THE RELATIONSHIP BETWEEN CAPITAL MARKETS AND INSTITUTIONS: CROSS-COUNTRY ANALYSIS

by

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Abstract

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In this paper we study the efficiency of capital markets of Ukraine and five other post-communist countries, namely the Czech Republic, Hungary, Poland, Slovakia and Russia by applying weak- and semi-strong-form tests of efficiency. The results are analysed from the standpoint of institutions necessary for capital market development, both formal and informal, that were or were not created in these countries during transition. It is shown that the superiority of gradual over Big Bang approach is reflected in these countries capital markets efficiency. We conclude by outlining the actions that are necessary for the Ukrainian capital market to grow, develop and become more efficient.

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GLOSSARY

Book-to-market. The ratio of the book value to market value of a stock.

Book value. A firm's total assets minus intangible assets and liabilities, such as debt.

Leverage (leverage ratio). The ratio of value of firm's debt to the total value of the firm (debt plus stockholder capitalization).

Market β. Market β is equal to the covariance of a security's return with the return on the market portfolio divided by the variance of the return on the market portfolio. It is the slope coefficient of the regression of a security's return on the market portfolio's return in the Sharpe-Lintner-Black model.

Market line. The line from the risk-free rate point through the market portfolio point in the Sharpe-Lintner-Black model. Each point on this line represents a portfolio combined of particular amount of risk-free asset and market portfolio.

Market model. Market model of expected returns takes expected returns of a security to be equal to mean of historic returns during the time period under study.

Mean-variance (Markowitz) efficient portfolio. Portfolio that has the highest expected return at a given level of risk.

Size of a stock. Stock price times quantity of shares outstanding.

Chapter 1

INTRODUCTION

The development of capital markets is commonly viewed as a fundamental element that led to growth of capitalist economies. In these countries capital markets act as intermediaries between the decision of a person to save and the decision of an entrepreneur to invest, as well as tools for efficient diversification of risk. Moreover, modern economic literature emphasizes the critical role these markets play in provision of appropriate incentives for managers. Investors' desire to maximize profits motivates them to monitor managers actively to ensure that they act in the interest of shareholders. That is why a developed capital market is necessary for Ukraine to finish its period of transition and become a successful capitalist economy.

Consider the history of appearance of capital market in Ukraine. Formally, it began in June of 1991. Then the law of Ukrainian SSR "On Securities and Stock Exchange" was passed. This happened in just two months before the series of events that put an end to USSR, first of which was the putsch of August 19, 1991. As early as in October 1991 the first Ukrainian stock exchange, joint-stock company "Ukrainian Stock Exchange" was founded. The stock market was planned as a tool for privatization.

Fifteen years were not enough for the Ukrainian capital market to transform into an efficient market. However, the years that passed have the ultimate importance for capital market development in Ukraine and define its future path. In this paper we look back to what has been done and draw conclusions about what is left to be done. The agenda is the following. First, in general terms we discuss the his-

tory of transition of six post-communist countries: Ukraine, the Czech Republic, Russia, Hungary, Poland, and the Slovak Republic. Second, we approach to the issue from the point of view of econometrics: how efficient capital markets of these countries are. Here we apply the Efficient Market Hypothesis and the tests of efficiency related to it: the tests for weak- and semi-strong-form efficiency. Note that in this study we take macroeconomic variables as proxies for "all publicly available information" for semi-strong-form tests. Finally, we evaluate the empirical results from the standpoint of institutional economics and determine what the successes and failures of the Ukrainian capital market are and what measures should be taken for this market to grow, develop and become comparable with those of the developed economies. The answer, indeed, depends on the measure that we use. Obviously, The Ukrainian capital market is underdeveloped as compared to the markets of USA, Great Britain or Japan. Nevertheless, this market is directly comparable to markets in other emerging economies, especially post-communist ones. In the light of aforesaid our choice of national capital markets, with which we compare Ukrainian one (the Czech Republic, Hungary, Poland, Slovakia and Russia) is nothing but natural. These countries started their independent policymaking with the collapse of USSR and went through the period of instability, decline in output, and political changes. The differences between these countries are in terms of sequencing and pacing of realization of transition and successes and failures in this work.

The structure of the remaining part of the thesis is the following. Chapter Two is devoted to a general historical description of privatization and capital market development which accompanied it. In Chapter Three the literature on efficient market hypothesis and institutional issues is reviewed. In Chapter Four we present the description of the model. In Chapter Five we describe the data used and the results of the tests obtained. Chapter Six concludes.

Chapter 2

OVERVIEW OF COUNTRIES UNDER STUDY

The political and economic debate that followed the collapse of USSR resulted in that ex-USSR countries formulated as top priority the goals of macroeconomic stabilization and microeconomic restructuring, as well as of institutional and political reforms. The major debate, however, took place about the speed of transition, either gradual or "Big Bang", which naturally led to division of the debate into two camps of thought. Note that they both emphasized the importance of development of national capital markets, but they approached this issue from different sides. The first camp pointed out that the most important is that centrally-planned state-owned enterprises are poorly managed and that the privatization is needed to enhance the management. The capital markets were seen as a necessary instrument for this. The approach of economists representing this camp is best described in the paper of Frydman and Rapaczynski (1994). The second camp stated that it is first of all a political issue of total government control and that main goal of privatization is "depoliticization" of the economy. The role of capital market was expressed less transparent, but still was considered important. This approach is described in the paper by Boycko, Shleifer and Vishny (1995). These two views were fundamental for the design and implementation of the privatization schemes in Central and Eastern Europe.

Poland and Hungary were proponents of the first camp, so they approached privatization gradually. In privatizing large and medium-sized firms Poland followed the way of "commercialization" where enterprises remained state-owned but got somewhat independent supervisory boards. Hungary opted to sell large and medium-sized companies one by one to foreign investors. These countries' methods

were considered slow by many economists, but they provided the necessary managerial skills and external funds that were used for investment in the privatized firms. Exchanges in both Hungary and Poland started to operate in 1991 with a very few listed firms and concentrated on applying regulations and listing requirements to provide for expansion of the market. In the following years, although starting from a low value, the number of listed firms, liquidity and market capitalization in these countries grew steadily. These countries underwent a period of high inflation and instability just as all other transition countries, although the levels of inflation have never exceeded 60%. This is explained by attention these countries paid to the issues of stability from the beginning. However, only Poland aimed at macroeconomic stability, control of corruption, and banking-system cleanup from the very beginning (Johnson, McMillan, and Woodruff (1999)). In mid-90s an important motivation for Hungary and Poland, as well as for the Czech Republic and Slovakia has become the need to develop a legal system that conforms to that of the European Union as a prerequisite for accession to EU.

Currently economists agree in the view that Hungary and Poland transition is mostly complete. By the end of 2005 in Hungary total market capitalization was 28.8% of country's GDP with 43 companies listed in the Budapest Stock Exchange. In Poland by the end of 2005 total market capitalization was 50% of its GDP with 254 companies listed in the Warsaw Stock Exchange.

Czechoslovakia (split into the Czech Republic and the Slovak Republic on January 1, 1993), Russia and Ukraine followed the prescriptions of the second camp and opted for mass privatization, for which the voucher system was designed. In Russia and Ukraine most companies were privatized by their management and workers. The major drawback of this is that it created poor corporate governance. It also did not lead to allocation of new funds for investment and did not create

revenue for the government. In the Czech Republic and Slovakia vouchers were distributed equally among the population. Although this approach was considered to be the most fair, it led to the same problems as in Russia and Ukraine, but also led to dispersed ownership. Due to this fact the Czech Republic and Slovakia experienced a lot of fraudulent schemes of ownership takeover, where minor shareholders were cheated, known as "tunneling." In fact, because the privatization was desired to be quick, regulations and enforcement were deliberately left weak in the "Big Bang countries." That is why, illegal schemes, growth of shadow economy and appearance of financial and industrial groups that were not interested in transparency happened in all these countries.

The creation of stock markets, however, went differently in the Czech Republic, Slovakia, Russia and Ukraine. In Czechoslovakia stock market was created in 1992 with the requirement to list 1,600 companies at one time, of which almost all stocks were illiquid. In Russia and Ukraine the stock market were created much later as in the beginning of privatization exchange of vouchers took place away from the official stock exchanges. In Russia the first stock exchange, the electronic trading system RTS, appeared in 1995 and remains the most liquid exchange in the country. In Ukraine the first stock exchange, the Ukrainian Stock Exchange, appeared in 1991, but privatized companies were not forced to get listed there. PFTS, the first electronic trading system, started in 1996 and remains the most liquid. In spite of differences, every country has had a major delisting, accompanied by drop of liquidity and capitalization. Russia and Ukraine have undergone a period of especially severe drop in GDP and employment. Inflation has peaked incredible 2,500% and 10,000% respectively. Although later macroeconomic stability was achieved, Ukraine and Russia had a lot to do to overcome the negative consequences of privatization.

By the end of 2005 the capitalization of capital market of Czech Republic constituted 49.5% of its GDP with 139 companies listed in Prague Stock Exchange. By the end of 2005 total market capitalization of Slovak capital market was 8.7% it's GDP with 93 companies listed in the Bratislava Stock Exchange. In Russia total market capitalization in 2005 constituted 9.8% of GDP with 278 companies listed in the RTS. By the end of 2005, total market capitalization of companies traded on PFTS was 27% of Ukrainian GDP with 443 companies listed.

Chapter 3

LITERATURE REVIEW

3.1 Efficient Market Hypothesis

In this section we present the discussion of the Efficient Market Hypothesis and the forms of efficiency connected to it: weak-form efficiency and semi-strong-form efficiency. The empirical literature finishes the section.

A. Weak-form Efficiency

A market in which prices always "fully reflect" all available information is called efficient. In the efficient market prices provide accurate signals that help to make the right decisions to firms and investors. This definition is rather intuitive than mathematical. To make it rigorous we need to define what we understand under the term "fully reflect" and what "all available information" is.

In his influential paper, Eugene Fama (1970) reviews the theory and empirical work in the field of market efficiency. He notes the fact that there was a considerable body of empirical work done before rigorous theory was developed. Authors were intuitively close to the concepts of fair game and random walk, but in all cases their explanations were lacking in rigor. It was not until the works by Samuelson (1965) and Mandelbrot (1966) that these concepts were thoroughly studied. Interesting to note, that the first statement and test of random walk model was done by Bachelier in 1900, but this was forgotten for almost 60 years.

Fama repeated his work with his second review of efficient market hypothesis theory (Fama (1991)). He shows that in early tests of market efficiency it was often found that stock returns are predictable from past returns. For example,

Fama (1965) finds that the first-order autocorrelations of daily returns are positive for 23 of 30 and statistically significant for 11 of 30 Dow Jones Industrial indexes. Fisher (1966) finds that the autocorrelations of returns on diversified portfolios are larger than those on individual stocks. However these results, although having statistical significance, do not have economical significance, as long as the demonstrated autocorrelations are less than 1%. Since these tests do not take into account transaction costs, this predictive power is negligible.

Later, in work by Lo and MacKinlay (1988) it is found that weekly returns on portfolios of NYSE stocks grouped according to size (stock price times shares outstanding) show positive autocorrelation. The autocorrelation is stronger for portfolios of small stocks. However, as Fama (1991) argues, this effect implies that autocorrelation may be due to nonsynchronous trading effect (Fisher (1966)). This effect appears for small stocks because they are less liquid compared to larger stocks, so they are traded less frequently. Due to this, occurrence of one deal within one time period (e.g. one day) or the next one may greatly influence the returns series. To avoid this bias, Conrad and Kaul (1988) examine the autocorrelation of Wednesday-to-Wednesday returns for size-grouped portfolios of stocks. They also find that weekly returns are positively autocorrelated, and more so for portfolios of small stocks. The first-order autocorrelation of weekly returns for the portfolio of largest decile of NYSE stocks is only 0.09. However, the portfolio of the smallest 40% of stocks demonstrates first-order autocorrelation around 0.3. Fama (1991) argues that the results of Lo and MacKinlay (1988) and Conrad and Kaul (1988) show that, because of the variance reduction due to diversification, portfolios produce stronger indications of time variation in weekly expected returns than individual stocks. These results also suggest that returns are more predictable for small-stock portfolios. However, this is in part due to nonsynchronous trading effect, not fully mitigated by using returns on successive Wednesdays.

