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POTENTIAL BENEFITS FOR FINNISH INVESTORS
FROM PORTFOLIO DIVERSIFICATION TO
CENTRAL AND EAST EUROPEAN TRANSITION ECONOMIES

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ABSTRACT

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Objective

The aim of the thesis was to investigate the potential benefits for Finnish investors from portfolio diversification to the selected transition economies by applying the classical mean-variance portfolio theory.

Data and Methodology

The returns of stock market indices were analysed and macroeconomic factors of the economies evaluated. Estonia, Latvia, Lithuania, Poland, Czech Republic, Slovak Republic, Hungary and Slovenia were the investigated countries. Typical characteristics of the emerging economies stock markets were also discussed. The distinction between the return distributions of the developed and emerging stock markets was highlighted.

Daily and weekly returns were analysed in two periods: 1/1995-7/2000 and 11/1997-7/2000. Minimum variance portfolios were calculated and the efficient frontiers with expected portfolio returns traced out. Different optimal portfolios were formed and optimal asset weights presented.

Results

The transition economies' stock returns seem to have different features than the other emerging markets as the returns are generally lower and distributed differently. Benefits for Finnish investor from portfolio diversification to transition economies can be achieved in the form of reduced variance. In addition, the optimal portfolios were relatively well diversified with the lower level of expected returns.

Keywords

portfolio diversification, mean-variance analysis, transition economies

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1. INTRODUCTION

In this thesis, the potential benefits for Finnish investor from portfolio diversification to selected Central and East European economies (CEEEs) will be investigated. The selected eight countries are the ones with most developed economies and financial markets out of the total 26 transition (i.e. former socialist) countries. Transition countries have rapidly restructured the economies, developed financial market institutions and created regulatory framework for capital markets. The actions taken during the last ten years are gradually making these countries more attractive to foreign investors, who want to take the opportunity of potential high returns and especially to further diversify their portfolios.

International portfolio diversification has been studied extensively for decades. During past fifty years the related theories have developed from classical mean-variance approach to relatively sophisticated international capital asset pricing models. The research has extended geographically from USA and Europe to Southern America, Africa, most recently Asia and other emerging economies. Transition countries have not been extensively studied yet, because of the short existence of their financial markets.

Previous research about portfolio diversification to CEEEs from the point of view of Finnish investor has not been published. However according to some previous studies (e.g. Haavisto, Liljeblom), substantial benefits from portfolio diversification to developed and developing countries to Finnish investors could have been achieved.

1.1 Why to Diversificate and Why Eastern Europe?

In theory, the benefits from portfolio diversification are obvious. Also in practice the benefits are unquestionable. Even for U.S. investors a large part of the investment opportunities lie outside the domestic market. For investors for example from Finland,

the opportunities (at least in terms of market values of the countries) outside the home country are wider than those within the country of domicile. For Finnish investors, the benefits are likely to be still quite substantial when compared to other Nordic countries as there are still only few liquid shares traded in Helsinki Stock Exchange and probably integration of the Finnish financial markets to the foreign markets is not yet complete.

An internationally diversified portfolio is substantially less risky than a purely domestic portfolio, because stock returns display much lower positive correlation across countries than within a country. However in light of the evidence on the greater integration of developed stock markets, portfolio managers should consider investing in non-developed markets. As developed country populations age, technology is diffused around the world and trade and investment barriers continue to fall, investors in the more advanced markets in the world have few options but to continue to diversify into emerging markets (Blommestein, 1998 14).

As financial reforms take root and market institutions appear the equity market activity in transition countries is expected to jump in the same manner as in the better-known emerging markets. Emerging equity markets offer potentially attractive rates of return in part because of the low-cost resources and technology transfers often produce large profit margins for firms operating in such environments (Papaioannou & Tsetsekos, 1997). Many East European emerging transition economies have higher GDP growth rates than the developed countries in Europe, the stocks are still inexpensive and in addition the correlations between developed countries and emerging economies have been and are likely to remain relatively low. In addition, the pension schemes in CEEs are likely to increase the domestic investors' interest to stock markets, which is likely to increase the index values.

1.2 Purpose and Objectives

The purpose of this paper is to investigate, whether it would be beneficial for Finnish investors to invest into the CEEEs' stock markets. The objectives are to investigate, by using the mean variance theory, the interactions between Finnish and CEEEs' stock markets and to evaluate CEEEs' investment potential and present state as an investment area for Finnish investors.

First the theory of diversification and development of the previous research will be presented to give the reader an overview of the topic. Then the special features of the emerging economies, from the point of view a portfolio investor, are introduced because of the substantial differences between the developed and emerging countries. The key macroeconomic indicators and the development of the CEEEs' stock markets are described, as the empirical analysis should not rely only on the stock index return information. The analysis of the CEEEs' country-wise position from the point of view of a Finnish investor is to support the empirical part in which the optimal portfolios consisting of Finland's and CEEEs' main stock market indices are created.

1.3 Research Hypothesis

The main hypothesis of this study is that mean-variance portfolio theory shows statistically significant *ex post* risk reduction and return improvement benefits for Finnish portfolio investor compared to holding non-diversified portfolio, when the assets in the minimum variance portfolios consist of the selected CEEEs. It is also assumed, that the return distributions of the CEEEs are normally distributed.

1.4 Methodology and Data Presentation

The following CEEEs will be analysed: Estonia, Latvia, Lithuania, Poland, Czech Republic, Slovak Republic, Hungary and Slovenia. When referring to CEEEs in this thesis, only the countries listed above are concerned, unless otherwise specified. In

international context, the CEEEs belong to the so-called emerging countries. Other countries, which are considered as emerging ones, include Asian tigers and dragons, China, some African countries and transition economies. According to International Finance Corporation's (IFC) classification, emerging country's stock market is in transition, increasing in size, activity or level of sophistication (Emerging Stock Market Factbook, 1999, 1-5). Other qualifications are that country falls in the World Bank's category of a low or middle-income economy and the country's investable market capitalisation is low relative to its most recent GDP figures (Emerging Stock Market Factbook, 1999, 1-5).

It is assumed in this research, that standard deviation i.e. risk (or dispersion of returns around the mean) and expected return (a measure of central tendency) are the attributes, which reflect the payoff to a single investor and based on which, he makes his investment decisions. There are two sources of risk in international portfolio diversification: The variation of security prices and the exchange rate changes.

Due to the varying data periods i.e. data period from the Baltic countries being substantially shorter, the different compositions of the CEEE portfolio will be tested. First Finland and the CEEEs will be analysed in the traditional variance covariance matrices. Then the efficient frontier with the given expected level of daily and weekly returns will be traced out for different investment horizons in a following ways:

1. non-diversified portfolio from Finland
2. diversified portfolio between Finland and all CEEEs
3. diversified portfolio between Finland and CEEEs without Baltic countries

The data used in this study consist of the daily returns of the major stock indices in CEEEs and the exchange rates between Finland and CEEEs. The daily returns will be converted to FIMs. The data has been achieved directly from the national stock exchanges and foreign exchange data from the Nordea Bank. The stock index data will be complemented with statistics from Standard & Poors.

1.5 Disposition

The first chapter, the introduction, explains why to diversificate and why should one invest in CEE transition economies' stock markets. The purpose and objectives of the study are also described. The methodology is briefly discussed and the concepts defined. Second chapter focuses on the modern portfolio theory (MPT) and problems related to MPT. Special features of portfolio diversification are home asset bias and domestic diversification, which are shortly introduced. Previous international and domestic research is presented at the end of the second chapter.

The analysis of the opportunities and risks related to emerging countries as an asset class in internationally diversified portfolio is included in the third chapter. CEEEs, which are investigated in this study, are also analysed in the third chapter. The macroeconomic indicators and the development of the stock markets are briefly described. Emerging and transition countries' indices are introduced and special characteristics of the emerging stock market returns data are presented in the fourth chapter. Descriptive statistics of the CEEEs' stock index data are in the fifth chapter. Eventually the mean-variance analysis is also carried out: Efficient frontiers are formed and optimal portfolio weights analysed. Discussion of the conclusions is in the sixth chapter.

2. THEORY OF DIVERSIFICATION

The primary motivation in holding a diversified portfolio of stocks is to reduce risk. The risk of a portfolio in terms of variability of returns will be less than the risk of its separate parts. The fundamental reason behind international diversification is the fact that the markets are not fully correlated with each other.

The standard assumptions of the behaviour of the investors can be stated as follows:

- i) investors base their decision on just two parameters of the probability distribution function namely the expected return and the variance of return
- ii) investors' preferences include the favoring of higher means of returns
- iii) investors' preferences include the favoring of smaller variances of returns

2.1 Introduction to the Modern Portfolio Theory

Modern portfolio theory is based on the Markowitz work from 1952. The modern portfolio theory will be very shortly presented in this context according to Elton and Gruber (1995). This standard way of presenting portfolio theory is very easily available practically in all of the relevant textbooks (e.g. Ingersoll (1987), Sharpe (2000), Grinold and Kahn (1999), Tucker et.al (1995) etc.)

The squared deviation from the sample mean value is called variance. The covariance is a measure of how returns on assets move together. Dividing the covariance between two assets by the product of the standard deviation of each asset produces a measure called correlation coefficient with the same properties as the covariance but with a range of -1 to $+1$. As more and more securities are added to a portfolio, the average variance on the portfolio declines until it approaches the average covariance.

By specifying the return at some given level and then minimizing the risk, the result shows one point on the efficient frontier. The whole efficient frontier can be determined by minimizing the risk for any level of expected return.

However, some restrictions have to be imposed in order to get feasible results:

- ♦ The proportions invested in each security add to 1 (2).
- ♦ All the securities have positive or zero investment (3).
- ♦ The level of expected return has to be specified (4).

More formally:

X_i = share of asset i in the portfolio

σ_i^2 = variance of asset i

σ_{ij} = covariance between assets i and j

N = number of assets

$$(1) \quad \text{Minimize} \quad \sum_{i=1}^N X_i^2 \sigma_i^2 + \sum_{i=1}^N \sum_{\substack{j=1 \\ j \neq i}}^N X_i X_j \sigma_{ij}$$

s.t.

$$(2) \quad \sum_{i=1}^N X_i = 1$$

$$(3) \quad X_i \geq 0, \quad i = 1, \dots, N$$

$$(4) \quad \sum_{i=1}^N X_i \bar{R}_i = \bar{R}_p$$

Varying \bar{R}_p between the return on the minimum variance portfolio and the return on the maximum return portfolio, the efficient set will be traced out. Mean variance efficient portfolios thereby are also the minimum variance portfolios. The above stated quadratic optimization problem, with non-linear and linear constraints, will be applied at the empirical part of this study in the Chapter five.

The possibility for short sales will be excluded, because they would be too costly for most of the indices in the sample and according to Jorion (1992) they significantly increase the adverse effect of the estimation error on portfolio selection. Foreign exchange rate risk hedging is not considered because of the underdevelopment of the financial derivatives markets in transition economies. No transaction costs and taxes will be included in this study.

2.2 Problems with Mean-Variance Analysis

Jorion (1985) analyses the deficiencies of the traditional mean-variance analysis. He investigates the problem related to past sample mean returns as estimates of expected returns, which perform poorly outside the sample period. The instability of optimum weights is also studied. However, according to Jorion (1985), the uncertainty in variances and covariances is not as critical because they are more precisely estimated.

Jorion (1985), proposes shrinkage estimators to be considered as a solution to the problem of measuring the expected returns. The basic idea behind the shrinkage estimators is that each asset mean should be shrunk toward a common value, for example world mean to predicting expected returns. In practise this means that when increasing shrinkage, the efficient set becomes flatter.

The major defects according to Jorion (1985) of the classical application of mean variance analysis are as follows: Poor out of sample performance of the optimal portfolios i.e. performance measures always deteriorate substantially outside the sample period. Instability of the optimal portfolio: the proportions allocated to each asset are extremely sensitive to variations in expected returns and adding a few observations may change the portfolio distribution completely. The optimal portfolios are not necessarily well diversified, as corner solutions tend to often appear.

The problem with out of sample performance is common with most of the models used to analyse financial markets. In the case of corner solutions maximum/minimum weight constraints could be added to the mean-variance framework, should some countries have such an optimal weight, which in practise would not be realistic. However, the proposed shrinkage estimators could be tested in further analysis of the CEEEs' stock market returns.

Bekaert (1998a, 1998b), Harvey (1995), Erb et.al. (1998) and Solnik (2000) claim that the usual mean-variance framework is no longer adequate to characterize investment decisions when studying the non-normally distributed returns of emerging markets. As the stock market returns of the emerging markets tend to exhibit excess kurtosis and are often skewed a mean-variance analysis, which takes into consideration those higher moments, could provide results that are more accurate. Erb et.al (1998) included the effects of the higher moments to the problem of portfolio allocation to the emerging markets. This kind of extension could be applied also to this study of CEEEs' if the optimal portfolio weights were to be studied more deeply.

2.3 Problems Related to CAPM Models in Emerging Market Analysis

Sharpe (1964) extended the portfolio diversification theory developed by Markowitz 1952 to include an assumption of homogenous expectations. They claimed, that if all the investors were rational and agreed on the expected returns, variances and correlations of the available investment alternatives then they will effectively be facing the same opportunity set and end up choosing the same perfectly diversified portfolio. These assumptions are the basis for the Capital Asset Pricing Model (CAPM), which states that if all the investors were rational and markets were efficient, only the non-diversifiable risk of an asset would be rewarded.

However, the applicability of the CAPM in to the emerging markets' analysis has been criticised by Bekaert in several research papers: According to Bekaert (1997 and 1995) CAPM fails for emerging markets for four main reasons:

1. the benchmark portfolio may not be mean-variance efficient
2. a multifactor representation is more appropriate for emerging markets
3. an examination of average returns and average risk could be misleading if the risk and expected returns change through time
4. if the markets are not fully integrated into world capital markets, the CAPM fails

It goes without saying, that the CEEEs are not likely to be fully integrated into world capital markets, which could be considered as a main reason, why CAPM will not be applied in this research.

Harvey et.al. (1997) states that, as the emerging market returns usually exhibit skewness and kurtosis (see the Chapter 4.), dynamic models taking into consideration these higher moments would be more appropriate. However, the dynamic models are likely to be too complicated to use, due to the relatively high number of countries included into this thesis.

As it has been relatively complicated to generalize domestic asset pricing models to the international environment, empirical research has often relied heavily on the risk-reward framework. In addition, emerging transition economies' stock markets are still at so early stage of development, that it would not be appropriate to try to apply more sophisticated asset pricing models, which would require the determination of beta coefficients, borrowing and lending rates or the inclusion of macroeconomic factors.

According to Rockinger and Urga, (1999), the quality of macroeconomic data of the transition countries may be of doubtful quality and the development of the market economy did not start until the beginning of 1990s. However, some indicators of the macroeconomic development describing the CEEEs transition period are likely to be

valuable and useful to estimate the country's overall suitability for foreign portfolio investors.

2.4 Home Asset Bias

Home asset bias is one factor, which slows down the development of international portfolio diversification. The strong bias in favor of domestic securities is a well-documented characteristic of international investment portfolios. Home asset bias can be defined as the dominance of domestic equities in portfolios.

The main factors that overwhelm the potential gains from a large scope of international diversification are familiarity with domestic economy, political, social, and legal institutional factors, existing informational networks, differing national accounting systems, deviations and uncertainty of government regulations, rule of law, the existing procedures for the assessment of foreign risks, geographical factors and trade links (Al-Khail, 2000). In addition to the above listed factors, the international diversification to emerging economies is affected by some additional factors to be considered in Chapter three.

Al-Khail (2000) examines the determinants of international portfolio investment from the Finnish investor's point of view. Data consist of outward portfolio investment positions of Finnish residents in 28 countries, which are included developing and developed countries as of December 31, 1997. Al-Khail, (2000) is able to explain about 80% of the variance of the international equity investment of Finnish based investors. A gravity model formulation is applied to identify, quantify and analyze the determinants of international portfolio investment of Finnish investors.

A-Khalil (2000) finds sizable and statistically significant parameter estimates for both the elasticity of market capitalization of the receiving country and the elasticity of the direct distance between the financial capitals of the sending country and the receiving

country. The distance is considered as a proxy for information asymmetries and contains such effects as differences in culture, language, tastes and so on. The geographical proximity and familiarity of the Baltic countries to Finland could make the Finnish investors to favor them in practise over the more unfamiliar CEEs like Slovenia or Slovak Republic.

2.5 Domestic Diversification

Errunza et al. (1999), examine whether portfolios of domestically traded securities can mimic foreign indices so that investment in assets that trade only abroad is not necessary to exhaust the gains from international diversification. Monthly data from 1976 to 1993 for seven developed and nine emerging markets (South America, Greece, India, Korea, Mexico, Thailand and Zimbabwe) are used. Errunza (1999) documents that emerging market returns on average are much higher, display greater volatility and are more autocorrelated than their developed market counterparts. Portfolios, which measure U.S. investors' ability to obtain the benefits of international diversification using domestically traded assets, are developed.

Return correlations, mean variance spanning and Sharpe ratio test results provide strong evidence that gains beyond those attainable through home-made diversification have become statistically and economically insignificant. Errunza (1999) also argues that investors no longer need to trade abroad to achieve an internationally mean-variance efficient portfolio. Obviously for a Finnish based investor, there certainly does not exist as wide domestic diversification opportunities as for U.S. investor and so the following investigation of diversification to CEEs is clearly justified.

2.6 Previous Research

The development of international portfolio diversification is briefly described in this chapter. Traditional international researches, which follow the classical mean-variance method, are presented first. Then some of the more recent international researches are briefed. Studies about portfolio diversification from the Nordic point of view are presented in the second subsection of this chapter. For this thesis, the previous research on the emerging equity markets introduced at the end of this chapter is the most relevant subsector of the research about international portfolio diversification. Hardly any studies about portfolio diversification to transition economies has been published, which could be because of the short existence and relatively small capitalisation of those markets.

2.6.1 International Studies

Grubel (1968) applied the Markowitz portfolio diversification theory for the first time to the long-term asset holdings that include claims denominated in foreign currency. Data used in his study consists of dividend adjusted monthly returns in dollars of eleven major stock market indices in the world for the time-period 1/1959-12/1966. Possible gains to U.S. investors from international portfolio diversification are studied according to the classical mean-variance analysis described above. Grubel (1968) comes to a conclusion, that diversification among the different markets would have yielded investors higher rates of return or lower risks than the portfolios without diversification.

Levy & Sarnat (1970) used the classical mean-variance analysis in their research of the possible portfolio diversification benefits to U.S. investors. They studied the period 1951 to 1967 and 28 countries (including developed and developing countries from all around the world) were included into the research. The annual returns in dollars for each country's main stock index were calculated.

Efficient frontiers were formed, with the assumption that selling short is not allowed. Levy & Sarnat add the risk free borrowing and lending rates in the analysis in order to reduce the efficiency locus to a single point (portfolio). Out of the 28 countries included in the study, nine countries were included in at least one of the optimal portfolios in the relevant range. In general, the countries highly correlated with USA are not included in to the optimal portfolios. Relatively high proportion of investments (40% - 60%) is allocated in developing countries, such as Venezuela, South Africa, New Zeland etc. Levy & Sarnat come to a conclusion, that significant improvement to American investors' portfolio performance (especially in terms of risk reduction) is gained only by diversifying to developing countries and Japan.

Solnik (1974), shows in his research for the major European Stock markets and for the NYSE stocks that substantial advantages in risk reduction through diversification can be achieved the benefits being greater, when diversified internationally instead of domestically. The seven leading European stock markets are studied (and NYSE stocks) based on weekly returns for the period 1966-1971. Solnik generates portfolios by randomly selecting the stocks for each country and finds that in the U.S. market non-diversifiable risk is substantially lower than for example in Germany, which means that international diversification should be more attractive for Europeans. Solnik discusses also about the different diversification strategies: geographical diversification, diversification across industries and the combination of the two above methods.

Grauer and Hakansson, 1987 have studied gains from international diversification 1968-1985. In the study, the multi-period portfolio model is applied to a universe consisting of the four principal U.S. asset categories and up to 14 non-U.S. equity and bond categories. The model used in the study is based on the pure reinvestment version of the multiperiod investment theory. The portfolio weights for the various asset categories and the proportion of assets borrowed are calculated by solving the above system (equations 1-4) plus applicable constraints via nonlinear programming methods. The

monthly and annual returns series for the U.S. asset categories and the quarterly data base on non-U.S. equity returns denominated in U.S. dollars for 1960-1985 covering seven countries (Canada, Japan, France Germany, Switzerland, Netherlands, and the UK). The risk free asset used for quarterly revision was assumed to be 90-day U.S. T bills. For many strategies the portfolio returns with non-U.S. asset classes included in the universe exceed those generated from the domestic universe at the 5% level of significance.

