Capital Markets Development in Eastern and Central Europe

By

Julius Skackauskas

THESIS

Submitted to
KDI School of Public Policy and Management
in partial fulfillment of the requirements
for the degree of

MASTER OF PUBLIC POLICY

2012

Capital Markets Development in Eastern and Central Europe

By

Julius Skackauskas

THESIS

Submitted to
KDI School of Public Policy and Management
in partial fulfillment of the requirements
for the degree of

MASTER OF PUBLIC POLICY

2012

Professor Lee. Young-Ki

Capital Markets Development in Eastern and Central Europe

By

Julius Skackauskas

THESIS

Submitted to
KDI School of Public Policy and Management
in partial fulfillment of the requirements
for the degree of

MASTER OF PUBLIC POLICY

Committee in charge:

Professor Lee, Young-Ki, Supervisor _____

Professor Han, Joong-Ho _____

Professor Kang, Moon-Soo _____

Approval as of June, 2012

ABSTRACT

CAPITAL MARKETS DEVELOPMENT IN EASTERN AND CENTRAL EUROPE

By

Julius Skackauskas

It is widely proved that the development of capital markets is important for economic growth. In particular such idea might be true in those countries which are in a mature phase of their economic development.

The capital markets in Eastern and Central Europe[1] are still underdeveloped in comparison with advanced countries as well as in relative terms comparing them with indicators of the real economy and financial markets. Due to this reason, in most cases the companies in Eastern and Central European countries can finance their new investments only by taking loans from financial intermediaries. Moreover, high debt leverage increases bankruptcy risk in the corporate sector. The lack of innovative financial products limits certain business activities.

Therefore the main question to be raised in this research paper is how developing economies create efficient stock exchange markets as part of their growth trajectory. In order to identify the main factors which are important for the development of stock markets in Eastern and Central European countries, such factors as development of financial intermediary system, a degree of trade openness, and the role of government, including micro-efficiency and macro-efficiency of capital markets, will be tested within the research paper. Both quantitative and qualitative techniques will be used.

[1] Eastern and Central European countries are 10 countries (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic, Slovenia, and Romania) which joined the EU in 2004 and 2007.

Content

1. Introduction

Capital markets[2] are important for economic growth. According to the well known Solow growth model, capital accumulation determines economic growth in the long-run (Mankiw, 2007, p. 186-215). There are several main reasons why properly functioning capital markets foster economic growth. First, smoothly working capital markets might offer a relatively cheap alternative to bank mechanisms for businesses to finance their investment projects. Second, with efficient capital markets investors can diversify their portfolios and due to that the rate of investment will increase more quickly. Third, developed capital markets, in particular a stock market, "reduce the transaction costs of trading the ownership of the physical assets (Bekaert & Harvey, 1997, p. 6). Fourth, bank-based borrowing leads to debt accumulation within the corporate sector and it causes high debt leverage. So, in time it might create a vulnerable situation for the whole economy. Finally, innovative financial products such as risk capital, derivatives or futures, which facilitate growth of the corporate sector, would be developed through the strengthening of capital markets.[3]

It is important to stress the assumption that efficiently working capital markets foster economic growth in particular might be true in those countries which are in a mature phase of economic development. Unfortunately, the capital markets in the Baltic States (Lithuania, Latvia, and Estonia) and broadly speaking, in many countries in Eastern and

[2] In this research paper, simply speaking, the capital markets are perceived as the places there securities instruments (stocks, bonds, and futures) are exchanged.

[3] In order to be more accurate it is important to mention an ongoing academic debate about the relationship between capital markets (in a broad sense – financial development) and economic growth. Some scholars argue that financial development can also be considered as economic growth, thus actually affect economic growth (Rajan and Zingales (1998); Levine et. all.(2000). Even this is not a central topic of this research paper (research paper tries to identify quantitative and qualitative variables affecting capital market development in Eastern and Central Europe) it should be admitted that in Eastern and Central Europe in some cases, and in particular taking into account capital market development, financial systems, by comparing them with industrial counties', are developed relatively less than economies in general. Thus in the context of Eastern and Central Europe at first we should look how economic growth impacts the development of capital markets.

Central Europe, are still underdeveloped in comparison with advanced countries as well as in relative terms comparing them with indicators of the real economy and financial markets (this assertion will be proved in my analysis). Due to this reason, in most cases the companies operating in Eastern and Central Europe can finance their new investments only by taking loans from financial institutions or banks and, eventually, this could result in increased costs of borrowing. High debt leverage increases bankruptcy risk in the corporate sector. The lack of innovative financial products limits certain business activities. For instance, an absence of risk capital is an obstacle for establishing start-up businesses which sometimes have exceptional growth potential. Similarly, there are limited options for local investors to diversify their portfolios and due to that they prefer to invest in well-developed foreign markets.

The main question to be raised in this research paper is how developing economies create efficient capital markets and instruments (in particular a stock exchange market) as part of their growth trajectory. Therefore, it is important to find and define the main factors determining development of capital markets. According to findings made by Demirguc-Kunt and Levine (1996) and Garcia and Liu (1999) stock market development significantly correlates with financial system development. Put simply, financial intermediary and equity market development are complements instead of substitutes. Therefore a preliminary 1 hypothesis (H1), which is going to be tested within this research paper, suggests that financial systems in Eastern and Central Europe should be also underdeveloped compared with developed economies. Therefore it is assumed in this research paper that the development of financial intermediary system positively impact the development of capital markets.

Similar to this the 2 hypothesis (H2) assumes that a degree of openness of an economy positively affects the development of capital markets. A level of openness of an economy can be defined by accumulating inflows of foreign direct investment and by looking

to an index of trade openness. According to Dunning (1993) the most prominent scholar in the area of FDI, "efficiency seeking investment is that which takes place in countries with broadly similar economic structures and income levels and is designed to take advantage of the economies of scale and scope, and of differences in consumer tastes and supply capabilities" (p. 60). To put simply, the author observes that in the first place investment and capital flow to those countries which are located at closest distance from the investor countries. In a similar way the importance of trade openness could be explained.

Another issue to be taken into consideration within the research is the government's role regarding stock market development. For instance, King and Levine (1993) suggested that government policies with regard to development of financial systems could have a significant impact on economic growth in long-run. Therefore, Levine (1994) showed that taxing and impeding financial market activities negatively affect economic growth. In this paper the micro-efficiency (shows the costs of financing through the capital market) and the macro-efficiency (shows the portion of capital supplied by public and private sectors according to the market needs) concepts of capital market will be discussed. Thus, 3 hypothesis (H3) to be tested in the paper suggests that the government should play a positive role and stimulate the creation of capital markets or at least should not impede the development of capital markets. In other words, the actions and measures taken by the government could either strengthen or weaken the functioning of the capital markets. In particular, it is important to take into consideration such significant aspects as the level of existing taxation systems (especially by comparing them with taxes applied on other instruments within the financial system) and regulations applied to capital operations or such factors which governments might use in order to stimulate the creation of capital markets (for instance, pension reforms or implementation of privatization programs through stock exchanges).

In most cases available data from ten Eastern and Central European countries (EU-10) will be used[4] mostly covering the period from 2001until 2010. All these countries, which joined the European Union in 2004 and 2007 (for this reason EU-10 countries often are named as "new EU Member States"), are experiencing quite similar processes in socio-economic and financial development. Having in mind some restrictions in obtaining data, in some cases of qualitative analysis, only data from 3 countries will be used (Lithuania, Latvia and Estonia[5]).

Both quantitative and qualitative techniques will be used in this research paper. The analysis uses ordinary and panel-based econometric techniques in order to catch statistical relations among relevant variables within EU-10 countries. Thanks to regression analysis the relationship between dependent, independent, and controlling variables will be examined. Some dependent variables (GDP per capita growth, market capitalization over GDP, traded value over GDP) will be regressed over various independent and controlling variables. Later, I will analyze policies that governments have implemented (or not implemented) in order to develop stock markets. Therefore, such factors as pension reforms and taxation on capital markets operations will be included in the qualitative analysis. Finally, I draw conclusions and offer some recommendations for policy makers. The data set upon which the research mostly will be based is the World Bank's World Development Indicators & Global Development Indicators data base; data will also be collected from the central banks and statistical offices of EU-10 countries.

It is important to stress that among dozens of studies, so far no one was focused upon Eastern and Central European countries, especially after their access to the European

[4] The EU-10 countries are: Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic, Slovenia, and Romania.

[5] Baltic countries (Lithuania, Latvia and Estonia) naturally compose the independent sub-region in Eastern and Central Europe.

Union due to that a huge amount of funds and investments became available for their economic development. Taking into account this, it will be the main academic contribution to the prior researches. In addition, matching quantitative and qualitative techniques as well as making research outcomes to the practical implications will be of major importance tool.

Before concluding the introductory part it is important to mention some limitations of this research. Firstly, the main goal of this paper is to identify the most important factors of capital markets development in Eastern and Central Europe. Thus, the main focus will be weighed on macroeconomic factors (basically microeconomic factories (on company level) are not included). According to the scope of the research, such factors as return in access of average market return or volatility of the market (risk) are not part of the research too.

2. Literature review

The main purpose of this literature review is to survey the academic achievements related to the development of capital markets. All literature which has been reviewed in this chapter could be grouped in two parts according to the structure of the thesis. Firstly, I will discuss the literature which shows why it is important to have developed capital markets. Later, I will consider the academic literature which deals with particular issues impacting the development of capital markets.

In my view, one of the most prominent studies within the relevant area was written by King and Levine (1993). Wide cross-country evidence, using data from 80 countries, shows that indicators of financial development have positive correlation with economic growth. All those findings made by King and Levine are consistent with the view that "financial services stimulate economic growth by increasing the rate of capital accumulation"

(p. 737). In their conclusion the authors suggest that government policies with regard to development of financial systems may have an important causal effect on long-term economic growth.

Miller (1998) shows the benefits of well diversified financial systems and gives an answer to the question why is it so important to develop the capital markets. By analyzing the Japanese financial system, which is heavily dependent on bank borrowing, Miller shows its negative impact on the country's economy. According to the author, relying on banking requires enormous amounts of direct government supervision in order to reduce possible threats. Moreover, during periods of financial distress when the majority of banks go into significant difficulties the regulatory measures are ineffective. The article originally suggests why the relevant research on capital markets development in Eastern and Central European countries should be important.

Another comprehensive study, written by Bekaert and Harvey (1997), provides both a theoretical framework and some clues for empirical analysis which are useful in my research. The links between the development of a capital market and economic growth with a particular emphasis on the stock market is the main topic discussed in the article. According to the article, there are four main roles whereby the stock market affects the process of economic growth: 1) ability to diversify investors' portfolios; 2) mitigating moral hazard problems; 3) making it easier to change ownership; 4) the possibility of a lump-sum gain made due to a sale of shares of the stock. Beyond a doubt, all these roles positively enhance economic growth. The article also discusses legal investment barriers which hamper economic growth. These theoretical findings are well supported by the empirical analysis. Bekaert and Harvey have computed a regression analysis between a number of stock market development indicators and growth of GDP within 18 countries. They conclude that investment projects that have been made in segmented capital markets "are likely to have

higher discount rates because the required rate of return on equity is linked to the local market volatility" (p. 18).

Levine (1994) is one of the most distinctive researchers in the relevant field and he has contributed a lot by explaining relations between capital markets and economic growth. In his paper "Stock Markets, Growth and Tax Policy," the author constructs an endogenous growth model in which a stock market plays a key role by allocating risk within the economy. To put it in simple words, Levine explains that efficient stock markets allow investors to sell their stocks during the so called "liquidity shocks" for more than a low typical liquidation return. Due to that no significant amount of capital would be removed from the firms. The paper also demonstrates that taxing and impeding financial market activity negatively affect economic growth. The original ideas discussed by Levine will be important for theoretical grounds within the research pursued in this paper.

Demirguc-Kunt and Levine (1996) in their well known analysis based on empirical evidences from 41 countries define stock market (by using market size, liquidity, asset pricing, concentration, regulatory and institutional indicators) and financial market development (by measuring the size of financial system and the efficiency of financial intermediary system) indicators; they also construct the indexes.[6] By running simple and multiple regressions the authors show existing correlations among various indicators and draw the conclusion that the degree of capital market development highly correlates with the level of financial system development. Thus, the empirical techniques defined by Demirguc-Kunt and Levine will be used in my research.

[6] The authors discovered that in the case of „indicator by indicator technique" the correlation coefficients are not very high because different indicators capture different factors of equity market development. In order to asses how well equity markets are in general, indexes of overall stock market development have been constructed.

Schumkler and Vesperoni (2001) analyze the significance of financial structure from the point of a firm's perspective. In their study the authors make distinctions between a bank-based system (capital is provided usually by financial institutions) and a market-based system (in which firms raise funds in capital markets). They claim that banks are better prepared to finance start-up business, and on contrary the capital markets are better to fund large and already established companies. Moreover, Schumkler and Vesperoni state that in many cases "the differences between emerging and developed markets are more important than differences between bank-based and market based systems (p. 34)."

