Input orientated DEA
 Scale assumption: CRS
 Slacks calculated using multi-stage method

EFFICIENCY SUMMARY:
  firm     te
    1  1.000
    2  0.409
    3  0.895
    4  0.604
    5  0.611
    6  0.496
 mean  0.669

SUMMARY OF OUTPUT SLACKS:
firm  output:          1
    1               0.000
    2               0.000
    3               0.000
    4               0.000
    5               0.000
    6               0.000
 mean               0.000

SUMMARY OF INPUT SLACKS:
firm  input:           1
    1               0.000
    2               0.000
    3               0.000
    4               0.000
    5               0.000
    6               0.000
 mean               0.000

SUMMARY OF PEERS:
  firm  peers:
    1      1
    2      1
    3      1
    4      1
    5      1
    6      1

PEER COUNT SUMMARY:
   (i.e., no. times each firm is a
peer for another)
  firm  peer count:
    1       5
    2       0
    3       0
    4       0
    5       0
    6       0
```

Appendix U: Results for Public Efficiency in Economic Performance using DEA-VRS

```
Results from DEAP Version 2.1

Instruction file = ecp-ins.txt
Data file        = ecp-dta.txt

 Input orientated DEA
 Scale assumption: VRS
 Slacks calculated using multi-stage method

EFFICIENCY SUMMARY:
  firm  crste  vrste  scale
    1  1.000  1.000  1.000  -
    2  0.409  0.633  0.647 irs
    3  0.895  1.000  0.895 drs
    4  0.604  0.911  0.664 irs
    5  0.611  0.681  0.897 irs
    6  0.496  0.677  0.733 irs
 mean  0.669  0.817  0.806

Note: crste = technical efficiency from CRS DEA
      vrste = technical efficiency from VRS DEA
      scale = scale efficiency = crste/vrste
Note also that all subsequent tables refer to VRS results

SUMMARY OF OUTPUT SLACKS:
firm  output:          1
    1               0.000
    2               0.410
    3               0.000
    4               0.390
    5               0.120
    6               0.310
 mean               0.205

SUMMARY OF INPUT SLACKS:
firm  input:           1
    1               0.000
    2               0.000
    3               0.000
    4               0.000
    5               0.000
    6               0.000
 mean               0.000

SUMMARY OF PEERS:
  firm  peers:
    1      1
    2      1
    3      3
    4      1
    5      1
    6      1

PEER COUNT SUMMARY:
   (i.e., no. times each firm is a
peer for another)
  firm  peer count:
    1       4
    2       0
    3       0
    4       0
    5       0
    6       0
```

Appendix V: Results for Overall Public Efficiency without Albania using DEA-CRS

```
Results from DEAP Version 2.1

Instruction file = alb-ins.txt
Data file        = alb-dta.txt

 Input orientated DEA
 Scale assumption: CRS
 Slacks calculated using multi-stage method

EFFICIENCY SUMMARY:
  firm     te
    1  0.653
    2  0.878
    3  1.000
    4  0.710
    5  0.631
 mean  0.775

SUMMARY OF OUTPUT SLACKS:
firm  output:           1
    1               0.000
    2               0.000
    3               0.000
    4               0.000
    5               0.000
 mean               0.000

SUMMARY OF INPUT SLACKS:
firm  input:            1
    1               0.000
    2               0.000
    3               0.000
    4               0.000
    5               0.000
 mean               0.000

SUMMARY OF PEERS:
  firm  peers:
    1      3
    2      3
    3      3
    4      3
    5      3

PEER COUNT SUMMARY:
   (i.e., no. times each firm is a
peer for another)
  firm  peer count:
    1       0
    2       0
    3       4
    4       0
    5       0
```

Appendix W: Results for Overall Public Efficiency without Albania using DEA-VRS

```
Results from DEAP Version 2.1

Instruction file = alb-ins.txt
Data file        = alb-dta.txt

 Input orientated DEA
 Scale assumption: VRS
 Slacks calculated using multi-stage method