De Santis & Gerard, (1997), test the conditional asset pricing model (CAPM) for World's eight largest equity markets and analyse its implications for international portfolio diversification. The original CAPM predicts that the expected return on any traded asset, in excess of a risk free return, is proportional to the systematic risk of the asset, as measured by its covariance with a market-wide portfolio return. CAPM applied to international financial markets postulates, that the conditional expected return on any asset is linearly related to the conditional covariance between that asset and the return on a worldwide portfolio.

The data are the monthly dollar-denominated returns on stock indices for the G7 countries and Switzerland for the period 1970-1994. Value-weighted world index is used as an approximation of the market portfolio. Although severe U.S. market declines are contagious at the international level, and often imply a significant reduction in the gains from holding an internationally diversified portfolio. However, the expected gains from international diversification for a U.S. investor average 2.11% per year and have not declined over the last two and half decades in response to changed conditions in international security markets.

2.6.2 Nordic Studies

Haavisto & Hansson (1991) have studied whether there would exist risk reduction possibilities for Danish, Finnish, Norwegian and Swedish investors from diversification in the Nordic equity markets.

The period 1970-1988 was analysed in the study. The monthly returns nominated in the local and foreign currencies of the general indices of the stock markets were used. Haavisto & Hansson apply the traditional mean variance approach of portfolio analysis. Domestic investor could add well-diversified foreign portfolios to his domestic portfolio. Then the possibilities, *ex post*, for risk reduction were calculated for each Nordic investor by constructing efficient frontier using a mean-variance optimization.

According to Haavisto & Hansson, efficient frontiers show that a Finnish investor will not be able to find a Nordic portfolio, which would dominate his domestic one whereas the other Nordic investors can lower the risk with the same or higher return. Haavisto & Hansson conclude that the actual risk reduction by Nordic diversification would have been possible.

Liljeblom et al., (1995), have studied whether the benefits from international diversification to Nordic investors have decreased towards the end of 1980s. The monthly returns of 18 national stock markets are analysed. The countries include 17 OECD countries plus Hong Kong. The returns are based on value-weighted indices of the national stock markets 1974-1993 and monthly exchange rate changes during two subperiods: 1974-1986 and 1987-1993.

Ex post efficient frontiers were formed and the results show that, in general, significant benefits from international diversification were obtainable also during the second subperiod. On an *ex post* basis, substantial benefits from international diversification for

the Nordic countries are found and the benefits would have been larger during the later subperiod.

Liljeblom & Löflund (1998), have studied the benefits from international diversification currently and after the EMU for the four Nordic countries of Denmark, Finland, Norway and Sweden. The analyses are performed on equity returns in 18 national stock markets using monthly data. The countries include 17 OECD countries plus Hong Kong. The stock market returns are based on value-weighted indices formed from mainly major companies on the national stock markets. The overall time period is 9/1974- 5/1998.

The most recent correlations between Nordic stock markets and various international benchmarks show that Finland, the only country, which joined EMU in its first phase, is the country with the lowest level of international correlations (0.41 or below). The Finnish index being poorly diversified, has a markedly high volatility. Therefore, Finnish investors seem to have a change for better risk reduction by means of diversification than the other Nordic investors, not so much due to the nonexistence of currency risk within the EMU as due to the poorly diversified domestic index itself.

2.6.3 Emerging Market Studies

Donayre (1994) Stone (1992) and Kautz, Perol and Sands (1993) have studied the role of emerging stock markets in a U.S. investor's asset mix. In all the studies, the analysis is carried out in mean-variance framework. Compared to the developed country stock returns, emerging market stock returns have been larger and more volatile, but the developed and emerging market returns have exhibited weak positive correlations. Because of the weaker correlation, it has been possible to add some of the more volatile emerging market stocks to a developed-country portfolio without increasing the portfolio's risk.

Donayre (1994) states, that prices in emerging markets are so volatile that the choice of entry point can be the critical decision. He also advocates the mean-variance framework but warns that the estimates must focus on the future, not the past. Kautz, Perlow and Sands discuss the role of emerging markets in a portfolio and recommend 10%- 25% of the international equity portfolio to be placed in emerging markets.

Erb et. al. (1998, 42) points out the change in the research view in the mid 1990s from the study of high returns of emerging markets to examine their role as an asset class, which would be used to diversify the global portfolio risk. The main benefit to investing in emerging markets was the low correlation with developed market returns.

Harvey (1995) examined the significance of the benefits from portfolio diversification to emerging countries. Harvey (1995) adds emerging market assets (IFC index) into the MSCI world composite index to examine whether the investment opportunity set shifts significantly in minimum variance framework. Harvey (1995) finds evidence, that mean variance efficient portfolio, which consists of the world index and 20 emerging countries' indices (based on IFC index) significantly reduces portfolio volatility and increase expected returns.

In the following research, Harvey et.al (1997) analysed the emerging and developed markets in differently weighted mixes in various active portfolio strategies. Several models, which captured the predictability in returns, volatilities and covariances were developed. Conditional maximum Sharpe ratio strategies and conditional probability strategies were tested. Mean-variance analysis, GARCH model according to Baba, Enlge, Kroner and Kraft (BEKK), and volatility model based on rolling variances and covariances were applied and tested. According to Harvey et al. (1997), multivariate GARCH s only feasible on a small number (less than five) regions and countries. Harvey et al. (1997) found that the models capture the special characteristics of the emerging market data and that rolling-variance-covariance model produces impressive

results. The best model, when implemented on an out-of sample basis, was the BEKK model.

2.6.4 Transition Market Studies

Rockinger & Urga (1999 and 2000) have studied the evolution of stock markets in Poland, Hungary, Czech Republic and Russia. The development of autocorrelation is studied in the GARCH framework by using dollar nominated daily returns for the period 4/1994-6/1999. They claim that the tradeoff for diversification into transition countries' stock markets is that they may not be fair i.e. efficient. On the other hand they admit, that the market efficiency may not be measurable by direct means as the enforcement of shareholder protection laws, insider trading or disclosure practises are difficult to turn into observable variables (Rockinger & Urga, 2000, 458).

3. EMERGING STOCK MARKETS AND THE CEEES

CEEEs' emerging equity markets possess the same characteristics as the emerging markets of the 1970s and 1980s. The most often stated characteristics of the more matured emerging markets are described in this chapter. Emerging markets will be evaluated as a homogenous asset class i.e. pros and cons common for all the countries are presented first. Secondly, some key macroeconomic indicators are evaluated. Eventually the initial development of the CEEEs stock market will be briefed. The overall stage of development of the CEEEs is discussed at the end of the chapter.

3.1 Pros and Cons of the Emerging Stock Markets

An international investor should be aware of the factors listed below, which are to be carefully considered, weighted and analysed before it is decided whether or not emerging markets should be included in internationally diversified portfolio.

Table 1. Pros and Cons of the Emerging Stock Markets

PROS	CONS
<i>Higher returns</i>	<i>High volatility</i>
<i>Low correlations</i>	<i>Contagion</i>
<i>Imperfect integration</i>	<i>High correlation during crisis periods</i>
<i>High growth rates of the economies</i>	<i>Small market capitalisation and limited liquidity</i>
<i>Country risk</i>	<i>Poorly diversified indices</i>
<i>Need for foreign capital</i>	<i>Currency risk</i>

Higher Returns

No study was found, which would doubt the fact that emerging markets have generated higher returns since mid 1980s than developed markets (see for example Harvey 1995, 1997, 1998, Solnik, 2000). The development of the transition countries' returns is more difficult to analyse due to the short existence of the equity markets and the periods of speculative trading (for example in Polish and Latvian stock markets).

Low Correlations

The low correlations between assets in portfolios are of utmost importance for portfolio investors. In addition to high returns, low correlations between emerging markets and developed markets have attracted much interest among the investors and the researchers. Emerging markets are documented by many authors (for example Solnik, (2000) to exhibit low correlations between developed markets. Harvey (1995) found correlation of 14% between IFC developed and emerging markets indices. The lower correlations could be at least partly explained by the fact, that the emerging countries' economies tend to be less linked to the business cycles of developed nations (Solnik, 2000, 309). Emerging markets are often not completely integrated into the world economy, which to some extent reduces the correlation between the world and emerging markets. International competition and specialisation among national economies has increased, which has not caused an increase to international correlations. Still national monetary, budgetary or fiscal factors do not appear to be well coordinated across world. (Solnik, 2000,118)

Imperfect Integration

In practice emerging markets are somewhat segmented from the international market. Returns on local companies are strongly influenced by domestic variables rather than by global variables, which means also that domestic risk is priced, not global risk. However in the future, the emerging markets are likely to integrate more in the world financial markets and the world information is more likely to have an effect on the equity returns. (Solnik, 2000, 314, Harvey 1998, 5-7)

Higher Growth Rates of the Economies

Emerging markets are expected to have high growth potential, as their economies have been growing rapidly in the 1990s. The economical growth is likely to cause the market capitalisation to increase. In many transition economies large privatised companies, which often held a monopolistic position in the socialist economy, still have a strong foothold in the local markets (e.g. Skoda-Auto in Czech Republic). In some cases, the monopolistic positions in the future are guaranteed by the local authorities (e.g. telecom in Lithuania). The monopolistic companies are obviously more likely to be able to generate higher profits than the companies operating in the competitive environment.

Country Risk

Cosset & Suret (1995) have studied the portfolio diversification the political riskness being one of the factors when composing an optimal portfolio. Main benefit of the inclusion of high political risk countries in an international portfolio is in terms of reduced overall portfolio risk. The reduction in the portfolio volatility reflects low correlation coefficients between returns in high and low political risk countries. However according to Perrotti & Oijen (1999) many emerging countries have reduced gradually their political risks during the course of sustained privatization. Emerging markets have performed so well because they have managed to convince many investors of their own reliability through radical economic reforms such as privatization. Country risks concerning especially CEEEs will be discussed in the next chapter, as macroeconomic factors, development of the stock markets and description of the CEEEs will be presented country-wise.

Need for Foreign Capital

Emerging markets rely extensively on foreign capital investments. A sudden loss of confidence in the emerging economy could lead to sudden capital outflows, currency collapse and to the illiquidity of the stock markets. Eventually also all the transition countries have realised the fact that they need foreign investors. All the CEEEs are

paying a lot of attention to create positive image about them, that the country's capital markets are well organised and regulated, smoothly functioning and trustworthy.

High Volatility

A common result from previous study of emerging markets is that the returns have been more volatile than the developed market returns (see for example Harvey, 1995. Solnik (2000, 307) has documented that in U.S. dollar terms most emerging markets have a volatility ranging between 25%-90% compared to 15%-25% for most developed markets. Recent examples would be Mexican stock market crisis in 1994, which reduced equity values in USD by 80% in three months after the crisis, the Asian crisis in 1997 or the partial default of Russia in the autumn 1998, which caused to certain extent the stock indices to plunge in CEEs. In Russia, the stock markets lost 87,5% during the year 1998 and in August 1998 62,5% (Emerging Stock Market Factbook, 1999, 48, 53).

Contagion

Due to the increased integration of the world capital markets, the crisis in one big economy often cause shock waves throughout the whole world. Solnik (2000, 309-311) claims that during the drops of developed markets, emerging markets drop even by a larger amount, because of their high volatility.

When a crisis hits an emerging country, it is likely to affect other emerging countries. Investors often consider emerging markets as one homogenous asset class and when crisis hits one emerging market, the investors' response is often to reduce the exposure to the whole asset class. (Solnik, 2000, 321) In addition, the financial markets of transition economies are even more sensitive and dependent on foreign (speculative) capital, which may quickly fly to higher quality assets during the bearish market.

High Correlations During Crisis Periods

During the crisis periods, the correlations within emerging markets and to the world tend to increase. Erb et. al (1998) has studied the risks in emerging markets. In his study, he focuses on the behavior of the correlations between the world and emerging markets during bull and bear markets. He finds evidence, that the international diversification does not work as well when markets are declining i.e. emerging markets are an unreliable hedge for declining world markets. Often the correlations tend to increase also between developed countries during the crisis periods (Longin & Solnik, 1999). Especially the correlations within emerging markets are likely to increase (for example during the Mexico crisis in 1994 the average correlation increased from 25,9% to 41,1% or during the Asian crisis 1997/1998 from Thailand's 24,1% to 43,1%). (Erb et al. 1998 42-46)

Small Market Capitalisation and Low Liquidity

Due to the small market capitalization of many emerging equity markets, even the small size of institutional investments can boost equity prices out of proportion with fundamentals and create the conditions for the genesis of a bubble phase.

In emerging markets, there is usually lack of liquidity and depth. Small trading volumes decrease efficiency, and may provide opportunities for price manipulation. Offering emerging market securities in more established stock markets can improve liquidity. Depth and breadth of trading is less when shares owned by the government, banks or families are not traded.

The speculative investors can create liquidity problems in the stock markets for example by selling large blocks of shares. Especially during the bearish market situation, the potential lack of liquidity could cause problems for foreign investors. Liquidity is an important indicator for foreign investors deciding whether to participate in a market,

because high liquidity means low trading costs and an ability to move quickly in and out of the market (Korhonen et.al, 2000, 19)

Poorly Diversified Indices

Many of the emerging market stock indices are relatively poorly diversified, and often only a handful of companies comprise the bulk of the market capitalization. Around 500-1000 out of 3000-3500 listed stocks dominate the trading activities in 30-plus emerging markets i.e. 25-50 dominating stocks per market (Alexander, 1999, 2). For the CEEEs, there are even less liquid companies per country. Usually the CEEE indices are dominated by large banks, telecoms, medical and/or oil companies.

The CEEEs have increased the cooperation between the stock exchanges, and have formed together indices (see the Chapter four), which comprise of the most liquid stocks of the local indices. This kind of indices can be considered as an attractive opportunity for an investor, who wants to invest in one asset, which consists of the less risky blue chips of the several CEEEs.

Currency Risk

Currency risk exists on all foreign denominated investments. Political and currency risk are connected and it is typical for emerging countries, that falling stock prices often lead to falling currency (contrary to developed countries). Currency risks can only seldom be hedged. However, the previous studies show that there exist benefits from international portfolio diversification even in the presence of currency risk.

3.2 Macroeconomic Development in the CEEs

It has been stated in the previous studies about the transition economies that the macroeconomic data may be of low quality and according to Bekeart et. al (1998) the emerging markets are more likely to experience shocks induced by regulatory changes, exchange rate devaluations and political crises. As the emerging markets are more sensitive to different economical and political events than developed countries, traditionally used macroeconomic indicators should not be directly used in capital market models. However, it could be useful to generate an overview of the given country's stage of development and success in macroeconomic transition process, in which liberalization, privatization, macroeconomic stabilization, transformation and capital market creation were the main pillars. The macroeconomic indicators, like GDP development, inflation, foreign trade, FDI, privatization and country credit risk ratings are presented and evaluated in this chapter.

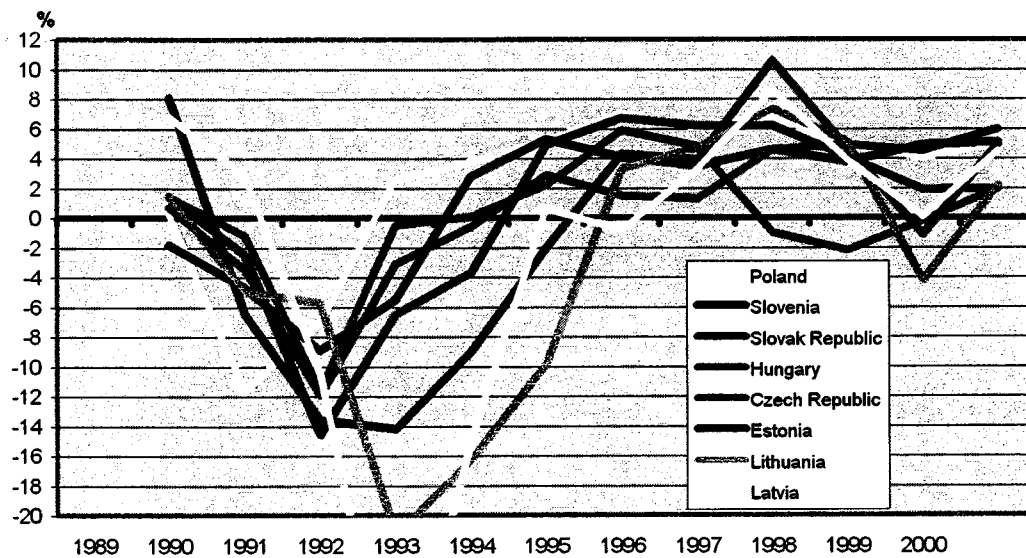
A given country's stage of economic development depends to some extent on the given measures i.e. you get what you measure. However a kind of conclusion could be drawn, that Slovak Republic, Latvia and Lithuania seem to be less developed and economically weaker than other CEEs. On the other hand, those three countries are the ones who suffered the most in the Russian crisis, and have not until yet fully recovered from it. The transition programs also started a few years later in Latvia and Lithuania than in other CEEs.

3.2.1 GDP Growth

Very steep negative GDP growth was experienced in the beginning of the transition period in all CEEs. The output decline was even larger in Lithuania and Latvia as some of their reforms were slower than in countries such as Poland and the Czech Republic. A positive economic growth started first in Poland, and at latest in Lithuania.

Another nod in the growth of Lithuania, Estonia, Latvia and Slovak Republic was caused by the Russian crisis since 8/1998. Especially Lithuanian banks suffered as they had substantial exposures on Russian Government Bonds, which defaulted. Czech Republic underwent a currency crisis in 1997, which was followed by a recession. Restructuring of the companies in Czech Republic had been postponed and the currency crisis triggered the recession. Poland, Slovenia, Slovak Republic and Hungary have experienced a positive GDP growth since 1993/1994 after successful and radical actions were taken to stabilize and restructure the economies. Those top four countries are also the ones, which have reached the 1989 GDP levels.

Figure 1. GDP Growth, 1989-2000



Source: Transition report, 2000, 65

Table 2. Estimated Level of the Real GDP in 1999 (1989=100)

Poland	Slovenia	Slovak Republic	Hungary	Czech Republic	Estonia	Lithuania	Latvia
122	109	100	99	95	77	62	60

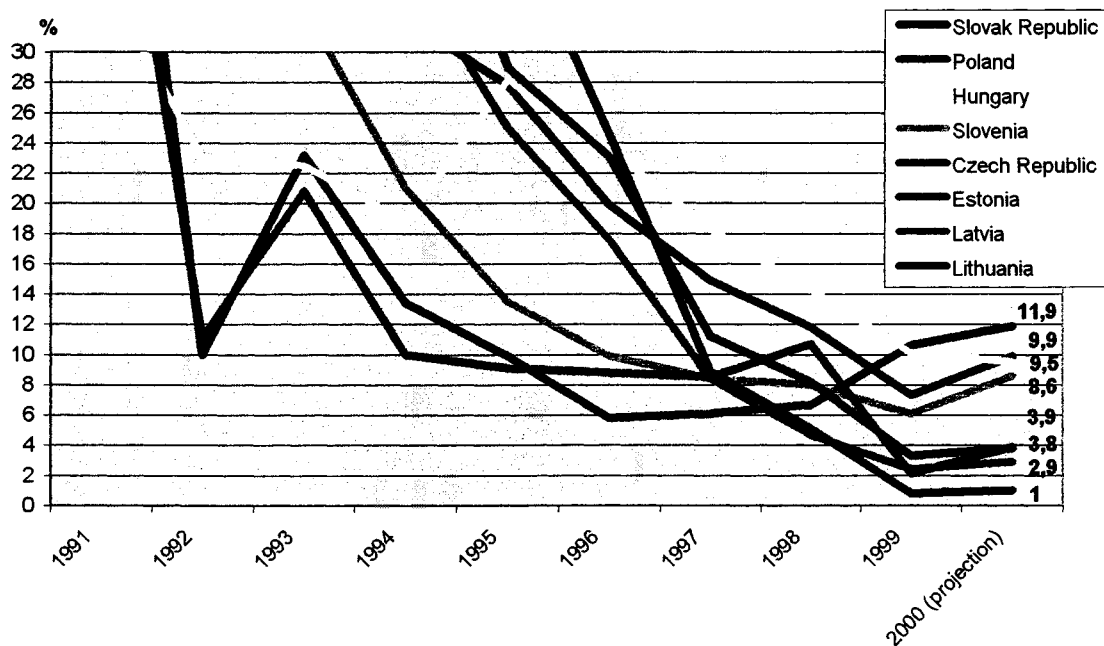
Source: Transition report, 2000, 65

Due to the recession in the 1980s in Poland, the GDP level in 1989 was relatively lower than in the other CEEs. Estonia seems to have succeeded better with its reforms than the other Baltics. On the other hand, there was not that much heavy industry in Estonia, than in Lithuania and Latvia. The old-fashioned communist era heavy industry sector has been the most problematic area for the CEEs to convert it to operate in the market economy.