Ben and Ghazouani's (2007) a well structured study is based on empirical evidence in 11 MENA[7] region countries. The authors have tested the importance of both bank and equity market development on growth. Their conclusions might be quite unexpected – "the overall financial development is unimportant or even harmful for economic growth in the MENA region" (p. 313). The authors specify the possible reasons for such results. On the one hand, the lack of relationship might be caused by weak financial systems within the MENA countries. On the other hand, the reason might come from very unstable growth rates that influence the relation between the development of financial system and economic growth. To conclude, the authors proved the statement that the development of financial systems might be a precondition for the development of capital markets.

Garcia and Liu (1999) use pooled data from 15 developing countries in their studies and try to define the macroeconomic factors of equity market development. The paper concludes: (1) such indicators as financial market development, saving rate, real income, and equity market development have an impact on market capitalization; (2) the macroeconomic stability it is not significant to stock market development; (3) therefore the development of

[7] MENA – Middle East and North Africa.

stock market and the development of financial intermediary system emerges together instead of occurring separately.

The article "Endogenous Growth Models and Stock Market Development: Evidence From Four Countries," which was written in 2003 by three British scholars, shows the causal relation between stock market development and two important indicators – the market capitalization and the value traded ratios. It is important to stress that the conceptual part of the article is fully backed by empirical evidence, also including analysis of Korea's capital markets. A general conclusion of this paper is that an efficient stock market could boost the economic growth in less-developed countries. Additionally, it confirms that stock market development in Korea positively affected economic growth.

The occasional paper published by the International Monetary Fund (2004), focuses on capital market development issues in the Baltic countries. It gives a smooth and well-concentrated introductory view regarding the development of capital markets in Lithuania, Latvia, and Estonia from various angles. It shows that the financial systems in all three countries are still largely bank-based and therefore bond and equity markets play a negligible role. The other issues of major importance discussed in the paper are suggestions on how to strengthen capital markets within the region. The paper proposes two main lines: eliminate existing distortions that favor bank financing over the capital market-based financing (for instance, to improve taxation) and implement more active government policies in order to stimulate development of capital markets (for example, to develop an active market for government securities or to implement the "privatization" of pension systems). In sum, it is important to highlight the observation that the capital markets in the Baltic States are still underdeveloped actually confirms the need and importance to analyze (and improve) the development of capital markets within the Baltic States.

The book *The Financial Development of Japan, Korea, and Taiwan: Growth, Repression, and Liberalization* and *Financial Deregulation and Integration in East Asia* (1994) gives quite a good understanding about the trajectory of development of the Korean financial system, including the development of capital markets. Within this book such important aspects as deregulation, structural changes, and market integration are discussed from the different perspective of time. The book shows that financial deregulation which took place from 1980 has helped to strengthen Korea's financial markets. This conclusion is backed by empirical analysis carried out within the book.

In the literature review several interconnected lines were defined on which will be based my research paper. First, it is empirically proven that the development of a financial system has positive significant impact to economic growth. Therefore government policies with regard to development of financial systems could have a significant impact on long-run economic growth. Second, several analyses showed that stock market development significantly correlates with financial system development. It is important to emphasize that development of financial intermediary and development of equity market are substitutes instead of complements. Third, various positive (for instance, saving rate and market size, market capitalization and value traded) and negative (taxing and economic growth) correlations between different indicators were found. Fourth, the empirical techniques based on regression analysis among different indicators and indexes and qualitative analyses are widely used within studies. Finally, many conceptual reasons which support the importance of capital market development both from the economy's as well as from firm's point of view were shown.

Another issue should be taken into consideration, that among dozens of studies no one substantial research paper analyzing capital markets development within the Eastern and Central European region has been found. However, a few studies analyzing separate countries

or sub-regions were discovered. For instance, the study on capital market development in the Baltic States shows that capital markets there are still underdeveloped. Therefore, I believe that this research paper will help fill the existing gap as regards research on capital markets in Eastern and Central Europe.

All reviewed pieces of literature have shown a high relevance to my selected topic as well as confirmed that I am on the right track within my academic research. Therefore, conceptual frameworks and analysis techniques showed within the literature review will be used in the research paper.

3. Empirical analysis of capital markets development in EU-10

3.1. Methodology

While this research paper is mostly based on a quantitative analysis, a basic explanation on empirical techniques and methodology will be provided in this chapter.

Thanks to empirical analysis the answers to three main questions will be given. First of all, the capital markets in EU-10 countries will be compared with advanced economies. By measuring the distance between the capital markets of EU-10 countries and developed economies, the relative level of capital market underdevelopment in the EU-10 countries will be shown. Later, in order to provide an introductory view for the further analysis, a short comparative analysis of the *status quo* of capital markets in the EU-10 countries will be provided. The last part of this chapter will be devoted to an econometric analysis which is of major importance within the research paper. The main goal of the econometric analysis is to identify the most significant independent variables which could explain the stock market's development trajectory in the EU-10 countries.

Various variables and two indexes will be used within the empirical analysis. All of them could be grouped as endowment, institutional and macroeconomic variables. From an econometric point of view these variables can be classified as dependent (variables of capital market), independent (financial system, FDI, trade and others) and controlling (area, population, GDP growth and others) variables.

Table 1 ***The variables and indexes which will be used within the research paper***

Variables		Acronym	Source
Dependent variables	Market capitalization to GDP	mcpgdp	WDI
	Total traded value to GDP	trvgdp	WDI
	Turnover ratio	turnrat	WDI
Independent variables	Gross domestic savings over GDP	dsvrgdp	WDI
	M3 over GDP	m3gdp	CB of EU-10 countries
	Domestic credit to private sector over GDP	dcrgdp	WDI
	FDI inflow over GDP	fdigdp	WDI
	Import plus export of manufacturing to GDP (trade openness index)	tomangdp	WDI
	Taxes on income, profits, capital gain (% of revenue)[8]	taxrev	WDI
	Taxes on income, profits, capital gain (% of total taxes)	captac	WDI
Controlling variables	Population	popul	CIA Factbook
	Area	area	CIA Factbook
	Border length with the countries of EU-15 block	distance	CIA Factbook
	GDP growth rate	gdpgrth	WDI
	Adjusted net national income (current)[9]	adjnic	WDI
	Inflation rate	infrate	WDI
Indexes		**Acronym**	**Sources**
Stock development index		stdevindex	Author
Financial system development index		findevindex	Author

Sources: WDI - World Bank's World Development Indicators & Global Development Indicators

[8] Taxes on income, profits, and capital gains are levied on the actual or presumptive net income of individuals, on the profits of corporations and enterprises, and on capital gains, whether realized or not, on land, securities, and other assets. See more WB's World Development Indicators & Global Development Indicators. Accessed September, 29 http://databank.worldbank.org/ddp/home.do .

[9] Adjusted net national income is GNI minus consumption of fixed capital and natural resources depletion.

Beck et al. (1999) underline the importance of three main indicators for an equity market which could be use in order to measure its size, efficiency and liquidity. A stock market capitalization over GDP indicator showing the stock market size equals the value of all listed equities over the GDP. According to Demirguc-Kunt and Levine (1996), "the assumption behind market capitalization is that market size positively correlates with the ability to mobilize capital and diversify risk (p.7)."

The size of a stock market is not enough because it does not give any information on its liquidity. Generally speaking, the definition "liquidity" expresses how easy is to sell and to buy securities in the stock market. Two different liquidity indicators of equity markets will be used in this research. A total value traded over GDP indicator which is calculated as total equities traded on the stock market divided to GDP within one year. Therefore, this ratio shows liquidity of an equity market based on a whole economy basis. The turnover indicator complements the market capitalization indicator and shows trading volume in line with the size of market capitalization. To put it simply, the turnover ratio captures the efficiency of a stock market.[10] For instance, in 2001-2010 on average the turnover ratio in the Bulgarian stock exchange was 18.6. This means that for all shares listed on the Bulgarian stock exchange, only about 18 % of them were traded once during one year.

These three measurements of a stock exchange separately capture the size, efficiency and liquidity aspects. In order to have an aggregate view on stock market development I will design a conglomerate index of equity market development, which is

[10] There are two concepts of capital market efficiency – micro and macro efficiency. The macro-efficient concept of capital market indicates if capital market is able to provide all financial instruments within market (it include such factors as taxation, regulation, competition). The micro-efficient concept of capital market indicates how individual stocks or assets are priced (cost of information etc.). In the given case by using term "stock efficiency" we are using the macro-efficient concept. See more in chapter 4 "Government Role: Micro-Efficient and Macro-Efficiency of Capital Markets".

similar to the one constructed by Demirguc-Kunt and Levine (1996). Therefore, stock market development index will be designed following two steps:

(1) For each country *i* and each time *t*, transformed values of market capitalization, traded value and turnover ratio variables are computed;

(2) Afterwards, an arithmetic average of the transformed values of market capitalization, traded value and turnover ratio are taken.

$$X_{it} = \frac{X_i - \overline{X}}{\left|\overline{X}\right|} \tag{1}$$

where $\overline{X}$ is an average value of X variable in all EU-10 countries.

The development of a financial system will be measured by using three main indicators. The most popular among researchers is the indicator which shows the level of domestic credit to the private sector. Which indicator is calculated by total value of credits given by the financial intermediaries to the private sector, divided over GDP. Though, this indicator does not include credits given by central banks, large time deposits or institutional money-market funds. In order to have an overall view about the size of a financial system, the M3[11] over GDP indicator will be used as well. Another indicator which is known as gross domestic savings over GDP equals GDP distracting final consumption expenditure. This indicator might be important to the analysis, because it is usually considered that the bigger savings rate a country has, more money to a financial system (also to stock market) could be supplied.

Another type of independent variable represents the degree of openness of an economy. In this case foreign direct investment (FDI) net inflows and imports plus exports in

[11] M3 it is the broadest indicator of money supply that includes M1, M2 also all large time deposits, money-market funds, and etc.

manufacturing over GDP[12] variables will be included in the analysis. According to Dunning (1993), efficiency-seeking investment in the first place flows to those countries which are located closest to the investor countries. In a similar way a factor of trade openness could be explained. A higher trade openness ratio means a country is going to be more integrated within the global economy, including financial and capital markets.

Last but not least, two variables which show the level of taxation in respect of capital taxing will be added to the analysis as well. One of these indicators shows taxes on income, profits, capital gain as percentage of revenue and another – taxes on income, profits, and capital gain as percentage of total taxes. It is assumed that a high level of taxation should have a negative impact towards the development of equity markets.

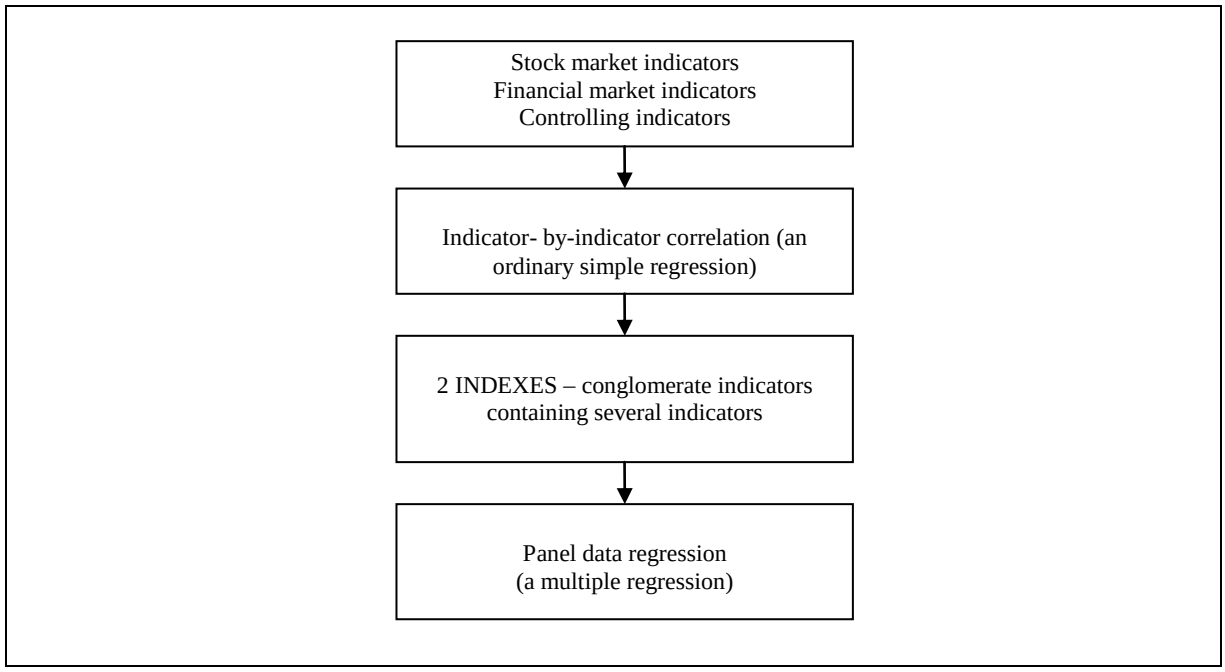
In order to have an overall view of financial intermediary development, the conglomerate index of financial development will be constructed. In the case of constructing index of financial development, the same procedures will be used as it was described above in the case of the capital market development index. Financial development index is constructed by taking an average from the means-removed values of M3 to GDP and domestic credit indicators. According to Demirguc-Kunt and Levine (1996), this index shows "the overall size of the financial system, particularly the financial system financing of the private sector" (p. 23).