An important finding was done by French and Roll (1986). They find that stock prices are more variable when the market is open. On an hourly basis, the variance of price changes is 72 times higher during trading hours than during weekend nontrading hours. And the hourly variance during trading hours is 13 times the overnight nontrading hourly variance during the trading week. As Fama (1991) argues, this can be explained as the result of noise trading by uniformed investors. In any case, the return autocorrelations found by French and Roll (1986) are on average close to zero.

The early literature does not interpret evidence of significant autocorrelation as sign of market inefficiency. Fama (1991) demonstrates, that the argument was that even if autocorrelations are not zero, they are close to zero and, therefore, economically insignificant. However this view was challenged by Shiller (1984) and Summers (1986). They present simple models in which stock prices take large slowly decaying swings away from fundamental values, but short-horizon returns have little autocorrelation. In this case market is highly inefficient, but this is not captured by tests of autocorrelation. The Shiller-Summers challenge spawned a series of papers that tested long-run returns. The argument was that although Shiller-Summers model produces small autocorrelation in short-term, in long-term it will show strong negative autocorrelation. The evidence at first seemed striking. Thus, Fama and French (1988) find that the autocorrelations of returns on diversified portfolios of NYSE stocks for the period of 1926-1985 have the pattern predicted by the Shiller-Summers model. The autocorrelation is small for short-term, but for long term it grows up to –0.4 for 3- to 5-year returns. However, when Fama and French delete the 1926-1940 period, this effect disappears. It was also demonstrated theoretically that in the model of Shiller and Summers variance of returns should grow less than in proportion to the return horizon. Poterba and Summers (1988) find that for horizon N of 2 to 8 years, the variance of N-year returns on diversified portfolios grows much less than in proportion to N.

Finally, Fama and French (1988) point to the fact that temporary swings in stock prices do not necessarily imply the irrational bubbles of the Shiller-Summers model. As Fama (1991) puts it, suppose (1) rational pricing implies an expected return that is highly autocorrelated but mean-reverting, and (2) shocks to expected returns are uncorrelated with shocks to expected dividends. In short, a ubiquitous problem in time-series tests of market efficiency, with no clear solution, is that irrational bubbles in stock prices are indistinguishable from rational time-varying expected returns.

DeBondt and Thaler (1985, 1987) find that the NYSE stocks identified as the most extreme losers over a 3- to 5-year horizon usually have strong returns relative to the market during the following years. Conversely, the stocks identified as extreme winners tend to have weak returns relative to the market in next 3- to 5-year period. According to Fama (1991), they attribute these results to market overreaction to extreme bad or good news about firms. Their findings summoned an active argument as to what is the cause for this behavior. Chan (1988) and Ball and Kothari (1989) suppose that the winner-loser scheme is due to failure to risk-adjust returns, DeBondt and Thaler (1987) disagree though. Zarowin (1989) argues that market overreaction to extreme news cannot explain this result. He argues that this result is related to the size effect, that is, small stocks are often losers and they also often have higher expected returns than large stocks. Chan and Chen (1991) provide another explanation. They argue that there is a risk factor associated with the relative economic performance of firms (a distressed-firm effect) that is compensated in way of higher returns. The common view on this feature of stock behavior has not been yet drawn up. However as is true in many cases, this finding does not allow building reliable trading rule with significant economic returns.

B. Semi-Strong Efficiency

This section provides an overview of asset pricing models in light of tests of semi-strong efficiency used in this study. The Sharpe-Lintner-Black (SLB) model is the first model that we overview. This model is of great importance to the development of understanding of asset-pricing. It has built the foundations for future development of asset-pricing models and for our understanding of links between capital markets and the economy. It was the first widely recognized formal model: before it was introduced, authors commonly used informal constant expected returns model or the market model. Moreover, the SLB model is still important in aspect of intuition. According to Fama (1991), market professionals and academics still think about risk in terms of market β and refer to the market line as a representation of the tradeoff of expected return for risk.

The SLB model is also important since it served as the foundation for multi-factor asset pricing models, which we consider next. These models are the natural successors of the SLB model. They bear the same intuition as the latter but they use a number of factors to explain the cross-section of securities' returns instead of only the market β, as in the SLB model. Multi-factor asset-pricing models are the most flexible and promising models, though they also have some caveats.

In this study we employ one of multi-factor models. It must be noted, however, that whichever model we employ, we have to use one. That means that we cannot do without using an asset-pricing model in tests of semi-strong market efficiency. A model is needed to estimate the expected rate of return, or the normal rate of return, relative to which the observed returns can be recognized as (not) efficient. Indeed, any model is simplification of reality and thus false by definition and none of existing models proved to be at least approximately true in every case. This has led economists to recognize the joint-hypothesis problem that is

especially significant in efficiency studies. Fama (1991) puts it in the following way:

> *Depending on the emphasis desired, one can say that efficiency must be tested conditional on an asset-pricing model or that asset-pricing models are tested conditional on efficiency. The point is that such tests are always joint evidence on efficiency and an asset-pricing model. (Fama (1991), p. 1589)*

The SLB model, also known as the CAPM, was developed by Sharpe (1964), Lintner (1965) and Black (1972) and, as was already mentioned, is the first widely-used formal asset-pricing model. The first studies of this model, including tests by Black, Jensen and Scholes (1972), Blume and Friend (1973), Fama and MacBeth (1973), and others, find that one of the predictions of the model does not agree with the reality. The special prediction of the Sharpe-Lintner version of the model implies that portfolios uncorrelated with the market (zero-β portfolios) have expected returns equal to the risk-free interest rate. However, in reality such portfolios have average returns higher than the risk-free rate. They find that other predictions of the model seem to be correct.

The key implications of the SLB model are the following. First, market portfolio of invested wealth is mean-variance efficient in the sense of Markowitz (1959). Next, a security's expected return is a positive linear function of market β. Finally, β is the only factor needed to explain the cross-section of expected returns.

For some time SLB model was widely accepted as correct. As Fama (1991) claims, there was a brief euphoric period in the 1970's when market efficiency and the SLB model seemed to be a sufficient description of the behavior of security returns. This period came to its end with the first attack on the model, that is, Roll's (1977) criticism. Roll argues that portfolio of invested wealth is too wide

and cannot be proxied by any available one, such as stock market portfolio that is commonly used, and therefore the early tests of the SLB model may be incorrect. Although his criticism is weakened by Stambaugh's (1982) evidence that the outcomes of SLB model are not sensitive to the proxy used for market portfolio, this issue remains actual.

Subsequent studies find that the implication of the SLB model that market β is the only factor needed to explain the cross-section of expected returns does not hold. Basu (1977, 1983) shows that earnings to price ratio (E/P) has marginal explanatory power. Controlling for β, expected returns are positively related to E/P. Banz (1981) demonstrates that size of a stock is also a significant explanatory variable. Given market β, expected returns of small stocks are too high, whereas expected returns of large stocks are too low. Bhandari (1988) shows that leverage is significantly positively related to stock returns in tests that also include market β. Chan, Hamao, and Lakonishok (1991) and Fama and French (1991) find that book-to-market has strong explanatory power. Controlling for β, book-to-market ratio is positively related to expected returns.

The literature suggests a number of explanations for the anomalies of SLB model. One argument says that the estimates of β are noisy and that the variables that are found to be significant are in fact correlated with true β. For example, Chan and Chen (1988) show that when portfolios are formed on size, the estimated β's of the portfolios are almost perfectly correlated (−0.988) with the average size of stocks in the portfolios. As Fama (1991) notes, the theory predicts that given a firm's business activities, the β of its stock increases with leverage. Thus leverage might proxy for true β's, when estimates of β's are noisy.

Chan and Chen (1991) argue that the size effect is due to a distressed firm factor in returns. When size of a stock is defined by the market value of equity, small stocks include many marginal or distressed firms, whose performance and sur-

vival is sensitive to business conditions. This relative distress is another risk factor in returns, not captured by market β, which is priced in expected returns. Fama and French (1991) argue that since leverage and book-to-market equity are to a great extent driven by the market value of equity, they also may proxy for risk factors in returns that are related to relative distress of firms.

Another approach is to use multi-factor asset-pricing models (which we discuss in the next section) to explain the SLB model anomalies. (The exposition follows Fama (1991).) For example, Ball (1978) argues that E/P is a proxy for many variables that are omitted in the SLB model. Thus, if two stocks have the same current earnings but different risks, the riskier stock has a higher expected return, and it is likely to have a lower price and higher earnings to price ratio. E/P is then a general proxy for risk and expected returns, and one can expect it to have explanatory power when asset-pricing follows a multifactor model, but not all relevant factors are included in the regression, i.e. when the SLB (one-factor) model is used.

There is voluminous literature, important for standpoint of the development of asset-pricing theory, not yet mentioned here. However, it is not important in this study; therefore, we cut the story short and sum up. By today the literature converged to the conclusion that primary SLB anomaly is the low power of market β in explaining a cross-section of securities' returns. The early success (in tests of Black, Jensen, and Scholes (1972) and Fama and MacBeth (1973) mentioned above, and others) does not seem to extend to later periods. We switch to the discussion of multi-factor asset pricing models with quotation from Cochrane (1999):

> *In retrospect, it is surprising that the CAPM worked so well for so long. The assumptions on which it is built are very stylized and simplified. Asset pricing theory recognized at least since Merton (1973, 1971) the theoretical possibility, indeed probability, that we should need factors, state variables or sources of priced risk, beyond movements in the market portfolio to explain why some average returns are higher than others. (Cochrane (1999), p. 39)*

Consider the following simple example. There are two stocks that have the same market β. However, in times of recessions one of them shows good performance whereas the other performs poorly. Perhaps, every investor would like to include the first stock into her portfolio as a cushion against recessions. This will bid up the price of this stock, effectively reducing its average return. The second stock will have to offer return higher than that of the first stock to be attractive for investors. So, the behavior in times of recessions is a factor, different from market β, which is responsible for the difference in returns between the two stocks. Obviously, we need to account for it to create more precise asset pricing model than the SLB model.

As we can see, the theory suggests that stocks that perform poorly in "bad times" should have higher returns. We therefore need a measure of "bad times" to act as another factor, apart from market β. Note that if investors' affairs are poor or they expect them to worsen in the future, they would consume less. Therefore, consumption must be the best measure of recessions. Unfortunately, empirical work trying to link asset returns and consumption series is not very successful. (See Rubinstein (1976), Lucas (1978) and Breeden (1979) for specifications of models using per capita consumption; the influential paper by Hansen and Singleton (1982) where they test parametrical consumption models; Mehra and Prescott (1985) where they do unconditional tests of these models; and others.) That

forced economists to search for other indicators of good or bad times. The candidates are the market return; events, such as recessions; business environment variables, such as D/P ratio, slope of the yield curve and industrial production; returns on other well-diversified portfolios. As Cochrane (1999) emphasizes, the most important required feature of an extra risk factor is that it must affect the average investor. For example, if an event makes some investors better off and some investors worse off, the latter group of investors would be willing to buy stocks that the former group of investors would be willing to sell and there would be only redistribution effect. The expected return of an asset would then be unaffected. If, in contrast, some event affects all investors approximately equally, they will collectively bid up or down prices for stocks that covary with the event.

Following the considerations presented above economists found a number of factors that explain the variation in returns across assets best, the most popular of which are the size and book-to-market ratio. One important shortcoming of these factors is that economic intuition behind these variables is vague. In contrast, for the macroeconomic factors at which we are concentrating in this study the economic intuition is straightforward, but the goodness of fit statistics is generally poorer. As Cochrane (1999) formulates it, "[for the various factors that are used] empirical success varies inversely with theoretical purity."