All the CEEs experienced positive GDP growth in the year 2000 and seem to have recovered from the Russian crises. The growth prospects for the not too distant future seem to be relatively positive. According to Hanousek (1999) the transition countries GDP growth is likely to predict also the development of the equity market.

3.2.2 Inflation

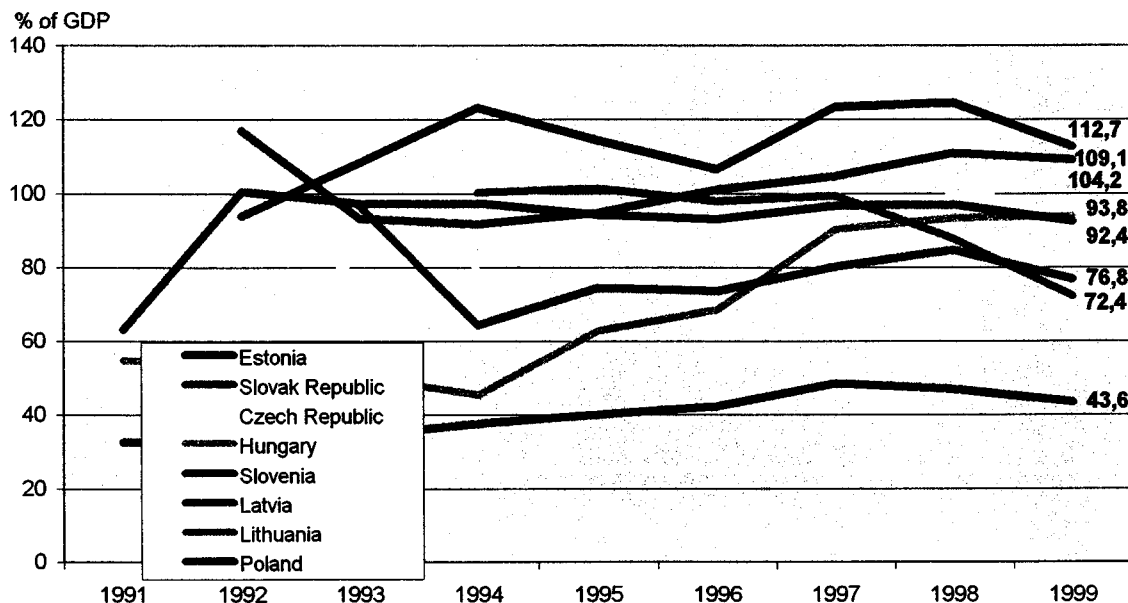
All the CEEs have managed to stabilize their economy. Hyperinflation, which was experienced in most of the CEEs, is not a problem any more in any country. However it should be noted, that only Poland, Czech Republic and Slovak Republic had inflation less than 15% since 1996. The Baltics and Czech Republic have had inflation less than 4% during last two years, which has been partly due to the economic slowdown in those countries. The other CEEs have the inflation rate approximately 10%, which is relatively high by the standards of the developed economies. The inflation figures should not be forgotten, when the attractiveness of the CEEs' stock markets is evaluated, as the development of inflation indicates the macroeconomic stability of the country.

Figure 2. Inflation, 1991-2000

Source: Transition Report, 2000, 67

3.2.3 Foreign Trade

After the collapse of the COMECON (the trade union of the former socialist countries) the system for planned foreign trade with predetermined prices also collapsed. All the CEEEs more or less lost their traditional foreign trade markets (and partners) and were to redirect their foreign trade to West. By now all the CEEEs' most important trade partner is the EU. Czech and Slovak Republics still have significant mutual trade. For many CEEEs, Germany is the single most important trade partner.

Figure 3. Share the Foreign Trade in GDP, 1991-1999

Source: Transition Report 2000, 2000, 154-213

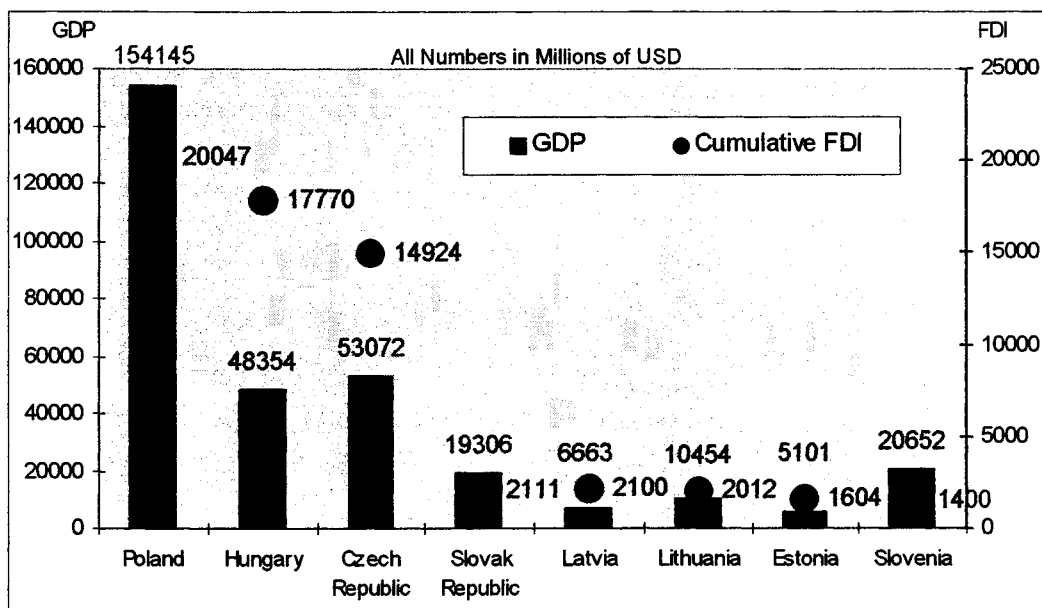
Trade to GDP indicates to some extent country's integration into world economy. Notably Poland is the country with less than 50% share of trade to GDP, which is substantially less than in other countries. Poland is the largest economy, and the country with relatively large domestic market, so it is not that depended on foreign trade. Estonia as a very open small economy has the highest share. Latvia and Lithuania have suffered most from the Russia's economic crises, as Russia was more important trade partner for them than for other CEEs. In this respect, the CEEs seem to be relatively well integrated (excluding Poland) on the world economy. However, this measure does not necessarily directly correlate with the extent of capital market integration into the world capital markets.

3.2.4 Size of the Economies and Foreign Direct Investments

One indicator of the country's stage of development is the amount of FDI it has managed to attract. In this respect Poland, Hungary and Czech Republic have been in

their own category. On the other hand, the size of their economies is also substantially larger. Poland could have expected to attract even more FDI, as it is so much bigger than Czech Republic or Hungary. For comparison Finland's GDP was USD 126 130 millions in 1999, which was approximately 20% smaller than Poland's. Obviously, the size of the country's economy reflects also the growth potential for its equity markets. In this respect, Poland is the most interesting country.

Figure 4. GDPs in 1999 and Cumulative FDI Inflows, 1989-1999

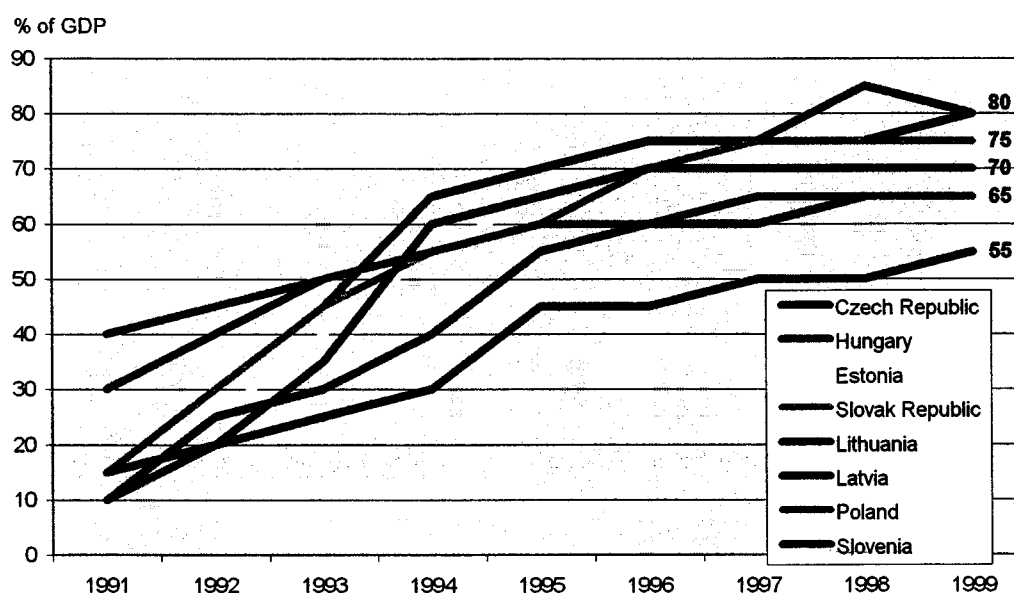


Sources: Transition Report 2000, 2000, 74 and Worldbank

3.2.5 Privatization

Within less than 10 years, all the CEEs have increased the private sector's share in GDP over 50%. CEEs have carried out massive large-scale privatization programs, which have enabled the quick increase of this ratio. Slovenia, which is in many respects the most advanced CEE, has still unsolved privatization schemes of the state owned companies.

Figure 5. Share of the Private Sectors in GDP, 1991-1999



Source: Transition Report 2000, 2000, 154-213

Table 3. Large-Scale Privatization in CEEs

	Czech Republic	Estonia	Hungary	Slovak Republic	Poland	Slovenia	Latvia	Lithuania
Large-Scale Privatization ¹	4	4	4	4	3+	3	3	3

Source: EBRD Transition Report 2000, 14

Poland's mass privatization program is still in process as the 512 privatized companies, which are monitored by the 15 national investment funds, are under restructuring. Latvia and Lithuania have some problems with corporate governance, but their privatization programs are in practice completed. Czech Republic, Estonia, Hungary and Slovak Republic have reached the final stage of the privatization as only a few crown jewelleries are to be privatized.

3.2.6 Country Credit Ratings and Country Risks

As far as the country credit or risk ratings are concerned, the most often referred sources are Institutional Investor and Euromoney. Institutional Investor uses leading international banks, money management firms and economists, who grade each country (136 in total) on a scale 0-100, with 100 representing those with the least chance of default. All the CEEs are among the top 10 countries in Eastern Europe, where the average rating was 32,2 (of all the countries). Poland, Slovenia and Hungary improved their ranking as a result of solid economic performance. The Baltics succeeded in attracting FDI, which mainly caused their improved rankings. (Shapiro, 1999, 128-130)

¹ See the Appendix for definitions of the EBRD's transition indicators

Table 4. Institutional Investor's Country Credit Ratings in 1999

Global Rank:	Finland	Czech Republic	Slovenia	Poland	Hungary	Estonia	Slovak Republic	Latvia	Lithuania
3/1999	14	29	30	33	36	58	60	64	69
9/1998	15	29	34	38	37	60	59	68	71
Credit Rating	82,2	59,7	58,4	56,7	55,9	42,8	41,3	38,0	36,1

Source: Institutional Investor March 1999, 124

Euromoney calculates the country risk for 180 countries. The country risk consists of political risk (25%), economic performance (25%), debt indicators (10%), debt in default or rescheduled (10%), credit ratings (10%), access to bank finance (10%), to short-term finance (5%) and to capital markets (5%).

Table 5. Euromoney's Country Risk Rankings in 2000

Global Rank:	Finland	Slovenia	Hungary	Poland	Czech Republic	Estonia	Latvia	Slovak Republic	Lithuania
9/2000	11	33	40	42	43	55	61	62	69
3/2000	9	32	42	43	44	55	59	66	61
Total Score	91,38	68,93	65,24	63,59	63,14	55,69	53,11	52,95	50,79

Source: Euromoney, Sep 2000, 214-222

The biggest differences between the CEEs and Finland arise from the political riskness of the CEEs (average 15.03) relative to Finland (23,52) and economic performance (9,7 vs. 18,03). Among the CEEs major differences were in the following categories: the access to bank finance and political risk, which were in Slovenia 5 and 17,43 versus 0,06 and 12,54 in Lithuania. Both institutions estimate Slovenia, Hungary, Poland and Czech Republic to be the countries, which have the lowest credit and country risk ratings.

3.2.7 EBRD's Assessment of the CEEs' Stage of Economic Development

European Bank for Reconstruction and Development (EBRD) provides credible aggregate information about the transition economies. All the CEEs were among the top 10 countries of the total 26 transition economies.

Table 6. CEEs' Stage of Economical Development in 1999

	Economic Strength	Balance of Payments	Business Ethics	Integration Into World Economy	Liquidity / Ease of Buying Stocks	Rule of Law	Price Stability	Currency Stability/ Investment Climate	Political Stability	Total Score
Hungary	8,42	6,99	8,69	8,78	9,21	9,14	7,07	9,10	8,69	85,32
Slovenia	8,84	8,45	8,72	8,91	6,30	8,91	8,16	8,83	9,18	84,66
Poland	7,92	6,35	7,30	7,85	8,85	8,71	7,42	8,42	8,23	79,51
<i>Czech Republic</i>	6,92	7,92	7,30	8,49	7,63	8,07	9,14	7,71	7,38	78,09
<i>Estonia</i>	7,00	5,33	8,00	8,33	6,75	8,36	8,25	8,59	8,45	77,16
Latvia	6,00	4,90	7,09	6,91	6,00	7,27	8,18	7,18	7,45	67,48
Lithuania	5,66	4,33	7,09	7,00	6,36	7,27	8,00	7,18	7,09	66,28
Slovak Republic	6,22	6,00	6,75	7,49	5,91	6,76	5,83	6,92	7,00	65,33

Source: EBRD 1999

The overall assessment of the selected economical indicators shows, that Hungary and Slovenia are the most developed countries from the CEEs. However, the liquidity/ease of buying stocks seems to be a problem in Slovenia, which still has some restrictions for foreign ownership. Poland, Czech Republic and Estonia form the second best group. Poland and Estonia have problems with their balance of payments. The recent economic recession has caused the Czech economy to become rather fragile. Somehow Latvia, Lithuania and Slovak Republic are lagging behind with respect to these factors. Especially the price stability and the stock market liquidity seem to be the most pronounced problems for Slovak Republic. The Baltics are facing problems with their balance of payments.

3.3 Stock Market Development of the CEEEs

In the Czech Republic, Hungary, Poland, the Slovak Republic and Slovenia the equity markets were created or re-established already in the beginning of the 1990s. In the Baltic states, the stock markets have developed on the second half of the 1990s. According to the transition indicators developed by the EBRD, above average progress with securities markets development has been achieved by the Czech Republic, Estonia, Hungary, Poland, Slovenia and the Russian Federation (!). (Blommestein, 1998) However, Latvia and Lithuania, which now closely cooperate with Estonia, have made substantial progress in developing their stock markets since 1998. Slovak Republic is to take corrective actions, as it has been reported (e.g. Transition report 2000) that the transparency of the stock markets could be doubted to some extent. Only a few factors have affected to the most to the development of the stock markets in CEEEs: Privatization method and regulatory (institutional) development. These factors will be described in this chapter. In addition, the development of market capitalization and turnover ratios will be described.

3.3.1 Privatization Methods

It is a generally accepted fact that equity market development has been significantly affected by the choice of privatization method (speed, extent, parties involved) (see for example Blommestein (1998), Czech Capital Market review (1999), Lieberman (1997), Korhonen (2000)).

Table 7. Privatization Methods of the Medium and Large Enterprises

	Equal access Voucher Privatisation	Sale to outside owners	Management Employee Buy-outs	Other
Estonia	-	Primary	Secondary	-
Latvia	Primary	Secondary	-	-
Lithuania	Primary	-	Secondary	-
Poland	Secondary	-	Primary	-
Czech Republic	Primary	Secondary	-	-
Slovak Republic	Secondary	-	Primary	-
Hungary	-	Primary	-	Secondary
Slovenia	-	Secondary	Primary	-

Source: EBRD Transition Report 2000, 2000, 154-213

In Czech and Slovak Republic a mass privatization via vouchers schemes took place early in the transition, before the regulation and oversight were developed. In Poland, the creation of capital markets infrastructure and the gradual privatization through IPOs was seen as an integrated process. The regulation of the public offerings and trading was drawn up according to the highest standards of major OECD markets. The Baltic Republics constitute an example following more mixed privatization paths and have achieved progress with institution building and regulation more in parallel with the development of capitalization and trading activities. (Blommestein, 1998, 15) In Hungary, the state owned enterprises were sold case by case to foreign strategic investors. In Slovenia and Slovak republic the management employee buyout was the

main method of privatization. The enterprises were privatized to company insiders and to some extent domestic investors

3.3.2 Privatization Results

In Estonia at the end of 1998, 483 large enterprises had been sold by direct sale at a total price of around USD 400 million out of which foreign capital paid 31%. 7.1 billion compensation vouchers were distributed, which could be used to acquire shares of listed companies. However investment funds in Estonia did not develop like for example in Czech Republic, as the biggest investment fund crashed already in 1992. (Mygind, 2000,6-11)

In Latvia more than 1000 enterprises were privatised with the price USD 345 million through the method, which included combinations of payment in the form of cash, vouchers, instalments and taking over debt. On average 60% of the price were financed by vouchers. The public offerings for both vouchers and cash were performed in close cooperation with the stock exchange and like in Estonia, less than 1% of the vouchers were put into investment funds. (Mygind, 2000, 13-17)

In Lithuania, around 400 investment funds were established since 1991 to collect and reinvest the vouchers, which were distributed to Lithuanians. However after the tightening of the investment fund regulations, by the end of 1998 there were only 22 funds left. Included in privatisation program were 2936 large enterprises. It is not yet clear; to what extent the investment funds have been used to tunnel the assets of the enterprises. (Mygind, 2000, 21)

The Czech capital market was created as a by-product of the extensive voucher privatisation program. In the aftermath of voucher privatisation, basically, all companies (more than 1600) were administratively put on the newly emerged capital market. This meant that the standard selective approach to listing shares and demanding detailed

periodic information disclosures was not used. Eventually there were too many equities for the market to handle. (Hanousek, 1999, 3) Approximately 400 investment funds were created. The funds managed to collect over 70% of the shares. The regulatory framework was only created after period of 1995-1998 when very visible fraud, insider trading, closed shop practises and other opaque activities were common and eventually made the foreign investors to leave the markets.

Unlike Czech Republic, Poland did not adopt mass privatisation as the primary method for privatising its state-owned enterprises and its mass privatisation program (MPP) was carried out in smaller scale a few years later than in Czech Republic. Poland's MPP begun in 1995 with 513 companies attending it. The citizens received shares in 15 National Investment Funds (NIF) which hold shares of those companies. The enterprises represented about 10% of total industry and construction and their book value was about \$2,8 billion. (Lieberman et al., 1997, 220) The majority of the companies were privatized through the management employee buyouts.

The management employee buyout was the primary method of privatization in Slovenia. Managers and employees were able to obtain 60% of the shares of the companies. Despite of the fact that privatization process did not start until mid-1994, by 1/1998 about 1 200 of the 1 598 enterprises were privatized. A relatively small share of enterprise assets was sold to the public (domestic or foreign capital): by 1/1998 about 5% of the shares were listed at the stock exchange. (Bojnec, 1999, 71-103) Still 180 mainly large state-owned companies are to be privatized or some of them liquidated (Transition Report, 2000, 210).

