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EMERGING CAPITAL MARKETS IN FINANCIAL GLOBALIZATION

Doctoral Dissertation - Summary

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1. SUMMARY

It must be admitted that in modern economies, financial systems play an important role in allocating scarce resources, helping channel individual or household savings to the corporate sector, and allocate funds among companies. The two main pillars of the financial system are the banking system and the capital markets. In this paper I investigate whether capital markets can fulfil its essential functions in the transition economies. In the last 3 years a dramatic change could be witnessed in the performance of emerging capital markets. While developed stock markets also had excellent years with 15-20% rise annually, emerging and transition markets increased over 50% a year in 2004 and 2005 (Figure 1, page 8). But does their performance reflect real efficiency? Is it a real development or only an illusion?

The main objective of the study is to evaluate if the capital markets of new EU member states have the capacity of efficient fund allocation. Well functioning financial intermediation plays a major role in the discussion, enhancing more efficient fund allocation and ultimately higher economic growth. Although it is clarified in related literature that a hybrid (parallel significance of banks and capital market) financial system is favorable to economic growth, this study presents why the stock markets in the post communist member states have limited contribution to this development. Despite that economic policy has boosted stock market orientation in the last 15 years, the evolution of the economies developed to its own direction. The reasons of it are twofold. On the one hand financial globalization spurs the biggest and most liquid companies of our region to cross-border issue, moving to a financial centre and leaving the local stock markets. On the other hand cultural aspects of the households also hinders the emergence of local stock market in Central-Eastern Europe (CEE).

In the first main section the related literature is surveyed, cherry picking some particularly important features. This is followed by an analysis of the demand of the different sectors in the economy, namely the: government, corporate and household sectors, for financial markets. Chapter 5 presents case studies concerning possible expedient strategies of the examined markets. The last main section provides the empirical evidences of the hypothesis, followed by possible ways of applicability, policy recommendations and conclusions.

2. INTRODUCTION

Europe is not only a continent with a set of countries, but also an even more integrated territory, and the world's second largest economy. It is standing beyond dispute that the greatest success of the European Union is the economic aspect of the integration, establishing the common currency, and mitigating the frictions between the economic interactions of the member states. Even this process already has come face to face with several difficulties, but represents an incredibly huge change and shows in an excellent way of global co-operation and collaboration. These obstacles, however, can be tracked even at the "flattest" (using the term of Friedman [2005]) segment of the economy: the financial markets. The idea of the single European capital market has been a long-lived dream in the European Union as it is prerequisite for economic growth and competitiveness of the Union. In spite of the effort to create a frictionless market, establishing the Financial Services Action Plan (FSAP) by the Lámfalussy's Committee of the Wise Men, today it still seems that it remains a dream.

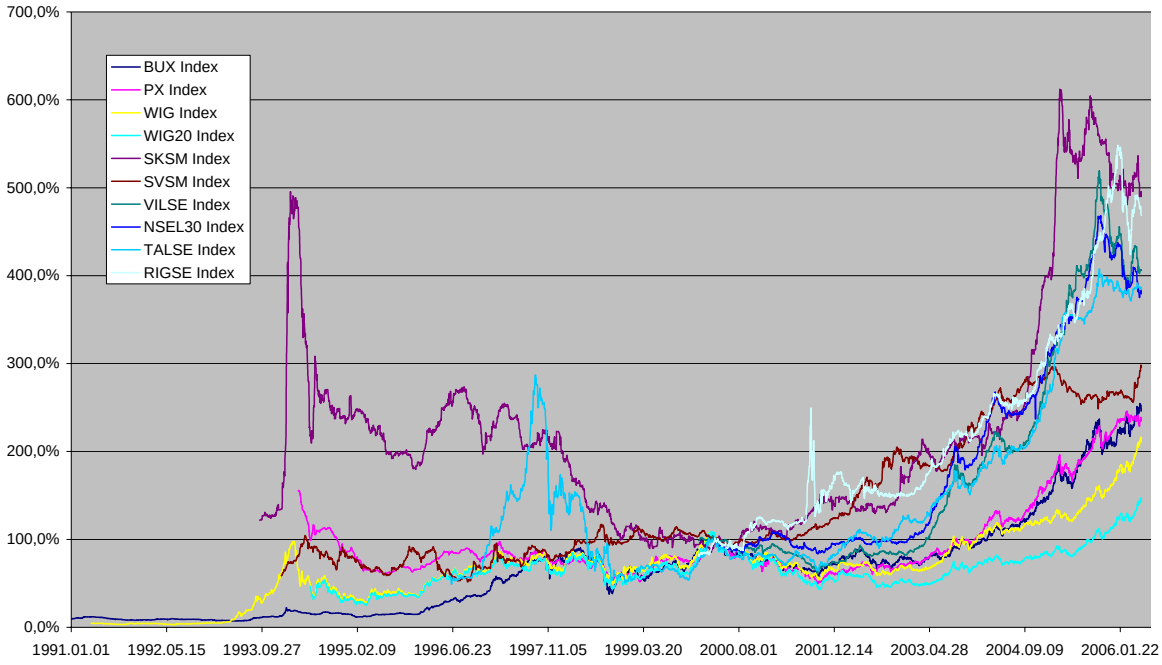
The European Union has become a formal marriage with eight countries from the former planed economies joining at 1st May 2004. In this inquiry the question is raised what role their capital markets can have in this process. This key question – if capital markets of new EU member states contribute to more efficient fund allocation – is important for at least three target audience. This work is important for policy-makers both at national and at the EU level. At the supranational level of the European Union the following institutions are concerned: EU Parliament (Parliamentary Committees of Parliamentary Committee for Economic Reform, Standing Committee on Economic Development, Finance and Trade of the ACP), Committee of European Securities Regulators (CESR), Committee of Wise Men on the Regulation of European Securities Markets, European Central Bank, Bank of International Settlement. They are responsible for the economic development of the European Union either in the form of facilitating convergence or removing barriers, mitigating economic frictions.

At the national level, besides Central Banks and Ministries of Finance, institutions such as Financial Supervisory Authorities and especially the management of emerging stock markets must be aware of the outcomes of the results of this research.

Accordingly present study discusses the main determinants of stock market development in the post-communist new European Union member states. In these countries the transformation of the institutions[1] was by no means without contradictions. It has risen many questions and dilemmas not only related to the financial sectors but to the real economy as well. Among others the most important one is whether the new member states can utilize the sources from EU funds (if spillover effects exist creating a virtuous cycle?), or does their impact remain on the strictly local level? This study faces with the challenge to shed light on the role of stock markets and measure their efficiency regarding this allocation process.

This is especially important nowadays when the soaring of these markets created a false illusion (as well as a misperception) of their real performance and efficiency (Figure 1).

Figure 1. : Performance of Eight New EU Member States Stock Indices (1991-2006)[2]



Data source: *Bloomberg*

[1] The term 'institutions' is used in the Northean context: "Institutions are humanly devised constraints that structure political, economic and social interaction. They consist of both informal constraints (sanctions, taboos, customs, traditions, and codes of conduct), and formal rules (constitutions, laws, property rights)(North [1991]).

[2] In order to achieve comparability, the values of all the indices are taken 100% at the launch time of the youngest index (March 2000).

3. LITERATURE

3.1. Relevance – Link between Finance and Economic Growth

The inquiry on the connection between the operation of financial intermediation and real economic growth has no old roots. Although Schumpeter [1912] highlighted the role of banks as selecting institutions, it has become popular among researchers only since the pioneering work of King and Levine [1993]. In the last 10-13 years, however, researchers clarified the fact that better developed financial systems ease external financing, which illuminates one mechanism through which financial development positively influences economic growth.

In case of new EU member states financial development has an even more important role! Before adopting the common currency, countries are more vulnerable. A study by Aghion et al. [2006] offers empirical evidence that real exchange rate volatility can have a significant impact on long-term rate of productivity growth, but the effect depends critically on a country's level of financial development. For countries with relatively low levels of financial development, exchange rate volatility generally reduces growth, whereas for financially advanced countries, there is no significant effect.

Research that makes clear our understanding of the role of finance in economic growth will have policy implications and shape future policy-oriented research. Information about the impact of finance on economic growth will influence the priority that policy makers and advisors attach to reforming financial sector policies.

3.1.1 The Functions of Financial Systems

Levine [2005] points out five basic functions of financial institutions, which contribute to economic development through reduction of transaction costs and the mitigation of information asymmetries[3]. In particular, financial systems:

- Produce information ex-ante about possible investments and allocate capital,
- Monitor investments and exert corporate governance after providing finance,

[3] Pálosi-Németh [2005c] analyses how these functions improve both the allocative and adaptive efficiency of the economy.

- Facilitate the trading, diversification, and management of risk,
- Mobilize and pool savings,
- Ease the exchange of goods and services.

Without functionally efficient financial system[4] the impact of different sources, subsidies, and government grants has no spillover effect, it remains strictly on the local level hindering economic development.

3.1.2 The Structure of Financial Systems

Considering the fact that some functions can be fulfilled more efficiently by the bank-system and others by the market, the question of the structure is not negligible and thus hybrid financial architecture is in general more efficient.

Tadesse [2002] argues that while market-based systems outperform bank-based systems among countries with developed financial sectors, bank-based systems are far better among countries with underdeveloped financial sectors. Accordingly – as Pálosi-Németh [2005a] generalized, taking three different aspects into consideration –, the evolution of financial system must have a hierarchical-order: in the first phase of institutional development bank-based financial system must dominate arm-length system. Furthermore, according to these facts there should be a certain point of institutional depth, when capital market emerges and accelerate economic growth.

Turning to an alternative approach the model by Pálosi-Nemeth [2005b] also focuses on why the emergence of capital markets is needed. The so-called "twin-agency problem"[5] sets up a trade-off between the capacity of the country to gain the benefits of financial globalization and its institutional structure. On the one hand country specific characteristics, such as history, laws, location, economic development in general and expropriation of interest groups, which leads to ownership concentration of the firms in particular can cause obstacles to international investments and financial globalization. On the other hand financial institutions in general, and capital markets in particular can mitigate the negative effect of the twin-

[4] Hereafter the term "functionally efficient financial system" is used if the financial institutions of a given country satisfy the above-mentioned five functions in the most efficient way.
[5] This term, which represents institutional weaknesses both on macro and micro level, is introduced by Stulz [2005].

agency-problem. Using the tools that capital markets can provide, corporate insiders can mitigate the effect of the twin-agency-problem. This view also stresses the fact that market based financial system would be desirable for further economic development.

4. THEORETICAL BACKGROUND

In this section the demand of the corporate and the household sectors of the economy for the services provided by local stock markets is examined. This is followed by an investigation whether the emerging stock markets contribute to the benefits of global diversification. But first the controversial role of the government is highlighted regarding capital market development after the transition from planed to market economies.

4.1 The Government

After the collapse of planed economies, following the American advisors' recommendations, many governments tried to set up a market-based financial system, forcing strategies where stock exchanges had a major role in financial intermediation. This is why stock market had an initial rise in the first part of the nineties.

Claessens et al. [2001] present how some countries pursued a policy of stock market development in the early stages of transition. One group of countries – including the Czech and Slovak Republics, Lithuania and Romania – made heavy use of the stock markets to transfer ownership through mass privatization. The number of firms listed on these stock exchanges increased dramatically, but after an initial phase of high trade volumes, most stocks became and remained illiquid. Over time, many companies have been delisted, and the number of shareholders fell as ownership became increasingly concentrated. Regulation of stock exchanges was minimal. In the Czech Republic, a formal regulator was not even established. A second group of countries – including Estonia, Hungary, Latvia, Poland and Slovenia – developed their stock exchanges mainly through a small number of initial public offerings. Trading in most of these shares remained relatively high. A third group of countries that were formerly part of the Soviet Union, including Russia and the Ukraine, developed stock markets through both privatization and initial public offerings. All these countries had mass privatizations, but the exchange of vouchers took place outside the official stock markets. Some of the least developed transition countries – Albania, Belarus, Bosnia-Herzegovina, Georgia, Tajikistan, and Turkmenistan – never established stock markets.

As a result instead of stock market economy, the Czech and Russian strategies led to state monopolist system (Csaba [1999]). Even in Hungary the Anglo-Saxon model was strained between 1990 and 1996 (Mohai [2005]).

In brief, market based financial system were supported, by state policy for longer or shorter period in the nineties. In spite of this bank-based financial system evolved. Some reasons for will be discussed in the following sub-chapters.

4.2 The Corporate Sector

Financial markets in general and stock markets in particular, have grown considerably in both developed and developing countries over the last decades. Several factors have aided in their growth, especially improved macroeconomic fundamentals, such as greater monetary stability and higher economic growth. General economic and specific capital markets reforms, including privatization of state-owned enterprises, financial liberalization, and an improved institutional framework for investors, have further encouraged capital market development. Financial globalization has also advanced in this period with increased cross-border capital flows. As an element of this many firms cross-listed on international exchanges, in order to access international markets in a process called internationalization of firm funding.

Here the author of the study argues that the emerging market upswing in the 1990s and their necessary wasting away have common reason, which also determines the future of these markets.

4.2.1 The Rise and Fall of Emerging Stock Markets

As Figure 2 shows the formation of stock markets in the related countries were different over time, however Budapest, Prague, and Warsaw had stock markets before, from the nineteenth century until the communist era.

Figure 2.: The Formation of Capital Markets in the New EU Member State Countries

Source: construction of the author

After creation – in connection with the new regulations enforced by the states – issues on these markets were mainly irrespective of the maturity of the listed companies. Frequently their consolidation and reorganization lacked, as well as transparency were often weak, with little disclosure of criteria, unequal access to information, and insufficient justification of decisions. Consequently, initially these markets listed a large number of stocks, many of which were illiquid. But once the markets became more established, the number of stockholders fell and ownership became more concentrated[6].

A second type of market — developed in Croatia, Estonia, Hungary, Latvia, Poland and Slovenia — started with a small number of stocks, all of which were offered in traditional ways using IPOs. Many of these stocks had fairly liquid trading, at least compared to the stocks in the mass-privatization countries.

The second half of the nineties brought realignment. Macroeconomic developments have generally been favourable for stock market development[7]. In this period numbers of fundamental factors affect both the growth of the local market as well as the degree to which countries participate in international markets. As countries improve their fundamentals, stock exchange activity increases, but so does the share of activity taking place abroad. This suggests that the two processes are complementary: as better fundamentals allow local markets to

[6] Concerning the number of listed companies, most countries exhibit an inverse U-shaped picture (except Slovakia): after an initial rise, the number of firms listed has declined again. At the end of 1996, the numbers of listed firms in Czech Republic were 1637, by 2002 however, it fell to 64. The case of Lithuania is similar: in 1997 there were 680 companies traded on Vilnius Stock Exchange, while today they have less then 50, furthermore there are only 8 papers on their main-list. In Slovenia and Poland the number of traded companies remained triple figures, but the tendency here is similar to the others as well.