From the whole volume of literature that takes macroeconomic variables as indicators of "bad times", Cochrane (1999) marks out the following papers as the most significant. (We review these papers in the following section.) Jagannathan and Wang (1996) and Reyfman (1997) use labor income. Chen, Roll and Ross (1986) look at industrial production and inflation among other variables. Cochrane (1996) looks at investment growth. All these authors find the linear relation between β's of macroeconomic indicators and average returns, i.e. find that these indicators indeed explain variation in cross-section of returns on securities.

C. Empirical Literature

In this section we review the relevant empirical studies. Two areas of empirical research fall within the scope of our interest: the connection between the stock market and the macroeconomic factors and efficiency of an emerging stock market. These two questions may or may not intersect in any particular paper we review, as they do in this study. To shape the presentation, we first present a few most influential papers on the link between the stock market and the economy that use the developed nations' data series and then proceed to the literature devoted to emerging markets on both areas of research combined.

The path breaking study that, indeed, shaped this area of research is the paper by Chen, Roll, and Ross (1986). In this paper authors test a number of macroeconomic factors for power to explain cross-sections of returns as well as time-series of expected returns. First, they make an intuitive guess about what macroeconomic variables might influence the securities' returns based on theoretical considerations, similar to those presented in the description of multi-factor models above. Then they test these factors to find what variables do explain variation in the securities' returns.

The approach of Chen, Roll, and Ross (1986) has several original features. One feature is that they do not use the factor analysis approach, which proved to be misleading[1], to find the factors that influence the returns. Instead, they apply a version of the Fama-MacBeth (1973) technique: First, they regress the returns of a sample of assets on the economic factors they want to test for significance. For this purpose they take a 5-year period prior to the estimation. The beta coeffi-

[1] This approach was suggested by Ross (1976). As Fama (1991) notes, the factor analysis approach leads to unresolvable issue with the number of factors that would be optimal. See Dhrymes, Friend, and Gultekin (1985), Roll and Ross (1984), Dhrymes, Friend, Gultekin, and Gultekin (1984), Trzcinka (1986), Conway and Reinganum (1988). As Shanken (1982) argues, the factor analysis approach to identifying the common factors is doomed by fundamental inconsistencies.

cients they obtain in the first step are then used as explanatory variables in 12 (i.e., for each month in one year) cross-sectional regressions of stocks' returns. Each coefficient obtained in this way is an estimate of risk premium associated with each economic factor. This procedure is then repeated for each year in the sample period which gives a time series of such risk premiums for each factor. Finally, the mean values of each of these time series are tested using a t-test for being significantly different from zero. Indeed, if a series is significantly different from zero, the corresponding economic factor is regarded as such that helps to explain the cross-section of stocks' returns.

Another important feature is that authors consider using the VAR model but reject it. They argue that in case of using VAR one would indirectly use lagged stock market variable to explain the expected stock market return, whereas the objective of their study is to explore the pricing of exogenous macroeconomic variables. They therefore employ simple linear regressions, however based on firm (or, at least, more firm compared to the VAR model) theoretical foundations.

For the sample of stocks traded at NYSE in 1953–1983 Chen, Roll, and Ross (1986) find that such factors, as industrial production, changes in the risk premium[2], term structure of interest rates[3], unanticipated inflation and changes in expected inflation are significant explanatory variables in time-series regressions of securities' returns. They also test the CAPM and the Consumption CAPM by adding the market return and the per capita consumption as explanatory variables. They find that these variables do not have marginal explanatory power. The

[2] The difference between the "Baa and under" bond portfolio returns and long-term government bonds.

[3] The difference between the return on long-term and short-term government bonds.

authors also report that oil price changes and yearly change in industrial production[4] do not have significant effect on securities' returns.

Cochrane (1991, 1996) constructs a production-based asset pricing theory. The model is analogous to the Consumption CAPM, the author argues: The consumption CAPM ties asset returns to marginal rates of substitution, obtained from consumption data, assuming a specific utility function. The production CAPM ties asset returns to marginal rates of transformation, obtained from investment data, assuming a specific production function. The main prediction of the model is that returns on investment and returns on stocks should be equal. Of course, to make it testable, the author relaxes the strict equality of the two indicators. Cochrane (1991) finds that correlation between securities returns and investment returns ranges from 0.241 for simple quarterly series to 0.385 for overlapping annual series with standard errors corrected for serial correlation due to overlap. Nevertheless, the author also finds that in regression of returns on stocks on D/P ratio, investment returns variable has no marginal explanatory value. Cochrane (1996) continues the work and tests the model in various settings, obtaining significant explanatory power in all cases. The general conclusion Cochrane draws from the results of these two pieces of work is that any model with factors related to economic theory is in a position to challenge the empirical success of the traditional finance models. The superiority of models that use stock market factors (D/P, size, leverage etc.) compared to the models that use macroeconomic factors are purely in terms of quality of measurement of data.

We switch to the literature with the focus on developing countries and other empirical studies on efficiency. The early work is presented by Homa and Jaffee (1971), Rozeff (1974), Rogalski and Vinso (1977) and Schwert (1981). Recent studies include Darrat (1990), Kwok (1992), Lee (1992), Muradoglu-Sengul and

[4] The difference between log industrial production in month t and $t-12$

Onkal (1992), Stengos and Panas (1992), Cornelius (1993), Gallinger (1994), Hiemstra and Jones (1994), Asai and Tsunemasa (1995), Fung, Lo, and Leung (1995), Jensen, Mercer, and Johnson (1996), Kearney (1996), Ratner and Leal (1996), Leigh (1997), al-Bazai (1998), Fifield, Lonie, and Power (1998), Niarchos and Alexakis (1998), Dhatt, Kim, and Mukherji (1999) and Ibrahim (1999).

Darrat (1990) studies the link between the stock returns in Canadian stock exchange (the Toronto Stock Market) and such variables as money growth rate, change in fiscal deficit, industrial production, short-run interest rate, long run interest rate, exchange rate, inflation rate, volatility of interest rates for the period of 1972–1987. The paper, however, concentrates on the influence of the monetary and fiscal factors, including other in order to avoid "omission of variables" (see Lütkepohl (1982)). The author uses multivariate Granger-causality tests to estimate the model. The empirical results show that stock prices fully reflect all available information. However, the tests also show that fiscal policy influences the Canadian stock prices with significant lag, which contradicts either the hypothesis of efficiency or the assumption of constancy of expected returns. Note that the dual hypothesis of efficiency and constancy of expected returns have been discussed in the theoretical literature (see above, see Fama (1991) for a review).

Stengos and Panas (1992) test the weak and semi-strong efficiency of the Athens Stock Exchange. They use not the market index, but a number of selected stocks from the banking sector. For the weak-form tests they use a methodology to test for the presence of nonlinear structure in the residuals. For the semi-strong efficiency they use the Granger-causality methodology. They find that the stocks demonstrate both weak and semi-strong efficiency.

Ibrahim (1999) investigates the interaction between the number of macroeconomic variables and the stock prices for Malaysia. The author uses cointegration and Granger-causality tests. The results strongly suggest inefficiency in the Malay-

sian market. There is cointegration between the stock prices and such factors as consumer prices, credit aggregates and official reserves.

Hanousek and Filer (2000) look at the link between the stock market and the economic factors in the Central European countries, namely the Czech Republic, Slovakia, Hungary and Poland. Apart from this link they pay attention to the history of development of capital markets in all these countries and link it to the observed statistical results. The aim of this investigation is to test these markets for semi-strong efficiency. They use linear techniques, but, instead of the OLS they use the least absolute deviations regression, arguing that errors in reported macroeconomic indicators are especially significant for this region and, therefore, it should be avoided to put too much weight on big residuals, as they most probably represent errors in measurement, not real fluctuations.

The authors run regressions of the stock market index on its lagged value. Then, the authors add a macroeconomic factor to the regression and perform a test, using conventional Granger causality, whether the added factor has marginal explanatory power. They use the stock index series for 1993–1999 in each of the four national stock markets and the following economic factors: M1, M2, exports, imports, trade balance, foreign capital inflow, budget deficit, government debt, price levels (CPI and PPI) and industrial production. The results show that three out of four markets (the Hungarian, Polish and Slovak) cannot be called semi-strong efficient, which implies that there exist possibilities to trade profitably in these markets, though connected with significant risks. The Czech Republic stock market seems to be divorced from the real economy since statistical findings show that stock index does not react to economic factors.

The paper by Leigh (1997) is an IMF working paper. The aim of this paper is to study whether the Stock Exchange of Singapore is weak and semi-strong-form efficient. The sample used in this paper is 1975–1991. The weak-form efficiency

test is done by testing the series of stock returns to follow random walk. The Augmented Dickey-Fuller and Cointegrating Regression Durbin-Watson Statistics are used. Another test that is used is Phillips and Perron (1988) Z statistics. All three tests show that the SES is weak-form efficient.

The author uses VAR to test for semi-strong efficiency of the SES. Leigh notes that the advantage of VAR is that it would allow testing for semi-strong efficiency in both short-run and long-run. More precisely, Leigh takes the Campbell and Shiller (1987) methodology which uses bivariate VAR and expands it to three multivariate VAR systems. One system corresponds to aggregate demand system with consumption, investment and exports. In constructing it the author follows the works of Fama and French (1989) and Barro (1989) where the significance of these variables for the stock market is shown. Another system corresponds to the aggregate production in the economy, incorporating capital stock, labor, financial development variable and human capital. Finally, the last system uses real stock market returns, real money balances, real income, domestic and foreign real interest rates. The author relates this system to the works of Fama (1981) and Fama and Gibbons (1982) in which it is shown that these variables are connected to the stock market returns. The results of the tests show that the SES is robustly semi-strong efficient in both the short and the long run.

3.2 The Institutional Environment

In this part of literature review we present discussion of institutional economics' approach to capital markets creation in transition economies. The discussion generally follows Kogut and Spicer (2002) argument (hereafter KS).

The idea that laid in the foundation of mass privatization is that markets are natural phenomena. That is, when there is nothing to prevent or interfere with the economy, markets will arise by themselves and organize themselves to be as effi-

cient as possible in given environment. Because of this view, economists expected that it would be enough just to remove the command system and markets will flourish. As KS point out, the intellectual roots of this approach are described in Hirschman's (1977) analysis of the changing role of the concept of self-interest in explanations of social and economic institutions. Hirschman explains that social theory at first concentrated on the negative consequences of selfish actions on socially-beneficial goals. However, over time the idea of self-interest became tied to a broader concept of an invisible hand of a market that naturally led all selfish motivations to collectively-beneficial goals. That explains why those who planned the future of ex-USSR countries supposed that it would be enough to remove the state from control of the economy to allow the latter to develop and become efficient with the motivating force of entrepreneurship and self-interest. It was supposed that this force will restructure the inefficient state enterprises into efficient ones without any actions from the side of the government. In short, it was supposed that the invisible hand of the market will lead the post-privatization economy to capitalism.

However, as KS note, this idea was doubted by some policymakers. The examples can be found in Pohl, Jedrzejczak and Anderson (1995), and Morgenstern (1995). As Goldstein and Gultekin (1998) set forth, the Polish policymakers cautioned against quick privatization by vouchers due to the fact that it would be driven by amateur, uninformed investors. But clear understanding of the fact that markets cannot create themselves and that they need institutional foundations came with the new institutional economics. For example, North (1990) argues that institutions act as "rules of the game" that define and organize actions of market participants.

Economic sociology also rejects natural market approach. Its representatives argue that economic behavior in general is subject to social relations (see, e.g.,

Granovetter (1985)). Biggart and Hamilton (1992) assert that markets are embedded in existing political and social relations and it, therefore, is fruitless to divide markets and institutions. Markets are always embedded in institutions.

The research devoted to microfoundations of capital markets proves the same idea. Baker (1984) describes the close personal relationships that link groups of traders into circles. These different circles are identifiable from analysis of the trading patterns of brokers on national securities market. Abolafia (1996), in his ethnographic study in the stock, bond and futures markets of Wall Street, demonstrates that traders that operate in these markets are guided by great many informal norms. As Kogut and Spicer (2002, p.14) put it, "market exchanges have developed routinized practices that allow traders to do complex exchange based on verbal agreements and standardized contracts."