EFFICIENCY SUMMARY:
  firm  crste  vrste  scale
    1  0.653  0.695  0.939 irs
    2  0.878  1.000  0.878 drs
    3  1.000  1.000  1.000  -
    4  0.710  0.748  0.949 irs
    5  0.631  0.744  0.848 irs
 mean  0.775  0.837  0.923

Note: crste = technical efficiency from CRS DEA
      vrste = technical efficiency from VRS DEA
      scale = scale efficiency = crste/vrste
Note also that all subsequent tables refer to VRS results

SUMMARY OF OUTPUT SLACKS:
firm  output:        1
    1              0.060
    2              0.000
    3              0.000
    4              0.050
    5              0.150
 mean              0.052

SUMMARY OF INPUT SLACKS:
firm  input:         1
    1              0.000
    2              0.000
    3              0.000
    4              0.000
    5              0.000
 mean              0.000

SUMMARY OF PEERS:
  firm  peers:
    1      3
    2      2
    3      3
    4      3
    5      3

PEER COUNT SUMMARY:
   (i.e., no. times each firm is a
peer for another)
  firm  peer count:
    1       0
    2       0
    3       3
    4       0
    5       0
```

Appendix X: Results for Overall Public Efficiency with the Lag Effect using DEA-CRS

```
Results from DEAP Version 2.1

Instruction file = lag-ins.txt
Data file        = lag-dta.txt

 Input orientated DEA
 Scale assumption: CRS
 Slacks calculated using multi-stage method

EFFICIENCY SUMMARY:
  firm     te
    1  1.000
    2  0.471
    3  0.594
    4  0.673
    5  0.481
    6  0.513
 mean  0.622

SUMMARY OF OUTPUT SLACKS:
firm  output:          1
    1               0.000
    2               0.000
    3               0.000
    4               0.000
    5               0.000
    6               0.000
 mean               0.000

SUMMARY OF INPUT SLACKS:
firm  input:           1
    1               0.000
    2               0.000
    3               0.000
    4               0.000
    5               0.000
    6               0.000
 mean               0.000

SUMMARY OF PEERS:
  firm  peers:
    1      1
    2      1
    3      1
    4      1
    5      1
    6      1

PEER COUNT SUMMARY:
   (i.e., no. times each firm is a
peer for another)
  firm  peer count:
    1       5
    2       0
    3       0
    4       0
    5       0
    6       0
```

Appendix Y: Results for Overall Public Efficiency with the Lag Effect using DEA-VRS

```
Results from DEAP Version 2.1

Instruction file = lag-ins.txt
Data file        = lag-dta.txt

 Input orientated DEA
 Scale assumption: VRS
 Slacks calculated using multi-stage method

EFFICIENCY SUMMARY:
  firm  crste  vrste  scale
    1  1.000  1.000  1.000  -
    2  0.471  0.612  0.769 irs
    3  0.594  0.659  0.901 irs
    4  0.673  0.823  0.818 irs
    5  0.481  0.619  0.777 irs
    6  0.513  0.739  0.694 irs
 mean  0.622  0.742  0.826

Note: crste = technical efficiency from CRS DEA
      vrste = technical efficiency from VRS DEA
      scale = scale efficiency = crste/vrste
Note also that all subsequent tables refer to VRS results

SUMMARY OF OUTPUT SLACKS:
firm  output:          1
    1               0.000
    2               0.280
    3               0.120
    4               0.220
    5               0.270
    6               0.370
 mean               0.210

SUMMARY OF INPUT SLACKS:
firm  input:           1
    1               0.000
    2               0.000
    3               0.000
    4               0.000
    5               0.000
    6               0.000
 mean               0.000

SUMMARY OF PEERS:
  firm  peers:
    1      1
    2      1
    3      1
    4      1
    5      1
    6      1

PEER COUNT SUMMARY:
   (i.e., no. times each firm is a
peer for another)
  firm  peer count:
    1       5
    2       0
    3       0
    4       0
    5       0
    6       0
```