[7] All examined countries experienced significant average annual growth rates over the last years. Inflation rates have dropped, capital flows, especially FDI, have increased sharply to these countries. The countries with the largest inflows of FDI relative to GDP are the Czech Republic, Slovakia, Estonia and Latvia, whereas Poland, Slovenia, and

develop, firms will tend to access global exchanges. But there will be limits to the degree of local development associated with more offshore activity. Migration of a major share of market capitalization and value traded may have adverse consequences for the liquidity of remaining companies.

4.2.2 The Effects of Cross-listings[8]

An element of the globalization trend has been the migration of stock exchange activities abroad, particularly from emerging markets. Many firms from emerging economies cross-list on international exchanges. Depository receipts (DRs), for example, are increasingly popular instruments. Especially trading in American depository receipts (ADRs) rose dramatically in the last 15 years. Advances in technology have further accelerated the globalization trend. Given the network properties of stock exchanges, high liquidity further increases the value of additional transactions at exchanges such as those in New York or London leading to greater concentration of order flows and increased liquidity at these exchanges. Migration of trading abroad is putting pressure on many local exchanges, especially those in Central Europe, as both trading volume and income from trading activities risk declining.

Firms migrating are typically larger than their domestic-only counterparts. Moreover internationalizing firms are generally the better performing segment of the local market. This reflects both demand and supply factors: better performing firms are likely to have greater growth opportunities, which makes seeking foreign financing more attractive. International investors may also view these types of firms more favourably. Firms listed only on the local markets will be smaller and perform less well. Besides liquidity and price setting process of a particular internationalizing firm, internationalization of a particular firm can have effects on the local exchange as a whole. Studies show that as firms move to international markets there may be negative spillovers for the remaining firms. Using data for over 3 000 firms from 55 countries during 1989-2000, Levine and Schmukler [2003] find that internationalization reduces the liquidity of remaining domestic firms through two channels. First, a reduction in

Hungary have low inflows relative to GDP. Generally, financial markets in these countries are integrating rapidly with the EU and other markets.

[8] Cross-listing is defined here to include dual-listing, using depository receipts, or listing only on an international exchange.

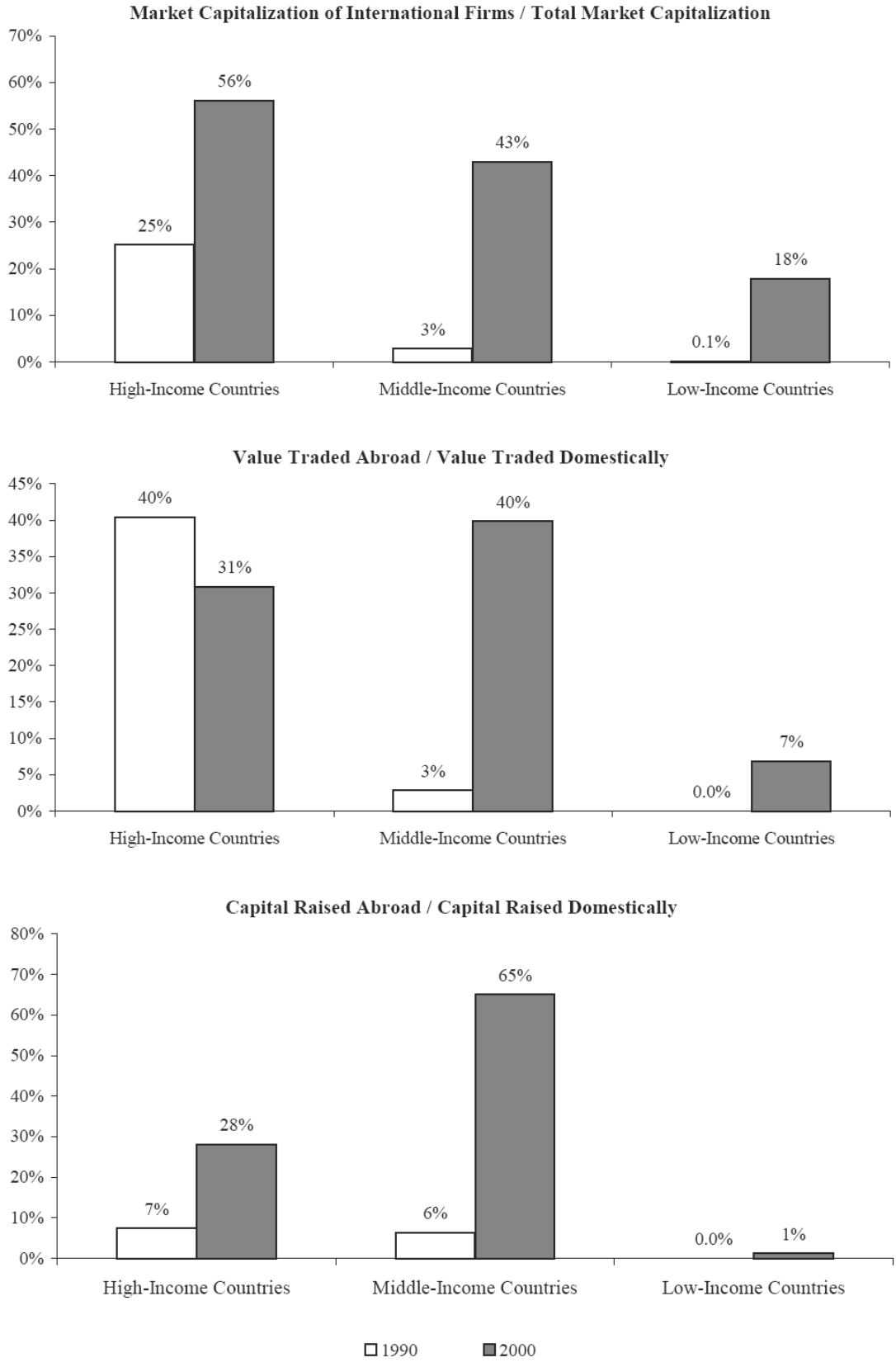
domestic liquidity of international firms has negative spillover effects on the liquidity of the remaining domestic firms. Second, there is trade diversion within the domestic market as liquidity shifts out of domestic firms and into international firms. Diminishing liquidity is nevertheless an issue for most of the investigated stock exchanges. Declining liquidity has its own dynamics (a 'death spiral') and may rapidly accelerate. With low liquidity, owners of stock exchanges, brokers and authorities are less inclined to incur the costs of maintaining an active and transparent market. The shareholdings in relatively small companies are being concentrated in fewer hands, as people or institutions seeking to control such companies gradually buy up shares. Some of the most attractive companies on local domestic markets are also being bought up by bigger foreign firms and are being de-listed.

Doidge et al. [2004] argue that cross-listings – especially at one of the US markets – lead to a dramatic rise in firm value. They provide evidence that foreign companies with shares cross-listed in the U.S. had Tobin's q ratios 16.5% higher than the q ratios of firms from the same country that were not listed in the U.S. The valuation difference is statistically significant and reaches 37% for those companies that list on major U.S. exchanges. To them a U.S. listing reduces the extent to which controlling shareholders can extract private benefits and increases the firm's ability to fund growth opportunities.

The limited scope for domestic stock markets does not mean that transition economies will lack access to the services and functions offered by stock markets. Globalization, increased cross-border trade in financial services, harmonization in the rules for global capital raising, and stronger technological links have made internationalisation much easier for any large corporation in an emerging economy. In this way they can list their stocks and raise capital in the market that offers the most available financing, lowest price, and best liquidity. Similarly, globalization in trading systems and new, Internet-based systems enable customers everywhere to access stock market services. Thus corporations can easily raise capital abroad, and local retail investors will have increased access to the desired mix – in terms of risk and returns – of financial instruments, reducing the need for local stock markets. As marketplaces transform into virtual electronic platforms, most transition economies may choose to import stock market services (Claessens et al. [2001]).

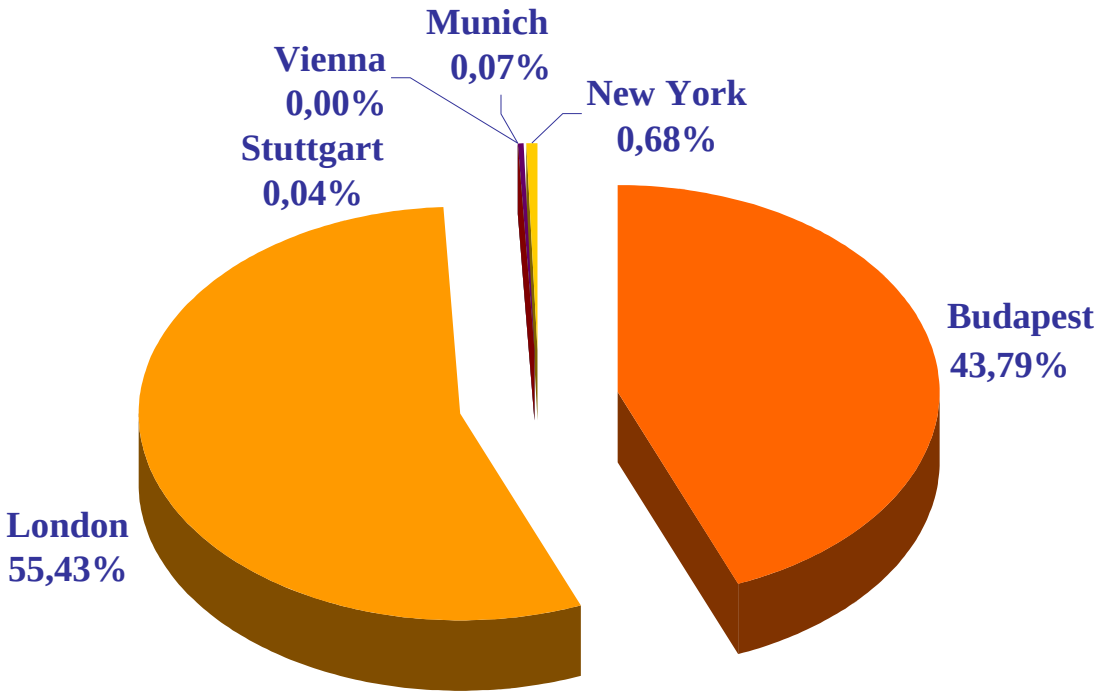
Figure 3 shows three indicators of the degree of internationalization relative to domestic activity: market capitalization of international firms as a ratio of total market capitalization, value traded abroad relative to value traded domestically, and capital raised abroad over capital raised domestically. The ratio of market capitalization of international firms to total market capitalization clearly shows how strong the internationalization trend has been, especially for middle-income (emerging) countries. For these economies the ratio of market capitalization of international firms to total market capitalization jumped from only a few percentage points in 1990 to 43 percent in 2000. The effective market of Hungarian shares also underpins it (Figure 4).

Figure 3: Internationalization of Stock Markets Relative to Domestic Activity



Source: Claessens [2006]

Figure 4.: Markets of Hungarian securities (2003)



Source: Budapest Stock Exchange

Finally, other scholars state that relationship-based system is more efficient for small and medium-sized companies, thus banks must play the major role in their financing, rather than instable stock markets (Rajan-Zingales [2001], Palosi-Nemeth [2005a]).

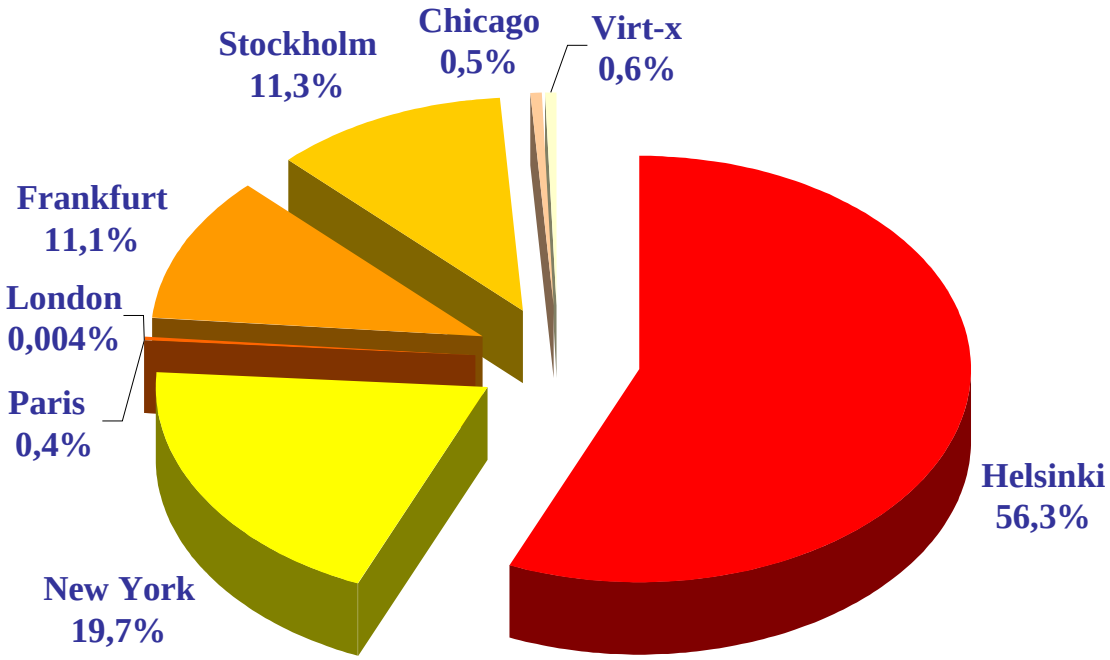
4.2.3 Pros and Cons: Arguments FOR Local Stock Market?

Foreign listings may divert trade away from the local exchange. Trading of a domestic share on a foreign exchange, however, is not simply a substitute for trading on the local market, – it can lead to greater domestic trading if the stock attracts more attention or acquires a higher reputation. Trading abroad may also lead to greater trading locally if foreign trading is unwound on the local market. Domestic traders may also be better informed about local companies than foreign investors. Foreign investors know this, keeping the trading of companies on the local market.