Provision of suitable laws may not suffice to create market economy, even if these laws are copied from those of developed countries. The problem is that the political and social components that are needed to transform laws-in-the-books to laws-in-practice may be missing. In following subsections we speculate about the institutional foundations that are necessary for this transformation. KS emphasize the three: effective state powers to enforce basic laws and regulations, the operational technology to support trading between buyers and sellers, and a chain of trust to permit impersonal trading.

A. State Powers

The decentralization of an economy in few years gives little time to develop new legislative mechanisms to regulate new market system. Therefore, mass privatization creates new private actors that operate in the field of little or no legal regulation. As KS put it, the autonomous civil bureaucracy is the force that provides the background of predictability and control to western market capitalism. There is

need for a strong government that would be able to construct predictable and consistent political and administrative structure in which entrepreneurs would operate. In the same fashion, Stark and Bruszt (1998) conclude that market development requires strong state and strong social actors. North and Weingast (1989) present an example from financial markets. They demonstrate that capital markets for public debt developed only when governments could credibly commit themselves to honor their obligations. Carruthers (1996) responds to their study and corrects their conclusion. He cites evidence that shows the primary role of social and political networks rather than credible commitment to law. Therefore, for assertion of North and Weingast about importance of government respecting its own law, Carruthers responds by saying that this situation may arise only when there is political consensus within a society. Political society is one that can credibly commit a government to its announced policies.

The post-communist countries were weak by the time they entered the privatization. Mass privatization weakened those that applied to it even more. Because of this, the rule of law cannot be assumed to be dominant in post-privatization period in those countries; in fact, the rule of law itself was prey to the political interests of competing groups. As KS note, during any transformation, insider information can be extremely profitable not only for trading, but also for acquisition of assets. That is why privatization gave huge incentives for groups of entrepreneurs to influence legal system so that it would support favorable rules of game. Obviously, these powerful interests would not seek transparency in the capital markets and the state was often too weak to counter against them.

B. The Institutional Technology of Markets

If government is not strong enough to create and enforce law, important question is whether market operators can do it themselves. That is, whether they can

create self-regulating mechanisms that would support market transparency, monitoring and enforcement and lead to its development.

These mechanisms, that KS label "institutional technologies," are those that enforce property rights, provide information on prices and monitor activities and which in final account produce institutional trust (discussed in part C). Among these technologies are the registries that record ownership of shares, the depositories, the licensing of brokers and dealers etc. One of the ideas of such institutional technologies was to promote creation of investment funds in the transition countries. This could solve the problem of uninformed investors, since such funds could provide monitoring that small shareholders could not (see Phelps. et. al. (1993); Lieberman et. al. (1995)). Help from international organizations, namely the World Bank, AID, British Knowhow Fund, or EBRD, was often in the way of transfer of these institutional technologies to emerging and transition economies. What is more, international organizations provided assistance to try to create new institutional technologies in the emerging capital markets. However, as KS note, these efforts highlight the fact that none of such market technologies existed before mass privatization in either of transition countries. All elements of capital markets, that is, brokers, dealers, mutual funds, stock exchanges, registries and depositories, had to be formed very quickly with the beginning of privatization. However, whether or not these entities, designed to work during privatization, could later become normal operators of emerging capital markets was unknown to the designers of this program.

C. The Chains of Trust

As KS assert, economic theory still cannot fully understand why people do not always follow their self-interest. For example, consider the free rider dilemma, which was emphasized by Olson (1965) and Ostrom (1990). Why should market participants contribute effort or money to organize self-regulation? However, it

was frequently observed that people act subject to social norms, even if probability of being penalized is low.

In western capital markets investors believe that if they invest, they will receive a fair return. The key role of capital market is intermediary between savers that postpone consumption by trusting their money for investment and lenders. Observing this, Zucker (1986) derives a term — "institutional trust". Institutional trust is trust into the fair workings of a complex institutional system, which suggests that the possibilities for fraud and theft are minimal and insignificant. Shapiro (1987) notes that individuals may prefer to "keep their money in mattresses, literally and figuratively — fearful of future transactions and cautious about transforming their tangible property into a symbolic share of collectivized wealth." This is an example of breakdown of institutional trust.

In the way of establishing institutional trust, the state and institutional technology play a certain role. Both help to create the regulatory framework to protect fair rules of the game. However, neither of the two can dictate nor implant trust. Government may define standards, that is to create laws-on-the-books and institutional technologies may give a basic scheme of running the complex exchanges within the capital market. However, the trust can only emerge from the individuals' beliefs about the system as being fair, which transforms laws-on-the-books to laws-in-practice.

From this emerges one special problem of transition countries: they lacked previous experience in impersonal exchange through financial markets. There was no possibility to build upon ruins of past institutions, since they were non-existent before. As a result, this experience was completely new. Although banks and enterprises did exist and were used to exchange and collaboration, they had no markets for and experience of trading in shares of ownership. So, the development of

such markets, experiences and institutions were critical for the development of the economy after privatization.

Another important issue is the instability of experience of market participants due to the novelty of the process. There appeared millions of new shareholders who had no idea of what to do with their shares, how to evaluate them, how to monitor the activities of the companies of funds they possess a share in. As a consequence, the development of experiences and expectations was endogenous to the process of capital market development. The initial experience played a major role in further build-up of norms and beliefs.

To understand the linkage between the factors described above, consider Kornai's (1980) influential analysis. Practically all studies of the socialist economies point the central planning as the main feature of socialist countries. However, bargaining also was very important in these countries. It took place in the setting of targets, in the provision of materials to firms, or in the agreement between workers and managers. Kornai (1980) also demonstrates that these economies were characterized by chronic shortages. Consequently, black markets were a usual feature of the socialist countries and people's daily experience was bartering over luxury and necessity goods (see Ledeneva (1998); Stark (1989)). So, it is not true that socialism lacked experience in bartering — the most basic of market transactions. The early prediction by Burawoy and Krotov (1992) that the transformation of these countries would move toward merchant capitalism was based on the recognition of this feature.

However, the key difference between the socialist and capitalist countries lies in the experience of impersonal exchange in financial markets. Granovetter (1985) and Baker (1984) observed that even for the most transaction-oriented environments of capital markets, economic behavior is embedded in social relations. However, for the participants outside the inner circle of trading, these markets are

seen as those characterized by impersonal exchange, since buyers and sellers do not know the identity of their vis-à-vis. In such settings the institutional trust, which was discussed above, is what makes these relations predictable and understandable. Note that trust of the wider circle of the market participants lies in the foundation of the services provided by credit cards, loans and mortgages, and purchases by phone or internet.

Therefore, market participants make transactions that are realized through chains of trust. A chain of trust is a series of transactions from the buyer of a security, to the intermediary agent or agents and finally to the seller and vice versa. Other market participants, that are external to this community, bear trust to a financial market that is supported by the quality of personal trust among traders, brokers and financial entities. As Kogut and Spicer (2002, p. 20) point out:

> *Financial markets are more than "intermediaries," as classically described by economic treatments, between savers and ultimately investors in physical capital. They are arenas in which trust is so routinized that verbal agreements are held to be binding. For this reason, the historical absence of financial markets in socialist economies is a fundamental starting point for the analysis of the formation of new social, as well as economic, organization.*

Chapter 4

MODEL DESCRIPTION

We say that the market is efficient if market prices reflect all available information. If this is so, the best prediction we can make about next period price is current period price. Consequently, the best prediction of next-period return is zero[5]. In mathematical terms,

$$E_t\left(p_{t+1} \mid \Theta_t\right) = p_t,$$

or,

$$E_t\left(r_{t+1} \mid \Theta_t\right) = 0,$$

where by Θ_t we denote all available information at period t.

What we take as proxy for "all available information" defines the form of the test of EMH. Weak-form efficiency suggests that we cannot predict future prices (or returns) using history of prices, i.e. series of past realizations. Therefore, in weak-form efficient market returns series must be stationary and have zero autocorrelations for all lags. Accordingly, to test for weak-form efficiency we test the returns series for stationarity and significance of autocorrelations. We use common econometric techniques to test autocorrelations for significance. For the purpose of unit root tests we utilize the Augmented Dickey-Fuller and Phillips and Perron statistics. These statistics are used commonly in the literature, thus we discuss them only briefly.

[5] This process is called martingale. If we take into account attitude to risk of market participants, specifically, assume them to be risk-averse, the expected return may be greater than zero as it presents a risk premium required by market participants. Such process is called sub-martingale. This difference, however, is of no importance for the purpose of both weak-form and semi-strong-form tests.

Augmented Dickey-Fuller (ADF) statistic is a test of unit root. It differs from the "plain" Dickey-Fuller statistic in one feature: it can be used in cases when the error term is autocorrelated. If this is so, we run the regression of the following form:

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \alpha_1 \sum_{i=1}^{m} \Delta Y_{t-i} + \varepsilon_t$$

As you can see, here we include the trend and use lagged differences of the variable in the amount *m* enough to make error term serially independent. Because of these additional regressors we cannot use DF statistic, but ADF test is applicable for regressions of such forms. Since we express *Y* in differences, the null hypothesis of ADF test (that series Y_t contain unit root) is equivalent to $\delta = 0$.

To find the right number of lagged difference terms in ADF test we may use a handful of criteria: Akaike information criterion (AIC), Schwartz's Bayesian information criterion (SBIC), Hannah and Quinn information criterion (HQIC) and Final Prediction Error criterion (FPE). AIC and FPE seem to have proven to be the most reliable, as these two are most often used in the empirical literature. Thus, in this thesis we also give preference to AIC and FPE. To test the ADF regression's residuals for serial correlation we use Cointegrating Regression Durbin-Watson statistic (CRDW).

Phillips and Perron (1988) (PP) developed tests for unit root, different from the ADF test. The main advantage of this test is that it is generally robust for heteroscedasticity and serial correlation in error term (therefore, we do not need to choose lag length for the PP test). PP test produced two statistics, Z_t and Z_ρ,

which under the null hypothesis of unit root have the same distributions as the ADF statistic and normalized bias statistic[6].

If we consider all publicly available information as proxy for "all available information," we have the property of semi-strong efficiency. Obviously, this definition is also vague; thereby a number of different proxies for publicly available information are used in the literature. In this paper we use macroeconomic variables for this purpose. Following the choice of variables of Hanousek and Filer (2000), we use money aggregates, levels of exports and imports, budget deficit, price levels (CPI and PPI), exchange rate and level of industrial production. If market is semi-strong efficient, it quickly, without lag, incorporates all available information into prices and, therefore, two statements must be true: 1) contemporaneous values of macroeconomic variables may have predictive power on stock prices, but 2) lagged values of macro variables may not have predictive power. In other words, it may turn out to be that a macro variable is irrelevant to the stock index variation. However, if its contemporaneous value is significant, its lagged values must be insignificant since all information has already been reflected in prices. The second statement from the two above is the test for semi-strong market efficiency itself. However we also need the first statement to test whether a macro variable has contemporaneous significance. If it does not, then we conclude that market does not react to changes in it. As a result, we estimate the following equations using OLS:

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[6] Consider the simple AR(1) model:

$$y_t = \rho y_{t-1} + \varepsilon_t, \quad \varepsilon \sim N\left(0, \sigma^2\right).$$

Phillips (1987) showed that under the $H_0: \rho = 1$,

$$T\left(\hat{\rho} - 1\right) \xrightarrow{d} \frac{\int_0^1 W(r)\, dW(r)}{\int_0^1 W(r)^2\, dr},$$

where T is the number of observations, $\hat{\rho}$ is estimated value of ρ and $W(r)$ denotes a standard Brownian motion (Wiener process) defined on the unit interval. This distribution is called the normalized bias distribution.

$$\Delta Y_t = \alpha + \sum_{i=1}^{r} \gamma_i \Delta Y_{t-i} + \mu \Delta X_t + \varepsilon_t, \tag{4.1}$$

and

$$\Delta Y_t = \alpha + \sum_{i=1}^{r} \gamma_i \Delta Y_{t-i} + \mu \Delta X_t + \sum_{j=1}^{s} \beta_j \Delta X_{t-j} + \varepsilon_t, \tag{4.2}$$

where Y is a stock market index, X is a macroeconomic variable, r and s are appropriately chosen lag lengths.