In order to control a relation between independent and dependent variables some controlling variables will be introduced. The controlling variables will be regressed with all dependent variables. Such variables as GDP growth, adjusted net national income and inflation rate will be used as a base for catching the effect of the general economic situation. It is widely assumed that an increase in economic growth or in the level of incomes cause a growth for stock market as well. The inflation rate measures the level of macroeconomic stability.

[12] An import plus export in manufacturing over GDP indicator also is named "trade openness".

Scheme 1

Methodology of quantitative analysis



In this research both ordinary simple / multiple and panel data (time-series) regressions techniques will be used (see Scheme 1 above). In our case the panel data,[13] which by catching a time-series data could be more accurately compared with ordinary multiple regression, contains data from 2001 until 2010. A panel regression is based on a general least squares (GLS) approach which is used when there is a problem of heteroscedasticity – when the variances of the observations are not equal. Each variable contains 100 observations (10 countries, 10 values). An empirical analysis is made by using STATA 11.

[13] On Princton University's Data and Statistical Services internet page some important advantages of data-panel are given: „*The estimates of coefficients derived from regression may be subject to omitted variable bias - a problem that arises when there is some unknown variable or variables that cannot be controlled for that affect the dependent variable. With panel data, it is possible to control for some types of omitted variables even without observing them, by observing changes in the dependent variable over time. This controls for omitted variables that differ between cases but are constant over time. It is also possible to use panel data to control for omitted variables that vary over time but are constant between cases".* Accessed 21 of September http://dss.princeton.edu/online_help/stats_packages/stata/panel.htm .

3.2 Capital markets in Eastern and Central Europe in comparison with advanced economies

The best way to evaluate the maturity of capital markets in Central and Eastern European countries might be to compare them with developed ones. The main indicators of capital market development might be used within the analysis. In this case the indicators of capital markets from Japan, Korea, the US, OECD and EU economies are used as benchmarks. It is also useful to trace how the capital markets have been changing over the years in comparison with changes in GDP growth. All indicators which represent EU-10 were taken as averages of respective indicators found in Central and Eastern European countries.[14] By measuring the existing distance between capital markets of EU-10 countries and developed economies, the relative level of capital market development in EU-10 countries will be shown.

Having in mind the convergence and integration processes which are taking place right now between EU-10 countries and the rest of EU in socio-economic, territorial and financial areas,[15] it is important to compare these indicators with respective EU indicators in more depth. The existing distance could indicate trends of changes in capital markets which are going to happen in the future within EU-10 countries.

On average, market capitalization over GDP and market turnover over GDP ratios in EU-10 countries are 5 times lower in comparison with advanced capital markets, and the difference in traded value over GDP ratios was found to be extremely large – about 19 times

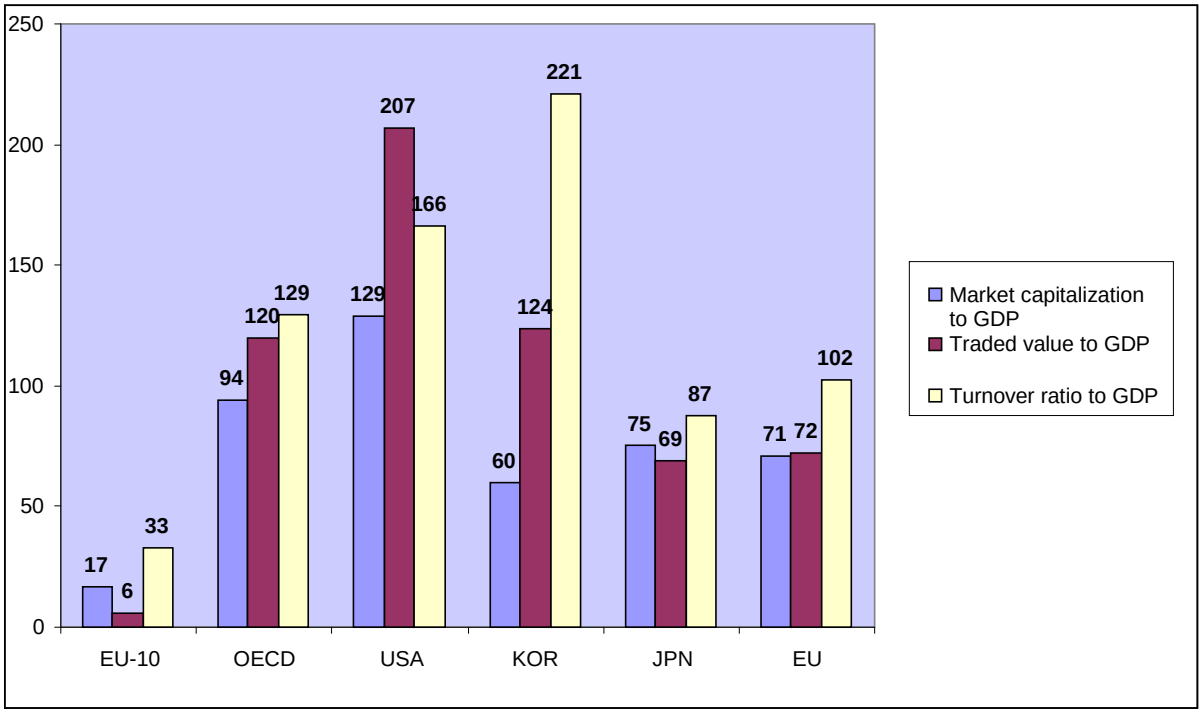
[14] All data set used in this chapter were taken from WB's World Development Indicators & Global Development Indicators. Accessed 29 of September http://databank.worldbank.org/ddp/home.do

[15] Achieving of economic, social and territorial convergence is one of the major goals within the EU. EU-10 countries which joined EU in 2004 and 2006 are less developed compared with the old Member States of RU. For instance, in the third part of the Treaty establishing a Constitution for Europe the whole third section is devoted to such goal. Treaty establishing a Constitution for Europe (III part), Official Journal of the European Union. Accessed 29 of September http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2004:310:0055:0185:EN:PDF .

(see Graph 1 below). So, capital markets of EU-10 countries compared with advanced ones are much smaller as well much more illiquid.

Graph 1

Main indicators of stock market over GDP in EU-10 countries compared with advanced economies (1995-2010)



The market capitalization to GDP of the EU-10 countries has reached only 24 % of the EU level so far, and respectively levels of the traded value and turnover ratios are 8 % and 32 % (see Table 2 below). So, the difference in capital market size over GDP and turnover ratio over GDP is about 3 times (less than we saw previously by comparing EU-10 data with generalized data of five advanced economies), and the traded value indicator in EU-10 capital markets compared with the EU indicator is significantly lower – again showing difference of about 12 times.

Table 2

Ratios of capital and financial markets indicators (where EU is 100 %)

Indicator	1995-2010	2010
Market capitalization over GDP in EU-10	24 %*	27 %*
Traded value over GDP of EU-10 in EU-10	8 %	10 %
Turnover ratio over GDP in EU-10	32 %	32 %
Domestic credit to private sector over GDP in EU-10	37 %	53 %
GDP per capita in EU-10	32 %	41%

* Ratios of capital and financial markets indicators (where EU is 100) were attained by dividing an indicator of EU-10 over the same indicator of EU (for instance, market capitalization over GDP in EU-10 is 17/71*100=24% of the level of EU).

In measuring the development trends of capital markets in EU-10 countries, it is also crucial to evaluate how capital markets have been changing over time. The market capitalization over GDP indicator in EU-10 countries since 1995 has increased about 350 %. Actually the growth rate of market capitalization in EU-10 strongly correlated with the growth rate of GDP which was 345 % during the same period. As a matter a fact, at the same time market capitalization in the EU grew only 170 % (see Graph 2 below). Therefore, this tendency indicating the growth of capital markets in EU-10 countries could be interpreted rather positively, especially taking into account dramatic GDP growth of EU-10 countries during that period.

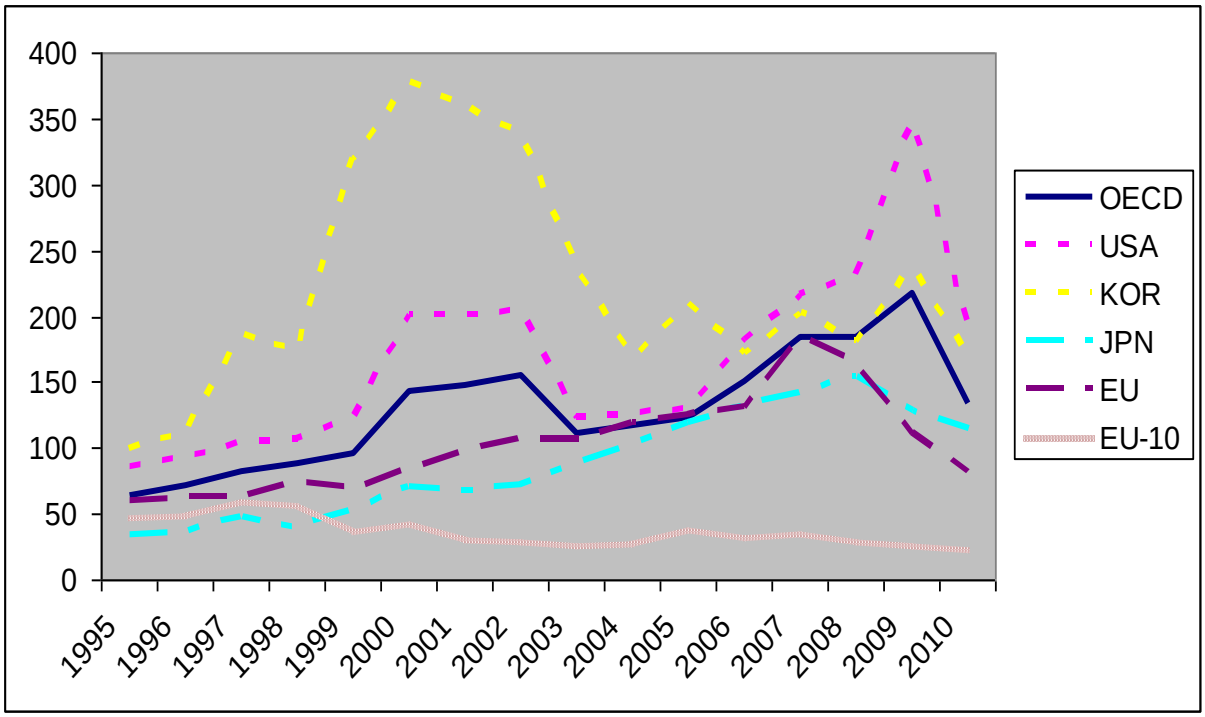
Graph 2

Market capitalization of all listed shares over GDP in EU-10 countries compared with advanced economies (1995-2010)

As regards the trend line of change in turnover ratio within EU-10 capital markets, surprisingly, it is negative and shows about 50 % the decrease in liquidity during the time (see Graph 3 below). Meanwhile, in the case of all other advanced economies liquidity increased about 300% (in the EU case – about 200%). The negative trend line within EU-10 countries could be explained by emphasizing the fact that in the middle 90's many countries of the EU-10 were implementing a huge privatization program by using a stock exchange and it has a substantial but temporarily positive effect upon the liquidity of stock markets. Another reason is that some big and highly liquid companies went through the process of delisting and left the stock markets.

Graph 3

Turnover ratio over GDP in EU-10 countries compared with advanced economies (1995-2010)



Before concluding the comparative analysis, it is worthwhile to take a short look at capital markets in EU-10 countries from a broader perspective, taking into account the structure of financial systems (see Table 2 above). The domestic credit to private sector over GDP indicator, which shows the level of development of financial intermediaries, is higher in EU-10 compared with indicators of market capitalization. In 2010 the domestic credit to private sector over GDP indicator of EU-10 was 50% below the EU level. The same could be said about development trends in the real economy. For example, GDP per capita in EU-10 countries compared with the EU level was 41% in 2010. Having in mind these findings, it is obvious that the capital markets in EU-10 compared with financial markets or even with real economies are less developed. It is also shows some evidence suggesting that those financial systems of EU-10 countries are rather based on financial markets (based on financing from bank) than on capital markets.

As we could see, the main indicators which describe stock markets of EU-10 countries and show market size and liquidity are significantly lower compared with the respective indicators of advanced economies. The same observation was discovered in analyzing tendencies in the years 1995-2010 and taking the last data of 2010. However, there is an important distinction between size of market capitalization and liquidity ratios in comparing EU-10 data with advanced economies. The latter indicator showed a negative tendency by actually diminishing over the years while the market capitalization showed positive change and converged to the level of advanced economies. Thus, due to a high degree of illiquidity within equity markets in EU-10 countries, is likely that severe problems might be found: wrong price signals, high volatility (a high spread between bid-ask prices) and easiness to manipulate in trading in the case of illiquid stocks.