Dual-listing in these markets was not a zero-sum but a positive-sum game, as liquidity was being created locally. There are also precedents of that, after an initial surge of foreign activity, trading flows back to the original market (Karolyi [1998]). Trading and price discovery ends

up concentrating in one place, most often the home market. The case of Nokia is a good example, where more than 56% of the trading volume concentrates in Finland, although it is traded at all the main markets.

Figure 5.: The Distribution Of Nokia's Turnover (2003)



Source: www.bloomberg.com

Claessens et al. [2003] provide some more arguments on that why it might be important to maintain some form of local stock exchange throughout the new EU member states:

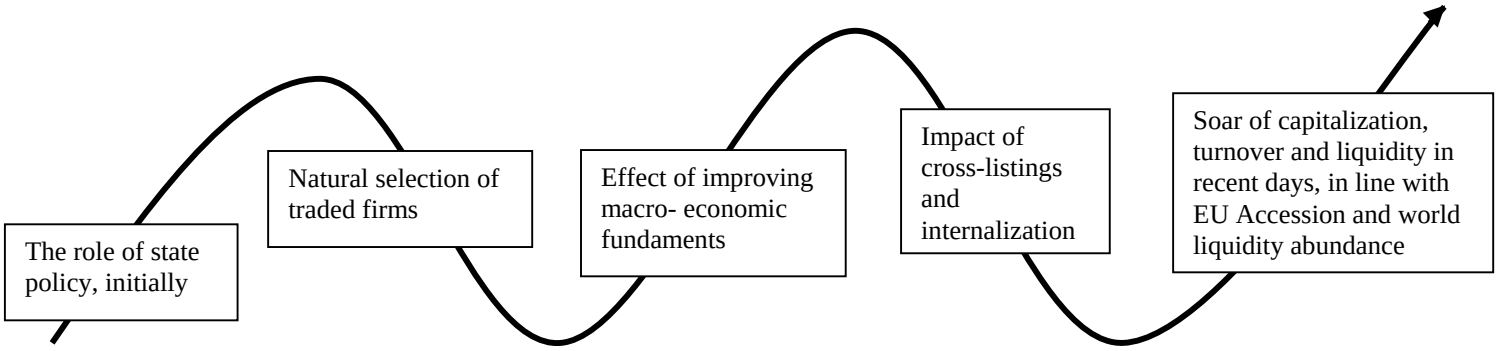
1. First, there is evidence that for many companies — except the truly global ones — the domestic market is the 'natural' place to be traded. For developed countries, trading volumes gravitate to the domestic market even when a stock is cross-listed. Having no 'home listing' may be a significant problem, especially for small and intermediate-sized firms, which tend not to be able to go abroad. Given the large number of smaller firms in the examined markets, some form of local stock exchange may be desirable for these countries.

   The con-argument of this is that the tendency for trading to gravitate to the local market is less overt for emerging markets and seems to depend on whether the domestic market meets appropriate standards (for example liquidity).

2. Second, a local stock exchange can adopt the market micro-structure that best conforms to the characteristics of potential listing candidates and investors, in terms of defining market segments, designing listing requirements, fee structures, etc. Autonomous local exchanges can also be more flexible in accommodating channels through which local small and medium-sized firms can tap into the public securities markets.

To sum up, we could have been said to witness a kind of "wave motion" of stock market performance in emerging economies in the last one and a half decade (Figure 6).

Figure 6.: „Wave Like Motion" Of Stock Market performance In Transition Economies



Source: construction of the author

These rises and falls were mainly regardless of the business cycles of the real economies. This fact raises two questions: (i) do these impacts contribute to the efficiency of the markets and (ii) is the recent soar just another ascent followed by the usual brake down?

Chapter 6 is written to answer these questions measuring stock market performance, efficiency, and the impact to the real economy over time.

After all, the importance or even the existence of local stock markets in transition economies is not obvious from the perspective of the corporate sector. Further investigation is needed.

4.3 The Household Sector

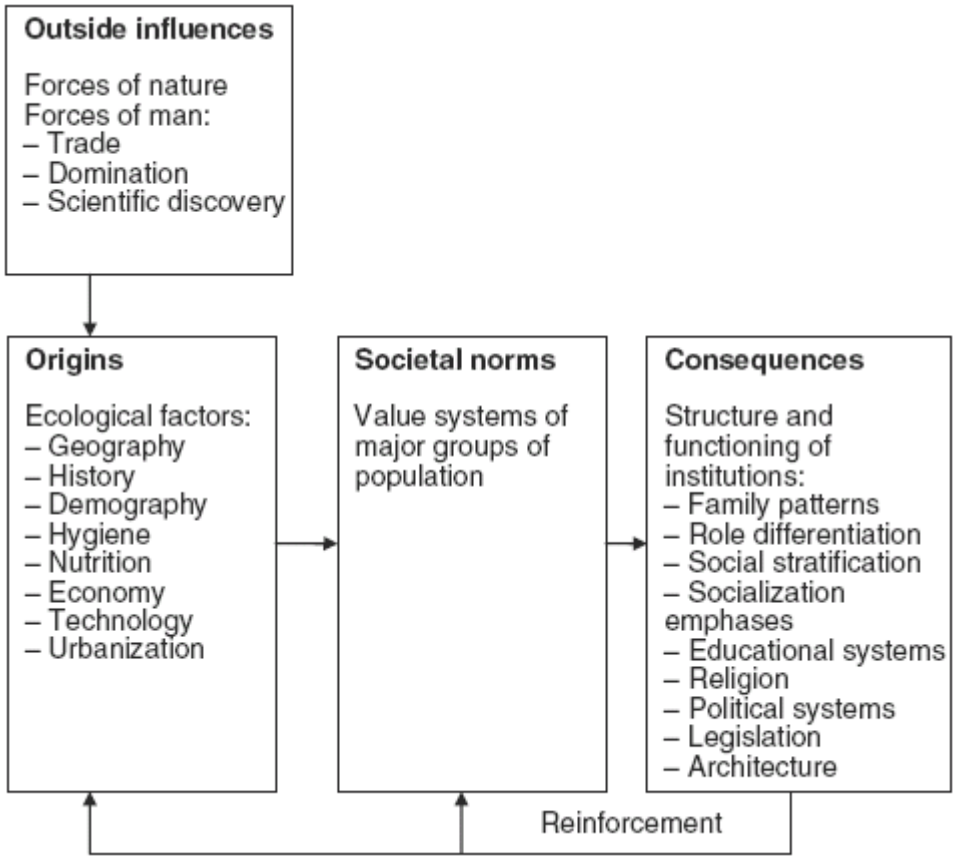
Stimulated by the observation that financial systems vary in managing perceived risk, it can be assumed that there might be a link between national cultures and financial systems. A large body of literature in psychology reports that an individual's perception of uncertainty, his/her coping mechanisms, and risk attitude are influenced significantly by the national culture in which the individual resides. Hofstede [1991], for instance, documents a wide variation in the perceived level of uncertainty and the extent of uncertainty avoidance behaviour across national cultures. Hofstede's research intended to develop a commonly acceptable, well-defined, and empirically based terminology to characterize cultures; and to use systematically collected data about a large number of cultures, rather than just impressions. According to questionnaire data, which he collected worldwide, Hofstede defined and quantified five cultural dimensions that are largely independent of each other:

- Individualism vs. Collectivism (IND);
- Power Distance (PDI);
- Masculinity and Feminity (MAS);
- Uncertainty Avoidance (UIA); and
- Long-term orientation (LTO).

To explain how cultural differences emerged and evolved between national cultures Hofstede [2003] developed a model (Figure 7).

History plays a dominant role, it obviously matters. Changes come from the outside in the form of forces of nature or forces of human beings: trade, conquest, economical or political dominance, and technological breakthroughs. As it can be seen on Figure 7, the outside influences, have an effect at the origins, not at the societal norms themselves. Accordingly norms change rarely through direct adoption of outside values. Instead, changes occur through shifts in ecological conditions. In general, norm shifts are gradual, and thus national cultures are extremely stable over time. As a result, Hofstede [2003, p. 34] underpins the view of Csaba [2003], from a cultural respect that regardless of globalization, the world will not become more and more similar, heterogeneity will remain.

Figure 7: The Emergence and Stabilization of Culture Patterns



Source: adapted from Hofstede [2003, p.12]

Hofstede [1991] traces back the differences in uncertainty avoidance among nations to the ancient world. The Roman and Chinese Empires were both powerful centralized states. They differed however, in one important aspect. The Roman Empire had developed a unique system of codified laws that applied to all people with citizen status regardless of origin. The Chinese Empire put less emphasis on this concept of law. The main continuous principle of Chinese administration has been described as 'government of man' in contrast to the Roman idea of 'government by law'. Thus uncertainty avoidance became more relevant in the Roman Empire than in the ancient China.

Of course the relationship between national culture and the configuration of financial systems, might be investigated particularly in Hofstede's cultural dimension of uncertainty avoidance.

Although it seems likely that financial architecture is affected by the degree of risk tolerance prevalent in that country's national culture, deep econometric evidence is indispensable. A study, which appeared out of the blue recently, measures just this (Kwok-Tadesse [2006]).

Using data on financial systems across a large cross-section of 41 countries and controlling for statistical distorting factors, especially endogenity, the authors could accept their main hypothesis: "Countries with higher mean scores of uncertainty avoidance (UAI) are more likely to be associated with a bank-based financial system (compared with a market-based financial system) than countries with lower mean scores." The robustness of their results is provided by the inclusion of other sets of control variables such as the legal environment; the level of economic development; macroeconomic conditions; political conditions; and the level of institutional development. Furthermore they also used an alternative logit model and alternative measures of the dependent variable. Their findings remained valid.

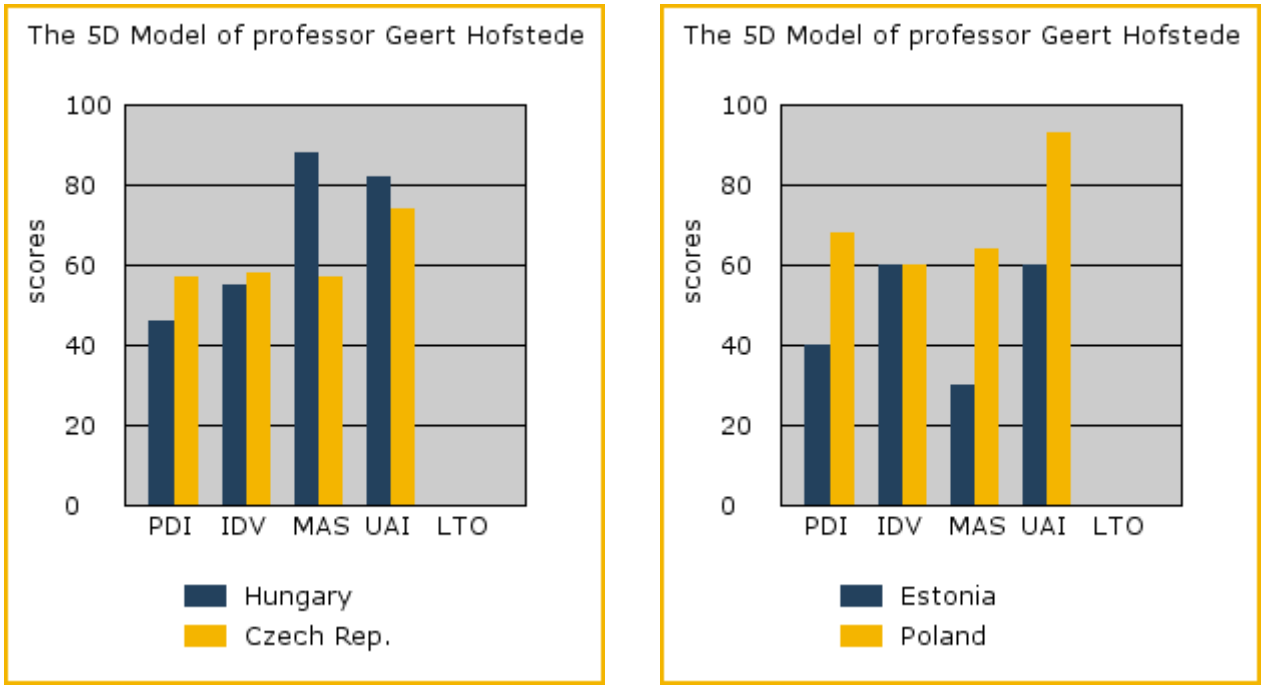
Why is this achievement important from the perspective of this study? Although Kwok and Tadesse did not take the transition countries into consideration in their sample, here it can be done. Collecting the data from Hofstede's research, it stands out that the uncertainty avoidance indices are rather high in the post-communist new EU member states (Table 1)! These can be compared with the sample of Kwok and Tadesse, where the average uncertainty avoidance (UAI) index of countries with bank-based financial architecture is 72,6 and only 53,7 in case of countries with market-based system.