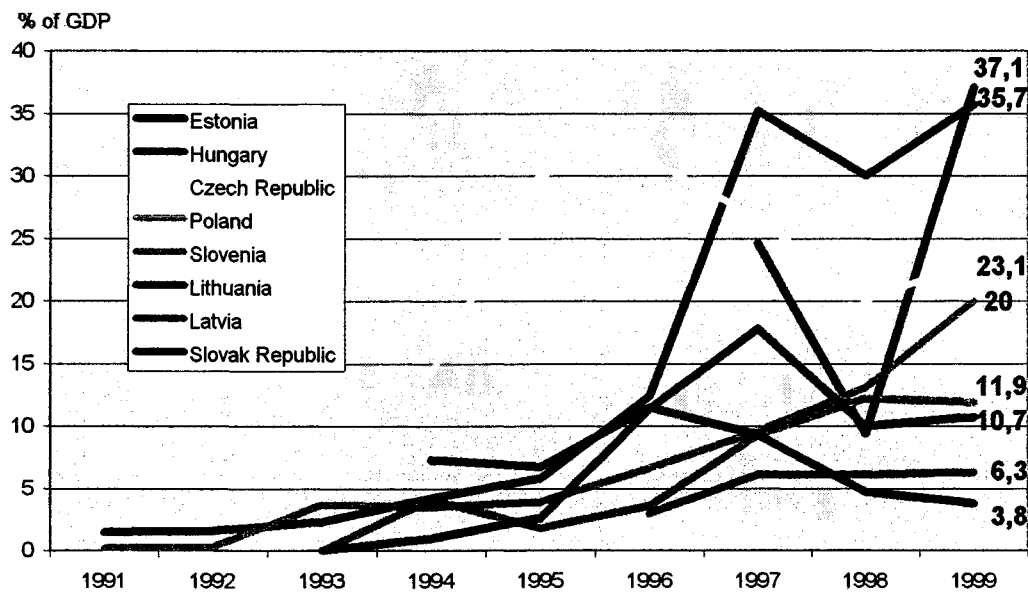
Slovak Republic started to privatize companies through voucher privatization in Czech style, but in 1995 the voucher privatization program was suspended and replaced by the management buyout program. Slovak Republic's management buyout privatization program can be considered to have been politically driven and unfair. 670 state companies with a book value of more than USD 3 billion have been sold. However, the

company insiders could buy the companies with cheap and easy terms (for example with downpayment of 10-18% and “pay” loans in the form of reinvestments in the company). Slovak Republic’s privatization program led toward the creation of monopolistic positions of the old companies, which are controlled by political allies that dominate in certain sectors. (Cook, 1996, 27-29 and 1995, 15-18) Doubts about the transparency of the privatization process has also been raised, as the shares of the big state owned companies were transferred to the insiders of the political elite.

Since the very beginning, Hungarian privatization sought responsible owners, and therefore, decided to sell the companies mainly for cash through auctions, tenders and case-by-case privatization deals mainly for foreigners. Hungary attracted some USD 16 billion in FDI between 1990-97 about which two thirds in the form of joint ventures and partially owned domestic firms. As a result of foreign ownership, the enterprises restructured rapidly. As most of the FDI has been in the form of equity (not loans) investors cannot collectively withdraw their stake, as attempts to sell major positions in the listed companies would send stock prices plummeting down. Due to this fact, the FDI inflows reversed after the Asian and Russian crises. (Hungary: On the Road to the European Union –Country Study, 2000, 28-33)

3.3.3 Stock Market Capitalisation and Turnover Ratios

It is important to be aware of the interlinkages between the privatization methods and equity market development when the transition economies are studied. The countries relying on early mass privatization methods generally achieved high capitalisation levels relative to other emerging market. In transition economies, capital markets are especially needed after the initial distribution of privatization vouchers and shareholdings in a mass privatization program, but also for the sale of state assets through direct share offerings (World Development Report, 1996, 106-109).

Figure 6. Market Capitalisation in % of GDP, 1991-1999

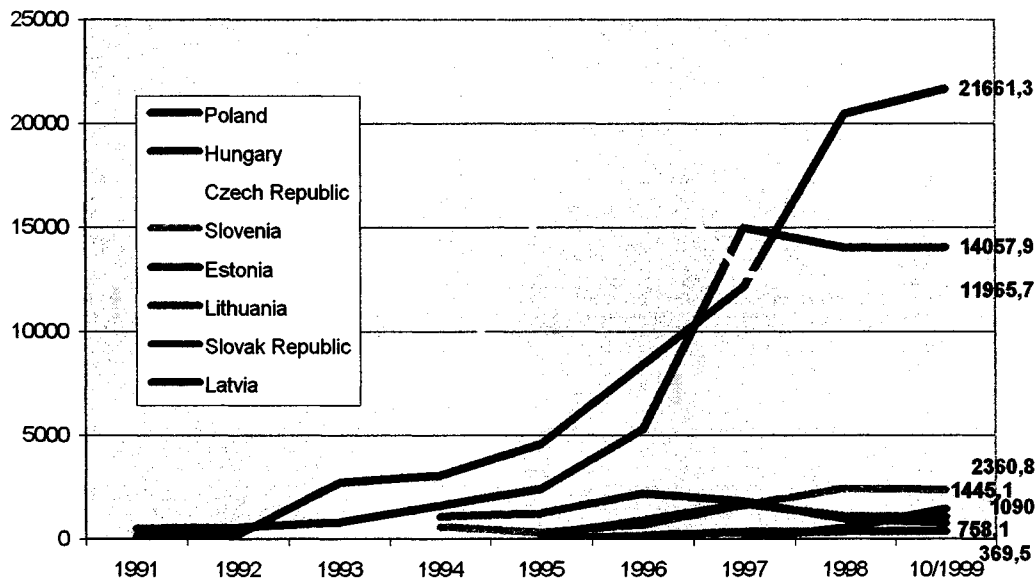
Source: Transition Report 2000, 2000, 154-213

Czech Republic as well as Slovak Republic exhibited fairly high initial capitalisation as a result of their mass privatization programs after which, the companies were immediately listed (without proper listing requirements). In Czech Republic, the market capitalisation has been decreasing due to the de-listings of more than thousand companies. The steadiest increase in market capitalisation has been in Poland and Slovenia. In Poland, the highly regulated capital markets have been gradually developed through slow privatization programs, which were the main reason also in the case of Slovenia. As a result of economical reform programs, the profits of the Hungarian companies increased in mid 1990s, which was reflected in the substantial increase in market capitalisation since 1996.

After the voucher privatization in Lithuania, the market capitalisation increased in 1996 and 1997, but during last years, there has not been much development. In Estonia, the privatization of banking and telecom sector increased the capitalisation to the highest level of the CEEs by 1999. In Latvia, the capitalisation has remained relatively low

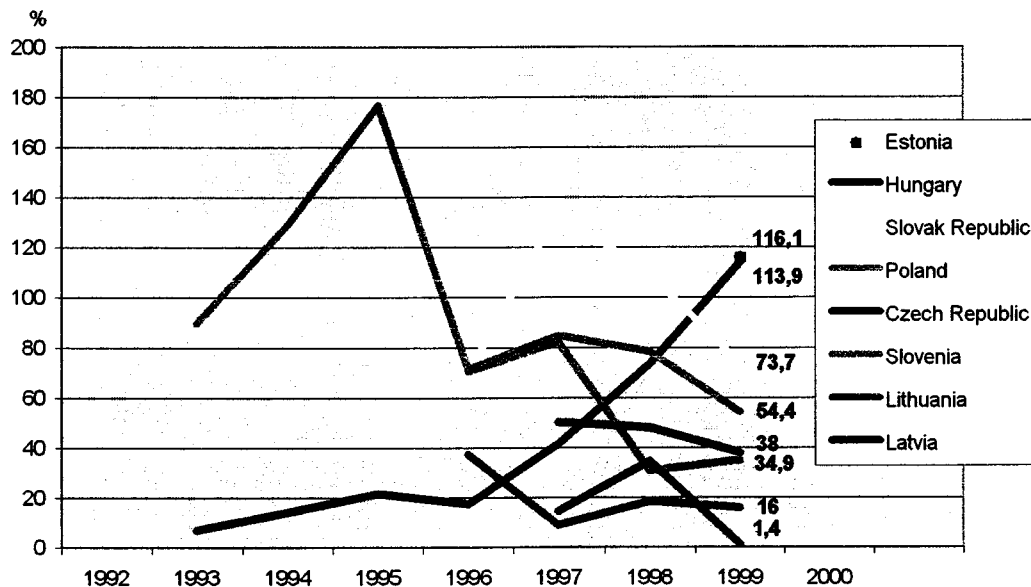
due to the limited liquidity. As there were only de-listings in the Slovak Republic stock markets and low growth, the market capitalisation continued to decrease.

Figure 7. Market Capitalisation in Millions of USD, 1991-10/1999



Sources: Emerging Stock Markets Review, 1999 and Frontier Stock Markets Review, 1999

Also in dollar terms, market capitalisations are relatively low. For comparison the market capitalisation of the Finland's HEX index was USD 212 691 million 10/1999 i.e. approximately five times more than the sum of all the CEEEs' market capitalisations. Poland, Czech Republic and Hungary could be, with respect to market capitalisation, the most attractive for foreign portfolio investors as these countries' stock markets would not be that vulnerable to speculative actions and price manipulation. The Asian and especially the Russian crisis caused the zero growth of the market capitalisation since mid 1997.

Figure 8. Stock Market Turnover Ratios, 1991-1999

Sources: Emerging Stock Markets Review, 1999 and Frontier Stock Markets Review, 1999

The apparent contradictory between turnover and capitalisation figures is explained by differences in privatization methods and listing requirements. In Estonia, the trading was marked by relatively few shares, whereas in Lithuania a large number of shares were listed. According to Korhonen et. al. (2000, 14) the liquidity in the Baltic stock exchanges has tended to be highest when the share prices have been rising. In Czech Republic as well as Slovak Republic, the turnover has been decreasing as the capital markets were mostly used to build up controlling stakes, which investors then tend to hold. (Blommestein, 1998) In Poland, trading on a fairly limited range of shares was initially very active, but fell between 1994 and 1996. Hungary with its reliance on outside strategic investors for privatization has developed steadily at a modest pace both with respect to capitalisation and turnover. Slovenia presents a more special case as privatization listings completely dominate stock market activity with irregular waves of trading as listings come on stream. In addition trading has been heavily influenced by foreign investor activity, in its turn, subject to restrictions. (Blommestein, 1998)

3.3.4 Institutional Development

In this respect, the stage of development varies more between CEEs. Hungary and Poland are most advanced and Slovak Republic and Latvia clearly lagging behind. In Hungary and Poland, the development of financial markets started already in the very beginning of the 1990s and the institutional development was more emphasized than in other CEEs; especially in Czech Republic and Slovak Republic, where rapid creation of stock markets was based on rather weak institutional framework.

Table 8. Stage of Financial Market Institutions Development in 2000

Securities markets and non-bank financial institutions ²	Hungary	Poland	Czech Republic	Estonia	Lithuania	Slovenia	Slovak Republic	Latvia
	4 -	4 -	3	3	3	3 -	2+	2+

Source: EBRD Transition Report 2000, 14

3.3.5 Regulatory Framework

Risk areas in investing in emerging markets include the operational efficiency of the stock markets, quality of market regulations, supervision and enforcement, corporate governance practices, minority shareholder rights, transparency and level of accounting standards (Emerging Stock Market Factbook, 1999, 1-5) Above listed factors are extremely important for outside investors and also to create trustworthiness towards capital markets. The importance of sound regulatory framework in the former socialist countries, where for example the concept of business ethics is not yet familiar to everybody, cannot be emphasized too much.

² See the Appendix for definitions of the EBRD's transition indicators

Blommestein (1998) identified three major problem areas in regulatory and institutional framework, which should be improved in CEEEs:

- 1) The threat posed to transparency and standards of disclosure in equity markets, in general, and minority shareholder rights, in particular, by the emergence of insider systems and “closed shop” practices.
- 2) The need for further growth of institutional and retail sectors in securities markets in transition economies and its implications for market development.
- 3) The conflict between trends towards spontaneous market fragmentation and ambitions to centralised trading in the interest of promoting transparency.

Eventually all the transition economies have realised, that in order to attract foreign capital the regulatory framework has to be at the same level as in the developed countries. During last years; standards, disclosure practices of firms and ownership rights have been improved. The most pronounced development with respect to the enforcement of regulations has been in Czech Republic and Lithuania, which capital markets could be identified to have had all the negative features listed by Blommestein (1998).

Table 9. Regulatory Development in 1999-2000

Financial Regulations 2000 (1999) ³	Hungary	Poland	Slovenia	Lithuania	Estonia	Czech Republic	Slovak Republic	Latvia
Extensiveness	4 (4)	4 (4)	4 (+3)	4 (-3)	4 (4)	4 (+3)	3 (4)	3 (3)
Effectiveness	4 (4)	4 (4)	4 (+3)	- 4 (2)	-3 (+3)	-3 (+2)	-3 (+3)	3 (2)

Source: EBRD Transition Report 2000, 36

Despite the high extensiveness scores, these countries still show a marked implementation gap. Effective implementation and enforcement of capital markets laws

³ See the Appendix for definitions of the EBRD's transition indicators

remains a problem throughout the region, possibly due to the need to create independent capital market regulators. (EBRD Transition Report, 2000, 39)

In the year 2000, the capital market indicators continued to improve except for Slovak Republic and Estonia for effectiveness of the regulations. Lithuania made substantial progress as it approved rules about trading outside the stock exchange. Czech Republic's indicators improved due to the efforts made to improve disclosure on the stock market. Slovak Republic's stock markets are clouded with suspicions of widespread insider trading. (EBRD Transition Report, 2000, 39 and 207)

3.3.6 Creation of the Stock Markets in CEEs

Due to the country specific timing, extent and involvement of foreigners, the CEEs' stock market creation will be briefly described country by country. All the statistics and the development of the indices will be described in the Chapter four.

Estonia

Tallinn Stock Exchange (TSE) was established in May 1996 and the shares of five banks were the first equities to be listed. The development of the public offerings for minority shares facilitated the development of the TSE, but there has been no strong relation between the privatization process and the development of the stock exchange. The companies listed on the main list of the TSE provide the bulk of market capitalisation and trading in the TSE. Foreigners are strongly involved both with portfolio investment and in the control of core-holdings and by the end of 1998, the foreign share of the listed stocks was 45% (Korhonen et. al. 2000, 6-16, Mygind 2000, 26-28).

Latvia

The Riga Stock exchange (RSE) was established in March 1995. When the Russian crisis broke out in August 1998, the exposure of many Latvian banks to Russian capital

markets became evident and Latvian equity prices sank (Korhonen et. al. 2000, 17). However, RSE has developed quite rapidly in the latest years in close connection with the acceleration of privatization of large companies and public offerings of shares. Out of the 67 companies in RSE in 1998, 59 are privatised (Mygind 2000, 28).

Lithuania

Due to mass privatization, the need for a functioning securities market became urgent by 1992. Lithuania's stock exchange started operations in 1993, with a large listing of privatised and new companies. By 1997, there were over 400 shares listed on the National Stock Exchange of Lithuania, but only about half of them were quoted at all. Only four companies were listed on the main list in Lithuania (Mygind, 2000, 28) and 30-40 companies are actively traded. There was practically no trade in the vast majority of these companies until recently. The Lithuanian equity market took off in 1996, when trading picked up sharply and prices rose. Although the market capitalization of the Lithuanian equity market is relatively large, the poor liquidity of most shares is still a serious problem. (Korhonen et. al. 2000, 6-16)

Poland

Warsaw Stock Exchange (WSE) was established in 1991 with an initial listing of only five Polish companies. Today there are 225 listed companies, out of which 102 continuously traded, which makes the WSE the biggest market of CEEs also in terms of number of liquid shares. There are also 15 National Investment Funds, which manage 512 big state owned enterprises, floated in the stock exchange. After restructuring, those companies are to be listed in the WSE. The main characteristics of the Polish capital market are strong supervision, high disclosure requirements, equal access to information and dematerialised and electronic trade with strong centralisation of trade (Blommestein, 1998,21).

Czech Republic

In Czech Republic the result of the mass privatisation program was that 1 700 medium and large joint stock companies were listed in the Prague Stock Exchange (PSE) between the years 1994-1995. However more than 1 600 were delisted by the end of 1999. In Czech Republic the early stage of capital market development at the time the funds were created made it difficult for them to evolve into viable financial intermediaries of the kind originally envisaged. Their very visible exploitation of opportunities for wealth creation by collusion and arbitrage in the absence of comprehensive information disclosure rules as well as overall regulation and oversight quickly eroded public confidence in the institutions as such. (Blommestein, 1998, 31)

Hungary

The Budapest Stock Exchange (BSE) was opened in 1990. Since the early 1990s, the foreign portfolio investors have been interested in Hungarian stocks due to the transparent privatization process and the advanced economic restructuring. In the end of 1999, foreigners held 80% of the shares listed in Budapest Stock Exchange. (Hungary Country Investment Profile, 2000, 35) At the end of 2000 there were 60 shares listed in the BSE out of which 20 in the BUX index.

Slovak Republic

The Bratislava Stock Exchange was established in 1993. After the promising start in 1996 and 1997 the foreign participation started to decline due to the opaque nature of the financial markets, falling profits of the companies and Russian crises. There were 830 listed shares at the end of 1999 out of which 11 on the main list. 786 companies traded on the free market are privatised relatively small companies. (Slovak Republic Country Investment Profile, 2000, 33)

Slovenia

The share of the foreign ownership has been approximately 10%, because of the regulatory restrictions to foreign investments. At the end of 1999, 134 shares were

traded in Ljubljana Stock Exchange (LjSE) and 46 shares of privatization funds. The Slovenian telecom company and a few big banks are still to be listed in the LjSE. Those companies are likely to further increase the interest on the Slovenian capital markets.

3.4 Overall Evaluation of the CEEs' Stage of Development

Despite of the fact, that the factors related to the macroeconomic, stock market or institutional development are not included as variables into the empirical part of this thesis (i.e. into capital market analysis), the overall evaluation of these measures could be used to analyze, whether the results of the empirical analysis would be recommendable also in practise.

Macroeconomic Development

By the year 1999, the GDP levels of the year 1989 were achieved by Poland, Slovenia and Slovak Republic. Hungary and Czech Republic were also very close with the levels of 99% and 95%. In this respect, the Baltics were clearly lagging behind. On the contrary, the inflation was less than 4% in the Baltics and Czech Republic whereas around 10% in the other CEEs. All the CEEs have managed to redirect their foreign trade to developed countries and the share of the foreign trade to GDP varied between 72%-112% with the exception of Poland (43%). Poland, Czech Republic and Hungary have each attracted almost two times more FDI than the other CEEs together. The economy of the Poland is more than three times bigger than Hungary's or Czech Republic's, which in turn have the size of the economies more than two times those of Baltics, Slovenia and Slovak Republic. More than 65% of the CEEs' economies were privatised by 1999 with the exception of Slovenia with 55% share. The credit and country risk rating institutions (Institutional Investor and Euromoney) estimate that Czech Republic, Slovenia, Poland and Hungary are the countries with the lowest risk ratings within the CEEs.

With respect to the overall macroeconomic development Poland, Hungary and Czech Republic could be the most attractive countries to the foreign investors as they have the biggest economies with most of the foreign investments and the lowest country risk ratings. If the size of the economy did not matter, the Slovenia would be at the same level with the top three countries. Estonia's economy is the best of the Baltic countries.

Slovak Republic, Latvia and Lithuania are the CEEEs with the weakest economies and have the lowest country risk ratings. These results are in line with the EBRD's assessment.

Stock Market Development

Privatisation is almost completed by all the CEEEs and the biggest state owned companies are, to a large extent, listed in the local stock exchanges. Countries which chose voucher privatisation programs (e.g. Czech Republic and Slovak Republic) have delisted the bulk of the illiquid stocks or transferred them from the main list to free markets, which has made the structure of the CEEEs stock exchanges more similar. Market capitalisation is the greatest in Poland, Hungary and Czech Republic, which is not surprising as their economies were also the biggest ones. The other CEEEs are far behind, in this respect. Estonia and Hungary have the highest turnover ratios (approx. 100%). Poland, Czech Republic and Slovak Republics have had a decreasing trend in their turnover ratios. In the case of Poland, the decreased ratio could be partly explained with the very significant increase in the market capitalisation.

As far as the stock market development is concerned, Poland and Hungary could be considered as the most attractive ones for foreign investors. These countries have the highest market capitalisation, which has also developed steadily without big negative drops in the indices. Czech Republic has the third highest market capitalisation, but relatively low turnover ratio. Estonia has high turnover ratio with low market capitalisation, which indicates that the stock index has only a handful of relatively small but liquid companies. The development of Slovenia is more slowly, but positive when compared to Slovak Republic, Latvia and Lithuania.

Institutional Development

Institutional and regulations development could be considered as third main factor affecting the decision, whether to invest in the CEEEs in practise. Institutional development, effectiveness and extensiveness of the financial markets regulations are at

the highest level in Hungary and Poland. These countries have since the early 1990s paid special attention on the development of the stringent institutional and legislative framework for the capital markets. Estonia, Lithuania, Czech Republic and Slovenia could benefit for further refinement in some areas. Latvia and Slovak Republic have to significantly improve their financial market institutions and regulations in order to attract foreign portfolio investors.

Overall Evaluation

If the macroeconomic, stock market and institutional development were equally weighted, it could be stated that Poland and Hungary are the most promising countries for international investor. Czech Republic, Slovenia and Estonia can be considered slightly more risky asset class. In the light of evidence of the above analysis, Latvia, Lithuania and Slovak Republic are less recommended.