After estimation we produce two series of tests. First, we test μ for significance in (4.1). Second, we perform a test of joint significance of β's in (4.2). To conclude that market is semi-strong efficient we must not be able to reject the null hypothesis that:

H_0: $\mu \neq 0$ in equation (4.1) and $\beta_i = \beta_j = 0 \; \forall i, j$ in equation (4.2).

Chapter 5

DATA DESCRIPTION AND RESULTS OF ESTIMATIONS

For both weak-form and semi-strong-form test we use series of countries' most representative stock indices. For Czech Republic this is PX50, for Slovakia this is SAX. For Ukraine the widely used index is PFTS. However, since PFTS as well as other Ukrainian indices have a few significant shortcomings, we use Sigma Bleyzer's SB50 index instead[7]. Unfortunately, we could not find history of stock market at daily frequency for Hungary and Poland. A solution was to use Morgan Stanley Capital International (MSCI) indices for these countries. MSCI indices are widely used and renowned as representative and reliable. MSCI site[8] provides full history of its indices at monthly frequency and five-year history at daily frequency. You can find the data summary for the weak-form tests in Figure 1. This figure presents the period of availability of the stock index for each country, number of observations, mean, min, max values and standard deviation.

For tests of semi-strong form efficiency we use monthly data for both stock market indices and macroeconomic variables. MSCI presents full history of an index at monthly frequency as closing price on the last trading day of a month. For other countries we generate monthly observations from daily as mean value of closing prices during a month. The series of macroeconomic variables are taken from the International Monetary Fund's International Financial Statistics CD-ROM dated February, 2006. For data summary for semi-strong form tests see

[7] First, these indices take into account not only the arranged deals, but also quotations and therefore they are susceptible to attempts to press on the market by making quotations; such attempts are not rare. Second, these indices often take into account stocks that are not in circulation, such as share of stock of government or strategic investors. SB50 index is corrected for these effects.

[8] www.msci.com

Figures 2 and 3. The structure of Figure 2 is the same as of Figure 1. Figure 3 presents mean, min and max values and standard deviation for the following series:

- Exchange rate of home currency to Special Drawing Rights (SDRs);
- Two money aggregates, as defined by IMF: "money (seasonally adjusted)" (M0) and "money plus quasi-money" (M1);
- Consumer and Producer price indices;
- Industrial Production as proxy for GDP (for Ukraine monthly GDP is available);
- Exports and Imports;
- Budget Deficit (−) or Surplus.

A. Weak-form results

First step that we make is testing the prices and returns series for stationarity. The results of these tests are presented in Figure 4. In this figure the following statistic is presented for each country's stock market index series and stock returns series derived from it:

- Slope coefficient of y_{t-1} in the ADF regression;
- ADF *t*-statistic;
- Number of lags used in ADF regression;
- Cointegrating Regression Durbin-Watson statistic;
- Phillips and Perron $Z(\rho)$ and $Z(t)$ statistics.

Figure 1. Summary for countries' stock market indices, daily frequency

Country (index)	Period	Obs.	Mean	Std.Dev.	Min	Max
Ukraine (SB50)	10.01.97–02.02.06	2236	165.44	94.02	61.45	442.81
Czech R. (PX50)	07.09.93–08.03.06	2974	609.89	272.33	316.00	1584.40
Hungary (MSCI)	16.03.01–15.03.06	1304	802.08	365.34	383.99	1688.59
Poland (MSCI)	16.03.01–15.03.06	1304	1166.45	326.59	720.23	2034.49
Russia (RTS)	01.09.95–06.05.06	2667	369.90	299.55	38.53	1765.35
Slovakia (SAX)	01.01.97–15.03.06	1998	175.04	116.60	70.19	507.98

Figure 2. Summary for countries' stock market indices, monthly frequency

Country (index)	Period	Obs.	Mean	Std.Dev.	Min	Max
Ukraine (SB50)	1997M1–2006M1	108	163.10	91.32	71.15	408.9
Czech R. (PX50)	1993M9–2006M2	151	617.53	278.23	331.68	1541.9
Hungary (MSCI)	2001M3–2006M3	135	591.69	353.74	77.13	1635.81
Poland (MSCI)	2001M3–2006M3	135	975.80	313.24	100	1764.35
Russia (RTS)	1995M9–2006M5	129	379.28	319.36	51.07	1739.03
Slovakia (SAX)	1997M1–2006M2	109	172.09	116.04	74.49	478.32

Figure 3. Summary for macroeconomic variables

		Ukraine	Czech R.	Hungary	Poland	Russia	Slovakia	
Exchange rate, units of local currency per SDR	Mean	4.67	42.45	240.9	4.05	24.4	50.48	Mean
	Std.Dev.	2.8	4.58	96.37	1.48	17	6.61	Std.Dev.
	Min	0.01	34.39	82.82	1.24	0.14	39.46	Min
	Max	8.24	52.37	401.16	5.99	43.8	65.53	Max
M0, millions local currency	Mean	18298.79	581.531 [a]	4466.81 [a]	68191.31	989689.4	179884.9	Mean
	Std.Dev.	14890.4	258.42	2883.67	44674.84	948652	75216.51	Std.Dev.
	Min	2575	230.86	733.79	3959.37	23214.7	95088.2	Min
	Max	55464.5	1146.4	10681.4	165760	3536840	395638	Max
M1, millions local currency	Mean	28845.26	1355.93 [a]	1134.93 [a]	185418.8	1880798	512999.1	Mean
	Std.Dev.	24140	393.45	543.8	129817.8	1818679	191960.9	Std.Dev.
	Min	4378	635.59	338.86	9804.14	40983	204618	Min
	Max	92704.8	2074.55	2389.56	411075	6604800	820577	Max

Figure 3, continued

Consumer Price Index, 2000=100	Mean	7.3[b]	93.42	74.95	71.53	78.56217*	92.37	Mean
	Std.Dev.	15.63	15.6	39.4	36.04	66.46315	25.49	Std.Dev.
	Min	–1.8	61.14	14.27	6.41	0.05	50.49	Min
	Max	90.8	112.87	134.05	115.19	203.07	134.52	Max
Producer Price Index, 2000 average =100	Mean	7.71[b]	95.33	72.4	74.86	5.08*	95.37	Mean
	Std.Dev.	17.93	10.43	31.86	32.46	9.88	19.08	Std.Dev.
	Min	–1.6	75.68	19.52	13.05	–76.44	62.7	Min
	Max	118.2	111.55	116.02	115.23	36.1	132.74	Max
Industrial Production, 2000 average =100, seasonally adjusted	Mean	0.2263[c]	106.32	80.86	85.08	n.a.	99.28	Mean
	Std.Dev.	0.2432	17.18	26.1	24.21		16.85	Std.Dev.
	Min	–0.4283	86.56	45.83	46.96		69.75	Min
	Max	1.1194	154.92	135	136.15		131.98	Max
Export, millions local currency	Mean	1484.98[d]	86185.46[a]	418.32[a]	8927.26	8441.58[c]	41408.31	Mean
	Std.Dev.	683.45	38176.11	336.81	7096.39	4287.23	22224.76	Std.Dev.
	Min	465.1	29067	36.23	398.25	2569.2	9393	Min
	Max	3225.99	178866	1160.75	26854.3	22166	100520	Max
Import, millions local currency	Mean	1483.21[d]	83561.59[a]	458.63[a]	4866.22	5635.86[c]	42907.32	Mean
	Std.Dev.	665.94	30070.32	358.05	3933.14	2179.53	24299.69	Std.Dev.
	Min	492.6	21386	33.53	337.28	2026.09	6052	Min
	Max	3283.71	159115	1214.94	14632	12274.9	103942	Max
Budget Deficit (-) **or Surplus**, millions local currency	Mean	3.15[e]	2.88[a]	–65.05[a]	–1726.66	20404.84	n.a.	Mean
	Std.Dev.	2.49	10.91	88.33	2882.76	53860.21		Std.Dev.
	Min	–0.3	–32.6	–612.6	–8663	–86335		Min
	Max	10.5	31.5	151	15929	268115		Max

Notes:
[a] In billions local currency
[b] 12.1995=100
[c] GDP
[d] In millions US dollars
[e] In per cent to that month GDP

Figure 4. Unit root test results

Country	Series	Coefficient	ADF	Lags	CRDW	Z(rho)	Z(t)
Ukraine	Prices	0.00065	0.475	4	0.398	0.365	0.155
	Returns	–1.5444	–25.053***	4	0.441	–2483.88***	–60.832***
Czech R.	Prices	0.00008	0.142	4	1.022	2.035	0.845
	Returns	–0.5969	–21.163***	4	2.189	–2178.86***	–39.887***
Hungary	Prices	0.00043	0.428	8	0.34	0.644	0.497
	Returns	–1.00822	–36.367***	0	0.315	–1297.26***	–36.374***
Poland	Prices	0.00055	0.393	1	0.415	0.763	0.415
	Returns	–0.96555	–25.1***	1	0.257	–1251.6***	–34.643***
Russia	Prices	0.00319	5.165	2	0.001	9.043	5.261
	Returns	–0.84651	–33.657***	1	0.092	–2245.719***	–44.011***
Slovakia	Prices	0.00032	0.609	8	1.26	1.2	0.979
	Returns	–1.01716	–45.439***	0	0.046	–2048.28***	–45.434***

Notes:
*** denotes significance at 99% CI.

The results are what could be expected. In all cases both tests show that price series are nonstationary with coefficients δ very close to zero[1], and returns series are stationary. For the returns series the null hypothesis of unit root is rejected at 99% confidence level.

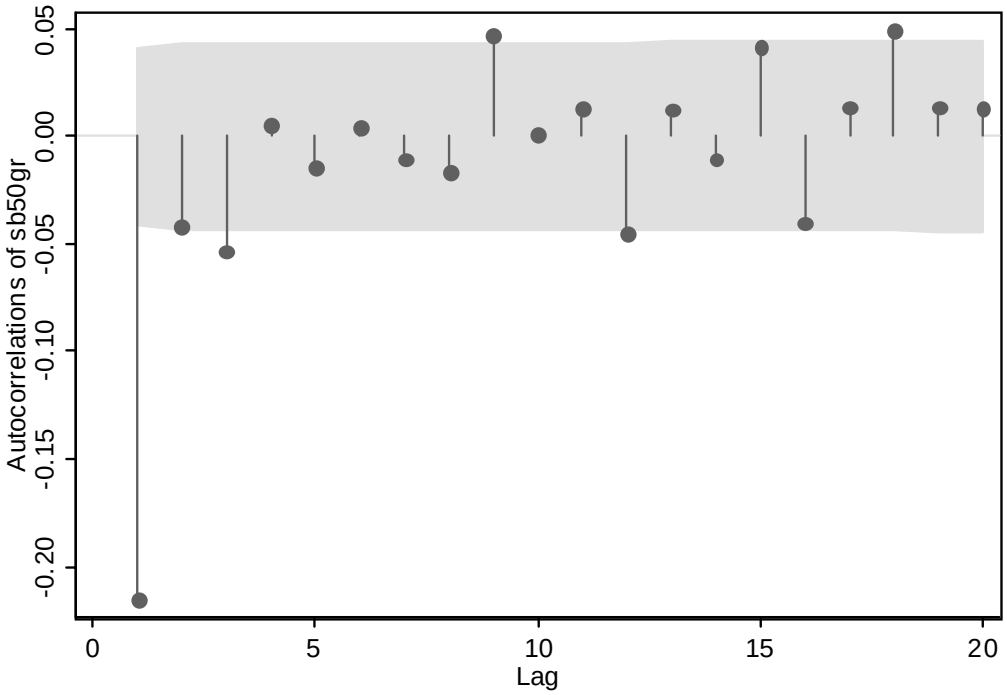
Next step is test of autocorrelations for significance. The correlograms (Figures 5–10) present values of autocorrelations (both full and partial) between contemporaneous and lagged values of returns series for each country for 20 lags. Since data covers five trading days a week, 20 lags correspond to 4 weeks, approximately one month. The figures present different results. Consider first the Figures 7–9, i.e. those for Hungary, Poland, and Slovakia. As we can see, none of the autocorrelations are significant. The only exception is sixth lag autocorrelation coefficient for Hungary. However, its coefficient does not exceed 5 per cent. Taking into account the levels of liquidity of all markets at hand we may conclude that this result, although being statistically significant, does not exceed transaction costs and is economically insignificant.