The domestic credit to the private sector over GDP and GDP per capita (shows the level of development of real economy) indicators between EU-10 / EU are more converged compared to the indicators of capital markets. Thus it was suggested that the capital market of EU-10 is underdeveloped in absolute terms as well as in relative terms comparing them with indicators of real economy and financial markets.

3.3. Capital markets in Central and Eastern Europe: status quo analysis

Despite the fact that equity markets in the EU-10 countries are underdeveloped in comparison with advanced economies, at the same time the level of equity market development significantly varies among these countries. Therefore, a brief comparative analysis of EU-10 equity markets will be presented in this subchapter. The framework used

by Demirguc-Kunt and Levin (1996) will be taken as a basis for the analysis. The main indicators and index of capital market development[16] will be used.

Map 1

Map of Europe

Taking into account the overall degree of equity market development within the EU-10 countries, it is convenient to compare them alongside the index of capital market development, capturing market size, liquidity and efficiency aspects of capital market

[16] In subchapter 3.1 you can find detailed information on how index of capital market development is constructed.

development (see Table 3 bellow). As a result, the EU-10 countries can be ranked into three groups: (1) countries which have relatively developed capital markets (Hungary, the Czech Republic, Poland); (2) countries which have relatively middling developed capital markets (Estonia, Slovenia, Lithuania, Romania, Bulgaria); (3) countries which have relatively underdeveloped capital market (the Slovak Republic, Latvia).

Table 3

The main stock market development indicators of EU-10 countries.

	Index of stock market development (stdevindex)	Index of financial system dev. (findevindex)	Market capitalization to GDP	Trade value to GDP	Turnover ratio to GDP	Listed shares	Population	Border length with EU-15 countries (km)
Hungary	1.71	0.13	24.36	18.46	77.26	48	9976062	366
Czech Republic	0.99	0.12	26.34	15.74	60.97	16	10190213	1008
Poland	0.49	-0.10	28.58	10.55	37.55	569	38441588	456
Estonia	0.04	0.30	27.06	5.99	21.58	15	1282963	0
Slovenia	-0.20	0.10	27.46	3.00	13.11	81	2000092	562
Lithuania	-0.45	-0.16	19.44	2.12	10.94	39	3535547	0
Romania	-0.49	-0.43	16.31	1.93	12.97	1383	21904551	0
Bulgaria	-0.50	0.04	17.52	3.14	18.61	390	7093635	0
Slovak Republic	-0.59	-0.10	7.01	0.88	17.35	90	5477038	106
Latvia	-0.67	0.11	9.55	0.74	8.56	33	2204708	0

All countries are ranked according to the index of capital market development[17]

[17] The countries are ranked to the three groups according to the index of capital market development which captures market size, liquidity and efficiency aspects of capital market development: (1) relative developed capital markets (index > 0.5); (2) relative middling developed countries (-0.5<index<0.5); (3) relative underdeveloped countries (index < -0.5). The methodology of grouping was made by author.

The countries containing relatively developed capital markets (index > 0.5) have both a higher market capitalization (±20 % of GDP) and liquidity (±15 % of GDP) indicators compared to other EU-10 countries. It is important to notice that Hungary, the Czech Republic and Poland have borders with EU-15 countries (Germany, Austria) and their populations are larger than 10 million people. The main feature of countries with relatively middling developed capital markets (-0.5<index<0.5) is that those countries have a higher market capitalization but a lower liquidity ratio. As the rule, these countries are smaller by population (except Romania) and do not have direct borders with the EU-15 countries (except Slovenia). Finally, the Slovak Republic and Latvia have relatively underdeveloped capital markets. Both of them have small market capitalization levels and low liquidity of equity markets. Last but not least, the number of listed companies within the stock market, the size of the country and the index of financial development in the case of EU-10 countries are not significant for the development of capital markets in the case of EU-10 countries.

Thanks to this analysis, the significant differences concerning the level of capital market development in EU-10 countries have been found. Therefore, the EU-10 countries could be ranked into three groups according to the maturity level of equity markets. Some relations between endowment variables and the level of capital market development were identified as well. However, in order to have more accurate, representative and detailed findings on EU-10 countries' capital market development, empirical and qualitative analysis should be taken further.

3.4. Econometric analysis results and interpretation

Before running a multiple panel regression, it is useful to observe some simple statistical relations among relevant variables. In order to get the statistical correlations, an

ordinary simple regression will be used. The main reason for using a simple regression is to provide a general trend line of correlations among critical variables. It is also important to highlight that a simple regression will be used because of some inconsistencies within the dataset. While the majority of data are based on time series, some of the variables are fixed and their values do not change over time (for instance, size of the country in km^2, border length with the EU-15 countries). Furthermore, all variables to be regressed in this subchapter are found by taking simple averages of values in the given time span, from 2001 to 2010.

Tables 4 and 5 some indications about empirical relations are shown. Table 5 shows correlations between capital market development and independent, conditioning variables in order to show whether the correlation is negative or positive. Therefore, a significance of correlations is not taken here into account.

Table 4

Correlations between stock market indicators and other variables

	mcpgdp	trvgdp	turnrat	m3gdp	dsvrgdp	dcrgdp	tomangdp	fdigdp	captax
mcpgdp	1.0000								
trvgdp	0.5577	1.0000							
turnrat	0.3289	0.9106	1.0000						
m3gdp	0.3153	0.4384	0.3329	1.0000					
dsvrgdp	-0.0214	-0.0329	-0.0462	0.2218	1.0000				
dcrgdp	-0.0021	0.0344	-0.0545	0.4866	0.2744	1.0000			
tomangdp	-0.2634	-0.0935	0.0356	-0.2140	-0.1172	-0.1778	1.0000		
fdigdp	-0.1236	-0.0369	0.1592	-0.1179	0.0449	-0.0477	-0.0722	1.0000	
captax	0.2848	0.5193	0.5784	0.2041	0.0369	-0.1335	0.1737	0.0471	1.0000
taxrev	0.3005	0.4545	0.5047	0.1513	-0.1309	-0.1089	0.1610	0.0314	0.9253
adjinc	0.4196	0.2626	0.1469	0.1658	0.1593	-0.0001	0.0012	-0.0743	0.1902
gdpgrth	0.2041	0.0133	-0.0339	-0.2740	-0.2687	-0.4304	-0.0575	-0.0039	0.0470

taxrev	adjinc	gdpgrth
1.0000		
0.1357	1.0000	
0.0948	-0.0929	1.0000

Table 5 shows correlations among the stock market development indicators and some independent and controlling variables. In this case a significance of correlations is taken into account. In the given situation only variables which significantly correlate with dependent variables and are important for the research are included.

Table 5

Correlations between stock market development variables and some independent, and condition variables

	(1) mcpgdp	(2) Trvgdp	(3) turnrat
Mcpgdp	-	0.352***	0.725***
		(0.053)	(0.210)
Trvgdp	0.788***	-	3.217***
	(0.127)		(0.144)
Turnrat	0.134***	0.256***	-
	(0.037)	(0.010)	
Distance	0.013*	0.128*	0.043*
	(0.06)	(0.04)	(0.19)
m3gdp	0.302***	0.273***	0.679***
	(0.090)	(0.056)	(0.194)
Tomangdp	0.421*	0.469*	1.942*
	(0.615)	(0.502)	(1.801)
manimpgdp	0.338	0.615	2.360
	(0.443)*	(0.315)	(1.13)*
manexpgdp	0.200	0.245	0.941
	(0.205)*	(1.59)	(5.71)
Taxcap	0.509***	0.591***	2.301***
	(0.150)	(0.096)	(0.328)
Taxrev	0.889***	0.844***	3.283***
	(0.243)	(0.164)	(0.567)

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Furthermore, some important conclusions might be drawn.

First, two independent variables which show the level of liquidity and efficiency in equity markets have significant positive correlation, while the correlation coefficients at the same time are sharply different. In the case when the value traded indicator is a dependent variable, the correlation coefficient is only 0.352. At the same time when a dependent variable is the turnover ratio – the correlation coefficient is remarkably higher, reaching a value of 3.217. That situation shows that the trading value compared to the market capitalization (turnover ratio) and the trading value compared with the size of the economy do not move one for one.

Second, the market capitalization indicator significantly positively correlates with the traded value over the GDP variable in the case of the EU-10 countries. It shows that more liquidity there is within a stock market, the bigger the capital market will be. Actually, it does not matter which variable is dependent and which is independent – in both cases the correlation coefficient shows similar strength.

Third, capital market indicators correlate with financial development indicators. However, in the case of an ordinary regression analysis only the correlation between the M3 to GDP and capital market indicators holds significance.[18] As it was presented previously, the M3 to GDP variable shows the size of a financial system by including the broadest range of money supplied in to an economy. A strong correlation between the M3 to GDP and all dependent variables has been found showing that by increasing M3 to GDP will strengthen capital market.

It is important to take into account that the domestic credit over GDP indicator showed negative correlation (but insignificant) regarding capital markets development (see Table 4 above). While such correlation was not statistically significant (t value falls to the region of rejection), we can not take such result fully into account. But again the negative association might be explained in that financial systems in EU-10 are more bank-centered.

[18] This might be caused by some limitations in an ordinary regression.

Hence, we can suggest that our findings partially correspond with the 1 hypothesis (H1) indicating that the development of a financial system positively affects growth in capital markets.

Fourth, all dependent variables significantly positively correlate with the indicator showing the border length between a particular EU-10 country and EU-15 bloc (this relation was presented in 3.3 subchapter). For instance, an increase by 100 km of border length with one of the EU-15 countries on average will add 5 % more to the turnover ratio over GDP. Taking into account that on average in the EU-10 country the turnover ratio is 27 % of GDP and that by adding 5 % more to the market liquidity over market size, the overall growth in turnover ratio will be around 20%. In order to explain this correlation a parallel is found in the theory of FDI flows might be used. According to the theory of efficiency seeking investment, in the first place FDI flows to those countries which are located closest to the investor countries. According to Karkkainen (2008), in 2008 around 70 % of all FDI of EU-15 to EU-10 countries were distributed in Poland, the Czech Republic and Hungary. Moreover, any significant statistical relations among the dependent variables and country size, population variables have not been found.

Fifth, the stock market development indicators positively correlate with the trade openness ratio measuring exports and imports of manufacturing over GDP. This correlation is statistically significant in the case of traded value over GDP and the turnover ratio indicators. The higher a trade openness ratio is, a country is going to be more integrated within the global economy, including integration into global financial and capital markets. For this reason, the trade openness ratio positively affects capital market development. It is important to point out that by decomposing the trade openness ratio to the import and export parts, it becomes visible that the import compared to export is much more important for capital market development. Such trend could be explained by taking into account that in the developing countries usually a

capital intensive category of machinery and equipment takes the biggest part in the structure of imports.

Sixth, quite unexpected results have been found regarding correlation between indicators of capital market development and the indicators showing the level of taxation in respect to capital taxing. Therefore, the traded value over GDP and turnover ratio indicator positively significantly correlates with the indicators measuring the level of capital taxation. According to theory, such relation should be negative rather positive, showing that a higher level of taxation reduces incentives for capital inflows. However, in the case of EU-10 such an untypical situation might be explained by the level of public spending over GDP. The countries which have the highest GDP per capita rates also have the highest ratios of public spending rates to GDP (Hungary - 49.2%; Poland 43.3%; Czech Republic – 42.9%).[19] Moreover, these countries have the strongest capital markets among EU-10 countries. Usually a public spending rate (level of taxation as well) goes up when a country's economy grows quickly. This happened in EU-10 countries. However, this paradox has not had a negative effect upon the capital market's development because at the same time other factors were more important and thus compensated for the increase in taxes. Moreover, it is also crucial to compare these taxes with taxes applied on other financial instruments within the financial system (see 4.2. chapter).

To conclude, many significant correlations have been found. However, it is likely that some important correlations were missed because of the shortcomings of the statistical techniques used.

[19] An average rate of public spending over GDP in EU-10 countries in 2011 was 40.5 %.
To see more: The Heritage Foundation. 2011 index of economic freedom. Accessed November 8, 2011. http://www.heritage.org/index/explore?view=by-variables

3.4.1. Market capitalization over GDP

This subchapter will discuss three multiple regressions done with panel data. Each of them explains on of the dependent variables – market capitalization over GDP, traded value over GDP, turnover ratio over GDP. An econometric analysis with panel data which was presented in detail in previous subchapter will be conducted using the following equation:

$$y_{it} = \alpha + \beta_1 Z_{it} + \beta_2 F_{it} + \varepsilon_{it} \qquad i=1,\ldots,N, \quad t=1,\ldots T \qquad (2)$$

where, i is the country dimension and t is the time dimension

y_{it} refers to one of dependent variables representing capital market development (market capitalization to GDP, traded value to GDP, turnover ratio to GDP);

Z_{it} shows conditioning variables such as GDP growth or FDI level to GDP;

F_{it} represents independent variables which indicates the level of financial system development;

ε_{it} - refers to a standard error.