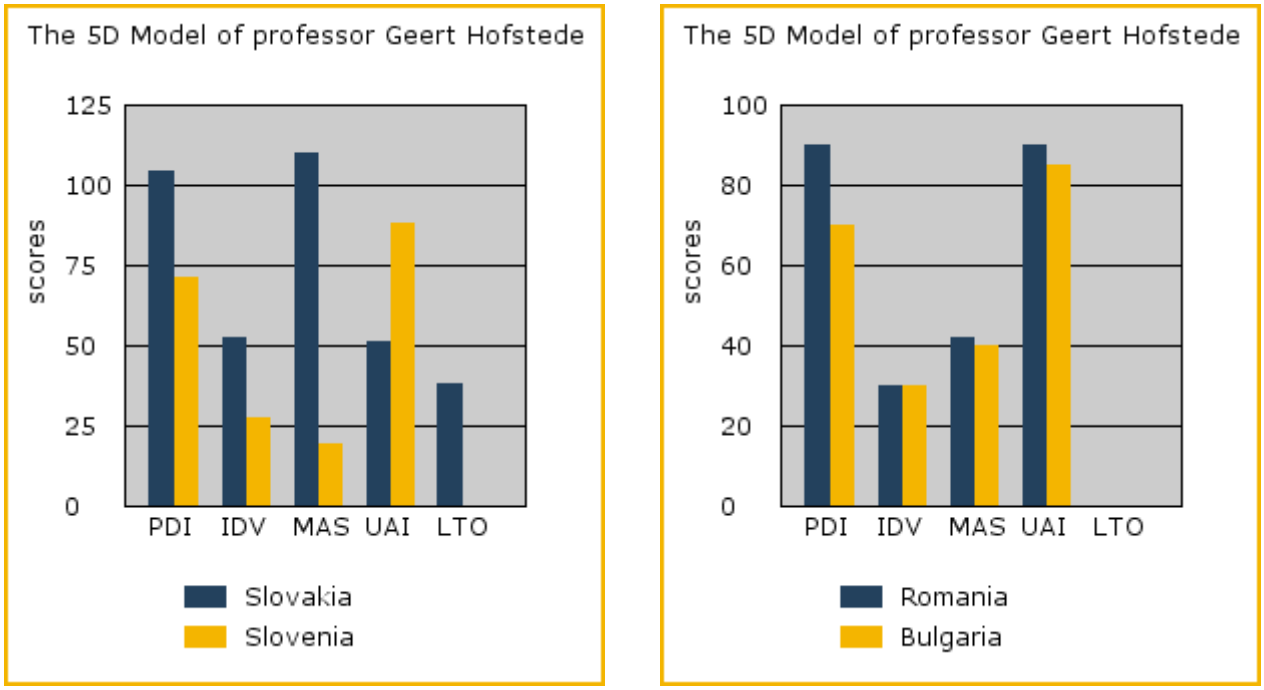
Table 1.: Hofstede's Dimensions In New EU Member States And Candidate Countries

Country	PDI	IDV	MAS	UAI	LTO
Czech Republic	35	58	45	**74**	
Hungary	46	80	88	**82**	
Poland	68	60	64	**93**	32
Bulgaria	72	31	40	**84**	
Estonia	40	60	30	**60**	
Romania	89	29	42	**90**	
Slovakia	104	53	110	**52**	38
Slovenia	71	26	19	**87**	

Source: Hofstede [2006]

Figure 8. Comparison Of Countries According To Hofstede's Dimensions



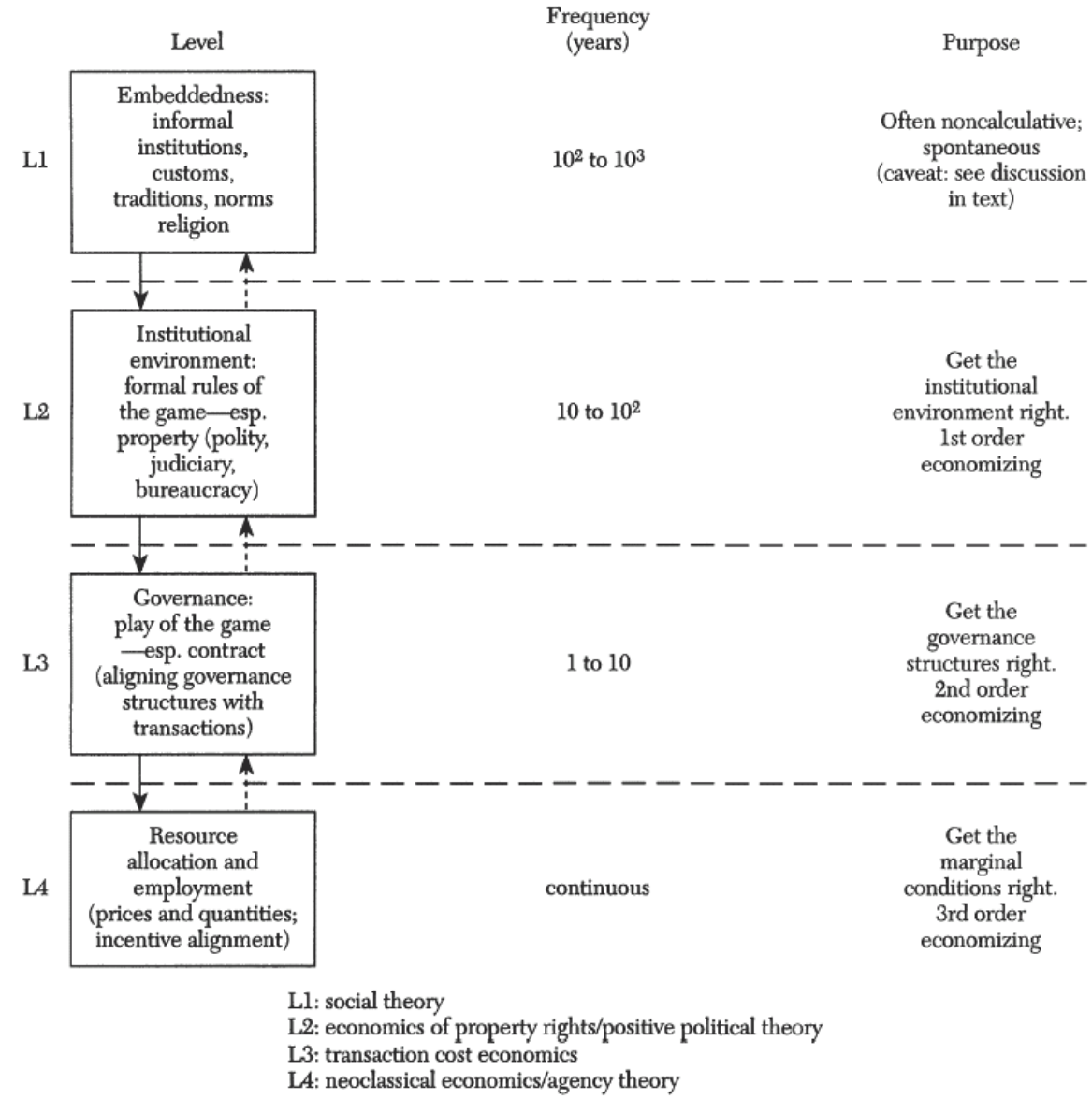


Source: Hofstede [2006]

Does this imply that capital markets are not viable in these economies? Of course not. It means only that the financial architecture is more likely to evolve to a bank-based system. What is more it reflects only the effect of cultural differences (uncertainty avoidance), depending on the inhabitants, i.e. on the household sector. Foreign owned companies, however, could easily provide need for capital markets regardless of other sectors. As we saw, the corporate sector – especially bigger firms – really have it, but – in order to import the institutions of developed countries – they tend to cross-list and use central capital markets rather than local ones.

As introduced above, Hofstede states that national cultures are rather stable over time, and culture influences our values, which in turn affect our attitudes, and flows through to our behaviour. The idea of the author of this study is to locate this hierarchy (values-attitudes-behaviour) in Williamson's 'Four Level of Social Analysis' (Williamson [2000]). Williamson argues that there are four levels of institutions (Figure 9). The top level is the social embeddedness level. This is where the determinants of cultures, norms, customs, traditions, etc. are located. According to Williamson institutions at this level change very slowly, taking centuries or millennia.

Figure 9: The 'Four Level of Social Analysis'



Source: Williamson [2000, p.597]

To sum up, one precondition of the viability of local stock markets in transition economics – the need of households – is not relevant in the contemporary world and presumably it takes at least dozens of decades to change.

This has an important policy implication. On the one hand organising road shows and convincing inhabitants to invest their savings into more risky assets and bear more risk is almost hopeless. On the other hand unless doing so there is less chance to alter the uncertainty avoidance of people even in the long run.

4.4 The perspective of global diversification

After we saw that the demand of the private sector for the services of local stock market in transition countries is rather doubtful, the idea emerged whether the foreign capital has incentives to support emerging capital markets. Accordingly it will be investigated that if these markets contribute to the benefits of global diversification.

The total risk of an asset, measured as the variance of its returns, σ^2, is the sum of its diversifiable risk, σ_D^2, and undiversifiable risk, σ_{UD}^2.

$$\sigma^2 = \sigma_D^2 + \sigma_{UD}^2, \tag{1}$$

Consider two funds, one representing emerging stocks and one representing international stocks. Consider, for simplicity, the case where the standard deviations of the returns of the two funds are the same, σ, and consider a global portfolio that combines the two funds in equal proportions. The global portfolio is fully diversified and its risk is undiversifiable.

The risk of the global portfolio, σ_{UD}, is:

$$\sigma_{UD}^2 = (\frac{1}{2})^2\sigma^2 + (\frac{1}{2})^2\sigma^2 + 2(\frac{1}{2})(\frac{1}{2})\sigma^2\rho, \tag{2}$$

$$\sigma_{UD}^2 = \sigma^2\frac{(1+\rho)}{2}, \tag{3}$$

The diversifiable risk is the difference between total risk and undiversifiable risk:

$$\sigma_D^2 = \sigma^2 - \left[\sigma^2\frac{(1+\rho)}{2}\right] = \sigma^2\frac{(1-\rho)}{2}, \tag{4}$$

$$\sigma_D = \sigma \sqrt{\frac{(1-\rho)}{2}}, \qquad (5)$$

We see that diversifiable risk depends not only on the correlation between returns but also on the standard deviations of returns. Higher correlations reduce the benefits of diversification since they reduce diversifiable risk while higher standard deviations increase the benefits of diversification since they increase diversifiable risk.

Following the methodology of Obstfeld and Taylor [2003] I quantified the cross sectional volatility of the most liquid shares of the new EU member state's stock markets.

Figure 10: The fall of volatility of the investigated stock markets

Source: computation of the author

In the last 7 years the diversity of the returns in markets of the new EU member states dropped significantly (the daily decrease is statistically significant in all level, the magnitude of p value is 10^{-437}).

This phenomena is not unique, it is the general tendency since the collapse of Long-Term Capital Management in 1998 (Cipriani-Kaminsky [2006]).

Consequently, since correlation is increasing and volatility is falling, the role of these countries in global diversification is more and more marginal, that is the demand of international portfolio-investments towards them cannot be considerable.

5. PRACTICAL PERSPECTIVE – CASE STUDIES

After the theoretical part it can be concluded that the continued feasibility of stock exchanges in many emerging markets, as well as in many developed countries, is open to question. Even so, existing exchanges follow various strategies. Here, four basic options can be distinguished, which can be tracked among these markets:

I. To seek to prosper by themselves by reducing costs and/or increasing revenues;

II. To create regional associations with other emerging exchanges;

III. To try to build larger virtual markets by establishing some form of cross-border linkages with other exchanges;

IV. To merge with, or be taken over by, one or more other exchanges.

5.1 Strategy I. (Self-Survivor Strategy)

In order to prosper by itself in the current climate, an exchange can seek to reduce costs and to increase revenues. Taking the limited number of firms and their even more limited liquidity and turnover, options to increase revenues may be limited. One key way for an exchange to reduce costs is by outsourcing major expenditures, such as IT software developments or the fusion of its various units (in Budapest for instance, the stock market merged with the commodity market on 2 November 2005).

In any case, if stock markets are sustained with this strategy, they cannot fulfil their essential role– as discussed above –, and work in a functionally efficiently manner. Thus the self-survivor strategy cannot be in the interest of any country, to the maximum of a given interest group. Accordingly policy should not support any type of this strategy!

Among the relevant transition countries the stock exchanges of Prague, Bratislava, Ljubjana and until 2004 Budapest have followed this strategy.

5.2 Strategy II. (Regional Associations)

The establishment of an all-equal regional stock exchange framework is very vulnerable, accordingly it is rather rare. All parties have their own interests and must be compensated from the synergy effects gained from the alliance. At the beginning any part of the various functions undertaken by exchanges can be shared, including marketing, listing, order routing, information dissemination, order execution, matching, clearing, settlement, and administration services, creating the base of a potential fusion in the future. No single model has yet emerged, however, as being either dominant or unequivocally better than others.

A working regional association in Europe is NOREX[9]. It is a strategic alliance between four out of the five Scandinavian stock exchanges: the Copenhagen Stock Exchange, the Iceland Stock Exchange, Oslo Börs and Stockholmsbörsen. Together these exchanges cover 80% of the Nordic equity market, and 90% of the Nordic bond markets are accessible via NOREX. NOREX has a joint system for equity trading, and harmonizes rules and requirements between the exchanges with respect to trading and membership. The alliance is based upon co-operation between independent stock exchanges and builds on several core principles:

i) Cross membership – which means that member firms are encouraged to join all the NOREX exchanges;

ii) A single point of liquidity – meaning that issuing companies are encouraged to list their securities on only one NOREX exchange;

iii) A common trading system — in that trading on the NOREX exchanges is carried out via the single electronic trading system SAXESS, allowing the NOREX partners to take advantage of economies of scale; and

iv) A common regulatory framework: the member countries of the NOREX alliance have harmonized their trading rules and membership requirements as well as the authorization obligations of brokers.

NOREX always hoped to attract the Baltic exchanges to join the partnership. In late spring 1999, a Memorandum of Understanding was signed between the Riga Stock Exchange, the Tallinn Stock Exchange and the National Stock Exchange of Lithuania. This agreement was

[9] This is drawn from www.norex.com.

valid until April 2001, when the Helsinki Stock Exchange (HEX) bought a majority stake in the Tallinn Stock Exchange. The aim was to encourage co-operation between the exchanges in setting up a joint Baltic market based on the principles of a single point of liquidity, cross membership, and a common trading system via NOREX. In mid-1999 the Riga Stock Exchange received an official invitation from the NOREX alliance to enter into negotiations concerning the possibility of joining the Co-operation of Nordic Exchanges. On 2 May 2000 a Letter of Intent was signed between NOREX and the three Baltic exchanges in Riga, Tallinn and Vilnius, and a Design Study Agreement was signed on 17 August 2000. Subsequent negotiations failed to yield an agreement, however, and the potential cooperation between NOREX and the Baltic Exchanges was put on hold a year later on 28 May 2001. Possible explanations for the failure were that the size of the combined Baltic markets was thought too small to be commercially interesting to some of the NOREX partners, and the cost to the Baltic exchanges of joining NOREX too high.

Here must be mentioned the situation of the market in Vienna. In 2004 its consortium bought the majority share in the Budapest Stock Exchange creating an option for a regional alliance in the future[10].

5.3 Strategy III. (Building Linkages to Leading Markets)

Of the many attempts at cooperation between exchanges that have been proposed, few have been implemented, and of those that have been realized, most have failed. Joining to a leading stock exchange network requires conformation and willingness to make compromises from the smaller party. It is always a question at linkages, whether the management is able to give up, at least partly, their control. There is often friction between cooperating exchanges about how to divide up any gains obtained from linkages. Besides, other preconditions make the linkage more difficult such as different level of economic development and efficiency of the markets, problems of technology and settlement, etc.

The relationship of Frankfurt and Vienna is a special type of this strategy: in November 1999 the Wiener Börse joined to the Xetra (Exchange Electronic Trading), the trading system of the Deutsche Börse. In this way the participants of the Austrian market have a direct link to

Frankfurt and their trades can be seen at the Xetra, but as a different market. The two markets are legally independent, thus their integration is only technological.