4. EMERGING MARKETS' AND CEEES' STOCK MARKET DATA

In the beginning of this chapter, the typical statistical features of the emerging markets' stock returns are discussed. These adverse features are usually a smaller problem in the stock returns of the developed countries. As the emerging markets develop, these features are likely to lose their significance in the future. In addition, some remedial actions can be taken to reduce the effects of these features on the results of the portfolio analysis. Other CEEEs' indices and often-referred indices of the International Finance Corporation (IFC) are also presented. CEEEs' stock market data and the index development are described at the end of this chapter.

4.1 Special Characteristics of the Emerging Markets' and Transition Countries' Stock Market Data

When the quantitative studies of emerging countries stock markets are performed, it should be taken into consideration that the statistical features of the data may differ to more developed countries' data. The appropriate interpretation of returns, possibility of autocorrelation, non-normality and at least partial segmentation of the markets are factors, which are to be considered when analysing emerging markets. Based on the previous research these factors are presented in this chapter. In the Chapter five, the CEEEs stock market data will be analysed keeping in mind these characteristics, which would most likely cause bias on results if neglected.

4.1.1 Returns

There can be large difference between arithmetic and geometric average returns. Harvey (1998) found arithmetic average return for Brazil 21,7% per annum. However, the return to a buy –and–hold strategy averaged only 3,7% per annum. The index returns may not reflect the real development of the equity prices, if majority of the trading activities are in the form of direct block trades, which are not reported.

4.1.2 Autocorrelation

The amount of predictability in emerging markets is greater than found in developed markets as local information play a much more important role in predicting emerging market returns (Harvey, 1995, 218) Harvey et. al. (1997, 49) studied emerging and developed market portfolio mixes by investigating the IFC emerging market (EM) index and MSCI world market (WM) index 1976-1994 and found significant autocorrelation in the EM index and none in the WM index. According to Bekaert (1997) the sources of the predictability (autocorrelation) could be time varying risk exposures and/or time-varying risk premiums.

Rockinger & Urga (1999 and 2000) have studied the evolution of stock markets in Poland, Hungary, Czech Republic and Russia. They document no significant autocorrelation in the returns of Hungarian market. The autocorrelation of the Czech and Polish markets has a decreasing trend i.e. the markets converge towards efficiency. Korhonen (1998) studied the development of the Baltic countries' equity market returns over the period 2/1997-8/1998 and found that past returns have been statistically significant in forecasting present returns (Korhonen, 1998, 29). Like Rockinger & Urga, (2000) Korhonen (1998) also claims that the predictability of the market may be due to low liquidity.

4.1.3 Non-Normality

Non-normality has been found by several authors (Harvey (1995,1998), Bekaert (1998), Rockinger & Urga) in some extent in most of the studies about emerging market and transition economies' returns. Bekaert et.al., (1998, 104-107) studied the 20 emerging markets in the IFC index. Over the period of 4/1987-3/1997 he found in 17 countries positive skewness in the returns and 19 countries had excess kurtosis. The standard tests of normality rejected the hypothesis of normality in more than half of the countries at the 95% level of confidence. Rockinger & Jondeau (1999) studied the returns of 27 emerging economies stock indices and found all the return distributions to be fat-tailed.

Due to the non-normality of the distribution of returns, the probability of a shock (a large price movement) is higher than would be the case if the return distribution were normal. For many countries the degree of kurtosis has been reduced in the 1990s compared to 1980s. They also found substantial evidence of the decreasing volatility of the returns in 1990s. For the last five years of the data, there was little overall change in correlations as for example the correlation of the IFC composite and World was 30% in 1991 and 35% 1996 (Bekaert et al, 1997, 6).

Rockinger & Urga (1999, 2000) have studied Poland, Hungary, Czech Republic and Russian stock markets' predictability. Jarque Bera statistics indicate that all series are non-normally distributed, which is possible explained by the heteroskedasticity in the returns and/or the jumps in the indices. Bekaert (1997) also doubts the standard implementation of autoregressive conditional heteroskedasticity (ARCH) models, as only models, which explicitly account for leptokurtosis and skewness, are likely to be useful.

4.1.4 Segmentation

Bekaert (1997) analysed the importance of the different risk attributes and examined then different portfolio strategies to emerging countries. According to the Bekaert (1997), in completely segmented capital markets, the volatility is the correct measure of risk and alternative risk attributes would include country credit ratings, country risk estimates, macroeconomic factors, demographics and the size of the trade sector to the total economy (Bekaert et al 1997, 7-9). Bekaert (1997, 10,) found evidence, that financial and economic risk, inflation and market capitalisation appear to be the most important ones to explain the difference between high and low returns of the countries studied. Rockinger & Urga (1999) analysed, whether the UK and Germany's stock markets have effect on the shocks in Poland, Hungary, Czech Republic and Russia' stock market returns. They found that UK has impact through the whole estimation period (4/1994-7/1997). Germany played important role until spring 1995 and U.S.

market did not affect those markets. The CEEEs could be considered to be segmented to some extent from the world capital markets. However, the current level of segmentation will not be detected and applied in the empirical part of this thesis.

4.2 Other Emerging Market Indices

Other emerging market indices are presented in this chapter. International Finance Corporation's (IFC) indices are often used in the previous research. They also function as an appropriate benchmark for local indices. Central and European Stock Index (CESI) is presented, as it would be interesting asset for an investor who considers East Europe as one homogenous asset class. Baltic list is an index, which is formed by Estonia, Latvia and Lithuania. This index is expected to raise the attention of the foreign investors to Baltic countries as an investment area.

International Finance Corporation (IFC) indices

Since the beginning of 1980s IFC index has been quoted for developing countries, which are classified as emerging countries. In 1985, 17 countries were included in the index and the monthly returns were calculated. Since 1988 weekly returns have been produced. In 1993 two indices were introduced: IFC investable index, which includes only legally and practically available stocks and IFC global, which measures the performance of the most active stocks. (Emerging Stock Market Factbook, 1999, 1-5) IFC indices represent portfolios of securities that comprise at least 60% of the market capitalisation, but still there are only a few stocks in the IFC index portfolio for some countries, which means that there might still exist some variance that is usually diversified away with larger portfolios (Harvey, 1998 1-5).

Standard & Poors/IFCG Emerging Market Indices: (Global) Index

The indices include securities without accounting for the stock's availability to overseas investors. The target coverage of the index is about 60%-75% of total market capitalization drawing on stocks in order of their liquidity. (Emerging Stock Market

Factbook, 1999, 1-5) Out of the countries analysed in this study Hungary, Poland, Czech Republic and Slovakia are the ones quoted in this index

Standard & Poors/IFCG Emerging Market Indices: Frontier Index

Frontier index has been produced since 1996. The frontier markets tend to be relatively small and illiquid even by emerging market standards and information is generally less available than in other markets. The countries in the index are not considered investable under the S&P's definition although they may be open to foreign portfolio investments. Out of the countries analysed in this study Estonia, Latvia, Lithuania and Slovenia are the ones quoted in this index. (Emerging Stock Market Factbook, 1999, 1-5)

Central European Stock Index (CESI)

The index is composed of the shares with the highest capitalisation and liquidity on their domestic security markets from Bratislava Stock Exchange, Budapest Stock Exchange, Ljubljana Stock Exchange Prague Stock Exchange and Warsaw Stock Exchange. The USD based index has been quoted since 1 February 1996 i.e. the market prices are converted into USD. The total market capitalisation of the basket of shares available for purchase by foreign investors from a particular stock exchange is required to account for at least 60% of the total market capitalisation of the official securities market in that country. Individual countries must not exceed a 50% share in the CESI index and the share of individual issuers must not exceed 12% of the CESI basket. The effect of dividend payment is not taken into account when CESI is calculated. At present, the index basket includes 48 equities. The equities included in the CESI basket represent 65.6% of the total market capitalization of the official equity markets of the five exchanges. (<http://www.bse.hu>)

Baltic list

Baltic list is a list of 15 largest firms listed on the official lists of Tallinn, Riga and Vilnius Stock Exchanges. No more than seven companies on the list can originate from

one country. Baltic countries share real-time trading information between each others and have agreed on mutual cooperation.

4.3 Description of the CEEEs' Stock Index Data

Data from all the CEEEs and Finland was provided by the local stock exchanges and the foreign exchange rate data by Financial Market Research of the Nordea bank. The data consist of the daily values of the main stock indices of the exchanges and daily exchange rates between the CEEEs and Finland.

Table 10. CEEEs' Stock Market Data

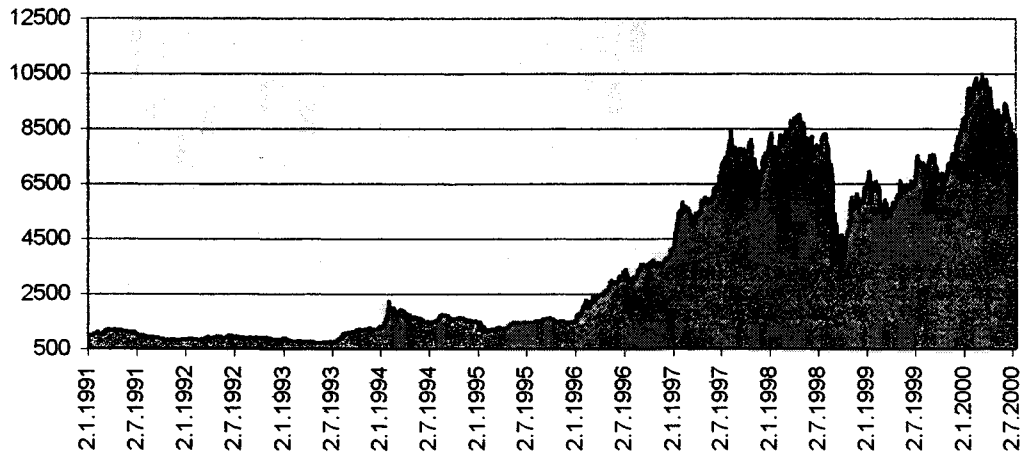
Country	Exchange	Index	Starting date	Ending date	Data period in years
Hungary	Budapest Stock Exchange	BUX	2.1.1991	17.7.2000	9.5
Poland	Warsaw Stock Exchange	WIG	16.4.1991	9.10.2000	9,5
Slovak Republic	Bratislava Stock Exchange	SAX	14.9.1993	30.10.2000	7
Slovenia	Slovenian Stock Exchange	SBI	3.1.1994	30.10.2000	6.75
Czech Republic	Prague Stock Exchange	PX	5.4.1994	18.10.2000	6.5
Finland	Helsinki Stock Exchange	HEX	2.1.1995	23.10.2000	5,75
Estonia	Tallin Stock Exchange	TALSE	3.6.1996	30.10.2000	4.5
Lithuania	National Stock Exchange of Lithuania	LITIN	4.4.1997	30.10.2000	3.75
Latvia	Riga Stock Exchange	RICI	3.11.1997	30.10.2000	3

Despite of the fact that the data was available from the early 1990s for some countries, it was not included into the analysis as the trading was infrequent, thinner and with just a few companies in the early 1990s. With the exception of the Helsinki Stock Exchange, the starting dates for the data periods were also the dates, when the stock exchanges were (re-) opened. In the beginning of the year 2001 Helsinki Stock Exchange announced the acquisition of the majority share of the Tallin Stock Exchange, and plans

to take over the other Baltic Stock Exchanges as well. This kind of development further makes it interesting to study the CEEE stock exchanges as their future seems positive.

4.4 CEEEs' Stock Market Indices

The development of the indices and the characteristics of the returns will be described in this chapter. Practically all the CEEE stock indices were affected by the Asian and Russian crisis: A relatively large drop in the weekly returns occurred in the August in 1998, as a contagion effect from the Russian partial default. The Baltics suffered most from the Russian crises, and the development of their stock indices has been very poor since the autumn 1998. In general there does not seem to be big differences between local and FIM returns, which means that during the estimation period, the exchange rates have been quite stabile with the exception of the currency crisis in 1997 in Czech Republic.

Figure 9. The BUX Index of the Budapest Stock Exchange (Hungary)

The development of the BUX index accelerated in 1996 as the result of the restructuring of the Hungarian economy in the mid 1990s. The increased profits of the companies raised the attention of the foreign investors. After the Russian crisis BUX recovered relatively quickly, as the confidence of the foreign investors was not lost.

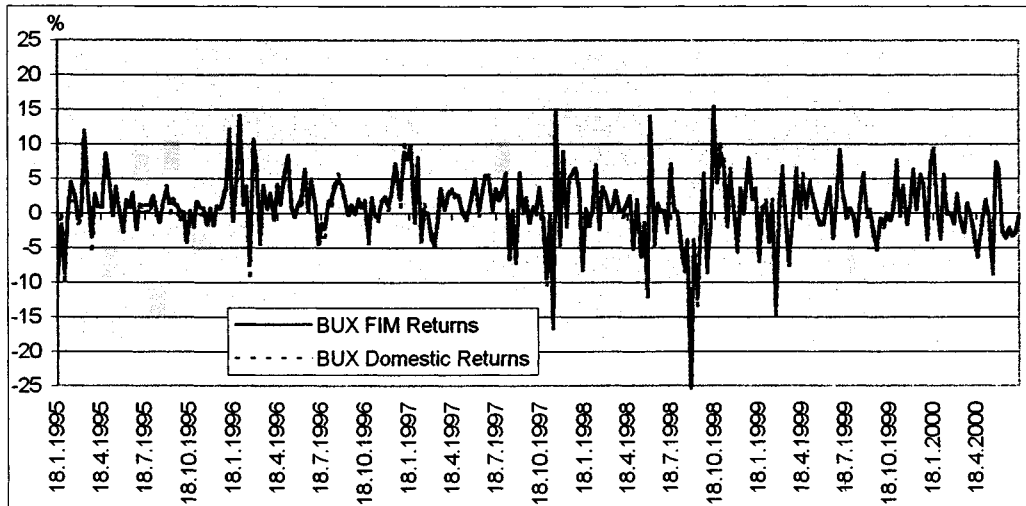
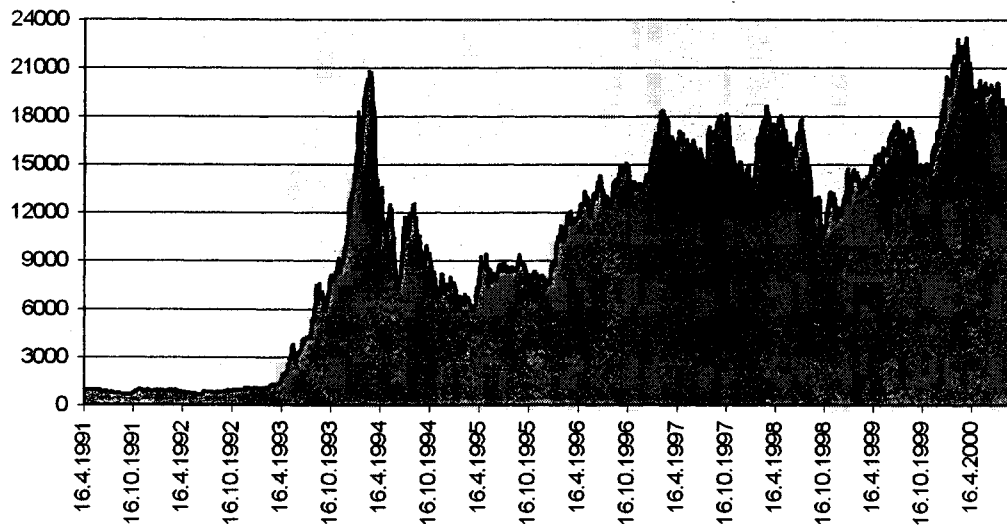
Figure 10. BUX Weekly Returns, 1/1995-7/2000

Figure 11. The WIG Index of the Budapest Stock Exchange (Poland)



After the speculative years of trading in 1993-1994, the development of the WIG index has reflected the real development of the Polish equity markets. The weekly returns graph indicates, that the volatility of the returns has slightly decreased since 1999.

Figure 12. WIG Weekly Returns, 1/1995-7/2000

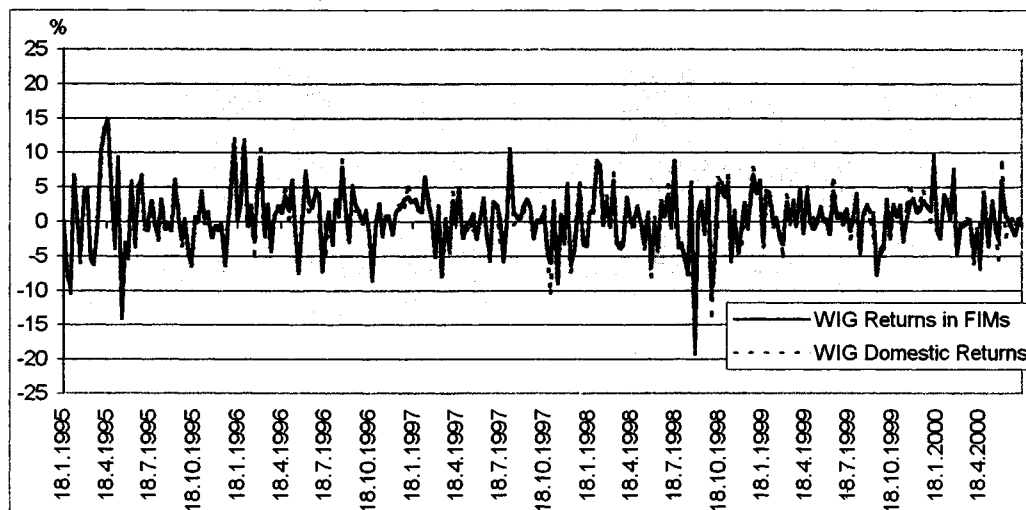
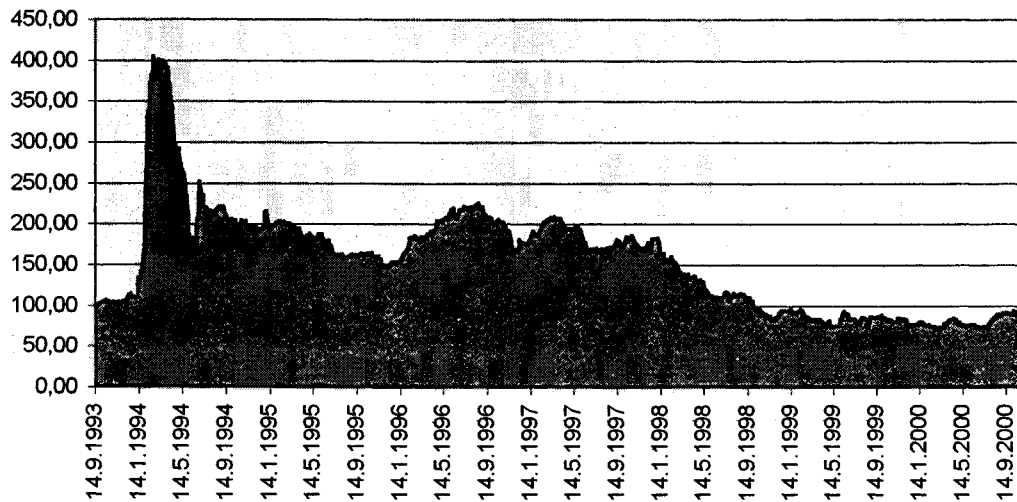


Figure 13. The SAX Index of the Bratislava Stock Exchange (Slovak Republic)



After the mass-privatised companies entered the market in the beginning of 1990s, SAX index developed sharply. However, during the last years the development of SAX has reflected the suspicions of widespread insider trading. The lower volatility of the returns partly reflects the underdevelopment of the equity markets.