All the output tables of multiple regressions will be based on "three star p-value test". Therefore three stars attached to the β coefficient value will indicate a strong significance (region of rejection constitutes 99 % of range of values) and it means that we strongly can reject the null hypothesis (which indicates that sample observations result purely from chance). Respectively, two stars indicate that the region of rejection falls in 95% of range of values, and one star – 90% of range of values.

Table 6

Panel regression table

	(1) mcpgdp	(2) mcpgdp	(3) mcpgdp
adjinc	0.049***	0.047***	0.039***
	(0.009)	(0.009)	(0.008)
gdpgrth	0.278	0.394	0.503**
	(0.264)	(0.251)	(0.218)
M3gdp		0.294***	0.139*
		(0.080)	(0.082)
trvgdp			0.560***
			(0.129)
_cons	14.726***	0.728	4.865
	(2.530)	(4.487)	(4.104)
N	100	100	100

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

In the given case we are using two controlling variables – gdp growth and adjusted national incomes[20]. We can see that these two variables hold strong significance in respect of the market capitalization indicator and other dependent variables. It means that in the case of EU-10 countries 1% of economic growth adds around 0.5 % to the market capitalization. Actually, the same conclusions might be drawn as King and Levine (1993) found in their article, that capital market development has positive correlation towards economic growth.

Also it is important to point out that in the given regression the significant correlation between the market capitalization variable and the M3 to GDP indicator has been found. Such correlation supports the H1.

[20] Adjusted net national income equals to GNI subtracting consumption of fixed capital and natural resources depletion.

3.4.2. Traded value over GDP

In Table 7 we can see that one controlling variable (total adjusted national income) holds significance in respect of the traded value over GDP and the dependent variables. Similarly, as we have observed in the previous regression equation, the level of incomes positively correlates with the level of liquidity within an equity market. Also, it is important to point out that in the given regression the correlations between the trade value indicator and the M3 to GDP as well as the gross domestic saving rate indicators hold strong significance. Again, the 1 hypothesis, which suggests that the overall development of a financial system matters for capital market development, could be supported.

Last but not least, the strong and positive correlation between the traded value over GDP indicator and the indicator showing the level of taxation in respect of capital (taxrev) has been found. As it was discussed in the previous chapter, such correlation should be negative rather than positive because a higher level of taxation reduces incentives for capital inflows. The same argumentation could be used in this case as well. The countries which have the most development capital markets (Hungary, the Czech Republic, and Poland) at the same time have the highest GDP per capita rate, and in turn the highest public spending rate. However, such situation has no effect on the development of capital markets because the other factors are more important and thus compensate for the increase in taxes. However, a taxation issue should be analyzed more in-depth in chapter 4.

Table 7

Panel regression output table for traded value over GDP variable

	(1) trvgdp	(2) trvgdp	(3) Trvgdp	(4) trvgdp	(5) trvgdp
adjinc	0.019***	0.015**	0.020***	0.014**	0.014**
	(0.007)	(0.007)	(0.007)	(0.006)	(0.006)
M3gdp		0.261***			0.230***
		(0.055)			(0.050)
dsvrgdp			0.333***		0.286***
			(0.110)		(0.089)
taxrev				0.799***	0.660***
				(0.163)	(0.142)
_cons	4.510***	-7.263***	-2.916	-7.175***	-22.088***
	(1.049)	(2.715)	(2.686)	(2.607)	(3.533)
N	100	100	100	100	100

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

3.4.3. Turnover ratio over GDP

First of all, a positive significant correlation between the turnover ratio and the independent variables indicating the degree of openness of an economy (FDI to GDP, import and export in manufacturing to GDP) has been found. As it was explained before, a higher trade openness ratio means, a country going to be more integrated within the global capital markets. For this reason, the trade openness ratio positively affects the capital market development. These findings are in line with 2 hypothesis of our research. Second, the correlations between the turnover ratio and the M3 to GDP as well as the gross domestic saving rate indicators hold significance. Moreover, in both cases the coefficients are quite high – respectively 0.697 and 0.971. In this case, we can observe that 1 hypothesis is strongly supported too.

Table 8

Panel regression output table for turnover ratio variable

	(1) turnrat	(2) turnrat	(3) turnrat	(4) Turnrat	(5) turnrat	(6) turnrat	(7) turnrat	(8) turnrat
adjinc	0.038	0.038	0.041	0.024	0.042	0.041	0.026	0.031
	(0.026)	(0.026)	(0.026)	(0.025)	(0.025)	(0.026)	(0.024)	(0.024)
tomangdp		0.029				0.039*	0.105*	0.129*
		(0.081)				(0.080)	(0.077)	(0.076)
fdigdp			0.005			0.005	0.007*	0.007*
			(0.003)			(0.003)	(0.003)	(0.003)
m3gdp				0.647**			0.755***	0.697***
				(0.197)			(0.199)	(0.195)
dsvrgdp					1.057**			0.961*
					(0.400)			(0.380)
_cons	24.401***	20.968*	23.605***	-4.510	0.819	18.938	-22.965	-44.661**
	(3.575)	(10.360)	(3.570)	(9.442)	(9.573)	(10.318)	(14.672)	(16.656)
N	100	100	100	100	100	100	100	100

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4. Government role: Micro-efficiency and Macro-efficiency of capital markets

In order to fully understand the importance of governments' actions for the development of capital markets in the Eastern and Central European countries at first we should introduce two general concepts – the micro-efficiency and the macro-efficiency of capital markets.

The concept of efficient market in finances usually means efficient information disclosure to the markets and taking into consideration the available information nobody can achieve return in access of average market return on a risk-adjusted basis. At this point it is important to highlight Paul A. Samuelson's famous dictum which states that stock market is micro efficient but inefficient at macro level. Following to this, the concept of efficient

market "much better works for individual stocks than it does for aggregate stock markets" (Jung and Schiller, 2006, p.1).

Another way to define those two concepts – is to look to them purely from the point of capital market development view. According to Bain A.D., questions of micro-efficiency include the range of financial instruments available, the prices which prevail in financial system, intermediation costs, and the factors as market structure, regulations, taxes, etc. The macro-efficiency is more concerned with aggregate issues of financial system such as capital supply, overall stability, etc (Bain A.D., 1992, p.239).

First of all, we will analyze the main factors of micro-efficiency in respect of EU-10 capital markets. As it was highlighted before the concept of micro-efficiency might be perceived by how least costly, both in transaction costs and in information costs, such as financing through the market is implemented. Relevant to the EU-10 countries, such issues as trading rules, availability of the public and private information, taxing systems and regulations will be taken into account.

It is important to stress, that according to the European Union's law a single market for financial services which includes securities as well is created among the EU countries. Thus, the trading rules and requirements for the issuance of securities (regarding initial public offers (IPO) as well as rules for securities to be listed on a stock exchange) are part of the EU law.[21] Following this, all the EU-10 countries should have the same legal requirements. However, two significant issues should be added at this point. Firstly, the EU-10 countries have the right to choose the trading currency in their stock exchange markets. Secondly, even having in mind that all of the EU-10 countries have adopted EU directives and regulations on

[21] The European Commission http://ec.europa.eu/internal_market/securities/index_en.htm Accessed May 8, 2012.

public and private information disclosure, there are still significant differences regarding the availability of such kind of information among the EU-10 countries.

The factor of currency which is used in a particular stock exchange traditionally is considered as being important for stock exchange development. Mainly, due to high transaction costs, incurred by currency exchange transactions (in the cause of local currency), and an eventual risk of local currency devaluation. A currency issue usually is much more relevant for small countries which are less prepared to manage currency crisis. In order to overcome above mentioned problems the main currencies (such as euro, the US dollar) instead of local ones could be used in local stock exchange markets. Hungary, the Czech Republic, Poland, Bulgaria, Romania, and Latvia are using their local currencies within stock markets, and Estonia, Slovakia, Slovenia, and Lithuania – euro. Taking into account the different size of the EU-10 countries[22], Estonia, Lithuania, Slovakia and Slovenia are more micro-efficient in respect of trading currency factor compared with Latvia, Bulgaria (more information on currency issue in EU-10 countries you can find in 4.2. chapter "Currency and privatization factors").

Another important issue of micro-efficiency is availability of the public and private information. As it has been explained before a single market for securities trading which include the public and private information disclosure was created within the EU area. However, on practical level situation varies according to particular countries. A small research which was made by the author showed that in Slovakia and Bulgaria is difficult to find the public and private information on the listed companies. For instance, there is no enough information about shareholders structure; there is no access to financial documents based on quarterly and yearly basis; the main information usually is provided only into local

[22] We should eliminate Hungary, the Czech Republic and Poland from our elaboration on trading currency because those countries are not considered as being relatively small ones.

languages. So, those two countries should be considered as micro-inefficient in respect of availability of the public and private information.

The tax systems are being considered as part of micro-efficiency as well. By emphasizing the term "tax systems" we have in mind the tax rates on different financial products existing within the financial systems in the EU-10 countries: banking instruments (interests from bank deposits or saving accounts), government bonds and equities (in chapter 4.3. "Taxation" you can find a detailed analysis on taxation systems in the EU-10 countries). We can generalize that Hungary, the Czech Republic and Poland equally treat different financial instruments and thus apply the same tax rate on interests from deposits and government bonds as well as on incomes from equities (see the table 13). And in most of the rest of the EU-10 countries taxation is not uneven across financial instruments, basically being in favor of bank deposits and government bonds. For instance, in Lithuania, Estonia, Romania, and Bulgaria incomes earned from bank deposits are tax free. At the same time, in Latvia, Bulgaria, Slovenia and Romania there are no taxes applied on interests earned from government bonds. So, only the Hungry, the Czech Republic and Poland among the EU-10 countries might be considered as having efficient tax systems regarding the development of capital markets.

Before finishing analysis of micro-efficient dimension of capital markets in the EU-10 countries, it is important to give some examples related with regulations. For instance, private pension funds are significant investors for local stock exchange markets. There are plenty of regulations impacting the activities of those funds (either positively or negatively). For instance, in Poland, Hungary, and Romania pension funds can invest up to 50% of total their investments to the equities and in the Czech Republic, Slovenia, and Bulgaria only up to 20-25%. Moreover, in Poland and Bulgaria positive discrimination in respect of investment to

foreign assets are applied. In both countries the governments have set some limitations for private pension funds' investments to foreign assets.

Our analysis has showed the significant differences among the EU-10 countries regarding the financing costs through the capital market. By adding up the factors of micro-efficiency (trading currency, availability of the public and private information, taxing systems, regulations) for each of EU-10 country, we can conclude that Poland and Hungary have the highest level of micro-efficiency while Bulgaria, Slovakia – the lowest. The rest of the EU-10 countries are between those two groups. More important so stress, that those findings are quite relevant by comparing them to the actual level of capital development within the EU-10 countries.

The macro-efficiency concept is more concerned with aggregate issues of financial system such as capital supply, overall stability, etc. The macro-efficiency can be measured by the relative portion of the public and private financing through the stock markets and the relative portion of capital supply by both private and public sectors according to the needs. Therefore the analysis on macro-efficiency dimension within EU-10 will be focused on two main factors: 1) the overall size and liquidity of capital markets in EU-10 countries; 2) the size of capital supplied by the governments of EU-10 in order to promote the development of capital market.

In order to answer whether the capital markets in the EU-10 countries are macro-efficient, first of all we should measure main indicators of capital markets. To do this we should refer to our analysis has been made in chapter 3 "Empirical analysis of capital markets development in EU-10".

The countries containing relatively developed capital markets have both a higher market capitalization, which is about 25 % of GDP, and liquidity, which is about 15 % of GDP, might be defined as benchmarks of overall macro-efficiency for the EU-10 countries

(all data you can find in table 3). Those countries are Hungary, the Czech Republic and Poland. Estonia, Slovenia, Lithuania, Romania and Bulgaria could be added to another group having a quite high market capitalization, which is on average around 20% of GDP, while a small liquidity ratio, which is only around 3% of GDP. Those countries still can be macro-efficient in respect of supplied capital to the stock exchange markets, therefore the capital is not liquid (trading is not happening often). Finally, the Slovak Republic and Latvia have relatively underdeveloped capital markets. Both of them have small market capitalization levels (less than 10% of GDP) and low liquidity of equity markets (less than 1 % of GDP). So, the overall macro-efficiency in respect of capital supply to capital markets is really low for the latter countries.

One might argue that governments' role to capital markets should be minimal or even should not exist at all. However, taking into account the fact that the capital markets within the EU-10 countries are still underdeveloped, the government should stimulate creation of capital markets.

Regarding the macro-efficiency of capital markets a small analysis was done taking into consideration the portion of capital supplied by state-owned companies within the EU-10 stock markets. The shareholder structure of top-60 equities by market capitalization for each 10 stock markets was analyzed in order to find out an exact portion of capital supplied by the government. Various types of capital owned by government, municipalities, state-owned companies or state-funds in this analysis were considered as government supplied capital. All share capital supplied by the government was accumulated. Taking into consideration the fact that still in EU-10 region substantial amount of companies are controlled by governments (especially, operating in such areas as energy, gas, oil, transportation or finances), the capital markets will be defined as macro-efficient according to the portion of capital supplied by the government (see more to 4.2. chapter "Currency and privatization factor").