The story of the Baltic markets is another example. In April 2001, the Helsinki Stock Exchange (HEX) bought a majority stake in the Tallinn Stock Exchange, and in February 2002, the two exchanges moved to the same trading system. 2002 was also the year when the Helsinki Stock Exchange acquired a majority stake in the Riga Stock Exchange and the Latvian CSD. In 2003, the HEX Group merged with OM, the Swedish stock exchange operator and technology provider, creating a new group named OMX. In May 2004, OMX acquired a majority stake in the Vilnius Stock Exchange and a 40 percent stake in the Lithuanian CSD. In April 2004, the exchanges in Helsinki, Tallinn and Riga joined the Nordic-Baltic stock exchange alliance NOREX, and in September 2004 the exchange members began trading in the common Nordic-Baltic SAXESS trading system and adopted the NOREX Member Rules. Delivery-versus-payment (DVP) links for settlement of stock exchange trades were established between the Estonian CSD and Latvian CSD in addition to previous free-of-payment (FOP) link.

Vilnius Stock Exchange and Lithuanian CSD followed in May 2005 at what time the Baltic exchanges also introduced the joint Baltic market concept, facilitating common securities lists, common trading rules and practices, and DVP settlement links between the depositories to facilitate stock exchange transactions. In February 2005, the Copenhagen Stock Exchange joined the OMX group.

The link between the Warsaw Stock Exchange and the Euronext also can be mentioned as a partial integration. Since 2001 the trading system of the Euronext has run at Poland.

5.4 Strategy IV. (Mergers and Takeovers)

There have been only a few mergers and takeovers between exchanges. Many of the problems associated with linkages between exchanges are also present in mergers between exchanges, and there may indeed be additional problems. Also, mergers are extremely hard to consummate, and once agreed, even harder to implement successfully.

[10] Even so, since this step Vienna has not forced subsequent arrangement.

The most memorable fail of this category is the takeover attempts of the Deutsche Börse to the London Stock Exchange. This transaction occurred over and over again in the last seven years.

Nevertheless, a merger between exchanges does have three very important advantages over any linkage. First, the distribution of any gains between merged exchanges becomes irrelevant, as they all share in any such gains via their equity in the merged vehicle. Second, the credibility of agreements between the elements of a single merged exchange is typically much higher than could obtain in any contractual agreements between different exchanges. This is because, while still possible, it is difficult to unwind such mergers. Third, unlike contracts between linkages, those between merged exchanges do not have to be fully specified in advance. Internal incentives are normally sufficient for the different components of a merged entity to work together even in changing circumstances.

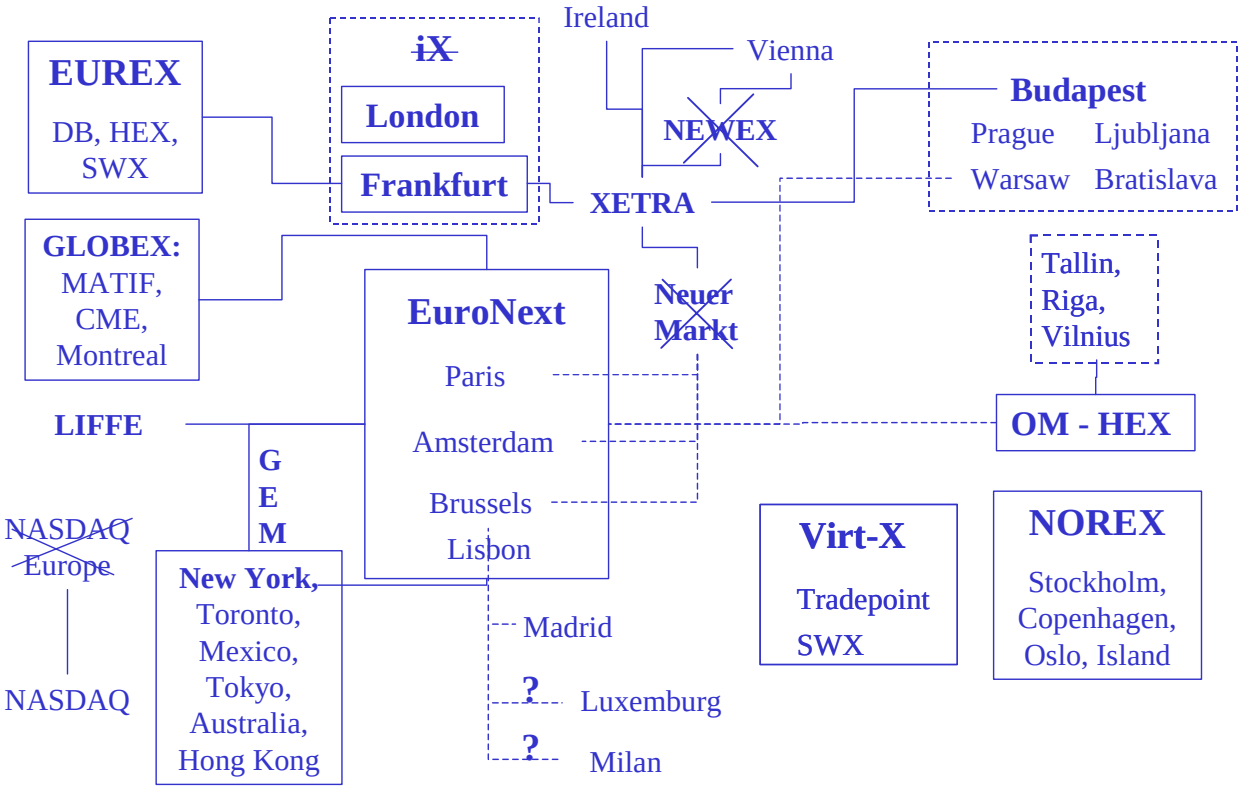
From the respect of new member states, however, a fusion may lead to the problem of firm size again: the standards and the information efficiency of a bigger exchange may encumber the listings of a medium-sized firm of the new EU member states. In a merger, the identity of the participating exchanges may disappear, which can cause significant political problems too. An example of a merger is Euronext[11]. This organization is the result of a merger which was carried out on 22 September 2000 between Société des Bourses Françaises SA (SBF), Amsterdam Exchanges NV (AEX), and Société de la Bourse de Valeurs Mobilières de Bruxelles SA/Effectenbeursvennootschap van Brussel NV (BXS). The three stock exchanges became wholly-owned subsidiaries of Euronext NV, a newly created Dutch holding company, and changed their names to Euronext Paris, Euronext Amsterdam and Euronext Brussels. Following the merger, Euronext NV became 60% owned by former SBF shareholders, 32% owned by former AEX shareholders and former holders of participating certificates issued by AEX, and 8% owned by former BXS shareholders. Although companies remain listed in their original market, all financial instruments are to be traded on a single integrated trading platform, and listing and trading rules will eventually be harmonized, resulting in a single market rulebook. Issuers are subject to supervision and monitoring rules, information obligations and public offer obligations set by the regulators in the country in which they are

[11] This is drawn from www.euronext.com.

listed. Following the merger, the three exchanges retained their separate legal status from a regulatory point of view. Following its creation, Euronext subsequently bought up the LIFFE (London International Financial Futures Exchange)(December 2002), and also merged with the Lisbon Stock Exchange (December 2001).

In June 2006 EuroNext and the NYSE have agreed to a merger of equals in what is the first cross-Atlantic merger of stock markets. A marriage between NYSE and Euronext boast a market value of about $20 billion.

Figure 11: Relationships of European stock markets



Source: adapted from Horváth [2004]

The above-detailed strategies reflect four different ways that the exchanges follow or can follow in the future. As it seems emerging stock markets have to give up self-survivor strategy, but which one is the optimal? It can be recommended that, first they should set up a regional alliance and than this alliance could joint to a leading market/network with better conditions.

One-by-one accession to a central market might lead to the loss of the tacit knowledge, incentives to harmonization and information-efficiency regarding medium-sized firms, which has similar impact than cross-border listings of large.

For these transition markets the Deutsche Börse, the Euronext, the LSE and the Norex can provide alternatives, however London and Frankfurt have not inquired on these markets before. They have their own struggle with each other; moreover they also try to attract the biggest firms of new member states to issue on their markets.

Figure 11 demonstrates that the linkages of the European markets are rather polarized, which can provide chances for convergence and accession for exchanges in new EU member states.

6. ECONOMETRIC EVIDENCE

When all is said and done evidence have to be presented on that if the statements of this research are true. Usually descriptive statistics underpins theory, but according to the argument of this study inefficiency is hidden, so deeper analysis is needed. What is more in this way the inevitable requirement of robustness can be met as well.

6.1 Methodology overview

The basic measurement of price movement efficiency is the Bresusch-Godfrey Serial Correlation LM Test. It measures if the price process is White Noise, in other words if asset prices move independently over time. The quarterly number of efficient papers may indicate a kind of development. However this quantification is too obvious, hence more sophisticated measures are followed to quantify the changes of stock markets performance:

Based on a two factor-model, a new measurement of efficiency is presented: the Synchronicity-index. The author of the study claims that this measurement is better than other degrees of financial deepness. On the one hand the shape of this index over time might show whether markets became more efficient. On the other hand besides other standards, it can be used as a proxy of financial development.

6.2 Data

Daily data of the heavy listed companies in transition economies had been collected from the Bloomberg database. The numbers of the examined firms are the following: Estonia 13, The Czech Republic 14, Hungary 12, Lithuania 10, Slovakia 6 and Poland 117, Romania 10, Bulgaria 12. The accessibility of the Slovenian and Latvian data was insufficient, thus they will be investigated at another occasion.

Finding the optimum between more information and longer horizon and reliable data stream, the period between 1995 and 2006 was selected. Newly listed or recently delisted stocks are included in our sample. However stocks those are about to be delisted during the examined

period were omitted. When trading of a stock is suspended, the returns data during the suspension period are coded as missing and also excluded from the regressions.

The given data contain some very large stock returns. If these very large returns reflect coding errors, they could add noise to our data or create bias in our results. On the assumption that coding errors are over-represented in extreme observations, the data was trimmed by dropping weekly observations for which the stock's return exceeds 25% in absolute value.

6.3 Measurement

As it has been stressed in the Introduction the usual measures of its performance is misleading in many cases. Here the literature have to be reached consciously again in order to substantiate why the applied methodology of this study is better than the various measurements of stock market performance in the literature.

The majority of the studies quantify the financial depth using only measurements of bank intermediation. Others, which try to take the stock market development into consideration as well, use rather simple measurements such as capitalization to GDP (*market capitalization ratio*), turnover to GDP (*total value-traded ratio*). Even Levine [2002] – whose study aims to distinguish bank-based and market-based financial systems and hence introduces measures of Finance-Activity, Finance-Efficiency and Finance-Size – uses these simple measures[12].

Here a measurement the so-called 'synchronicity-index' is introduced first and then some arguments are added why it is a better degree of stock market efficiency using it withal others.

6.3.1 Degree of Co-movements of Stock Prices

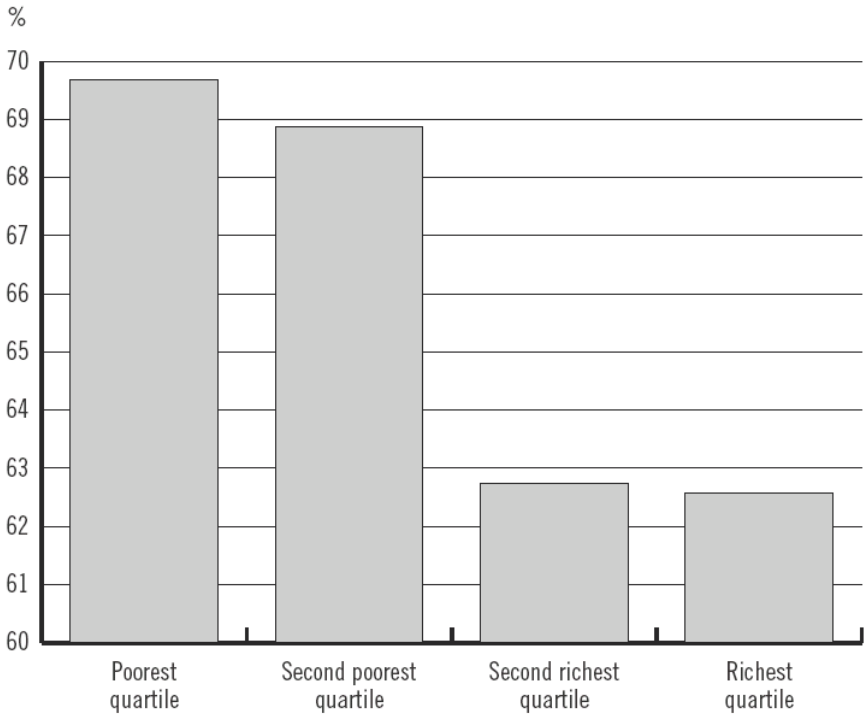
Finance economists distinguish weak, strong and semi-strong forms of the efficient markets hypothesis according to whether or not portfolio managers can 'beat the market' using extant information about prices and volumes, all existing information, or all existing publicly available information. Tobin [1984], however, proposes the functional form of the efficient

markets hypothesis as holding if stock prices allocate capital economically efficiently. Functional efficiency is important because, as the theory of Hayek [1937, 1945] discusses, as the scale of economic activity grows, markets perform increasingly more functionally efficiently than bureaucracies, to use Tobin's term. But is it the case in the transition economies? Individual stock prices move quite independently of each other in most high-income countries, but in low-income countries they tend to rise and fall en masse (Figure 12).

[12] Finance-Activity = Ln (total value traded ratio * private credit ratio). Finance-Size = Ln (market capitalization ratio + private credit ratio). Finance-Efficiency = Ln (total value traded ratio/overhead costs). Finance-Aggregate = Principal component of Finance 1, 2, 3.

Figure 12: Stock Return Synchronicity And Per Capita Gross Domestic Product

Countries are divided into four quartiles according to *per capita* GDP in 1995. The stock returns synchronicity in each country is measured by the average fraction of stocks moving in the same direction in a typical week of 1995.