Figure 14. SAX Weekly Returns, 1/1995-7/2000

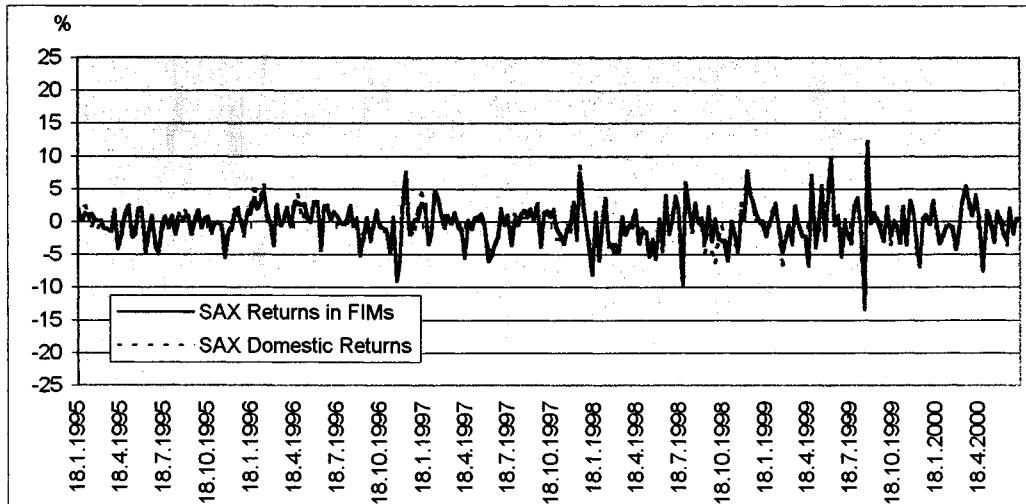
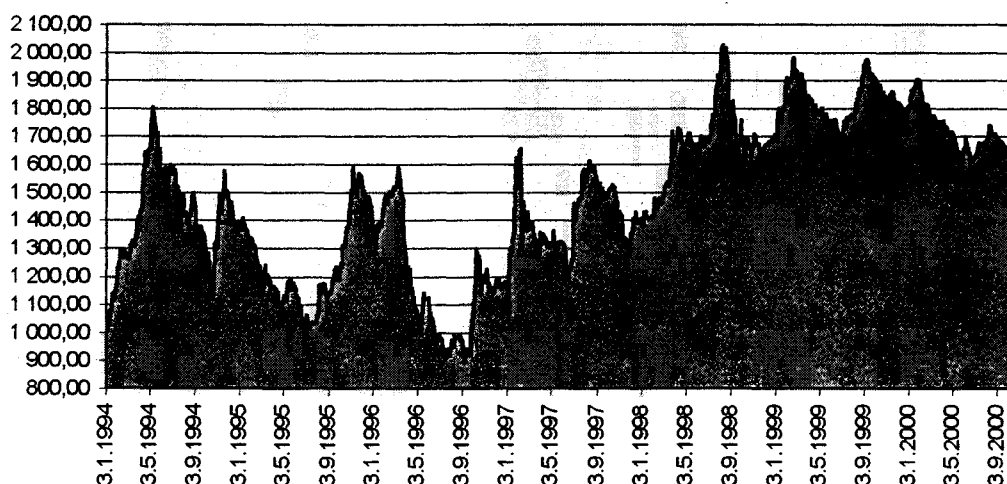


Figure 15. The SBI Index of the Ljubljana Stock Exchange (Slovenia)



The LjSe has experienced less growth than other advanced central European stock markets in the last five years. The main reason for the modest growth has been the higher control on foreign portfolio investments and capital flows. However during the last years the regulations have been relaxed and the foreigners can now withdraw their investments after one year (instead of seven years in the mid 1990s). The volatility of the returns has decreased towards the end of the 1990s. Not even the Russian crisis had as big effect on the returns as in the other CEEEs.

Figure 16. SBI Weekly Returns, 1/1995-7/2000

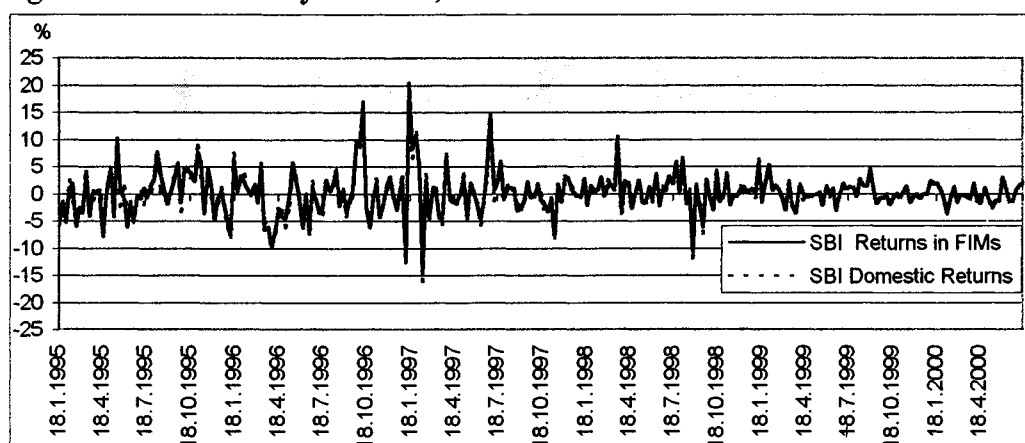
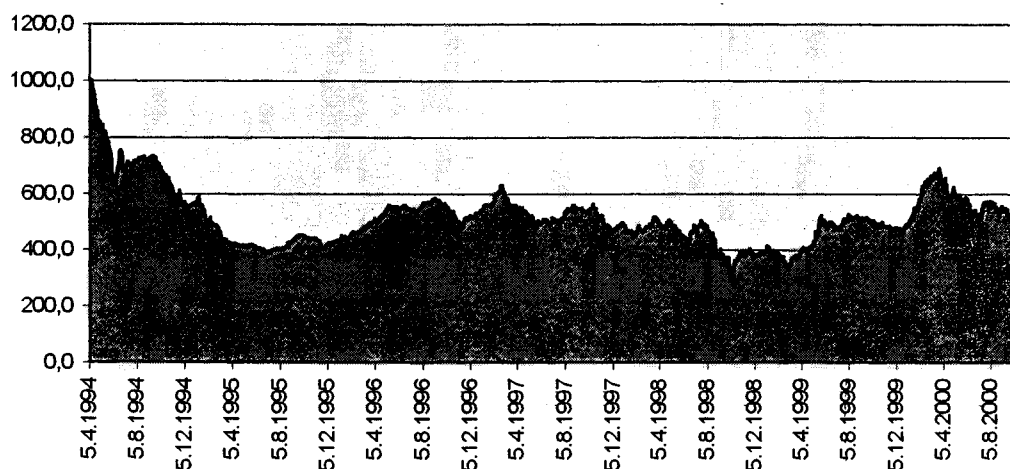


Figure 17. The PX Index of the Prague Stock Exchange (Czech Republic)



Since the opening of the Prague Stock Exchange in 1994, the PX index has performed rather poorly. The underdevelopment could be partly explained by the fact, that in the early years of trading more than 90% of the trade took place outside the exchange as not reported block and direct deals. Since the 1998 the regulations were tightened, new trading system was implemented and 1600 companies delisted. The taken actions have likely improved the price formation process, which may be reflected as an increased volatility of the returns i.e. the index more sensitive to the market information.

Figure 18. PX Weekly Returns, 1/1995-7/2000

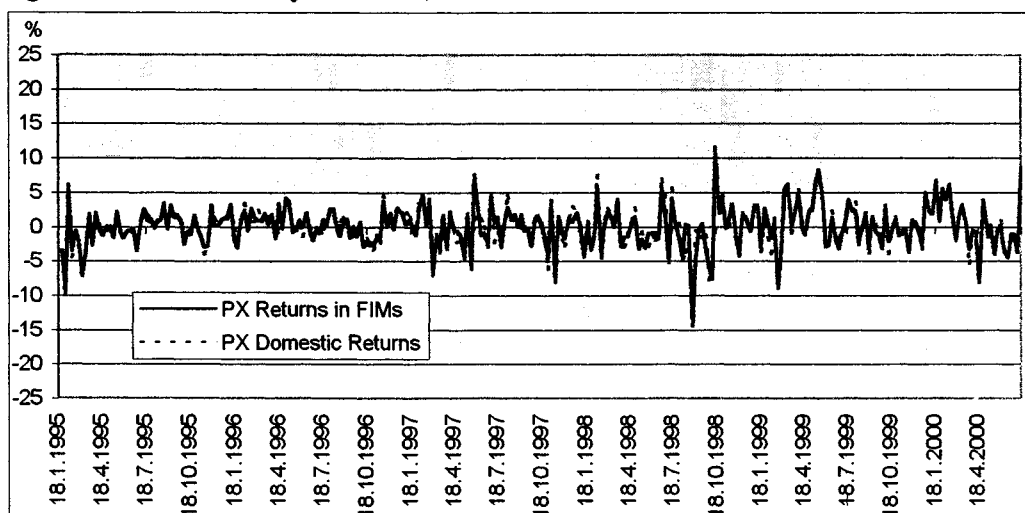
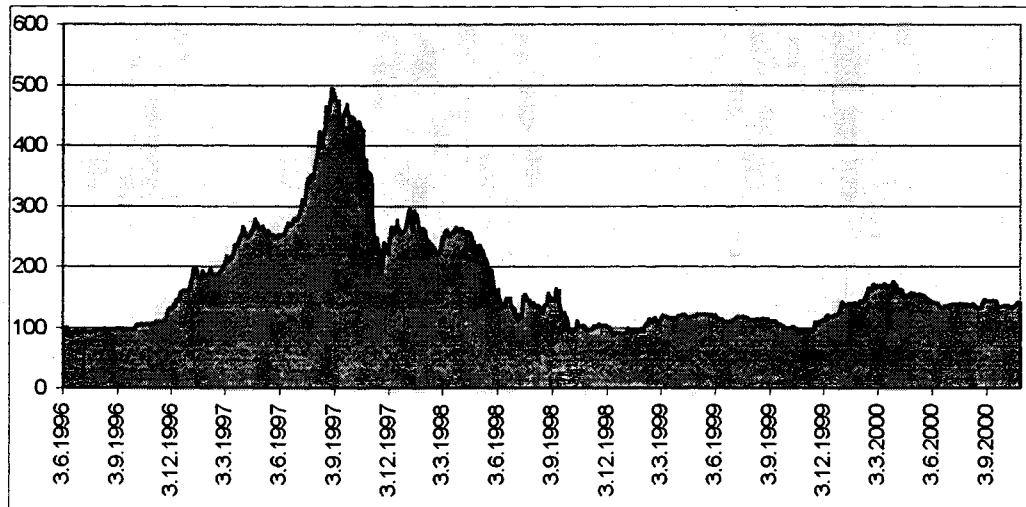


Figure 19. The TALSE Index of the Tallin Stock Exchange (Estonia)

After the early bubble phase of the stock markets, the TALSE index has not developed markedly. In 1999 the Hansabank and Eesti Telecom accounted for approximately 80% of the TALSE index, which in practise means that the index itself is not very well diversified. There were 25 listed companies in 1999 in Tallin Stock Exchange (Frontier Stock Markets Review, 29, 1999).

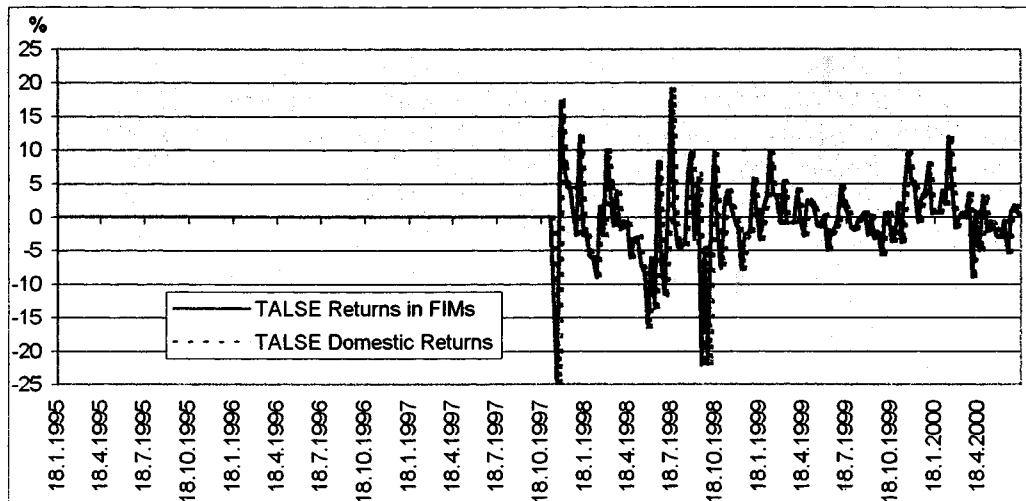
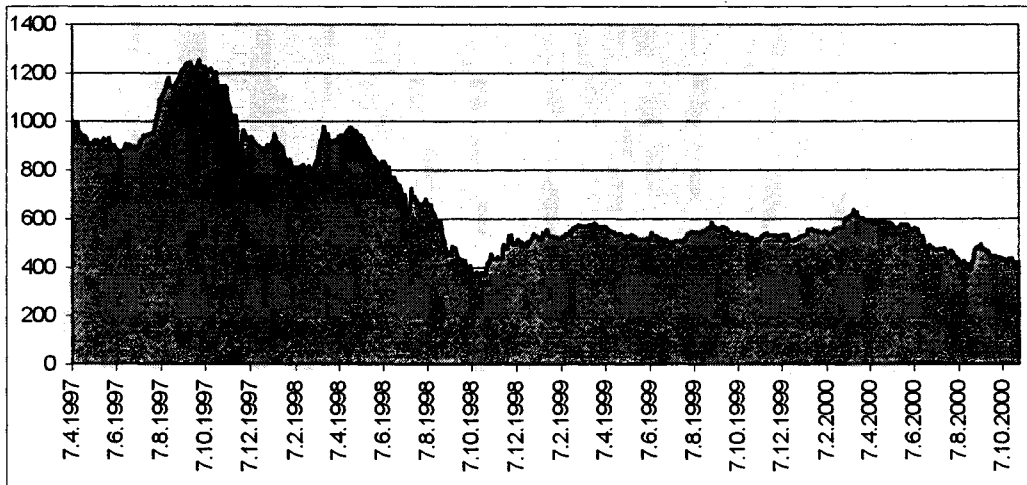
Figure 20. TALSE Weekly Returns, 11/1997-7/2000

Figure 21. The Litin Index of the National Stock Exchange of Lithuania

The Litin index suffered most from the Russian crisis, and has not bounced back since the drop in autumn 1998. Like in other Baltics, the biggest banks (two) had accounted for a large share (40%) of the market capitalisation in 1999. There were 54 listed companies in 1999 in the Litin index. (Frontier Stock Markets Review, 41, 1999).

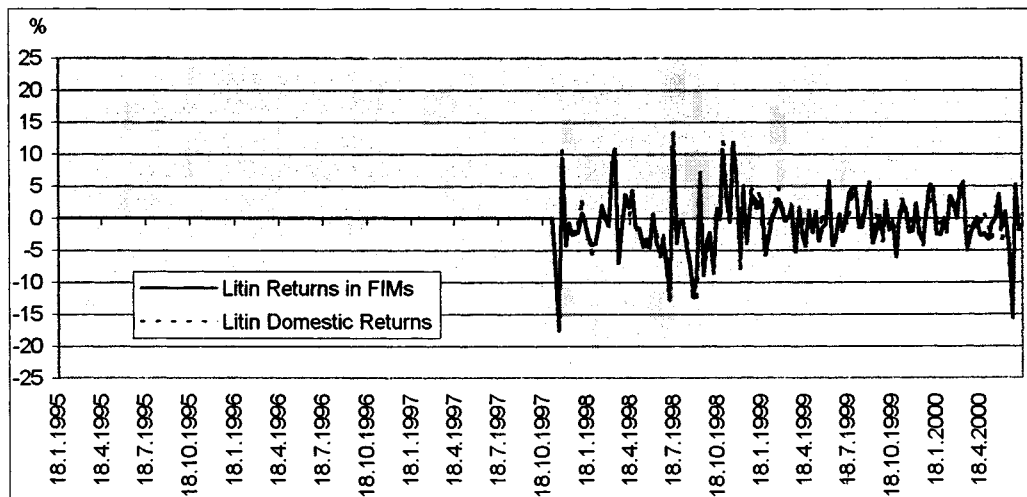
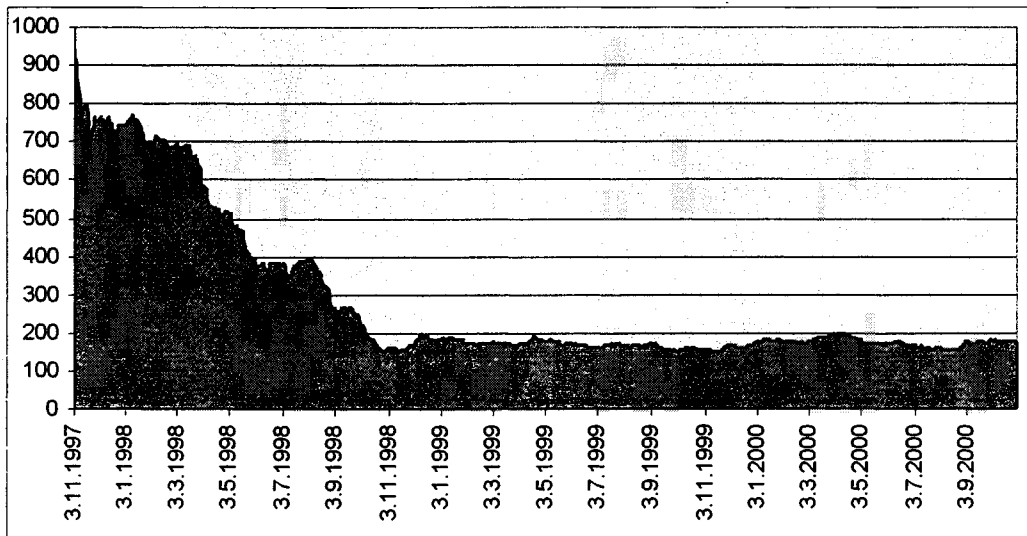
Figure 22. Litin Weekly Returns, 11/1997-7/2000

Figure 23. The RIC Index of the Riga Stock Exchange (Latvia)



Like in the other Baltics, the development of the RIC index has remarkably decreased in Lithuania since the early years of trading. There were 70 companies listed in 1999. The index was dominated by Unibanka, with more than 50% share of the index.

Figure 24. RIC Weekly Returns, 11/1997-7/2000

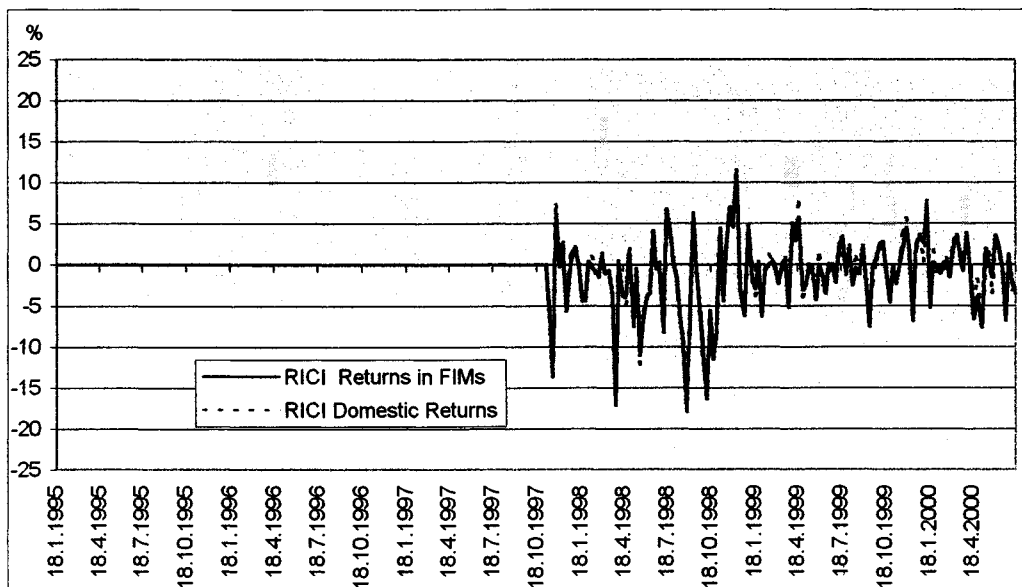
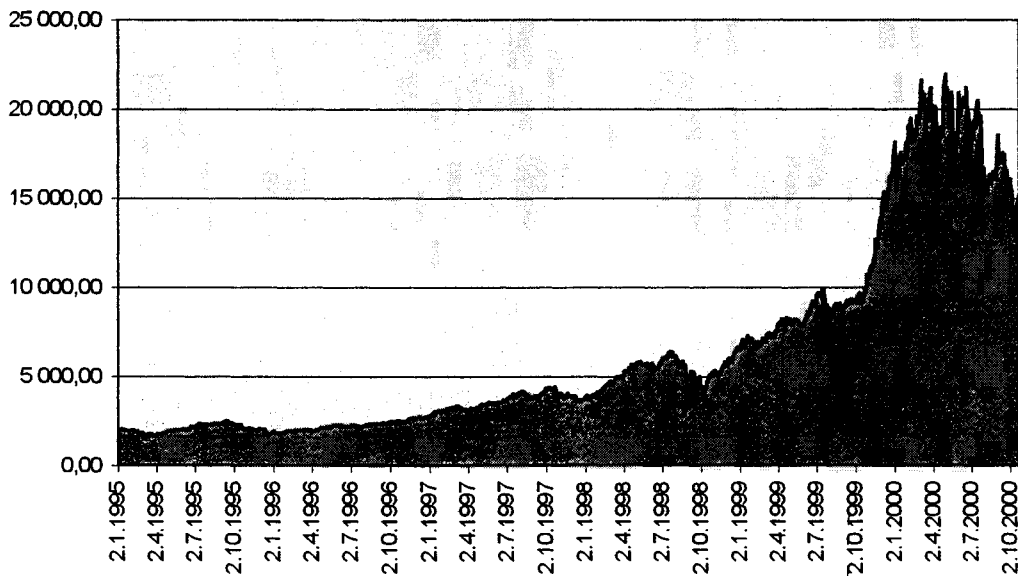
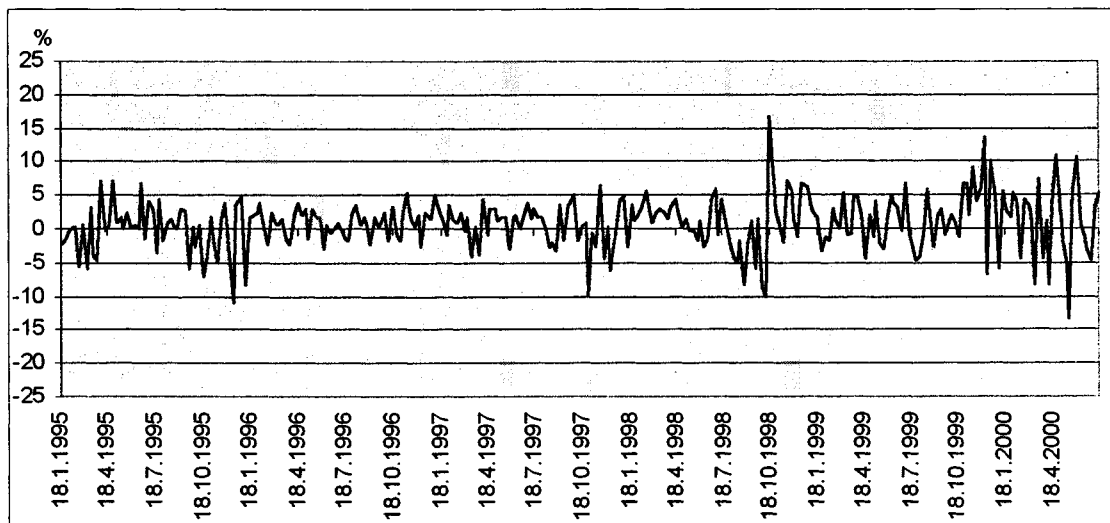


Figure 25. The HEX Index of the Helsinki Stock Exchange (Finland)

The development of the HEX skyrocketed at the end of 1990s due to the heavily weighted information technology sector in the index. Just two companies Nokia (mobile phones) and Sonera (telecom) accounted for 80% of the HEX at the record-breaking levels of 1999/2000. It also seems that the volatility of the returns has increased towards the end of the 1990s.