However, some shortcomings regarding the macro-efficiency analysis have occurred. Firstly, following to the rules regulating the disclosure of ownership structure of companies listed on the stock, there are no requirements to disclosure shareholders in the case of one owns less than 5% of total equity capital. Secondly, in some countries (Slovakia, Bulgaria) there is no enough information about shareholders structure of listed companies.

By measuring the level of capital supplied by the governments of EU-10 countries to stock markets (see Table 9, for detailed analysis see Appendix 1), we obviously can see that stock markets which are the most developed according to the index of capital market development at the same time have a higher level of macro-efficient. For instance, Poland, Hungary, Slovenia, Lithuania and the Czech Republic are among those countries which supply the biggest portion (around 20%) of capital by governments. All of those countries

Stock exchange market	Number of companies with state capital among top-60 companies	Total market capitalization (mil. euro)	Market capitalization taking into account only government owned capital (mil. euro)

have offered a minority stake of capital of state-owned companies to private investors through the stock exchange markets. On the contrary, the countries having the least development stock exchange markets virtually do not have any share capital supplied by the governments (Slovakia, Latvia, and Bulgaria). More important to stress, that all of those countries still have state-owned companies. For instance, the Bulgarian government controls such companies as Bulgaria Energy Holding (controls 18 companies operating in the field of energy),

Vilnius Stock Exchange (Lithuania)	**7/32**	**3,119.5**	**34%**
Ljubljana Stock Exchange (Slovenia)	**18/60**	**4,810.1**	**29%**
Warsaw Stock Exchange (Poland)	**15/60**	**87,341.3**	**26.3%**
Prague Stock Exchange (Czech Republic)	**2/27**	**41,725.5**	**25.9%**
Budapest Stock Exchange (Hungary)	**10/52**	**16,824**	**16.5%**
Bucharest Stock Exchange (Rumania)	**8/56**	**19,005.2**	**10.1%**
Tallinn Stock Exchange (Estonia)	**2/15**	**1,456.4**	**6%**
Bratislava Stock Exchange (Slovakia)	**3/25**	**2,838.4**	**5%**
Riga Stock Exchange (Latvia)	**1/32**	**866.2**	**0.06%**
Sofia Stock Exchange (Bulgaria)	**0/37**	**6,321**	**0%**

Bulgartabac, Bulgaria Post, Sofia Airport, Bulgaria Railways.[23]

Table 9

Analysis of EU-10 stock markets in respect of capital supplied by governments (macro-efficiency)

All data used was taken in 2012 of April.

The reason why countries with a higher portion of public capital supplied to the stock markets at the same time have the more developed equity markets might be explained by the factor that the majority of the state-owned companies are monopolies by their nature and thus are very profitable paying yearly dividends to shareholders. Therefore, large state-owned companies usually are a quite attractive for institutional investors. More important to admit that after institutional investors have been entering to the stock market likely they going to invest to other equities as well ("snowball effect"). In general those capital markets which are macro-efficient have an advantage compared with the others.

To summarize the macro-efficiency concept of capital markets in EU-10 analysis, some conclusions could be drawn. There is a clear segmentation among the EU-10 countries

[23] Novinite.com „Bulgaria's Corporate Bank Keeps 50% of State-Owned Companies Funds" http://www.novinite.com/view_news.php?id=116242 Accessed May 8, 2012.

in respect of overall capital supply to the capital markets. The level of capital supplied to stock exchange markets is the highest in Poland, Hungary and the Czech Republic, and the lowest in Latvia and Slovakia. Regarding the capital supplied by the government, the situation is a pretty similar: Poland, Hungary, Slovenia, Lithuania and the Czech Republic are among those countries which supply the biggest portion (around 20% of total capital) of capital by governments. So, the latter countries are macro-efficient while Latvia, Slovakia and Bulgaria are not.

Some micro-efficient factors of capital markets as taxation, pension reforms and privatizations will be discussed further in details.

4.1. Pension reforms

Although the main goal of pension reforms is to address the long-run sustainability issues of public finances, especially taking into account rapidly aging populations within the EU-10 countries, the evidences suggest that by reforming pension systems some countries have experienced a sound impact towards the development of their capital markets. Most of the EU-10 countries have decided to switch from a standard old-age "pay as you go"[24] (PAYGO) system to the so-called three-pillar pension system. The first pillar is a slightly modified version of the former PAYGO. The second pillar consists of mandatory privately managed pension accounts but it is fully funded by the state pension funds. Finally, the third pillar is based on voluntary contributions to private pension funds and government provides

[24] Within PAYGO pension systems tax payers immediately make contributions to pensioners. No any contributions are invested in capital markets. A balanced PAYGO pension system can be expressed by following equation: **pR=swL**; where p = average pension; and R = the average number of pensioners. Expenditure on pensions, pR, is financed by a proportional contribution s (percentage rate 100s) on covered wages (w = average wage; L = number of workers participating in a labor market). http://www.ageing.ox.ac.uk/system/files/AH%201%20Willmore.pdf Accessed February 29, 2012.

incentives for those who decide to participate in this mechanism. Actually, there are slight differences among pension systems in the EU-10 countries (see below table 10).

Table 10

Pension systems in EU-10 countries

Country	Pension scheme PAYGO	Mandatory pension fund (2ed pillar)	Voluntary pension fund (3ed pillar)
Hungary	Yes	Yes	Yes
Czech Republic	Yes	No	Yes
Poland	Yes	Yes	Yes
Estonia	Yes	Yes	Yes
Slovenia	Yes	Yes	Yes
Lithuania	Yes	Yes	Yes
Romania	Yes	Yes	No
Bulgaria	Yes	No	Yes
Slovak Republic	Yes	Yes	Yes
Latvia	Yes	Yes	Yes

N.Leiner-Killinger, Ch. Nickel and M.Slavik. Pension Funds and Financial Markets: Evidence from the New EU Member States, European Central Bank, 2009.

Taking into account capital market developments within the EU-10 countries, the most important factor of pension reforms is the second pillar which is fully funded by the state pension funds. On opposite, the third pillar, which is a voluntary based, is relatively small by its size despite the tax deductions provided by government. For instance, in Lithuania the total value of assets managed by the pension funds of the second pillar was around $ 1,6 bill. in 2011, compared with only about $ 30 mil value of assets which was in the third pillar funds at the same time.[25] For this reason by using the term of "pension funds" further in this paper, we will have in mind the pension funds of the second pillar.

According to the occasional paper published by the International Monetary Fund (2004), "the empirical evidences suggest that most pension funds in other countries have

[25] Lithuanian Central Bank http://www.lb.lt/finansu_istaigu_finansines_ataskaitos . Accessed February 29, 2012.

traditionally preferred domestic assets (p. 22)". Usually, portfolio regulation of private pension funds might be based on prudent personal decision or quantitative restrictions.[26] Mostly all of the EU-10 countries their rules on pension fund portfolio management are based on the quantitative limit approach. In general in the EU-10 countries there are several types of pension funds with different investment strategies in which investment allocation to particular classes of assets depends on the risk. For instance, in Lithuania pension fund managers should provide 4 types of funds: 1) conservative funds which only invest in government bonds; 2) conservative funds which invest small portion of investment in equity (up to 30%); 3) funds with medium equity portion in which between 30-70% of total investment goes to equities; 4) risky funds allowing 100% of investment in equity. A similar structure of private funds might be found in most of the EU-10 countries.

According to their nature, the private pension funds more intend to invest to government bonds which are associated with long returns and low risk, however the total proportion of investment to equities significantly differs among the EU-10 countries: from 35 % in Poland to 5 % in Latvia (see table 11 below).

11 Table

Pension fund investment regulation in EU-10 countries

Country	Year of introduction statutory-funded private pension schemes	Total contribution to private pension funds	Basic investment regulations concerning investment in equities	Actual investment to stock exchange markets (2007-2008)
Hungary	1998	8 % + 2 % can be given by employer until 2011;	- Up to 50 % of all investments allowed to invest to equities;	30 %

[26] „*The prudent person principle avoids the imposition of stringent portfolio limits and focuses on regulating the behavior of investment managers. The quantitative approach prescribes various investment limits which investment managers are obliged to follow in their portfolio allocation on behalf of pension funds"*. To see more Antolin, P. (2008), "Pension Fund Performance", OECD Working Papers on Insurance and Private Pensions, No. 20, OECD publishing.

		from 2012 private pension funds were integrated back into state pension scheme	- Investment in shares issued in non OECD countries is prohibited	
Czech Republic	2003	Only voluntary based funds (3ed pillar)	- Up to 25 % of all investments allowed to invest to equities; - Foreign investment is allowed only in case of the securities traded in the OECD countries.	11 %
Poland	1999	7.3 %	- Up to 40 % of all investment allowed to invest to quoted equities; - Up to 10 % of all investment allowed to invest to secondary market shares; - **only 5% can be invested to foreign securities**	36 %
Estonia	2001	6 %	-Investment limits to equities depend on the type of pension fund (conservative, semiconservaitve, risky).	37 %
Slovenia	2000	3 %	- 30% of assets is allowed to invest in equities or mutual funds; - Foreign investment is allowed only in case of the securities traded in the OECD countries; -Limit of 20 % to non-euro investment.	17 %
Lithuania	2004	5.5 % in 2007; 2% in 2009; 1.5 % in 2012; 2,5 % in 2013	- Investment limits to equities depend on the type of pension fund (conservative, semiconservaitve, risky).	37 %
Romania	2005	2 % in 2008; 6 % in 2016	- A maximum of 50% can be invested in equities listed on Romanian, EU or EEA markets	8 %
Bulgaria	2002	5 %	- Up to 20% can be directly invested in equities; - **Pension funds can invest a maximum of 15% of assets abroad.**	32 %
Slovak Republic	2005	9 %	- Investment limits to equities depend on the type of pension fund (conservative, semiconservaitve, risky). - At least 30% of their assets should be invested into instruments of Slovak issuers	12 %

Latvia	2001	9 % in 2009; 4% in 2011; 6 % in 2012	- Investment limits to equities depend on the type of pension fund (conservative, semiconservaitve, risky). -20% for investments in non-listed securities.	5 %

*Includes investment in equities and equity investment funds
** Data taken from OECD, Eurostat, http://www.pensionfundsonline.co.uk pages.

By looking carefully to table 11, we can highlight several important factors which affect the development of capital markets: 1) contribution rate to private pension funds (shows the total size of money being transferred to private pension funds); 2) actual investment rate of pension funds to equities (shows the total size of pension funds' money being invested in to equities); 3) regulations (positively or negatively affecting investment to equities). Therefore, Poland, Hungary, Estonia, Lithuania have both a quite high contribution rates (above 6-7%) as well as high actual investment rates to equities (above 30%). No wonder that those countries have the most advanced capital markets within the EU-10 countries. On the other hand, such countries as Latvia, Slovakia, Bulgaria, Romania and Slovenia which in fact have the less developed capital markets have either low contribution rates or low actual investment rates. The Czech Republic has a quite different situation because its pension system doesn't have mandatory pension funds (voluntary based funds are not sizable compared with mandatory ones). Moreover, the case of Poland it is interesting because of positive discrimination in respect of investment to foreign assets. At the moment, only 5% of pension funds total assets can be invested to foreign securities. It is widely assumed, that this discriminatory provision has sound effect for boosting capital markets in Poland.[27]

[27] In 2011 the European Commission sued Poland to the European Court of Justice for foreign investments restrictions of pension funds (according to the European Commission such regulations failed to fulfill European legislation provision of free capital of movement). The European Court of Justice http://eur-

Taking into account current financial crisis, many governments of EU-10 countries in order to reduce their fiscal deficits have taken restrictive actions regarding money transferring to private pension funds. For instance, in Lithuania the contribution rate was reduced from 5.5% to 1.5%, in Latvia from 9% to 4%. Certainly, such step-backs have had negative impact on capital markets. For instance, in 2008 Bulgaria (the stock went down 80%) and Lithuania (the stock went down 71%) were among the top-6 worst performing stock markets in the world.[28] The special attention goes to Hungary which took drastic actions towards private pension funds in 2010-2011. The Hungarian government approved renationalization measures to force Hungarians return back into the state's pension system (PYAGO). These radical reforms are highly criticized by many international organizations because it is assumed that the breaking-up of the existing private pension system will cause the decrease in liquidity of domestic stock and bond markets. To conclude it is obvious that the provisions made by some governments in respect of private pension funds could significantly contribute to the growth of capital markets.

This chapter has showed the importance of how certain government actions (implementing pension reforms) can positively affect capital markets. Indeed, countries with strong capital markets (as Poland, Hungary, Estonia, and Lithuania until 2009) had both a quite high contribution rates to private pension funds (above 6-7%) as well as high actual investment rates to equities (above 30%) within private pension funds.

---

lex.europa.eu/Notice.do?mode=dbl&lang=lt&ihmlang=lt&lng1=lt,en&lng2=bg,cs,da,de,el,en,es,fi,fr,hu,it,lt,lv,mt,nl,pl,pt,ro,sk,sl,sv,&val=620972:cs&page= Accessed March 03, 2012.

[28] BBC Business http://news.bbc.co.uk/2/hi/business/7802871.stm Accessed March 07, 2012.