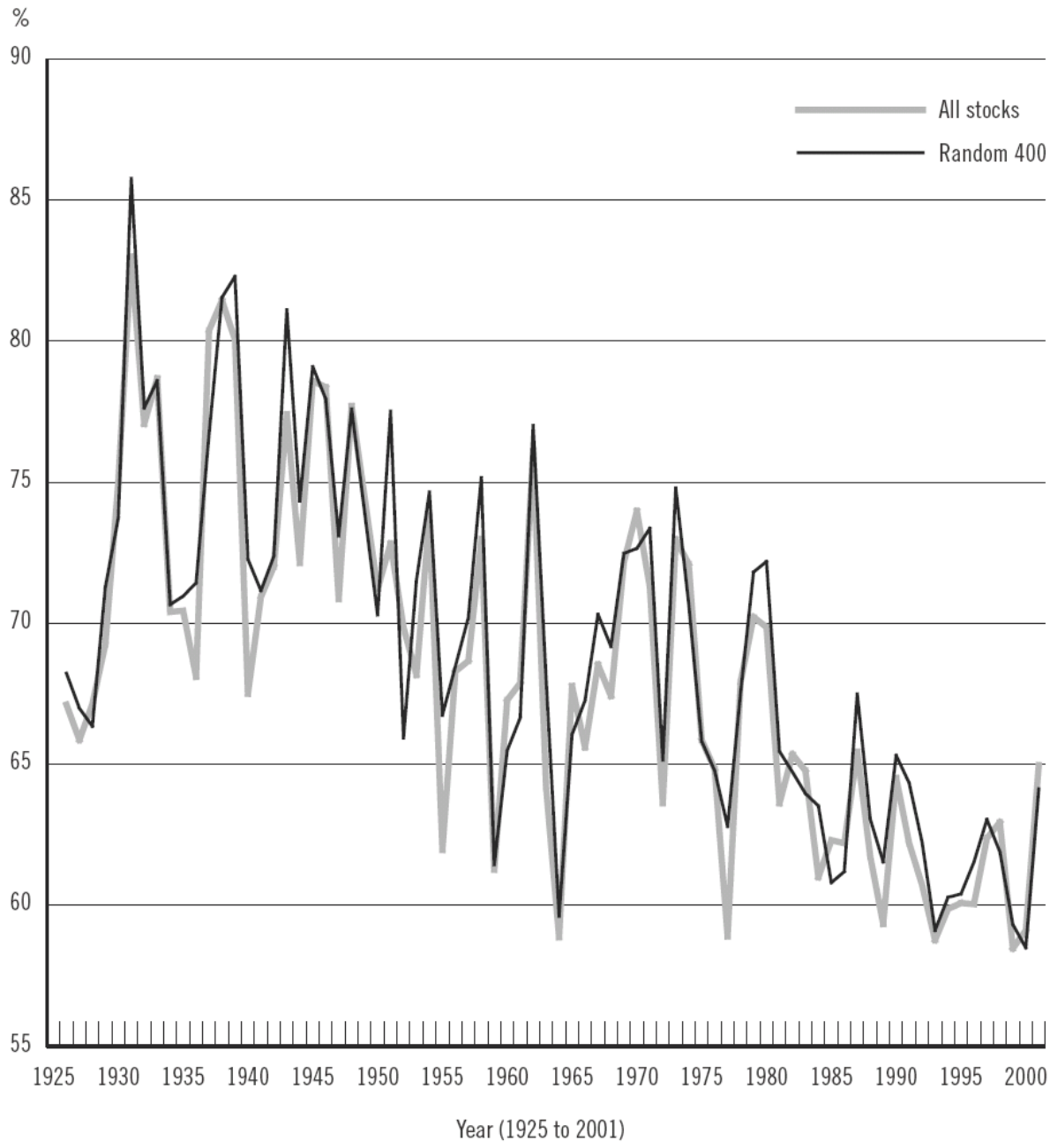


Source: Mørck-Yeung [2002]

This degree of efficiency is also applicable in the case of the U.S. market. As Figure 13 presents the co-movement of US stocks significantly decreased in the last century in line with its efficiency improvement.

Figure 13: Co-movement in US Stocks (1926-2000)

The fraction of stocks moving together in an average month of each year from 1926 to 1995 in the United States, estimated using 400 randomly chosen stocks for each year and estimated using all available stock returns.



Source: Mørck-Yeung [2002]

Highly synchronous returns lead to relatively inefficient microeconomic capital allocation, what Tobin [1984] calls a functionally inefficient stock market. If the prices of different stocks rise and fall independently, as in the Anglo-Saxon countries, the stock market distinguishes changes in the value of capital in a firm or industry from changes in its value elsewhere, at

least potentially. But if the prices of different stocks rise and fall in tandem, as in developing countries, the stock market can only signal changes in the aggregate value of capital. Recent works in behavioral finance suggests that even this may overstate some stock markets' capabilities, for market-wide fluctuations may often reflect investor sentiment – what Keynes called animal spirits – more than macroeconomic information. Thus, the cross-sectional independence of individual stock returns is a useful indicator of the potential functional efficiency of a stock market.

Following French and Roll [1986] and Roll [1988], Mørck et al. [2000] decomposed the variation in individual equity returns across countries to create a synchronicity-index for each country. They first regressed biweekly returns of each stock in the country on contemporaneous domestic and world market returns. They calculated the R^2s of regressions of the form

$$r_{it} = \alpha_i + \beta_{1,i} r_{m,jt} + \beta_{2,i} [r_{US,t} + e_{jt}] + \varepsilon_{it}, \qquad (1)$$

where i is a firm index, j a country market index, t a two-week period time index, $r_{m,jt}$ is a domestic market index, and $r_{US,t}$ is the U.S. market return. The rate of change in the exchange rate per U.S. dollar is e_{jt}[13].

The inclusion of U.S. stock market return into Eq. (1) is important, because most economies are at least partially open to foreign capital. The expression $r_{US,t} + e_{jt}$ translates U.S. stock market returns into local currency units. Biweekly returns were used to overcome thin trading problems, which arise when securities are traded infrequently. These returns were compounded from daily total returns.

The regression statistic for Eq. (1), R_{ij}^2, measures the percent of the variation in the biweekly returns of stock i in country j explained by variations in country j's market return and the U.S. market return. Given this statistic for each firm i in country j, the following formula can be defined:

[13] Obviously the regression specified in Eq. (1) is similar to classical asset pricing equations. Our emphasis is, however, on the type of information that enters stocks prices, not on any trade-off between risk and return.

$$R_j^2 = \frac{\sum_i R_{i,j}^2 \, x \, SST_{i,j}}{\sum_i SST_{i,j}} \qquad (2)$$

This is a possible country measure regarding stock price synchronicity, where $SST_{i,j}$ is the sum of squared total variations. The use of this weighting rather than a simple average follows Roll [1988] and French and Roll [1986] in order to make our results comparable to the indices of Mørck et al. [2000].

A higher R_j^2 indicates that stock prices frequently move together.

In this section this methodology will be followed in order to estimate synchronicity indices (hereafter: SI) of transition stock markets.

As it has been stressed before a good measurement must take all the five basic functions of financial systems into account. Here it is also shown this criterion can be met using the synchronicity index besides the ordinary degrees of stock market depth.

Again, the five main functions of the capital markets[14] are:

1. Produce information ex ante about possible investments and allocate capital:
   - The conventional measure, capitalization to GDP can be used properly, because it gives information about the extent of the listed firms in an economy which are already selected, accordingly they are traded on the market.
   - The efficiency of capital allocation can be measured, however, by the degree of co-movement. The better the market capacity to allocate resources to the accurate place the lower the *synchronicity* is.
2. Monitor investments and exert corporate governance after providing finance:
   - Once a paper is already selected and listed the most important question is how fast the market can react and adapt to the new information. The degree of this is obviously the *synchronicity index*.
3. Facilitate the trading, diversification, and management of risk:

[14] The manner how the functions of the bank system can be measured is not relevant here.

- Here liquidity risk and idiosyncratic risk must be distinguished. Liquidity risk[15] can be quantified by turnover velocity (turnover to capitalization), but the *synchronicity index* is needed for idiosyncratic risk. This is the degree of independence of each stock which determines the investors' ability to diversify.

4. Mobilize and pool savings:

- This is the simplest function to be measured. One possibility for instance: the proportion of stock market capitalization to aggregate savings.

5. Ease the exchange of goods and services.

- This is the informational function of the market. Through conscious alter of prices the market provides guidance for exchanges. The herd-effect is less typical the decisions made on the basis of the right prices are more effective. Consequently smaller synchronicity plays an important role in the process of relaying on prices for guidance, making the prices more informative.

To sum up, the measurement of price co-movements is a good indicator regarding the majority of financial functions. On the other hand synchronicity-index is not

6.3.2 Application for Transition Economies

Using the above demonstrated methodology and data set the case of stock markets in emerging Europe is investigated here.

First using daily returns, weekly returns of each stock were calculated in all countries. By the same token the returns of the whole market were computed as well as the U.S market (S&P 500) adjusted by the weekly returns of the exchange rate. In order to compute quarterly indices the regressions were run quarterly. Using the weekly returns 12-13 data were got from each variables[16].

Considering the high number of regressions (194 firms * 13 week * 4 quarter = 10088 per year – of course in case of many stocks there were only a few years of historical data), a simple

[15] Liquidity is the ease and speed with which agents can convert assets into purchasing power at agreed prices.
[16] Although Mørck et al. [2000] used biweekly returns to eliminate the noise-effect, in this case compromise had to be made in order to get more data in the regressions.

Excel macro helped me to avoid doing it by hand[17]. In this way R_{ij}^2 are resulted for all firms in every three months. Than using the sum of squared total variations ($SST_{i,j}$) of each firms within a given country R_j^2s were computed according to Eq. (2), in every countries computation was started in the earliest quarter, where at least three listed stocks were available. The results can be seen as follows:

Table 2: Synchronicity-Indices In Eight Transition Economies

	né	Estonia	Czech Republic	Hungary	Lithuania	Poland	Slovakia	Romania	Bulgaria
1995	I.					0,513			
	II.					0,545			
	III.		0,274			0,457			
	IV.		0,210	0,273		0,586			
1996	I.		0,336	0,446		0,593			
	II.		0,261	0,361		0,406			
	III.		0,560	0,245		0,235			
	IV.		0,158	0,308		0,265			
1997	I.		0,568	0,459		0,630			
	II.		0,435	0,297		0,431			
	III.		0,435	0,497		0,596			
	IV.	0,673	0,679	0,819		0,777			
1998	I.	0,671	0,365	0,381	0,423	0,588		0,450	
	II.	0,794	0,705	0,683	0,802	0,886		0,644	
	III.	0,837	0,684	0,674	0,706	0,939	0,783	0,811	0,573
	IV.	0,690	0,582	0,479	0,636	0,806	0,673	0,734	0,445
1999	I.	0,640	0,752	0,770	0,769	0,856	0,844	0,706	0,339
	II.	0,495	0,341	0,437	0,407	0,509	0,534	0,522	0,234
	III.	0,641	0,671	0,627	0,700	0,679	0,700	0,708	0,495
	IV.	0,676	0,424	0,456	0,540	0,520	0,561	0,437	0,289
2000	I.	*0,342*	*0,155*	*0,162*	*0,294*	*0,232*	*0,258*	*0,259*	*0,151*
	II.	0,555	0,387	0,410	0,385	0,458	0,671	0,402	0,162
	III.	0,374	0,360	0,350	0,513	0,398	0,436	0,402	0,416
	IV.	0,436	0,565	0,400	0,488	0,474	0,422	0,318	0,384
2001	I.	0,166	0,224	0,246	0,126	0,184	0,123	0,347	0,392
	II.	0,197	0,326	0,269	0,181	0,390	0,308	0,425	0,360
	III.	0,556	0,596	0,515	0,456	0,597	0,462	0,626	0,899
	IV.	0,212	0,322	0,269	0,287	0,362	0,123	0,222	0,402
2002	I.	0,333	0,411	0,347	0,500	0,523	0,397	0,518	0,399
	II.	0,333	0,167	0,393	0,213	0,402	0,238	0,496	0,253
	III.	0,276	0,233	0,413	0,349	0,357	0,340	0,354	0,305
	IV.	0,256	0,206	0,346	0,391	0,348	0,311	0,411	0,324
2003	I.	0,213	0,242	0,169	0,159	0,254	0,375	0,379	0,208
	II.	0,315	0,423	0,185	0,347	0,324	0,330	0,288	0,289

[17] Here the role of Mr. Somay Róbert must be highlighted who helped in programming.

	III.	0,396	0,355	0,350	0,421	0,330	0,446	0,442	0,215
	IV.	0,292	0,289	0,193	0,389	0,243	0,377	0,350	0,335
2004	**I.**	0,094	0,011	0,180	0,210	0,083	0,251	0,259	0,258
	II.	0,264	0,435	0,299	0,398	0,428	0,463	0,246	0,181
	III.	0,125	0,157	0,188	0,271	0,315	0,363	0,208	0,397
	IV.	0,028	0,072	0,107	0,123	0,248	0,162	0,266	0,306
2005	**I.**	0,181	0,234	0,217	0,382	0,322	0,328	0,165	0,616
	II.	0,306	0,413	0,335	0,434	0,522	0,478	0,132	0,347
	III.	0,521	0,523	0,437	0,530	0,544	0,602	0,207	0,282
	IV.	0,398	0,522	0,454	0,462	0,494	0,559	0,230	0,384
2006	**I.**	0,221	0,311	0,328	0,297	0,300	0,353	0,284	0,147
	II.	0,401	0,455	0,439	0,419	0,385	0,502	0,442	0,444
	III.	0,259	0,298	0,356	0,225	0,269	0,344	0,455	0,391
	IV.	0,190	0,345	0,292	0,249	0,392	0,279	0,153	0,219

Source: construction of the author

6.3.3 What Do the Numbers Reflect?

Figure 13 shows a slight decrease of the SIs, thus the functional efficiency of the markets is poorly increased. The initial and the ultimate numbers cannot be compared statistically, because of the different number of stocks used in quantification. In spite of this the average value of these markets in 2004-2005 is round 0,22, which is worse than the synchronicity indices of Chile and Columbia in 1995.