Figure 26. HEX Weekly Returns, 1/1995-7/2000

5. MINIMUM VARIANCE ANALYSIS OF THE CEEES' STOCK INDEX DATA

The returns of the CEEEs and Finland, higher moments of the data and the correlations between CEEEs and Finland will be described in the beginning of this chapter. The analysis is applied to logarithmic daily and weekly returns to find the possible unstabilities in the parameters, for example in the correlation coefficients. Domestic and FIM returns are presented to explore the share of the currency returns at the indices. Complete correlation tables between the CEEEs and Finland can be found in the Appendix B. The data is analysed in two periods: 1/1995-7/2000 and 11/1997-7/2000. The first data period covers Finland and the CEEEs without the Baltics. All countries are included in the second data period. The data periods captures the Asian and Russian crisis, which hit especially the CEEEs. The mean-variance analysis is presented at the end of the chapter i.e. efficient frontiers and optimal asset weights are investigated and analysed.

Despite of the fact, that the data period is relatively short, it could be considered to well describe the typical period of development of the emerging markets, which includes at least one crisis. The crisis period also well characterizes the vulnerability of the emerging equity markets to contagion –especially during the bear market. During the estimation period, the Finnish stock market development was rather extraordinary as the IT-weighted HEX increased irrationally.

5.1 Returns and Variances of the CEEEs' and Finland's Stock Indices

Mean returns and variances were calculated for the stock index data. Daily and weekly returns in domestic currency and in FIMs for both estimation periods are presented in the Table 11. The most surprising result is that the CEEEs' stock returns were relatively low also for the first estimation period and Czech and Slovak Republic's and Baltics' returns are not even positive. Only Hungary has relatively high, 42,6%, annual return during the first period. In the second period, the gap between the Finland's (HEX) and CEEEs' returns grew wider, because of the extremely strong performance of the HEX

In general, the CEEEs' variances of the returns seem to be relatively low compared to Finland's. For Slovenia (SBI), Czech (PX) and Slovak Republics (SAX) even substantially lower than for the Finland (HEX). For example, Slovenia's (SBI) and Hungary's (BUX) returns were in the second period almost equal, but the variance of the SBI was only 6,29 compared to 31,01 of the BUX. At this point it can be stated, that the potential benefits from the portfolio diversification for Finnish investors could occur only from the possible reduction of the portfolio risk (variance) as the portfolio return cannot be increased through diversification in the CEEEs' stock indices.

5.2 Normality

The hypothesis for normality of the returns for both periods for all the countries is clearly rejected, when tested with the Bowman-Shelton test for normality. The test is based on the closeness to 0 of the sample skewness and the closeness to 3 of the sample kurtosis (Newbold, 1995, 413-414). However the effects of the non-normality of the returns on the optimal asset weights can be estimated by including those higher moments into the portfolio analysis. The effect of kurtosis and skewness to optimal portfolio weights was investigated for example by Bekaert et. al. (1998b). Investment weights were increased toward the asset with positive skewness, holding kurtosis constant, and investment weights in emerging markets increase as kurtosis increased (holding skewness positive and constant) (Bekaert et. al., 1998b, 114). Ingersoll (1987) presents also a method for portfolio analysis using higher moments (Ingersoll, 1987, 99-101).

5.2.1 Skewness and Kurtosis

Like in most of the previous studies (in Chapter four), the CEEs have kurtosis and skewness values, which indicate the non-normality of the return distributions. However contrary to the results from Bekaert (1998) from the study of 20 emerging markets, the values for the skewness for CEEs are negative. The kurtoses appear to be higher for the domestic returns and daily returns than for weekly returns in FIMs. For weekly FIM returns Hungary, Slovenia and Estonia exhibit kurtosis higher than 3, which indicates that the distributions are long tailed. For other CEEs and Finland, the kurtosis is less than 3, which means that the tails of the distributions are flat (short-tailed). With the exception of Slovak Republic, all the distributions are negatively skewed i.e. the returns below the mean are more likely than in the case of normally distributed returns. The (non-normal) histograms of the CEEs and Finland are presented in the Appendix C.

Table 12. Skewness and Kurtosis of the CEEs and Finland

Daily Returns of CEEs and Finland								
	<i>Domestic Currency</i>				<i>FIMs</i>			
	6.1.1995-17.7.2000		4.11.1997-17.7.2000		6.1.1995-17.7.2000		4.11.1997-17.7.2000	
	Skewness	Kurtosis	Skewness	Kurtosis	Skewness	Kurtosis	Skewness	Kurtosis
BUX	-1,20	13,79	- 0,90	7,75	-1,03	12,36	- 0,86	7,99
WIG	-0,20	2,79	- 0,34	2,09	-0,13	2,13	- 0,32	1,75
SAX	-0,32	5,54	- 0,23	4,68	-0,29	4,25	- 0,24	3,63
SBI	0,73	27,71	- 0,45	6,38	0,76	23,76	- 0,24	4,01
PX	-0,22	3,43	- 0,21	1,86	0,38	9,15	- 0,18	2,20
TALSE	-	-	- 0,81	10,28	-	-	- 0,81	10,20
Litin	-	-	0,10	4,93	-	-	0,26	4,51
RICI	-	-	- 0,59	2,21	-	-	- 0,44	1,63
HEX	-0,56	4,07	- 0,51	2,12	-0,56	4,07	- 0,51	2,12
Weekly Returns of CEEs and Finland								
	<i>Domestic Currency</i>				<i>FIMs</i>			
	18.1.1995-17.7.2000		14.11.1997-17.7.2000		18.1.1995-17.7.2000		14.11.1997-17.7.2000	
	Skewness	Kurtosis	Skewness	Kurtosis	Skewness	Kurtosis	Skewness	Kurtosis
BUX	- 0,86	5,25	- 0,93	4,49	- 0,80	5,20	- 0,90	4,59
WIG	- 0,22	1,94	- 0,77	2,97	- 0,19	1,74	- 0,74	2,45
SAX	- 0,05	2,44	0,18	1,88	- 0,19	2,23	0,09	1,80
SBI	0,61	5,40	- 0,46	5,81	0,62	4,63	- 0,38	5,05
PX	- 0,25	2,35	- 0,10	1,55	- 0,30	2,45	- 0,23	2,02
TALSE	-	-	- 0,63	3,38	-	-	- 0,66	3,43
Litin	-	-	- 0,21	1,88	-	-	- 0,15	1,84
RICI	-	-	- 0,89	1,98	-	-	- 0,83	1,74
HEX	- 0,14	1,61	- 0,05	0,83	- 0,14	1,61	- 0,05	0,83

5.2.2 Autocorrelation

The inclusion of the effects of the possible autocorrelation on the portfolio analysis is behind the scope of this study. Based on the previous studies, it is likely that the autocorrelation would be present in the returns. The problems related to the predictability of the stock returns in the CEEs are often caused by the low liquidity (Rockinger & Urga, (2000) Korhonen (1998). If the liquidity of the CEEs stock markets increases as the markets develop, the problem of the autocorrelations for the other CEEs is likely to diminish.

5.3 Correlations Between the CEEs, Western World and Finland

In the previous studies, the correlations between emerging and developed countries have been found to be relatively low (see for example Harvey (1995) or Solnik (2000)). The low correlations between developed and emerging markets has often argued to be the main reason for portfolio diversification to emerging markets. Liljeblom & Löflund (1998) claimed that the correlations between Finland (0,41) and the rest of the Europe were lower than other Nordic countries' correlations.

Table 13. Correlations Between CEEs and U.S., U.K., Japan and Europac

	# of months	U.S. S&P	U.K. FT-SE 100 *	Japan **	FT Europac
Slovenia (12/98)	36	0,26	0,03	-0,28	-0,07
Estonia (12/98)	12	-0,35	0,07	-0,07	-0,06
Lithuania (12/98)	36	0,23	0,14	-0,21	0,04
Slovak Republic (12/00)	59	-0,05	-0,02	-0,39	0,18
Poland (12/00)	59	0,37	0,26	0,26	0,51
Czech Republic (12/00)	59	0,16	0,38	0,09	0,54
Latvia (12/98)	12	0,66	0,54	0,23	0,57
Hungary (12/00)	59	0,49	0,39	0,31	0,77
* and ** 12/98 values for all countries					

Sources: Emerging Stock Markets Factbook, 1999, 182-305 and S&P correlations 12/2000

All and all the correlations between the CEEEs and developed countries seem to be relatively low, with the exception of Hungary and Latvia. However, the estimation period for Latvia covers only the crisis year 1998, which could have resulted to higher correlations than normal periods. Relatively high correlations are between FT Europac and Poland and Czech Republic. On the other hand, the correlations are low and even negative for Slovenia, Baltics and Slovak Republic. The correlations are lowest between the CEEEs and Japan and quite low between CEEEs and U.K FT-SE100 and U.S. S&P.

Table 14. Correlations Between the CEEEs and Finland

	<i>Daily Returns in Domestic Currency</i>		<i>Daily Returns in FIMs</i>	
	6.1.1995-17.7.2000	4.11.1997-17.7.2000	6.1.1995-17.7.2000	4.11.1997-17.7.2000
	HEX	HEX	HEX	HEX
BUX	0,41	0,45	0,38	0,43
PX	0,33	0,41	0,26	0,37
WIG	0,31	0,38	0,21	0,27
TALSE	-	0,14	-	0,14
SBI	0,08	0,13	0,04	0,08
SAX	0,01	0,01	-0,04	-0,03
Litin	-	0,07	-	-0,05
RICI	-	0,02	-	-0,10
	<i>Weekly Returns in Domestic Currency</i>		<i>Weekly Returns in FIMs</i>	
	18.1.1995-17.7.2000	14.11.1997-17.7.2000	18.1.1995-17.7.2000	14.11.1997-17.7.2000
	HEX	HEX	HEX	HEX
BUX	0,42	0,49	0,41	0,49
WIG	0,33	0,44	0,27	0,38
PX	0,30	0,35	0,27	0,32
TALSE	-	0,10	-	0,10
SBI	0,12	0,18	0,12	0,19
Litin	-	0,15	-	0,12
RICI	-	0,11	-	0,10
SAX	-0,01	0,00	-0,06	-0,06

Correlations between the CEEEs and Finland seem to be generally low. Hungary (BUX), Poland (WIG) and Czech Republic (PX) have the highest correlations to the Finland (HEX), which could be due to the more advanced stage of development of their stock markets and higher integration into the world capital markets. Slovak Republic (SAX), Latvia (RICI), Lithuania (Litin), Slovenia (SBI) and Estonia (TALSE) have quite low correlations to HEX. Interestingly, the geographical proximity to the Baltic

countries does not seem to have much effect on the correlations. Despite of the fact that Slovenia (SBI) is the furthest country from Finland and its capital markets are still regulated, the correlation is higher than the Baltics'. This may be an indication of the better developed capital markets in Slovenia (SBI), than in Baltics. Slovak Republic (SAX) is the only country (when considering weekly FIM returns) with negative correlation to HEX.

It seems, that some unstability in the correlations exists: During the first estimation period the differences between the daily and weekly correlations are substantially lower than during the second period i.e. the correlations are more stable when the estimation period is longer. The correlations between daily FIM returns seem to be lower than for domestic returns for all the CEEEs, which is not surprising after the exchange rate developments are added into the analysis. The correlations between all the CEEEs and Finland were higher during the second period, which includes the Asian and Russian crises. Often during the crisis periods, the correlations tend to increase. However, the further investigation about the stability of the extreme correlations is not within the scope of this thesis.

The CEEEs could be divided into two groups on the basis of their weekly FIM returns correlation structure: Baltic countries and Czech Republic, Poland and Hungary. The correlations among the Baltics were in the range of [0.29, 0.48] and otherwise their correlations to other CEEEs were less than 0,27, with the exception of Latvia and Poland: 0,34. Czech Republic, Poland and Hungary had correlations within the range [0.47, 0.55]. Slovenia, which has the most segmented capital markets, had the highest correlations to Czech Republic (0,27), Poland (0,31) and Hungary (0,38). Otherwise, the correlations were low among the CEEEs. It seems that to some extent the geographical proximity and the level of development of the CEEEs' stock market affect the correlation value i.e. the closer the countries are and the more developed their equity markets are, the higher are the correlations. The complete correlation tables are presented in the Appendix B The relatively low correlations between Finland and the

within CEEs are likely to generate relatively well-diversified portfolios from the portfolio analysis.

5.5 Efficient Frontiers

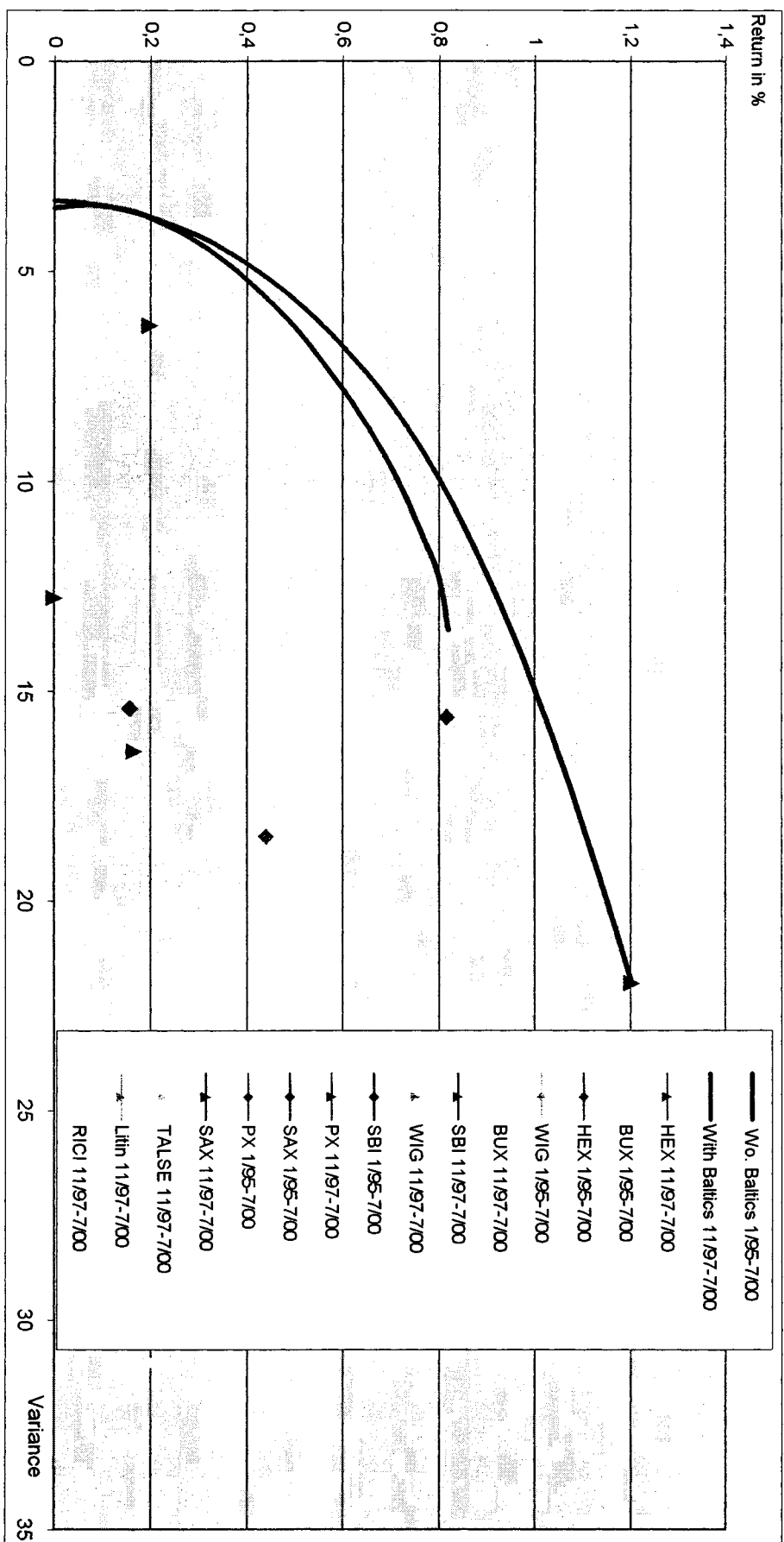
The efficient frontiers (i.e. optimal portfolios with a given level of expected portfolio returns, which minimize the portfolio variance) were obtained by optimizing the portfolios consisting of the CEEs and Finland. The optimization was carried out according to the theory of diversification presented in the second Chapter. As the scaled daily returns did not substantially differ from the weekly returns, only the latter ones will be reported. The efficient frontiers for both estimation periods and the expected returns of single countries are presented in the Figure 27. Because all the Baltics had negative returns during the estimation period, they are not shown.

For both estimation periods, 1/1995-7/2000 and 11/1997-7/2000 the reduction of the portfolio risk (variance) seems obvious. Unfortunately, for the second estimation period, the Finnish investor would have to give up some return to reduce the risk of his position. The more risk reduction the Finnish investor wants, the more she would have to give up return expectations. If the Finnish investor was satisfied with 0,6% weekly return (31,2% annual return) the risk of the portfolio would reduce to 7,8 from the 15,6 (with no diversification). With 0,4% weekly (20,8% yearly) return the portfolio variance would be further reduced to 5,2.

When the Baltic countries enter the analysis in the second period, the diversification benefits are only slightly increased as the efficient frontier switches left. If the expected return of the portfolio was below 0,2%, the variance would not differ much between the estimation periods. The statistical significance of the risk reduction benefits (i.e. whether the distance between variances of non-diversified and diversified portfolios is statistically significant) could be studied with mean variance spanning tests (see for example Harvey, 1995 or Huberman & Kandel, 1987). However, that kind of testing is

behind the scope of this thesis. There seems to be notable portfolio risk reduction benefits for Finnish investor from the diversification to the CEEEs' stock market indices.