4.2. Currency and privatization factors

The factor of currency which is used in particular stock exchange traditionally is considered as being important for stock exchange development as well. Two important arguments could be given in order to justify this statement. Firstly, for foreign investors, in particular, for institutional ones, high transaction costs incurred by currency exchange transactions might be a serious obstacle to invest into local stock markets. Secondly, foreign investors investing in local stock markets should also bear an eventual risk of local currency devaluation. Both reasons in particular might be a serious case within small countries which are more vulnerable compared with the big ones. For example, in 2009 such countries as Latvia, Lithuania, Estonia and Bulgaria[29] experienced a strong pressure for their currency devaluations.

In order to overcome above mentioned problems the main currencies (such as euro, US dollar) instead of local ones could be used in local stock markets. Usually the government and central bank make decision regarding which currency will be used within the stock market. Despite the fact that the EU-10 countries having the most developed stock markets (Hungary, Czech Republic, Poland) are using their local currencies within stock markets (see table 12 below), it is important to stress that those countries are not considered as being relatively small and weak in economical terms. At the same time by looking to small countries of EU-10, then it is obviously that those countries which have euro currency based stock markets are performing better compared with those which have not. A good example

[29] Latvia, Estonia, Lithuania and Bulgaria keep fixed pegs to the euro. In 2009 their economies experienced the deepest recessions in the European Union. Therefore, many economists (for instance, Nouriel Roubini, Paul Krugman) and institutions (Bank of America, Brown Brothers Harriman & Co.) strongly advocated for currency devaluation at that time. http://www.bloomberg.com/apps/news?pid=newsarchive&sid=ahFgWOIkd3es Accessed February 27, 2012.

might be Estonia – a country which switched to trading in euro within its stock market in 2002. The similar case might be observed by looking to Lithuania (switched to euro in 2010). In opposite, Latvia and Bulgaria which have the least developed stock markets among the EU-10 countries are still using local currencies in their stock markets.

Table 12

Operating currencies of EU-10's stock markets

	Index of stock market development (stdevindex)	Population	Currency used in stock exchange
Hungary	1.71	9976062	local (HUF)
Czech Republic	0.99	10190213	local (CZK)
Poland	0.49	38441588	local (PLN)
Estonia	0.04	1282963	euro (from 2002)*
Slovenia	-0.20	2000092	euro**
Lithuania	-0.45	3535547	euro (from 2010)***
Romania	-0.49	21904551	local (LEI)
Bulgaria	-0.50	7093635	local (BGN)
Slovak Republic	-0.59	5477038	euro****
Latvia	-0.67	2204708	local (LAT)

* Estonia joined the euro zone in 2011
** Slovenia joined the euro zone in 2007
*** Lithuania until now is not a member of euro zone
**** Slovakia joined the euro zone in 2009

It is important to highlight, that the governments by implementing privatization policies through stock markets can boost capital markets, in particular by increasing liquidity. According to the empirical study, which includes 19 countries, done by Bortolotti, Jong, Nicodano and Schindele (2004), privatization can significantly strengthen stock markets

especially “privatization enhances the liquidity within exchange market as a whole and has a positive spillover effect on price impact of other (non-privatized) stocks” (p. 41).

Above listed quotation can be put within the context of the whole EU-10 region. For example, during the meeting between Lithuanian Prime Minister A.Kubilius and foreign institutional investors (such East Capital Private Equity) in the end 2011, the investors urged to increase liquidity within Vilnius stock market by listing there the state-owned companies. While the majority of those large companies (such as Lithuanian Railways, Lithuanian Post, Lithuanian See Port, Airport companies and others) are highly profitable and yearly pay dividends, they might be quite attractive for institutional investors. A similar situation might be found in other EU-10 countries because there are still many state-owned companies which are not listed on the stock markets yet.

This chapter showed that a currency factor is important for small countries which are considered containing higher risk of currency devaluation (in Estonian, Lithuanian, Slovenian stock markets equities are traded in euro). Also we found out that there is still a lot of space for governments to increase liquidity within the stock markets by listing the state-owned companies on the stock markets.

4.3 Taxation

The most important purposes of taxing system are to mitigate unequal distribution of wealth in the society and to regulate economic activity (for instance, to tax the production of tobacco in order to reduce incentives to consume such unhealthy products). However, in many cases taxation might be a source of some distortions. In fact the most important distortions within financial system occur due to the unequal treatment of financial

instruments. According to the study conducted by researches of the International Monetary Fund (2004), exactly such a case was in the Baltic States (p.16).

The main goal of this chapter is to observe and compare the tax rates on different financial products existing within the financial systems in the EU-10 countries. Therefore, we are going to compare the tax rates on banking instruments (interests from bank deposits or saving accounts), government bonds[30] and equities (tax rates on capital gain and dividends). Basically, in order to avoid financial distortion and ensure level playing field the government should equally tax different financial products. By analyzing *status quo* of taxation system we are going either to confirm or reject 3 hypothesis (H3) that government should play a positive role and stimulate the creation of capital markets or at least should not impede the development of capital markets.

Table 13 shows that some countries as Hungry, the Czech Republic and Poland equally treat different financial instruments and thus apply the same tax rate on interests from deposits and government bonds as well as on incomes from equities. More important, that all these countries have the most advanced capital markets among the EU-10 countries. However, in most of the rest of the EU-10 countries taxation is not uneven across financial instruments, basically being in favor of bank deposits and government bonds. For instance, in Lithuania, Estonia, Romania, and Bulgaria (in some cases in Slovenia) incomes earned from bank deposits are tax free. And Latvia in order to increase budget incomes recently has introduced 10% tax on incomes from bank deposits; however it is still higher than a tax on capital gain (15%). At the same time, in Latvia, Bulgaria, Slovenia and Romania there are no taxes applied on interests earned from government bonds. Such financial distortions might be explained by the fact that in most of EU-10 countries traditionally are highly concentrated

[30] Regarding instruments of bond market we are taking into consideration only government bonds because in the EU-10 countries a corporate bond market is still very weak.

financial institutions with few dominant banks which easily can influence governments. The interests earned from government bonds are exempted from taxes in order to make government bonds more attractive for investors. Eventually with tax free on government bonds the governments are able to increase borrowing. It is interesting to pay attention to Slovakia which is unique country among EU-10 countries (probably among all European countries as well) by not taxing capital gain at all.

Table 13

Tax rates on main instruments of financial system within the EU-10 countries

Country	Tax rate on interests from deposits	Tax rate on interests from government bonds	Tax rate on income gained from capital gain	Tax rate on dividends
Hungary	- 16 % - 10 % for three-year deposits; - 0 % for more than 5 year-term deposits.	- 16 %	- 16 %	- 16 %
Czech Republic	- 15%	- 15%	-15%	- 15%
Poland	- 19%	- 19%	- 19%	- 19%
Estonia	- 0 %	- 21% - 18 % from 2012	- 21% -18 % from 2012	- 21% -18 % from 2012
Slovenia	- exemption for 1000 euro on interests from deposits; - 0 % for more than 5 year-term deposits.	- 0 %	- 20 % for a holding period up to 5 years; - 15 % for a holding period from 5 to 10 years; - 5 % for a holding period from 10 to 15 years; - 0 % for a holding period more than 20 years	- 20 %
Lithuania	- 0 %	-15 % for a	-15 % for a	- 20 %

		holding period less than 1 year; - 0 % for a holding period more than 1 year.	holding period less than 1 year; - 0 % for a holding period more than 1 year.	
Romania	-0 %	-0 %	-16 % for a holding period less than 1 year; - 1 % for a holding period more than 1 year.	-16 %
Bulgaria	-0%	-0 %	-10 %	-5 %
Slovak Republic	-19 %	-19 %	-19 %	-0 %
Latvia	-10 %	-0 %	- 15 % - capital gains on immovable property if the ownership is more than 5 years and it is place of residence more than 1 year	-10 %

Data taken from European Commission's Taxes in Europe Database v2[31].

In general our analysis has showed that in most of EU-10 countries taxation is not in favor of equity markets compared to other financial instruments. Just few countries have a flat tax rate and thus equally treat banking instruments, investment on government bonds and equities. More important to notice that such countries (Poland, the Czech Republic, and Hungary) are the most advanced regarding capital market development. Back to previous chapters where regression analysis has showed positive correlation between capital taxes and the development of capital markets, at this point we can add that actually not the size of the capital taxes matter so much but rather taxation itself among different financial instruments within the country.

[31] European Commission, Taxation and Custom Union, Taxes in Europe Database v2. Accessed March 3, 2012.

5. Conclusions and Recommendations

This study statistically and qualitatively identifies and analyzes the main factors which are important for the development of stock markets in the EU-10 countries, which joined the EU after 2004. Thanks to an ordinary and panel multiple regressions the paper examines relationship between the development of equity markets and the development of financial system, openness of an economy, economic growth, inflation, and taxation indicators. A qualitative analysis, including micro-efficient and macro-efficient definitions of capital markets, has showed the importance of government actions for the development of capital markets. Two conglomerate indexes which trace the development level of equity market and the development of financial system were constructed as well. Three main hypotheses were tested within this paper and the most of evidence found in the paper supported them. It is important to stress that among dozens of studies, so far no one was focused upon Eastern and Central European countries.

An analysis showed that in general stock markets in EU-10 countries are underdeveloped and thus should be further developed. Such conclusion is based on strong evidence by taking into account that capital markets in EU-10 are underdeveloped in absolute terms comparing them to the EU average, as well as in relative terms comparing them with indicators of real economy and financial markets. Therefore, we might observe that financial systems in EU-10 countries are rather based on financial markets (bank borrowing) instead of on capital markets. It is important to stress that in particular a big gap in stock liquidity between the EU-10 countries and the EU was found. Due to illiquidity, severe problems such as wrong price signals, high volatility (a high spread between bid-ask prices) and easiness to manipulate in trade are common in the EU-10.

The important differences within EU-10 countries regarding the level of capital market development have been found. Respectively, according to the conglomerate index of capital market development the EU-10 countries could be ranked into three groups: (1) the countries containing relatively developed capital markets (Hungary, the Czech Republic and Poland); (2) the countries with middling developed capital markets (Romania, Lithuania, Estonia, Slovenia, Bulgaria); (3) the countries having relatively underdeveloped capital markets (Latvia, the Slovak Republic).

Therefore some other conclusions based on empirical findings should be drawn:

First, the empirical results have shown that there is a significant positive relation between capital market development and the level of financial system development. All indicators of capital market development have positive significant correlation with the M3 to GDP indicator which shows the development of financial system in the broadest sense. We may draw the same conclusion concerning the indicator which measures a gross domestic saving over GDP. On the other hand, the domestic credit over GDP indicator has shown negative but insignificant correlation towards the variables of capital market development. This might be explained by the argument that financial systems in EU-10 countries are more bank-centered (this assumption was proved by showing the gap between the development of financial systems and capital markets in EU-10 countries). Hence, summing up, we can admit that our findings **partially correspond with the first hypothesis (H1) indicating that the development of a financial system positively affects growth in capital markets**. However, it is obvious that there is a certain competition between financial intermediaries and capital markets.

Second, the turnover ratio, which shows the level of efficiency in a stock market, positively significantly correlates with indicators measuring the openness of an economy. Such conclusion **fully supports the second hypothesis (H2) which assumes that a degree of openness of an economy positively affects the development of capital markets**. Thus,

the more open an economy is, a country is going to be more integrated within the global capital markets and in turn such country would have a more developed capital market. In particular the level of import in manufacturing is of major importance (because a capital intensive category of machinery and equipment usually takes the biggest part in the structure of import in EU-10 countries).

Third, we have observed a strong positive significant relation of GDP growth and adjusted national income in respect to capital market development. In the case of EU-10 countries 1% of economic growth adds around 0.5 % to the market capitalization. Actually, the same conclusions might be found in many papers written within the relevant academic area.

Fourth, the market capitalization indicators significantly positively correlate with the indicator showing the border length between a particular EU-10 country and EU-15 bloc countries (consisted of old and more developed EU member states). In order to explain this correlation a parallel found in the theory of the FDI flows might be used. According to the theory of efficiency seeking investment of FDI, at first place investment flows to those countries which are located at closest from the investor countries.

Fifth, the positive significant correlation between the traded value over GDP indicator and the indicator showing the level of taxation in respect of capital has been found. This unexpected relation could be explained by taking into account that the countries which have the most development capital markets (Hungary, the Czech Republic, and Poland) at the same time have the highest GDP per capita rates, and in turn the highest public spending rate too. However, the other factors affecting the development of capital markets are more important and thus compensate the increase in taxes. Moreover, a qualitative analysis has showed the importance of the equal treatment of financial instruments within financial system (for instances, taxes on capital gain and dividends, and taxes on interests from bank deposits). So, at this point

we can add that actually not the size of the capital taxes matter so much but rather taxation itself among different financial instruments within the country.

Sixth, the macroeconomic stability measured by inflation it is not significant to stock market development.