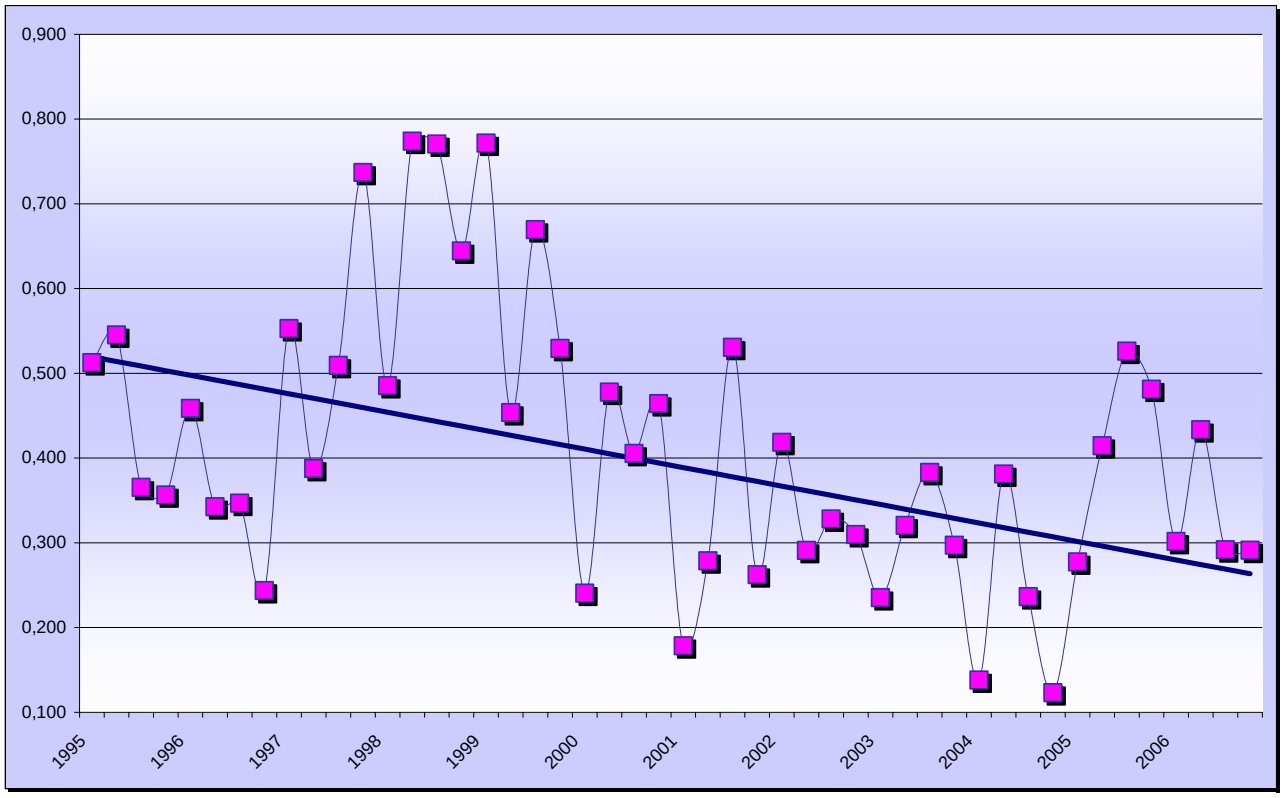
It must also be admitted that the average SI of Estonia in 2004-2005 was 0,14 that is close to the numbers of some developed countries (Belgium, Finland and Sweden) in 1995. On the other hand, although Estonian indices seem lower compare with the others, it is more volatile (jump more) in crises.

The SI values show (reversed) heteroscedasticity over time, the dispersion decreases which might reflect more confidence (robustness).

Reading up Table 2 and Figure 14 some additional characteristics can be perceived. In Poland and Slovakia the average of SI are higher (significant only at 10% confidence level) than in the other countries. In case of Poland this can be explained by the greater sample where the higher proportion of small firms tend to move together[18].

[18] Fundamental analysts examine the smaller companies less, hence the herd-effect might be more relevant in their case.

Figure 14: Average Synchronicity Indices of Eight Transition Economies Over Time



Source: construction of the author

To sum up the functional efficiency of the investigated stock markets – measured by the synchronicity index – is far from convincing.

7. CONCLUSIONS

It is a mild understatement that nowadays the EU is navigating through rough waters. There are several puzzlements, which – according to EU-sceptics – might blast the build-up of the European Union. Nevertheless the biggest success the EU reached so far is in the financial field, the introduction of the common currency, which really works and facilitates economic cooperation in general and within EMU member states in particular. The financial integration however is by no means complete. Although geographical and administrative obstacles regarding the free float of capital have broken down, structural barriers are still present. Such a barrier is the polarized structure of stock markets in the European Union. What is more the capital markets of new EU member states raises additional questions.

From this perspective, the factors are highlighted why emerging stock markets are unlikely to contribute either to economic growth and efficient fund allocation or to the pooling household savings.

There is a widely accepted policy viewpoint regarding emerging stock market:

> "Although stock exchanges in new EU member states may not have a comparative advantage in offering capital-raising, listing and trading services for large firms, the majority of small and medium-sized firms will not be able to go directly overseas. Since these firms are important for economic growth and need to raise capital. Thus a decline in local market activity can be costly for countries."

This is a misperception, which partly explains the various and faulty policy responses in the last decades.

One model in post communist states was a more proactive policy specifically aimed at bringing firms for the first time to a public market. This type of special market has been tried many times, however as presented, it has been difficult to sustain on a long-term basis, not least in the European Union. Financing of new and expanding firms will require the development of venture capital firms, commercial banks, non-bank financial institutions, and institutional investors. In order for these forms of financial intermediation to work, major innovations may be required in the legal, and institutional set-up needed to support an active

first-stage financing industry. Policy implications of these findings are that countries will need to continue to improve fundamental factors – such as shareholder protection and the quality of local legal systems better general property rights protection, better specific protection of investors' property rights, corporate transparency, simplified corporate ownership structures, and capital account openness – to make it more attractive for any investor to buy shares and thus make it easier for firms to list in public markets, have their shares properly valued, and trade liquidly.

The results also imply that countries may not face a choice between local and international exchanges: improving fundamentals will lead to more activity, but most of this activity may go abroad as better fundamentals accelerate the degree of migration. The implications are that countries will be best off facilitating as much as possible the access of their firms to international exchanges – by removing regulatory barriers and harmonizing standards – to allow them to reap the gains from more liquid exchanges overseas.

Finally, giving the answer to the *key question*, raised in the introduction – *if capital markets of new EU member states contribute to more efficient fund allocation* –, 'NO' must be said, they do not fulfil the five main functions of financial intermediation. However, two points also have to be emphasized in order to prevent possible misunderstandings:

I. Creating tighter links or even merging with global exchanges may be important for local market because not doing so will lead to a sure decline. This, however, does not necessarily mean that there is no role for local exchanges. There might still be a role for a locally provided mechanism that allows firms to come to the market for the first time. But also means that – as econometric evidence proved –, the role of local stock markets in efficient fund allocation is rather limited.

II. On the other hand it must be stressed again that the limited scope for domestic stock markets, does not mean that transition economies will lack access to the services and functions offered by stock markets. Globalization, increased cross-border trade in financial services, harmonization in the rules for global capital raising and trading, and stronger technological links have made it much easier for any large corporation to list its stock and raise capital in the market that offers the most available financing, lowest price, and best liquidity. Similarly, globalization in trading systems and new, Internet

based systems enable customers everywhere to access stock market services. Thus corporations can easily raise capital abroad, and local institutional and retail investors will have increased access to the desired mix – in terms of risk and returns – of financial instruments, reducing the need for local stock markets. As marketplaces transform into virtual electronic platforms, most transition economies may choose to import stock market services.

8. RECOMMENDATIONS AND APPLICABILITY

The role of efficient financial intermediation particularly in the new EU member states is inevitable and thus desirable for many reasons, which was detailed earlier in this study. Its findings lead to the better understanding of the evolution of financial system, pointing out the former distorting/dead-ended arrangements in emerging economies, in order to avoid unsound decision making of economic policy-makers in the future. Furthermore the outcomes might also lead to a consensus between politicians, who are influenced by different interest groups.

As it was highlighted in the Introduction, the study results are addressed to three different target groups:

A. Perhaps the most important audience is the group of the Hungarian policy makers, the government, the Ministry of Finance, the Hungarian National Bank and the Hungarian Financial Supervisory Authority. Their distorting interventions led inefficient resource allocation (at least) in the last few years. Furthermore the outcomes are by no means concerning only to Hungary. It can be gainful for a wider audience of politicians and economists in emerging and developing countries.

   From a policy perspective, this study is relevant in three areas. First, understanding better the characteristics of financial system in transition economies that allow firms to issue capital internationally can help design policies that will increase the likelihood of firms accessing global capital markets and reaping the associated gains (of lower costs and better terms). For example, it appears that firms from weaker countries can use international markets to bind themselves to higher standards only when the country of origin has passed some hurdle in terms of legal and overall development. Second, the study sheds light on the prospects and viability of stock exchanges in countries of different characteristics. It seems that countries that are sufficiently far along in developing the legal and other institutional foundations for their financial markets risk the prospects of triggering migration from their stock exchanges as firms become able to access international markets. This has implications for local market capitalization, liquidity and general development, with the severity depending on the type of country

and its corporate sector structure. It can suggest that (further) investments in the development of a local trading system or stock exchange are not warranted as local markets are not viable and efficient on their own. Third, the study provides insights on which firms cannot be expected to migrate, even when certain policies improve, and which are therefore left to issue capital, trade, and list domestically. However, tailoring the forms of local capital market development to these firms is less important than many policy-makers believe. As Rajan and Zingales [2001] argue bank system and venture capital are more efficient and thus more important in case of small-medium and start-up firms.

After all, recommendation for policy makers is that they should not force companies to list in the domestic exchange, but they ought to support ones which intend to appear on the public market.

B. By the same token, especially in new member states EU Commission should be aware of the inefficiency of stock markets in fund allocation. If convergence of the new regions is a valid goal of the European Union, the controllers of the Commission must double check the sources of the provided EU funds otherwise those could easily migrate to offshore accounts and will never enhance real economic growth.

Nevertheless, as the experience of the last decades proved, the recommendations of economic advisors from the developed world[19] can be misleading for developing countries. Subsequently both EU advisors and national decision makers must be aware of the limitations of advises and act in conformity with the given context.

Furthermore, the recognition that the financial architecture is able to evolve only a certain way, leapfrogging is impossible, can prevent many frustrate and useless attempts in these countries, which wastes resources.

Eventually, recommendation to EU authorities (besides double check the utilization of financial sources) is to take all the circumstances of the particular country into consideration, when they formulate suggestions.

[19] Not necessarily from the European Union, but from IMF and World Bank too.

C. Last but not least the management and executive board of stock exchanges of emerging market are also an important target audience. They must follow one of the three possible strategies out of the four in order to save their market.

To me, in concrete term, their best option is a regional association in the first phase and then this alliance could join to a leading market/network with better conditions in the second. The stronger the link between exchanges the more efficient operation could be reached. Thus the form of accession should be merger and acquisition rather than weak linkage.

Besides main (orientation) strategies, the management must reduce operational costs of the exchanges. This requires investments to technology. In concrete terms, the best and most effective solution would be if these exchanges became media companies. Although vertical integration, with clearing for instance, can boost cost-efficiency, it might lead to anti-competitive behaviour.

More generally, the from of the stock markets in the new EU member states must and will differ from a fully-fledged stock exchange as may exist in an advanced country. The preferred form of financial market development will hinge on the nature and determinants of fundamental factors and the migration abroad.

Accordingly it is important to (continue to) ameliorate fundamental factors – such as shareholder protection and the quality of local legal systems better general property rights protection, better specific protection of investors' property rights, corporate transparency, simplified corporate ownership structures, and capital account openness – in order to make it easier for firms to list in public markets, have their shares properly valued, and trade liquidly.

While this work sheds light on the domestic stock market development in emerging Europe, most of the issues on the more general financial sector development strategy go beyond this analysis. Additional research is needed, for example, on what constitutes not only the minimum legal, but also the institutional set-up for an active first-stage financing market and possibly secondary market, and whether or not that includes some formal stock exchange for the trading of public shares.

APPENDICES

A. PER CAPITA GDP AND STOCK RETURN SYNCHRONICITY

Using the results of Mørck et al. [2000] the initial values (1995) of the inquiry of this research is comparable among wide range of countries.

Countries are ranked by per capita GDP in Panel A. In panel B, countries are ranked by stock return synchronicity, measured as the average R^2 of firm-level regressions of bi-weekly stock returns on local and U.S. market indexes in each country in 1995. Returns include dividends and are trimmed at ±25%.

Panel A				*Panel B*	
Country	**Number of listed stocks**	**1995 per capita US$ GDP**		**Country**	R^2_i
Japan	2276	33 190		United States	0,021
Denmark	264	27 174		Ireland	0,058
Norway	138	25 336		Canada	0,062
Germany	1232	24 343		U.K.	0,062
United States	7241	24 343		Australia	0,064
Austria	139	23 861		New Zealand	0,064
Sweden	264	23 861		Portugal	0,068
France	982	23 156		France	0,075
Belgium	283	21 590		Denmark	0,075
Holland	100	20 952		Austria	0,093
Singapore	381	20 131		Holland	0,103
Hong Kong	502	19 930		Germany	0,114
Canada	815	19 149		Norway	0,119
Finland	104	18 770		Indonesia	0,140
Italy	312	18 770		Sweden	0,142
Australia	654	17 327		Finland	0,142
U.K.	1628	17 154		Belgium	0,146
Ireland	70	14 186		Hong Kong	0,150
New Zealand	137	12 965		Brazil	0,161
Spain	144	12 965		Philippines	0,164
Taiwan	353	10 698		Korea	0,172
Portugal	90	9 045		Pakistan	0,175
Korea	461	7 555		Italy	0,183
Greece	248	7 332		Czech	0,185
Mexico	187	3 944		India	0,189
Chile	190	3 361		Singapore	0,191
Malaysia	362	3 328		Greece	0,192
Brazil	398	3 134		Spain	0,192

Czech	87	3 072		South Africa	0,197
South Africa	93	2 864		Columbia	0,209
Turkey	188	2 618		Chile	0,209
Poland	45	2 322		Japan	0,234
Thailand	368	2 186		Thailand	0,271
Peru	81	1 920		Peru	0,288
Columbia	48	1 510		Mexico	0,290
Philippines	171	880		Turkey	0,393
Indonesia	218	735		Taiwan	0,412
China	323	455		Malaysia	0,429
Pakistan	120	424		China	0,453
India	467	302		Poland	0,569

Source: Mørck et al. [2000]