Figure 27. Efficient Frontiers for Weekly Returns in FIMs



5.6 Optimal Asset Weights

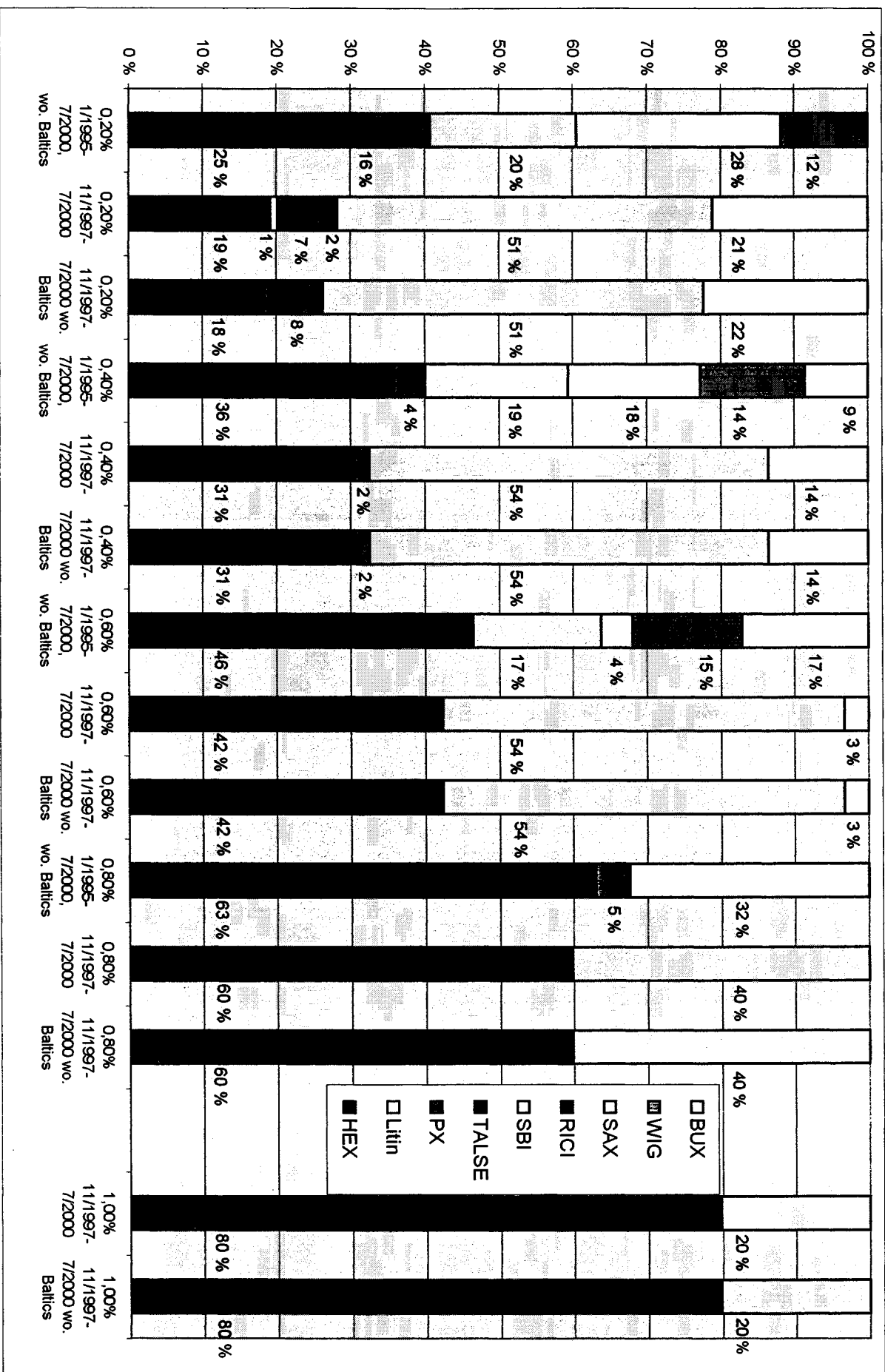
The optimal asset weights were solved according to the theory of diversification presented in the second Chapter. Optimal asset weights for expected weekly FIM portfolio returns of 0,2%, 0,4%, 0,6%, 0,8% and 1% with and without Baltics are presented in Figure 28. for the estimation periods 11/1997-7/2000 and 1/1995-7/2000. Only the asset weights equal or higher than 1% for weekly returns are reported in this context, as there were no substantial differences in the results between the daily and the weekly returns. See the Appendix D. for all the results.

The composition of the optimal portfolios for the period 11/1997-7/2000 for those two scenarios (with or without Baltics) is identical, when the portfolio returns are equal or higher than 0,40%. In practise, this result means that for the returns equal or higher than 0,40%, the Baltics are not included into the optimal portfolios. For the expected portfolio return of 0,20% the Estonian (TALSE) and Lithuanian (Litin) indices capture the shares of 2% and 1% of in the portfolio. Because of the negative mean returns for the Baltic countries, it is not surprising that the share of those assets is negligible. During the period 11/1997-7/2000 the Finnish (HEX) index had a mean return of 1,20% (62,4% annually), the variance of the Slovenian (SBI) index was very low, 6,29, and the correlation between indices 0,19. These factors caused the dominance of those two assets for the estimation period: The sum of the share of those indices varied between 70% for 0,20% portfolio return and 100% for the 1% return. Despite of its negative mean return, the third asset in the 0,20%, 0,40% and 0,60% portfolios was Slovakian (SAX) index, as it had negative correlation with HEX and SBI. The fourth asset in the 0,20% and 0,40% portfolios was Czech (PX) index.

For the estimation period of 1/1995-7/2000 there was no data available from the Baltic countries, so the portfolio analysis was carried out with five remaining CEEs and Finland. The optimal portfolios were better diversified than during the first estimation period (i.e. with the Baltic countries), which is to a certain extent surprising result. The

assets, which were not included in the first period, namely Hungarian (BUX) index and Polish (WIG) index, enter the portfolios with 0,40%, 0,60% and 0,80% expected returns. The 1,00% return portfolio could not have been created, as the highest asset returns for this estimation period were 0,82%. All the assets are present at the 0,40% portfolio with the shares varying from 4% of PX to 36% of HEX. In general, the share of the SBI is markedly reduced from the first estimation period. Due to the lower correlations between HEX and the CEEEs' indices, the share of HEX is slightly increased. Because of the highest returns of the BUX (0,82%) and HEX (0,82%), their share increases (as the expected portfolio return increases) despite of the fact that those two assets have the highest correlation (0,49). It seems that the portfolio optimization for the period 1/1995-7/2000 for the lower level weekly FIM returns produces relatively well diversified portfolios, which truly reduce the risk of the position of the Finnish investor, when compared to investing in only Finnish assets. When compared to the previous studies of emerging markets, the results differ in the sense that the investor from a developed country would have to give up some returns in order to achieve portfolio diversification benefits.

Figure 28. Optimal Portfolio Weights: Weekly Returns in FIMs



6. CONCLUSIONS

International diversification has been studied extensively for decades. However, the topic is not dried up, as new markets have been springing up in the Latin American, Asian, African and most recently in the former socialist block countries. The theory of portfolio diversification has developed from classical mean-variance analysis to advanced international capital asset pricing models. In practise, not all the investors take the full benefits from international diversification, as domestic diversification or geographically proximate countries are favoured more. One factor affecting the investment decisions is the level of information an investor has about the investment opportunities. This thesis informs the Finnish investors about the potential benefits from portfolio diversification to the selected Central and East European economies' (CEEEs) stock markets.

The macroeconomic development of the CEEEs was studied by evaluating the key macroeconomic factors, which also seem to indicate the stage of development of the CEEEs' stock markets. All the CEEEs have managed to stabilize and privatize their economies and create the necessary institutional and regulatory framework for capital markets. The level of stock market development is largely defined by the chosen privatization method and credibility of the institutional and regulatory framework. Based on the analysis of the macroeconomic development, regulatory framework and stock market indicators, it seems that Poland and Hungary are the most attractive countries for portfolio investment. Czech Republic, Slovenia and Estonia would be the second best group. Slovak Republic, Latvia and Lithuania are more risky assets.

Pros and cons from the portfolio diversification to the emerging markets and special characteristics of the stock market data were presented to get a general comprehension about this asset class. These characteristics make the emerging markets differ significantly from the developed economies stock markets, which

also restricts the number of feasible theories i.e. sophisticated international capital asset markets theories may not be directly applicable to study these markets. The CEEEs' stock index data exhibits different features than the emerging markets' data in the previous studies: The returns are low, even negative for some countries. Practically all the previous studies document the high returns. The low returns of the CEEEs could be partly explained with the Asian and especially Russian crises, which occurred during the estimation period. Very strong performance of the Finnish information technology weighted index was due to the worldwide IT boom. The returns have negative skewness, contrary to for example results of Bekaert (1998a), who found in 17 out of 20 emerging markets positive skewness. The hypothesis of the normality of the returns for the CEEEs and Finland was also clearly rejected.

In the previous studies, the correlations between developed and emerging markets have been found to be low. In this respect, the results are not substantially different, as the correlations between CEEEs and Finland are generally low. The highest correlation value between Finland and CEEEs was between Hungary (0,49) and lowest between Slovak Republic (-0,06). The geographical proximity did not seem to affect correlations between Finland and the CEEEs. Instead, within CEEEs the two countries could be divided in two groups based on their correlations: Czech Republic, Poland and Hungary and the Baltics.

The classical mean-variance analysis was carried out between Finland and the CEEEs for daily and weekly index returns. Two different data periods (11/1997-7/2000 and 1/1995-7/2000) were analysed. The second period was analysed with and without the Baltic countries. The hypothesis of the potential benefits from diversification to CEEEs is not totally rejected: For the Finnish investor the variance of the optimal portfolios was lower than without diversification, but additional returns cannot be achieved. This contrasts with the results of Haavisto & Hansson (1991) who did not find benefits for Finnish investor from

diversification to other Nordic countries. On the other hand Liljeblom et. al. (1995) and Liljeblom & Löflund (1998) find notable benefits from international diversification. However, when diversifying to the CEEEs Finnish investor would have to give up some return expectations in order to gain benefits from portfolio diversification. Usually this result is not typical in the emerging market studies. Another surprising result was that the inclusion of the Baltic countries in the portfolio analysis did not significantly change the optimal asset weights. This result is explained with the non-positive returns of the Baltic stock indices. The results from the macroeconomic evaluation are in line with the results from the mean-variance analysis with the exception of Slovak Republic i.e. Hungary, Slovenia, (Slovak Republic) and Poland capture the biggest shares in asset allocation. For the lower level of expected returns, the optimal portfolios seem to be relatively well diversified, which is not always common in previous studies.

The non-normality of the returns may have effect on the optimal asset weights. The effect of the higher moments of the return distributions on the asset weights could be adjusted according to Bekaert (1998b). The stability of the correlations during the estimation period could also be investigated. Jorion (1985) has criticized the mean-variance analysis with respect to the problems related to past sample mean returns as estimates of expected returns, which tend to perform poorly outside the sample period. A remedial action would be to use shrinkage estimators to shrink the mean value towards a common mean (e.g. CESI or IFC's index), which would predict the expected returns. Mean-variance spanning tests could be used to explore the statistical significance of the diversification benefits i.e. whether the efficient frontier is significantly further away from the non-diversified portfolio. As the CEEEs' stock market develop and more transition economies achieve higher stage of capital market development, the asset universe could be increased. Within a few years, the topic could be revisited to test whether the diversification benefits have changed as the CEEEs are expected to be less segmented from the European financial markets.

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Helsinki Stock Exchange: <http://www.hex.fi>

Hungarian Central Statistical Office: <http://www.ksh.hu/eng/homeng.html>

Ljubljana Stock Exchange: <http://www.ljse.si>

National Stock Exchange of Lithuania: http://www.nse.lt/beta/default_e.htm

Organisation for Economic Cooperation and Development:
<http://www.oecd.org/sge/ccnm/>

Prague Stock Exchange : <http://www.pse.cz>

Riga Stock Exchange: <http://www.rfb.lv/>

Standard & Poors: <http://www.spglobal.com>

Tallinn Stock Exchange: <http://www.tse.ee/>

Warsaw Stock Exchange. <http://www.wse.com.pl>

Worldbank: <http://www.worldbank.org>

APPENDIXES

Appendix A. Definitions of the EBRD's Transition Indicators

Share of Private Assets in the Economy According to the Transition Report, 2000, 15

3 More than 25% of large-scale enterprise assets in private hands or in the process of being privatised, but possibly with major unresolved issues regarding corporate governance.

4 More than 50% of state-owned enterprise and farm assets in private ownership and significant progress on corporate governance of these enterprises

4+ Standards and performance typical of advanced industrial economies: more than 75% of enterprise assets in private ownership with effective corporate governance.

Institutional Development of the Financial Markets According to the Transition Report, 2000, 15

2 Formation of securities exchanges, market-makers and brokers; some trading in government paper and/or securities; rudimentary legal and regulatory framework for the issuance and trading of securities.

3 Substantial issuance of securities by private enterprises; establishment of independent share registries, secure clearance and settlement procedures, and some protection of minority shareholders; emergence of non-bank financial institutions (e.g. investment funds, private insurance and pension funds, leasing companies) and associated regulatory framework.

4 Securities laws and regulations approaching IOSCO standards; substantial market liquidity and capitalisation; well-functioning non-bank financial institutions and effective regulation.

+4 Standards and performance norms of advanced industrial economies: full convergence of securities laws and regulations with IOSCO standards; fully developed non-bank intermediation

Extensiveness of the Financial Regulations According to the Transition Report, 2000, 37

3 Legislation for financial markets is perceived as reasonably comprehensive but could benefit from further refinement in some areas. Banking regulations appear generally to conform with the Basle Committee's Core Principles, although regulations concerning bank insolvency and deposit protection may not have been adopted. Further refinement to the regulation of securities intermediaries and/or investment funds and the creation of shareholder depositories and registers seem to be needed to achieve conformity with minimum international standards.

4 Comprehensive financial market legislation is perceived as conforming generally with minimum international standards. However, refinement appears to be needed in at least one important area of either banking or securities regulation. For example, many jurisdictions in this category may need

to enact rules concerning money laundering or bank insolvency. Legislation concerning shareholder depositories and registries seems to be in its early stages of implementation.

+4 Banking and capital markets legislation and regulation are perceived as comprehensive and in conformity with minimum international standards

Effectiveness of the Financial Regulations According to the Transition Report, 2000, 37

2 Legal rules are perceived as somewhat unclear and sometimes contradictory. Supervision of financial institutions appears to exist only on ad hoc basis. There appear to be few, if any meaningful producers in place to enforce the law. There may be a lack of adequately trained staff in either banking or capital markets regulatory authorities.

3 Although legal rules governing financial markets are perceived as reasonably clear, regulatory and supervisory support of the law may be inconsistent, creating a degree of uncertainty. Although the regulator may have engaged in corrective actions against failing banks and securities market practices, enforcement problems appear to exist.

4 Legal rules governing financial markets are perceived as readily ascertainable. Banking and securities laws appear to be well-supported administratively and judicially, particularly regarding the efficient functioning of enforcement measures against failing institutions and illegal market practises. For example, the regulator has taken corrective action to liquidate failing banks. Enforcement actions against individuals and securities intermediaries are evident, but might still benefit from more systematic and rigorous enforcement. Courts seem to have adequate authority to review enforcement decisions or other corrective actions for banks and/or securities firms.

+4 Regulators appear to possess comprehensive enforcement powers and exercise authority to take corrective action on a regular basis. Examination of securities intermediaries and licensing of intermediaries seem to be frequent, as is the use of corrective action, such as prosecution for insider dealing revocation of bank licences, and liquidation of insolvent banks.

Appendix B. Correlations Between Finland and CEEEs

Correlations between CEEEs and Finland, Baltics Excluded

Logarithmic Domestic Daily Returns 6.1.1995-17.7.2000

	Hungary	Poland	Slovak Republic	Slovenia	Czech Republic	Finland
Hungary	1,00					
Poland	0,41	1,00				
Slovak Republic	0,04	0,02	1,00			
Slovenia	0,12	0,07	-0,05	1,00		
Czech Republic	0,39	0,27	0,02	0,06	1,00	
Finland	0,41	0,31	0,01	0,08	0,33	1,00

Correlations between CEEEs and Finland, Baltics Excluded

Logarithmic Daily Returns in FIMs 6.1.1995-17.7.2000

	Hungary	Poland	Slovak Republic	Slovenia	Czech Republic	Finland
Hungary	1,00					
Poland	0,32	1,00				
Slovak Republic	0,02	0,04	1,00			
Slovenia	0,12	0,06	-0,02	1,00		
Czech Republic	0,32	0,21	0,05	0,06	1,00	
Finland	0,38	0,21	-0,04	0,04	0,26	1,00

Correlations between CEEEs and Finland

Logarithmic Domestic Daily Returns 4.11.1997-17.7.2000

	Hungary	Poland	Slovak Republic	Slovenia	Czech Republic	Estonia	Lithuania	Latvia	Finland
Hungary	1,00								
Poland	0,47	1,00							
Slovak Republic	0,03	0,03	1,00						
Slovenia	0,21	0,26	-0,02	1,00					
Czech Republic	0,49	0,36	0,03	0,14	1,00				
Estonia	0,12	0,20	0,04	0,05	0,13	1,00			
Lithuania	0,12	0,10	0,03	0,05	0,09	0,18	1,00		
Latvia	0,05	0,11	0,03	0,07	0,07	0,22	0,20	1,00	
Finland	0,45	0,38	0,01	0,13	0,41	0,14	0,07	0,02	1,00

Correlations between CEEEs and Finland

Logarithmic Daily Returns in FIMs 4.11.1997-17.7.2000

	Hungary	Poland	Slovak Republic	Slovenia	Czech Republic	Estonia	Lithuania	Latvia	Finland
Hungary	1,00								
Poland	0,37	1,00							
Slovak Republic	0,00	0,01	1,00						
Slovenia	0,22	0,22	0,01	1,00					
Czech Republic	0,43	0,27	-0,01	0,09	1,00				
Estonia	0,11	0,18	0,02	0,04	0,13	1,00			
Lithuania	0,07	0,11	0,05	0,08	0,06	0,16	1,00		
Latvia	-0,01	0,14	0,03	0,08	0,01	0,17	0,29	1,00	
Finland	0,43	0,27	-0,03	0,08	0,37	0,14	-0,05	-0,10	1,00

Correlations between CEEs and Finland

Logarithmic Domestic Weekly Returns 18.1.1995-17.7.2000

	Hungary	Poland	Slovak Republic	Slovenia	Czech Republic	Finland
Hungary	1,00					
Poland	0,53	1,00				
Slovak Republic	0,13	0,07	1,00			
Slovenia	0,19	0,05	0,00	1,00		
Czech Republic	0,51	0,43	0,07	0,11	1,00	
Finland	0,42	0,33	-0,01	0,12	0,30	1,00

Correlations between CEEs and Finland

Logarithmic Weekly Returns in FIMs 18.1.1995-17.7.2000

	Hungary	Poland	Slovak Republic	Slovenia	Czech Republic	Finland
Hungary	1,00					
Poland	0,46	1,00				
Slovak Republic	0,09	0,06	1,00			
Slovenia	0,21	0,00	-0,02	1,00		
Czech Republic	0,47	0,36	0,06	0,09	1,00	
Finland	0,41	0,27	-0,06	0,12	0,27	1,00

Correlations between CEEs and Finland

Logarithmic Domestic Weekly Returns 14.11.1997-17.7.2000

	Hungary	Poland	Slovak Republic	Slovenia	Czech Republic	Estonia	Lithuania	Latvia	Finland
Hungary	1,00								
Poland	0,62	1,00							
Slovak Republic	0,15	0,12	1,00						
Slovenia	0,36	0,26	-0,03	1,00					
Czech Republic	0,57	0,52	0,10	0,27	1,00				
Estonia	0,08	0,21	0,07	0,10	0,15	1,00			
Lithuania	0,20	0,22	0,01	0,12	0,25	0,35	1,00		
Latvia	0,15	0,34	0,08	0,21	0,25	0,30	0,43	1,00	
Finland	0,49	0,44	0,00	0,18	0,35	0,10	0,15	0,11	1,00

Correlations between CEEs and Finland

Logarithmic Weekly Returns in FIMs 14.11.1997-17.7.2000

	Hungary	Poland	Slovak Republic	Slovenia	Czech Republic	Estonia	Lithuania	Latvia	Finland
Hungary	1,00								
Poland	0,56	1,00							
Slovak Republic	0,10	0,08	1,00						
Slovenia	0,38	0,31	-0,05	1,00					
Czech Republic	0,55	0,47	0,06	0,27	1,00				
Estonia	0,08	0,19	0,04	0,09	0,18	1,00			
Lithuania	0,19	0,23	0,01	0,13	0,27	0,34	1,00		
Latvia	0,14	0,34	0,07	0,23	0,25	0,29	0,48	1,00	
Finland	0,49	0,38	-0,06	0,19	0,32	0,10	0,12	0,10	1,00

Appendix C. Histograms of the Returns