Seventh, micro-efficiency and macro-efficiency concepts of capital markets have been analyzed within the research paper. The micro-efficiency shows the costs of financing through the capital market and the macro-efficiency shows the portion of capital supplied by public and private sectors according to the market needs. Analysis suggested, that the most developed capital markets (Poland, Hungary, the Czech Republic, Estonia, Lithuania) at the same time are the micro-efficient and macro-efficient. However, such countries as Latvia, Bulgaria and Slovakia are in totally opposite situation – having the least development capital markets and a low level of micro-efficiency and mocro-efficiency. So, the cost of financing through the capital markets and the overall level of capital supplied to the stock exchange markets (including the capital supplied by the government) are meaningful and important for capital market development.

Eighth, our analysis showed that government actions significantly matters for capital markets development. Thus **we supported the third hypothesis (H3), which suggests that the government should play a positive role and stimulate the creation of capital markets** (or at least should not impede the development of capital markets)**.** An in-depth analysis of pension reforms (mainly by taking into account such factors as contribution rate to private funds, the allowance level of investment to equity markets) has showed that countries with more advanced capital markets (such as Poland, Hungary, Estonia, Lithuania) had both quite high contribution rates to private pension funds (above 6-7%) as well as high actual investment rates to equities (above 30%) within private pension funds.

Ninth, we confirmed that a currency factor (currency which is used for trading in stock exchange) is important for small countries which are considered containing higher risk of currency devaluation (in Estonian, Lithuanian, Slovenian stock markets equities are traded in euro). Therefore, the governments by switching trading currency in stock markets from local ones to euro can boost confidence for foreign investors.

Tenth, a qualitative analysis on taxation showed the importance of government actions for capital market development as well. It might be concluded that in most of EU-10 countries taxation is not in favor of equity markets compared to other financial instruments. Just few countries have a flat tax rate and thus equally treat banking instruments, investment on government bonds and equities. More important to notice that such countries (Poland, the Czech Republic, and Hungary) are the most advanced regarding capital market development.

*

As a final part of this research paper I would like to offer specific policy suggestions for governments for capital market development:

1. Taking into account that 1% of economic growth adds around 0.5% increase to the market capitalization, so the most important and fundamental challenge for the governments of the EU-10 countries is to ensure stable and permanent economic growth (by increasing competiveness, implementing deregulation programs, decreasing administrative burden, etc.);
2. The governments in the EU-10 countries should create an attractive environment for FDI inflows. Thanks to the inflows of FDI, a highly competitive and profitable business might be created with a huge potential of going to the stock exchange markets later;

3. Also, for governments are crucial to encourage trade, in particular taking into account imports of manufacturing. The higher a trade level is, a country is going to be more integrated within the global economy, including integration into global financial and capital markets;
4. The government should provide a regulatory framework in order to create competitive and on level playing field among different financial instruments based financial system which in turn positively affects the development of capital market. Therefore, tax rates on banking instruments, bonds and equities should be equalized. In most of the EU-10 countries except Poland, Hungary and the Czech Republic taxation is not uneven among different financial instruments;
5. Pension reforms should be implemented further (especially, governments should abolish temporary restrictions introduced due to reduce fiscal deficits as in Lithuania, Latvia and Hungary). By increasing the contribution rate to private pension funds at the same time the governments can significantly strengthen capital markets and solve the sustainability problem of public finances;
6. The existing practices of positive discrimination (for instance, in Poland, where only 5% of pension funds total assets can be invested to other than domestic securities) should be abolished as soon as possible. Such cases distort competition in attracting capital to stock exchange markets among EU-10 countries;
7. Small countries which have illiquid stock markets might consider to switch trading currency from local currencies to euro (Latvia, Bulgaria, Romania);

8. Some governments of EU-10 might consider creating regional stock markets by merging the local ones (for instance, Lithuania-Latvia-Estonia; the Czech Republic-Slovakia; Romania-Bulgaria). In such case a bigger, more diversified and more liquid stock exchange market will be more attractive for institutional foreign investors;
9. State-owned companies should be listed within stock markets of EU-10 countries by offering a minority stake of capital to private investors;
10. Privatization programs should be implemented only through the local stock markets.

However, the analysis has showed that there are certain limits of government actions for developing capital markets. For instance, a border length factor is an endowment and any improvements coming from government might not be used here.

Appendix 1

Analysis of EU-10 stock markets in respect of government's supply capital (Macro-efficiency analysis)

No.	The name of company	% of equity capital owned by government	Market capitalization (mil. Euro)	Market capitalization taking into account government owned capital (mil. Euro)
Vilnius Stock Exchange (Lithuania)				
1.	Klaipedos nafta	70.6%	143.2	98.7
2.	Kauno energija	92.8%	9.4	8.7
3.	Lietuvos dujos	17.7%	265	46.9
4.	LESTO	82.6%	388.9	321.2
5.	LITGRID	97.5%	335.3	327
6.	LJL	56.6%	6.1	3.4
7.	Lietuvos energija	96.1%	257	247
Total:	**7/33**		**3,119.5**	**1,052.9/3,119.5=34%**
Tallinn Stock Exchange (Estonia)				
1.	Silvano fashion group	27.1%	133.3	36.9
2.	Talinn Vesi	34.7%	155.5	53.9
Total:	**2/15**		**1,456.4**	**90.8/1,456.4=6%**
Riga Stock Exchange (Latvia)				
1.	Liepajas autobus parks	34.9%	1.4	0.5
Total:	**1/32**		**866.2**	**0.5/866.=0.06%**
Budapest Stock Exchange (Hungary)				
1.	MOL	24.6%	6,504.5	1,594
2.	EMASZ	11.7%	150.6	17.6
3.	ELMU	15.6%	432.9	67.7
4.	Richter Gedeon Plc.	25.2%	2,428.9	612
5.	Ormester	7.7%	0.7	0.06
6.	OTP Bank	8.6%	3,708.9	318
7.	PannErgy	15.0%	46.1	6.9
8.	Pannon-Valtro	7.4%	6.5	0.5
9.	Raba	15.5%	33	5.1
10.	TVK	86.8%	175.7	152.5
11.	Tv Network	12.7%	10.8	1.4
12.	Biomedical	10%	167.2	16.7
Total:	**10/52**		**16,824**	**2,775/16,841=16.5%**
Prague Stock Exchange (Czech Republic)				
1.	CEZ	69.8%	15,477	10,802.9

2.	Unipetrol	40%	1,238.8	495.5
Total:	**2/27**		**41,725.5**	**10,802.9/41,727.5=25.9%**
Sofia Stock Exchange (Bulgaria)				
1.	Bulgarian Telecom	1 golden share		
Total	**0/37**		**6,321**	**0%**
Ljubljana Stock Exchange (Slovenia)				
1.	Aerodrom Liubliana	64.9%	25.2	16.4
2.	Gorenje	34%	84.5	28.7
3.	Helios	9.5%	114.2	10.9
4.	Iskra Avtoelektrika	27.4%	25.2	6.9
5.	Intereuropa	7.5%	3.4	0.3
6.	Istrabenz	20%	6.2	1.2
7.	Juteks	17%	15.7	2.7
8.	Nova Kreditna Banka	39%	120.9	48.4
9.	KRKA	24.9%	1,647.1	410.1
10.	LUKA KOPER	70.5%	144.2	101.6
11.	Mercator	9%	496.2	44.7
12.	Petrol	31.5%	396.4	124.9
13.	Zavarovalnica Triglav	64.1%	306.4	196.2
14.	Pivorana Lasko	18.9%	70.61	13.3
15.	Sava-Re	25%	50.6	12.6
16.	Telekom Slovenje	72.3%	470.5	340.4
17.	Triglav Nalozbe	64.1%	52.3	33.5
18.	UNIOR	12.8%	20.4	2.6
Total	**18/66**		**4,810.1**	**1395.4/4810.1=29%**
Bratislava Stock Exchange (Slovakia)				
1.	OTB banka Slovensko2	8.6%	17.3	1.5
2.	OTB banka Slovensko	8.6%	7.4	0.6
3.	Slovnaft	24.6%	579.4	142.5
Total	**3/25**		**2,838.4**	**144.6/2,838.4=5%**
Bucharest Stock Exchange (Rumania)				
1.	OMV Petrom	20.6%	5,037.7	1,037.8
2.	Banca Transilvania	15%	465.5	69.8
3.	C.N.T.E. Transelectrica	73.8%	228.9	168.9
4.	S.N.T.G.N Transgaz	73.5%	554.1	407.2
5.	Oltchim SA	54%	51.4	27.8
6.	Antibiotice	53%	49.1	26.0
7.	Oil terminal SA	59.6%	18.5	11.0

8.	Rompetrol Rafinere	44.7%	339.3	151.7
Total:	**8/56**		**19,005.2**	**1,900.2/19,005.2=10.1%**
Warsaw Stock Exchange (Poland)				
1.	PZU	35.1%	6,511	2,285.4
2.	JSW	57.0%	2,593.3	1,478.2
3.	KGHM	31.8%	6,084.9	1,935
4.	LOTOS	53.2%	796.2	423.6
5.	PKN	27.5%	3,511.4	965.7
6.	PGE	61.9%	8,272.9	5,120.9
7.	PGNIG	72.4%	5,621.7	4,070.1
8.	PKOBK	40.9%	9,522.4	3,894.7
9.	TAURONPE	30.1%	1,860	559.9
10.	TPSA	13.4%	5,370.9	719.7
11.	AZOTYTARNOW	32.5%	514.4	167.2
12.	CIECH	38.7%	222.2	86
13.	ENEA	51.6%	1707.5	881
14.	GPW	51.7%	365.1	188.7
15.	PULAWY	50.7%	438	222.1
Total	**15/60**		**87,341.3**	**22,998.2/87,341.3=26.3%**

Bibliography

Bain, A.D. (1992). *The Economics of the Financial System.* Oxford: Martin Robertson, 320.

Beck, T., Levine, R., Loayza, N., (1999). Finance and sources of growth. World Bank Policy Review Working Paper No. 2057.

Bekaert, G., Harvey, B.C. (1997). Capital Markets: an Engine for Economic Growth. Unpublished working paper, Catalyst Institute research project.

Ben, S., Ghazouani, N.S. (2007). Stock Markets, Banks, and Economic Growth: Empirical Evidence from the MENA Region. *Research in International Business and Finance,* Vol. 21, 297-315.

Bortolotti B., De Jong F, Nicodano D., Schindele I. (2004). Privatization and Stock Market Liquidity. A Research Report from Stockholm Institute for Financial Research. No 24, June.

Caporale, M., Alla, G.S., and Howells P.G. (2003). Endogenous Growth Models and Stock Market Development: Evidence from Four Countries. South Bank University research project.

Demirguc-Kunt, A., Levine, R. (1996). Stock Market Development and Financial Intermediaries: Stylized Facts. *The World Bank Economic Review*, Vol. 10 (2), 291-321.

Demirguc-Kunt, A., Levine, R.R. ed. (2001). *A Cross-Country Comparison of banks, Markets, and Development.* Schmukler, S., Vesperoni, E. Firms' Financing Choices in Bank-Based and Market-Based Economies. London: MIT Press, 346-375.

Dunning, J.H. (1993). *Multinational Enterprises and the Global Economy.* Harlow: Addison-Wesley.

Garcia, F., Liu, V.L. (1999). Macroeconomic Determinants of Stock Market Development. *Journal of Applied Economics,* Vol. II (1), 25-59.

Jung, J., Schiller R.J. (2006). *Samuelson's Dictum and the Stock Market.* Research Paper. Cowles Foundation for Research in Economics, Yale University.

Ito, T., Krueger, O.A., ed. (1996). *Financial Deregulation and Integration in East Asia.* Chicago and London: The University of Chicago Press.

Karkkainen, A. (2008). EU-15 Foreign Direct Investments in the new Member States. *Statistics in Focus. Economy and Finances. Eurostat, 71.*

King, G., Levine, R.R. (1993). Finance and Growth: Schumpeter Might Be Right. *The Quarterly Journal of Economics*, MIT Press, Vol. 108 (3), 717-737.

Levine, R.R. (1994). Stock Markets, Growth and Tax Policy. *Journal of Finance*, Vol.64, 1445-1465.

Levine, R.R., Loayza, N., Beck, T. (2000). Financial Intermediation and Growth: Causality and Causes. *Journal of Monetary Economics*. Elsevier, Vol. 46(1), 31-77.

Miller, H.M. (1998). Financial Markets and Economic Growth. *Journal of Applied Corporate Finance*, Vol. 11(3), 8-15.

Nam, I.Ch., Kang Y., Kim, J.K. *Comparative Corporate Governance Trends in Asia.* OECD paper written for conference on *"Corporate Governance in Asia: A Comparative Perspective".* Korea Development Institute, 85-115.

Patrick, T.H., Park, Y.Ch. ed. (1994). *The Financial Development of Japan, Korea, and Taiwan. Growth, Repression, and Liberalization*. NY: Oxford University Press.

Rajan, R.G., Zingales L. (1998). Financial Dependence and Growth. *American Economic Review.* American Economic Association, Vol. 88(3), 559-86.

Schipke, A., Beddies, C.H., George, S.M., Sheridan, N. (2004). *Capital Markets and Financial Intermediation in the Baltics.* Washington DC, IMF.