Now let us look at the figures for other countries, that is, Figures 5, 6 and 10 for Ukraine, Czech Republic and Russia respectively. We see that in all three cases the first few (up to third) partial autocorrelations are significant. What is more, the coefficients are very high, peaking at 30 per cent. Obviously, these autocorrelations have not only statistical but also economic significance. The result shows that in given markets prices adjust to new information slowly, slower than within a day. This is indeed the sign of inefficiency.

[1] This means that coefficients of the AR process, $(1-\delta)$, are very close to 1.

Figure 5:
UKRAINE, returns on stock index SB50

a: Autocorrelations, lag 1-20



b: Partial autocorrelations, lag 1-20

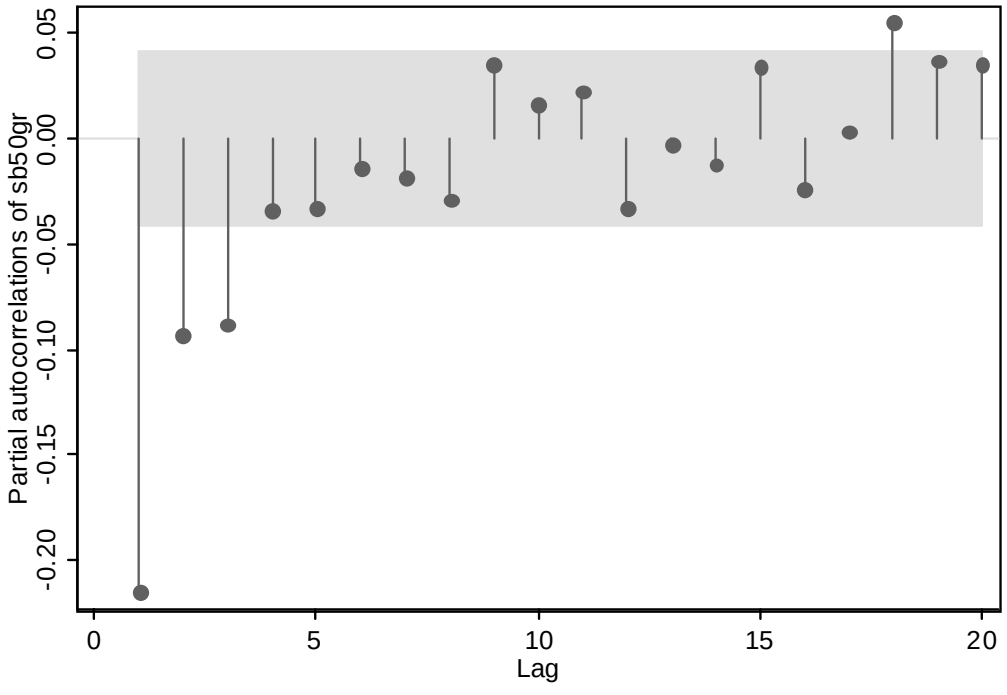
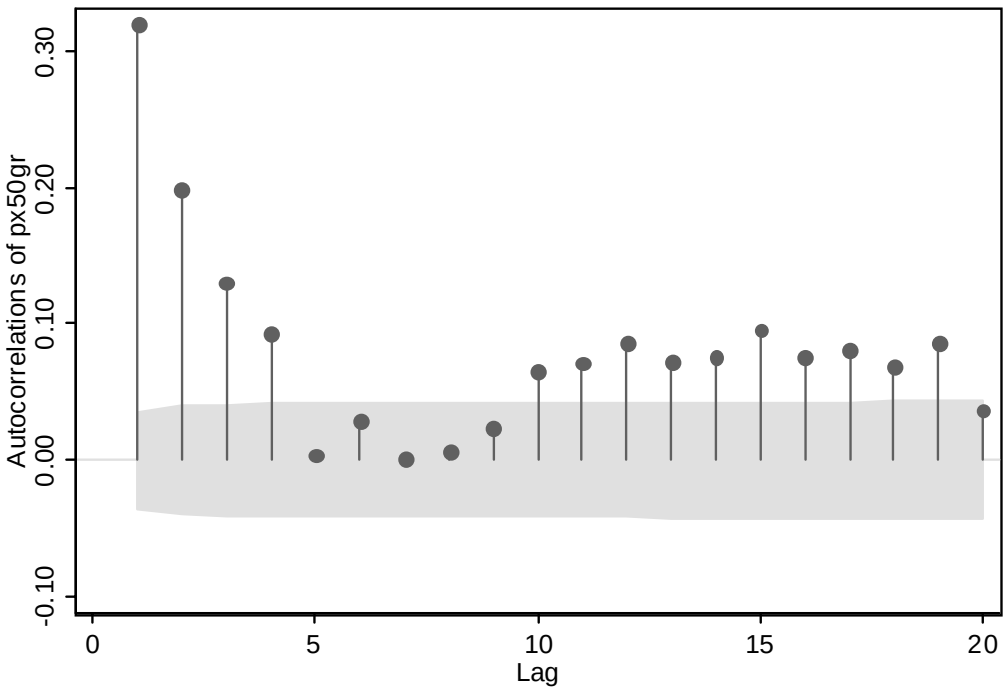


Figure 6:
CZECH REPUBLIC, returns on stock index PX50

a: Autocorrelations, lag 1-20



b: Partial autocorrelations, lag 1-20

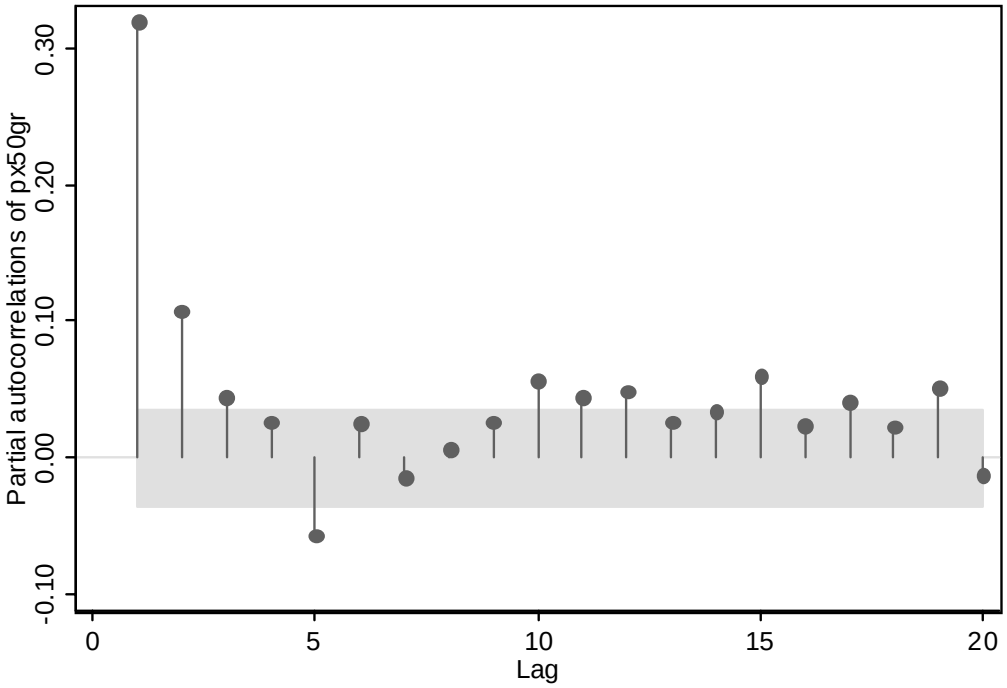
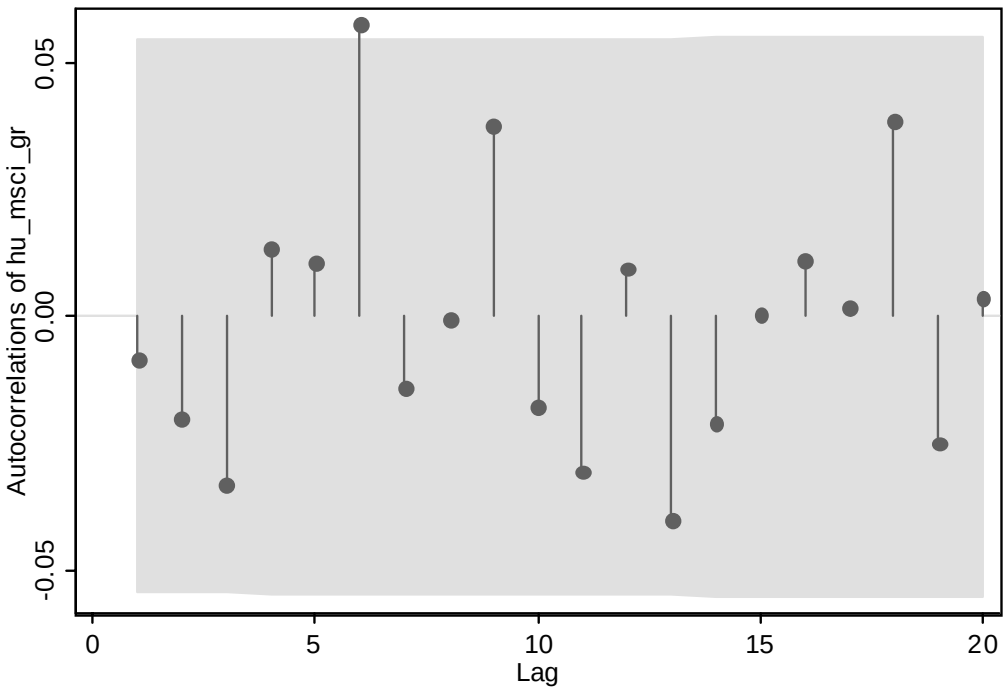