B. DESCRIPTIVE DATA OF THE EXAMINED COMPANIES

Estonia

	Ticker	Name	% Weight in the Index	Shares in the Index
1	HPA1T ET Equity	AS Hansapank	68,895	317,368
2	KLEAT ET Equity	AS Klementi	0,052	1,947
3	BLT1T ET Equity	Baltika AS	0,275	5,634
4	ETLAT ET Equity	Eesti Telekom	18,301	137,955
5	HAE1T ET Equity	Harju Elekter AS	1,315	5,6
6	KLV1T ET Equity	Kalev AS	0,654	23,633
7	MKO1T ET Equity	Merko Ehitus	4,36	8,85
8	NRM1T ET Equity	Norma AS	1,613	13,2
9	RLK1T ET Equity	Rakvere Lihakombinaat AS	1,632	37,722
10	SKU1T ET Equity	Saku Olletehase AS	1,229	8
11	TFA1T ET Equity	Tallinna Farmaatstatehase LA	0,081	1,25
12	TKM1T ET Equity	Tallinna Kaubamaja AS	1,464	6,788
13	VNU1T ET Equity	Viisnurk	0,13	4,499

The Czech Republic

	Ticker	Name	% Weight in the Index	Shares in the Index
1	CBJ CP Equity	Ceska Pojistovna AS	3,987	1,977
2	SPTT CP Equity	Cesky Telecom AS	15,337	322,09
3	CEZ CP Equity	CEZ	24,98	592,211
4	RBAG CP Equity	Erste Bank der Oesterreichischen Sparkas	27,565	213,648
5	KOMB CP Equity	Komercni Banka AS	13,293	38,01
6	PARM CP Equity	Paramo	0,209	1,33
7	TABAK CP Equity	Philip Morris CR	3,875	1,914
8	SVEN CP Equity	Severoceska Energetika	0,721	2,152
9	SVDL CP Equity	Severoceske Doly	1,935	7,514
10	SKUH CP Equity	Sokolovska Uhelna	0,549	5,949
11	SSZL CP Equity	Stavby Silnic A Zeleznic AS	0,528	1,386
12	STRD CP Equity	Stredoceska Energeticka	0,657	2,364
13	UNIP CP Equity	Unipetrol	2,869	181,335
14	ZEN CP Equity	Zentiva NV	3,495	38,136

Hungary

	Ticker	Name	% Weight	Shares
			in the Index	in the Index
1	ANTENNA HB Equity	Antenna Hungaria Rt.	0,332	2,377
2	BCHEM HB Equity	BorsodChem Rt.	5,935	74,095
3	DEMASZ HB Equity	Delmagyarorszagi Aramszol	0,883	1,877
4	EGIS HB Equity	Egis Rt.	2,317	4,432
5	FHB HB Equity	FHB Land Credit and Mortgage Bank Rt	1,395	3,232
6	FOTEX HB Equity	Fotex Rt.	0,417	45,045
7	RICHT HB Equity	Gedeon Richter Rt	14,083	17,995
8	MATAV HB Equity	Matav Rt	14,768	534,489
9	MOL HB Equity	Mol Magyar Olaj- es Gazipari Rt.	27,557	53,847
10	OTP HB Equity	OTP Bank Rt	31,331	155,028
11	PPLAST HB Equity	Pannonplast Rt.	0,19	4,211
12	TVK HB Equity	Tiszai Vegyi Kombinat Rt	0,794	5,116

Lithuania

	Ticker	Name	% Weight	Shares
			in the Index	in the Index
1	12391 LH Equity	AB Lietuvos Telekomas	2,836	433,058
2	10203 LH Equity	Grigiskes	9,476	943,288
3	10227 LH Equity	Invalda PVA	18,541	586,079
4	11165 LH Equity	Klaipedos Nafta PVA	6,127	1953,858
5	11622 LH Equity	Lietuvos Dujos	8,217	696,743
6	11555 LH Equity	Mazeikiu Nafta	17,832	1168,357
7	10037 LH Equity	Rokiskio Suris	7,922	38,576
8	12638 LH Equity	Rytu Skirstomieji Tinklai	11,857	1410,175
9	10927 LH Equity	Snaige	12,689	285,068
10	10367 LH Equity	Vilniaus Vingis	4,502	309,032

Poland

	Ticker	Name	% Weight	Shares
			in the Index	in the Index
1	AGO PW Equity	Agora SA	3,52	34,685
2	ALM PW Equity	Alma Market SA	0,113	2,566
3	AMC PW Equity	Amica SA	0,214	4,283
4	APT PW Equity	Apator SA	0,352	2,257
5	ATG PW Equity	ATM Group SA	0,078	0,863
6	ATM PW Equity	ATM SA	0,096	1,611
7	BCA PW Equity	Bank Austria Creditanstalt AG	0,487	0,912
8	BPH PW Equity	Bank BPH	3,394	4,014
9	BHW PW Equity	Bank Handlowy w Warszawie	0,911	7,772
10	MIL PW Equity	Bank Millennium SA	0,548	94,798
11	BOS PW Equity	Bank Ochrony Srodowiska SA	0,05	0,609
12	PEO PW Equity	Bank Pekao SA	10,131	43,205

13	BZW PW Equity	Bank Zachodni WBK SA	2,025	12,011
14	BMP PW Equity	BMP AG	0,024	1,775
15	BCH PW Equity	BorsodChem Rt.	0,35	4,76
16	BRS PW Equity	Boryszew SA	0,948	22,511
17	BRE PW Equity	BRE Bank SA	0,934	4,456
18	RMF PW Equity	Broker FM SA	0,176	1,245
19	ZWC PW Equity	Browary Zywiec SA	0,705	0,832
20	BDX PW Equity	Budimex SA	0,837	10,452
21	CCC PW Equity	CCC SA	0,225	9,72
22	CGN PW Equity	Ceramika Nowa Gala SA	0,302	28,424
23	CST PW Equity	Cersanit Krasnystaw SA	1,263	6,8
24	CIE PW Equity	Ciech SA	0,687	14,088
25	CMR PW Equity	ComArch SA	0,37	3,76
26	COR PW Equity	Comp Rzeszow SA	0,262	1,39
27	CMP PW Equity	Comp SA	0,034	0,456
28	CPL PW Equity	Computerland Poland SA	1,137	6,206
29	DBC PW Equity	Debica	0,719	5,539
30	DBP PW Equity	Deutsche Bank PBC SA	0,018	6,77
31	ECH PW Equity	Echo Investment SA	0,776	5,77
32	EDR PW Equity	Eldorado SA	0,226	3,704
33	ELE PW Equity	Elektrim SA	0,371	35,224
34	ELB PW Equity	Elektrobudowa SA	0,171	3,971
35	BDZ PW Equity	Elektrocieplownia Bedzin SA	0,028	0,49
36	ELS PW Equity	Elstar Oils SA	0,13	1,929
37	EMX PW Equity	Emax SA	0,341	1,971
38	EPN PW Equity	Energomontaz - Polnoc SA	0,061	2,864
39	EUR PW Equity	Eurocash SA	0,323	57,485
40	RFK PW Equity	Fabryka Kotlow Rafako SA	0,166	8,718
41	FTE PW Equity	Fabryki Mebli Forte SA	0,288	15,507
42	FCL PW Equity	Farmacol SA	0,59	11,692
43	FER PW Equity	Ferrum SA/Poland	0,027	1,584
44	DWR PW Equity	Firma Chemiczna Dwory SA	0,654	10,357
45	GTN PW Equity	Getin Holding SA	0,415	72,015
46	GTC PW Equity	Globe Trade Centre SA	1,588	8,104
47	KTY PW Equity	Grupa Kety SA	1,803	8,926
48	GRO PW Equity	Grupa Onet.PL SA	0,16	1,42
49	HOP PW Equity	Hoop SA	0,072	3,533
50	HTM PW Equity	Hutmen SA	0,125	3,582
51	IPL PW Equity	Impel SA	0,161	6,2
52	IPX PW Equity	Impexmetal SA	0,127	1,479
53	IND PW Equity	Indykpol	0,089	1,001
54	BSK PW Equity	ING Bank Slaski SA	0,638	0,887
55	CAR PW Equity	Inter Cars SA	0,233	3,915
56	GCN PW Equity	Inter Groclin Auto SA	0,434	2,562
57	IVX PW Equity	IVAX Corp	0,522	4,852
58	JCA PW Equity	JC Auto SA	0,12	2,5
59	JLF PW Equity	Jelfa	0,502	4,758
60	JTZ PW Equity	Jutrzenka	0,089	1,304
61	KGH PW Equity	KGHM Polska Miedz SA	5,76	111,432
62	KLR PW Equity	Koelner SA	0,259	10,9

63	KGN PW Equity	Kogeneracja	0,131	2,814
64	KPX PW Equity	Kopex SA	0,033	0,485
65	KRB PW Equity	Kredyt Bank SA	0,347	21,917
66	KRS PW Equity	Krosnienskie Huty Szkla Kros	0,256	1,289
67	LTX PW Equity	Lentex SA	0,19	6,025
68	LPP PW Equity	LPP SA	0,818	0,577
69	MCI PW Equity	MCI Management SA	0,086	22,627
70	MNC PW Equity	Mennica Panstwowa SA	0,207	1,655
71	MPW PW Equity	Miejskie Przedsiebiorstwo Energetyki Cie	0,075	4,846
72	MNI PW Equity	MNI SA	0,06	9,18
73	MOL PW Equity	Mol Magyar Olaj- es Gazipari Rt.	2,141	4,599
74	MPP PW Equity	Mondi Packaging Paper Swiecie SA	1,047	11,828
75	NET PW Equity	Netia SA	2,104	297,645
76	ORB PW Equity	Orbis SA	1,125	27,379
77	ORF PW Equity	ORFE SA	0,038	1,205
78	PGD PW Equity	Paged SA	0,106	4,419
79	PBG PW Equity	PBG SA	0,411	4,5
80	PEK PW Equity	Pekaes	0,294	22,302
81	GRJ PW Equity	Pfleiderer Grajewo SA	0,839	2,464
82	PLT PW Equity	Polcolorit SA	0,173	32,646
83	PLC PW Equity	Polifarb Cieszyn-Wroclaw SA	0,146	14,819
84	PLG PW Equity	Poligrafia SA	0,107	2,321
85	PXM PW Equity	Polimex Mostostal Siedlce SA	0,603	13,3
86	PLS PW Equity	Polmos Lublin SA	0,242	2,816
87	PGF PW Equity	Polska Grupa Farmaceutyczna SA	0,866	9,229
88	DUD PW Equity	Polski Koncern Miesny Duda SA	0,602	28,96
89	PKN PW Equity	Polski Koncern Naftowy Orlen	10,499	129,144
90	PKO PW Equity	Powszechna Kasa Oszczednosci Bank Polski	9,876	212,926
91	PTM PW Equity	Praterm SA	0,198	6,5
92	PRM PW Equity	Prochem	0,114	2,543
93	PKM PW Equity	Prokom Software SA	2,417	10,905
94	PSP PW Equity	Prosper SA	0,071	3,277
95	RDN PW Equity	Redan SA	0,096	6,226
96	RMX PW Equity	Rolimpex SA	0,132	6,731
97	SKA PW Equity	Sniezka SA	0,231	4,794
98	SFT PW Equity	Softbank SA	0,605	11,789
99	SKW PW Equity	SOKOLOW SA	0,21	22,735
100	STX PW Equity	Stalexport SA	0,263	76,184
101	STF PW Equity	Stalprofil SA	0,156	0,754
102	STR PW Equity	Ster-Projekt SA	0,177	14,491
103	SNK PW Equity	Stomil Sanok	0,489	2,504
104	TEX PW Equity	Techmex SA	0,159	4,013
105	TPS PW Equity	Telekomunikacja Polska SA	9,93	277,6
106	TMX PW Equity	Telmax SA	0,122	1,426
107	TIM PW Equity	Tim SA	0,071	6,885
108	TFM PW Equity	Torfarm SA	0,05	0,702
109	TVN PW Equity	TVN SA	1,259	17,938
110	UML PW Equity	Unimil SA	0,14	2,06
111	VST PW Equity	Vistula SA	0,266	4,885
112	WSP PW Equity	WSiP SA	0,334	26,563

113	STP PW Equity	Zaklad Przetworstwa Hutniczego STALPRODU	0,374	3,43
114	MSO PW Equity	Zaklady Przemyslu Cukierniczego MIESZKO	0,063	10,8
115	WWL PW Equity	Zaklady Przemyslu Cukierniczego WAWEL SA	0,105	0,605
116	KSW PW Equity	Zaklady Tluszczowe Kruszwica	0,115	2,281
117	ZLR PW Equity	Zelmer SA	0,274	9,115

Slovakia

	Ticker	Name	% Weight	Shares
			in the Index	in the Index
1	BSL SK Equity	DES Biotika AS Slovenska Lupca	n.a.	n.a.
2	NAFT SK Equity	Nafta Gbely AS	n.a.	n.a.
3	IRB SK Equity	OTP Banka Slovensko AS	n.a.	n.a.
4	SES SK Equity	Slovenske Energeticke Strojarne AS	n.a.	n.a.
5	SLOVN SK Equity	Slovnaft AS	n.a.	n.a.
6	VUB SK Equity	Vseobecna Uverova Banka AS	n.a.	n.a.

Romania

	Ticker	Name	% Weight	Shares
			in the Index	in the Index
1	BRD RO Equity	BRD-Groupe Societe Generale	25,492	153,318
2	SNP RO Equity	SNP Petrom SA	24,321	4956,359
3	TLV RO Equity	Banca Transilvania	24,187	2867,436
4	RRC RO Equity	Rompetrol Rafinare SA	8,557	10549,638
5	TEL RO Equity	Transelectrica SA	5,544	18,324
6	ATB RO Equity	Antibiotice	3,413	227,449
7	BCC RO Equity	Banca Comerciala Carpatica Sibiu	3,372	698,675
8	IMP RO Equity	Impact	2,636	500
9	BIO RO Equity	Biofarm Bucuresti	1,942	352,128
10	FLA RO Equity	Flamingo International SA	0,537	194,763

Bulgaria

	Ticker	Name	% Weight	Shares
			in the Index	in the Index
1	DZI BU Equity	Insurance & Reinsurance Co DZI	21,771	3,86
2	PET BU Equity	Petrol AD	14,964	109,25
3	SFARM BU Equity	Sopharma AD	14,447	66
4	ALB BU Equity	Albena AD	12,067	4,273
5	CCB BU Equity	Central Cooperative Bank AD	10,917	48,507
6	BTH BU Equity	Bulgartabak Holding	7,022	7,367
7	BLABT BU Equity	Blagoevgrad-BT AD	5,953	2,703
8	BIOV BU Equity	Biovet AD Peshtera	3,642	6,783
9	NEOH BU Equity	Neohim AD	3,493	2,654
10	ZLP BU Equity	Zlatni Pyasatzi AD	2,843	6,494
11	ORGH BU Equity	Orgachim AD	1,912	0,503

12	SLB BU Equity	Slanchev Bryag AD	0,969	1,958

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