Figure 7:
HUNGARY, returns on MSCI stock index for Hungary

a: Autocorrelations, lag 1-20



b: Partial autocorrelations, lag 1-20

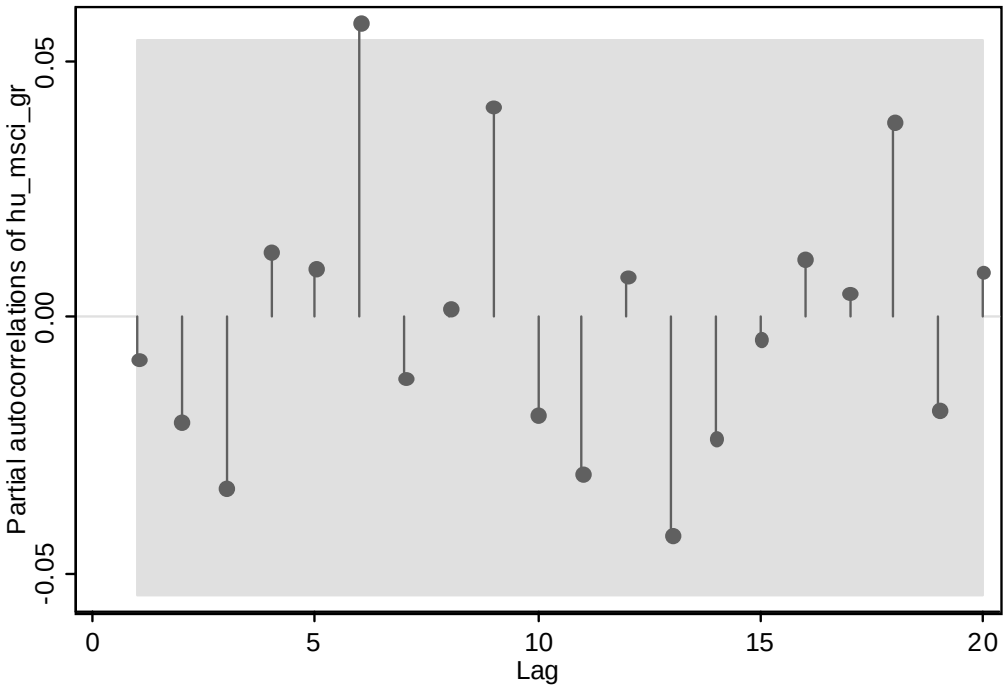
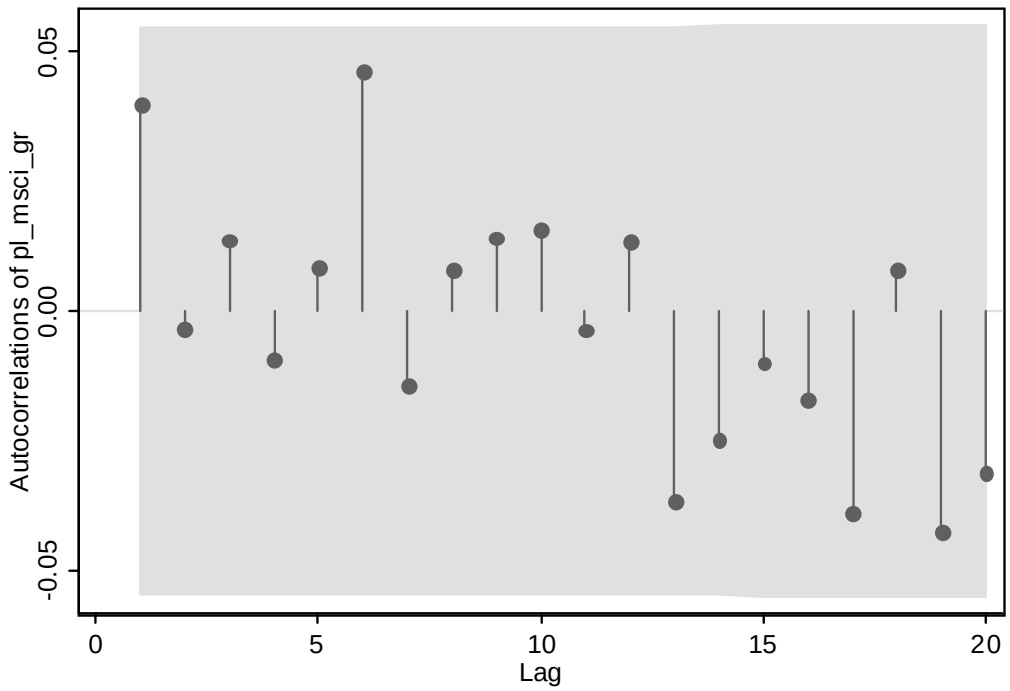


Figure 8:
POLAND, returns on MSCI stock index for Poland

a: Autocorrelations, lag 1-20



b: Partial autocorrelations, lag 1-20

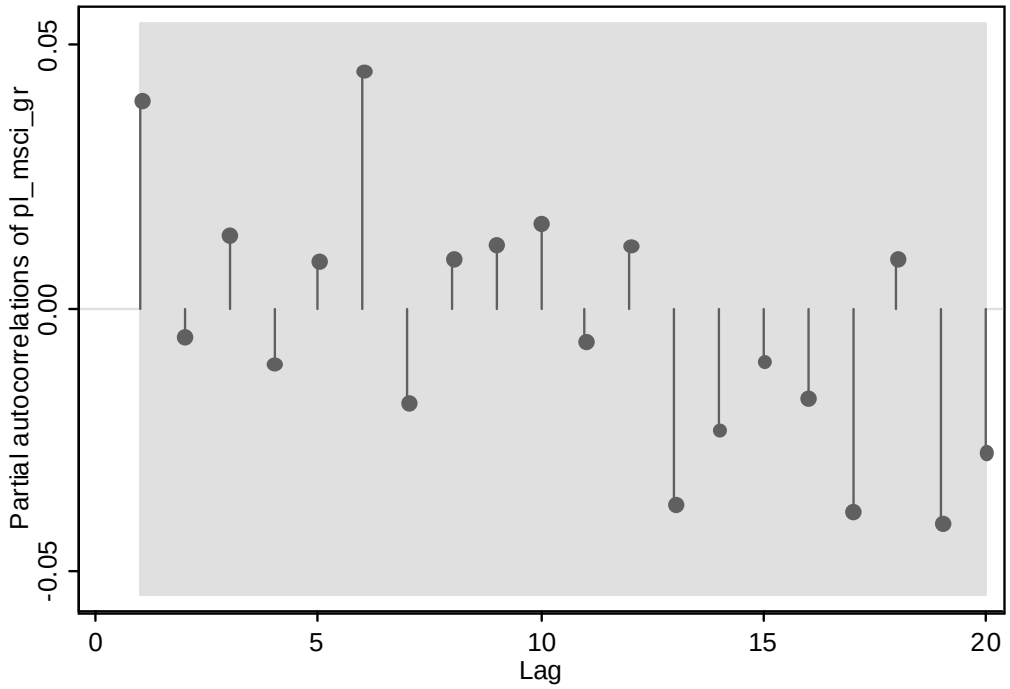
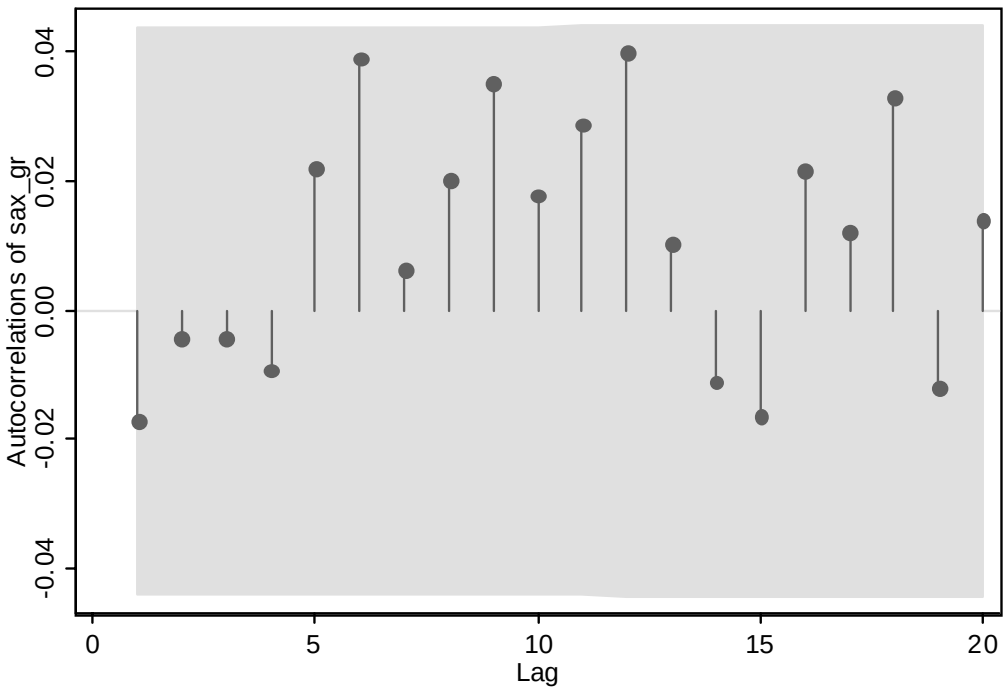


Figure 9:
SLOVAK REPUBLIC, returns on stock index SAX

a: Autocorrelations, lag 1-20



b: Partial autocorrelations, lag 1-20

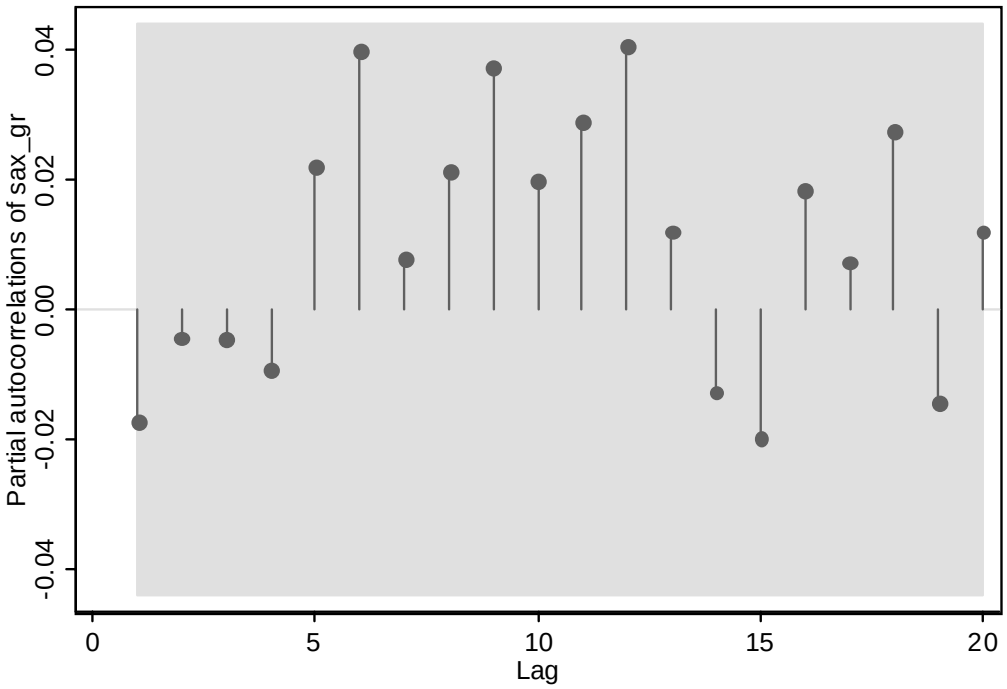
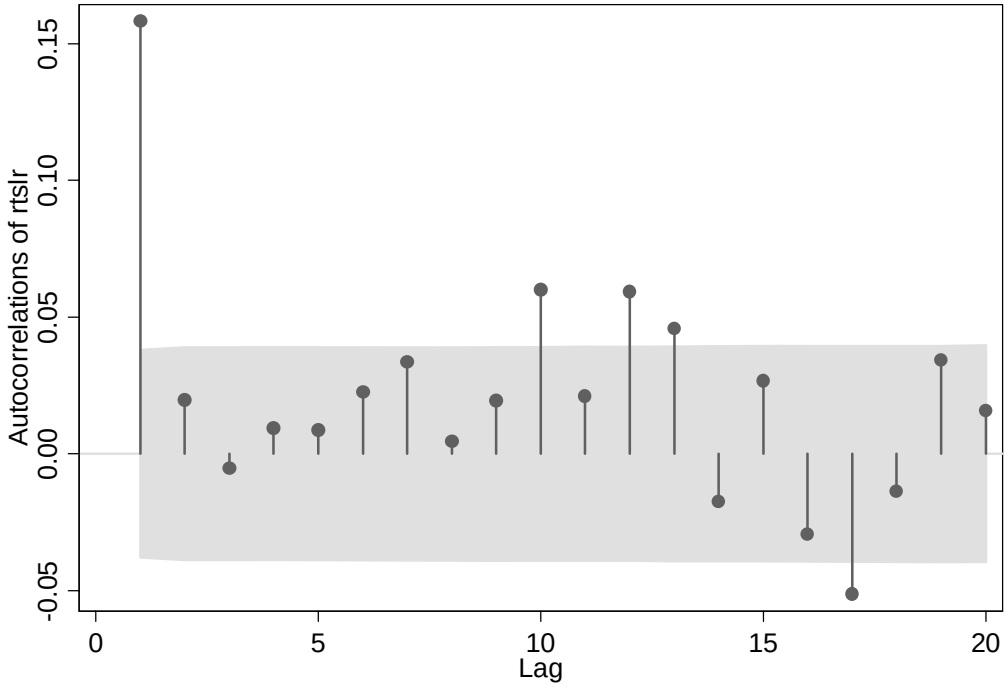
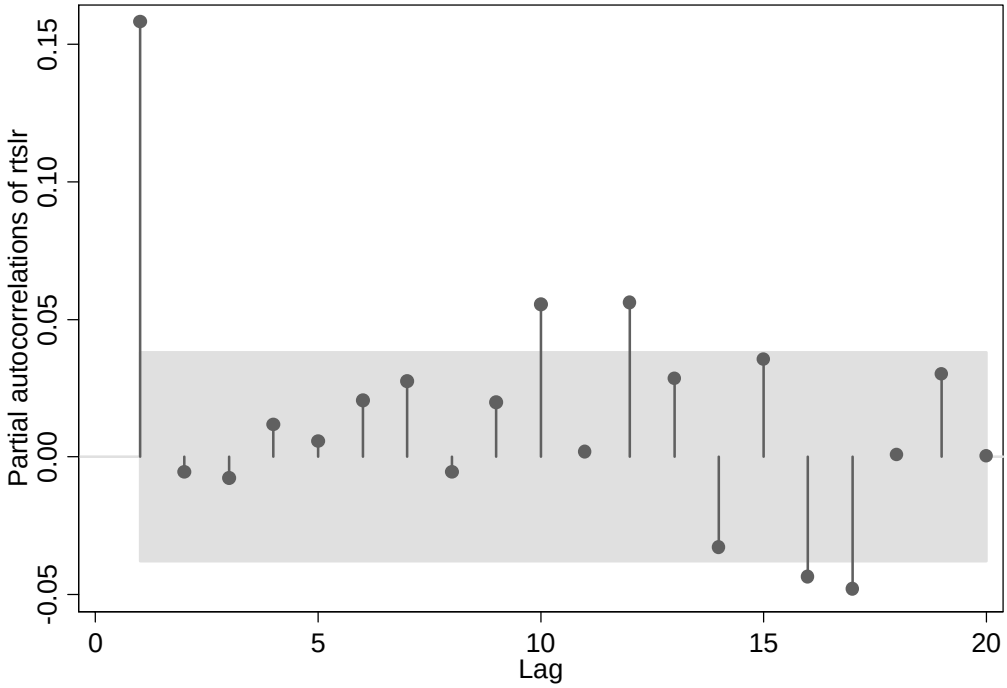


Figure 10:
RUSSIA, returns on stock index RTS

a: Autocorrelations, lag 1-20



b: Partial autocorrelations, lag 1-20



Having observed such results in the Czech, Russian and Ukrainian markets we cannot leave the question partly answered: we must make further inference into the nature of this inefficiency. We would like to know, how did the market (in)efficiency evolved in these economies. For this purpose we do the following. For each country we break the whole sample into periods containing 125 observations (corresponding to the number of business days in half of a year) and run regressions of the stock return series on its three lags in each period. In other words, we are calculating time paths of partial autocorrelations for up to three lags. The choice of three lags can be explained so that: (1) we see autocorrelations being significant for up to three lags for all three countries and (2) although there are few lags of higher order being significant, these do not have independent economic explanation, i.e., this effect follows from the more short-term relation between prices.

See the results of these estimations in Figures 11-13. For Ukraine we see that coefficients are fluctuating widely without any sign of convergence. There are periods when the coefficients are close to zero: mid-1998 and mid-2002 to mid-2003. However, the latest trend is going away from zero again.

For the Czech Republic we see that stock market have started from very high coefficients, that is, from highly inefficient stance. The first lag's coefficient of some 0.8 in 1993 is higher than any of such presented for Ukraine or Russia. However, the Czech stock market demonstrates a clear trend to converge towards zero. From 1999 onwards coefficients fluctuate in (–0.2, 0.2) band. Although there is a spike in mid-2005, we see that it is followed by a trend back to zero.

Russia also demonstrates signs of convergence. Although it is not as obvious as for the Czech Republic, we can see that from the beginning of 2000 coefficients fluctuate in (–0.2, 0.2) band, but mostly closer to the edges than to zero.

The overall result for the weak-form test is not uniform. On the one hand we have the cases of Hungary, Poland and Slovakia, for which we cannot reject the hypothesis of weak-form efficiency. On the other hand, we do reject this hypothesis for the Czech Republic, Russia and Ukraine. Deeper investigation shows that although the markets in the Czech Republic and Russia are inefficient, they present the clear trend towards convergence to efficiency. The Ukrainian stock market, however, does not exhibit signs of convergence to efficiency.

Figure 11: UKRAINE, coefficients of first three lags in AR(3) regression of returns series

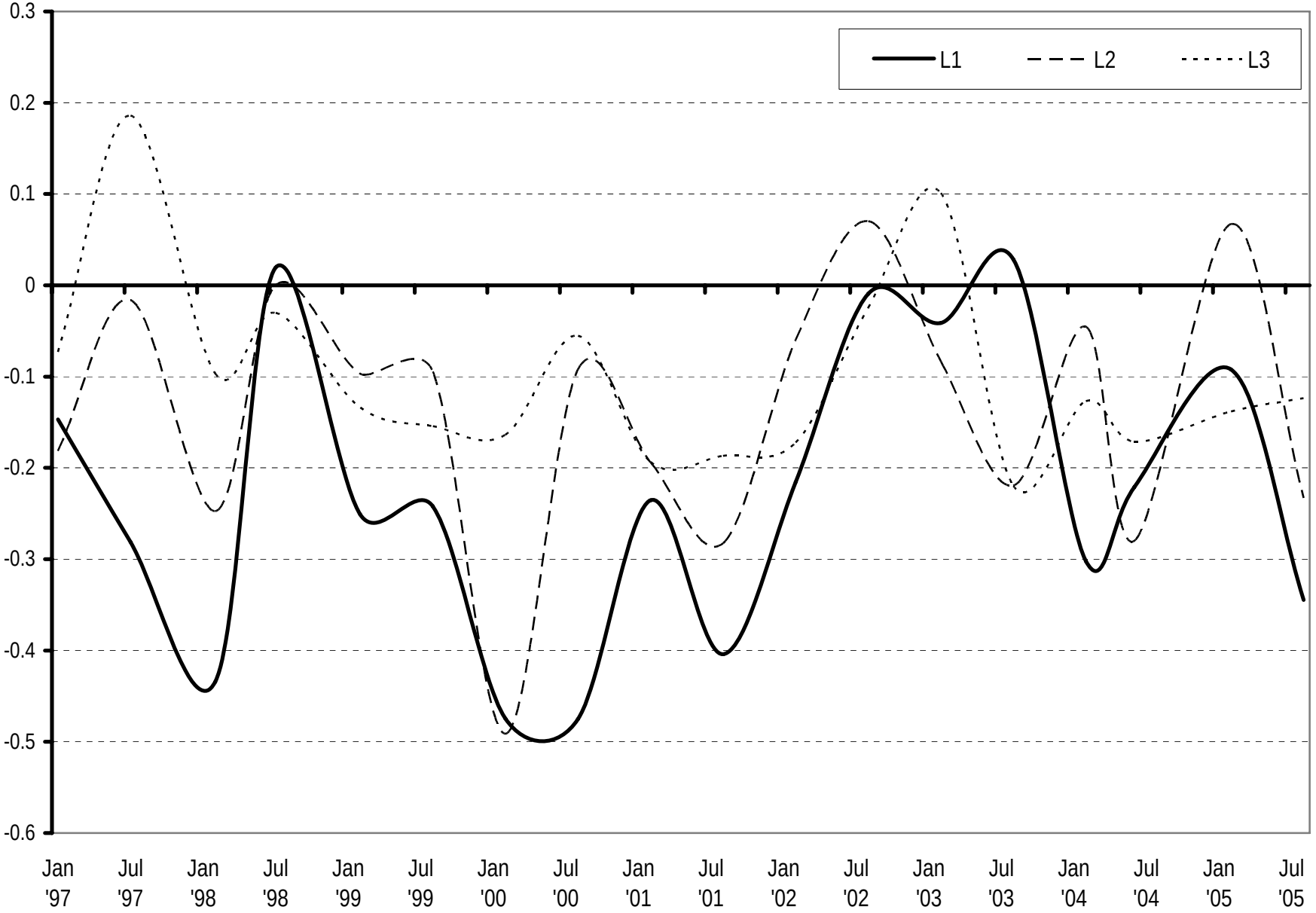


Figure 12: CZECH REPUBLIC, coefficients of first three lags in AR(3) regression of returns series

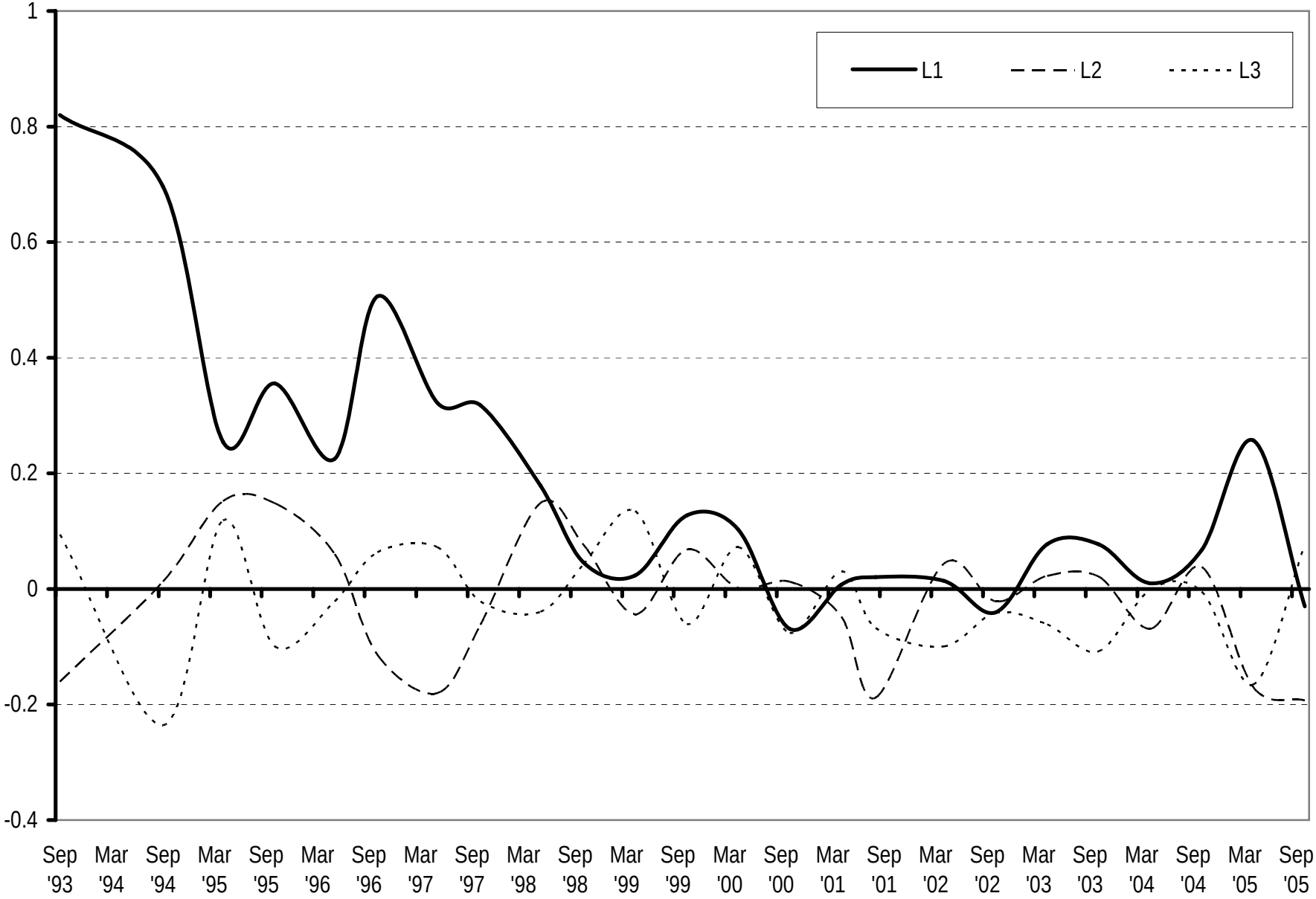
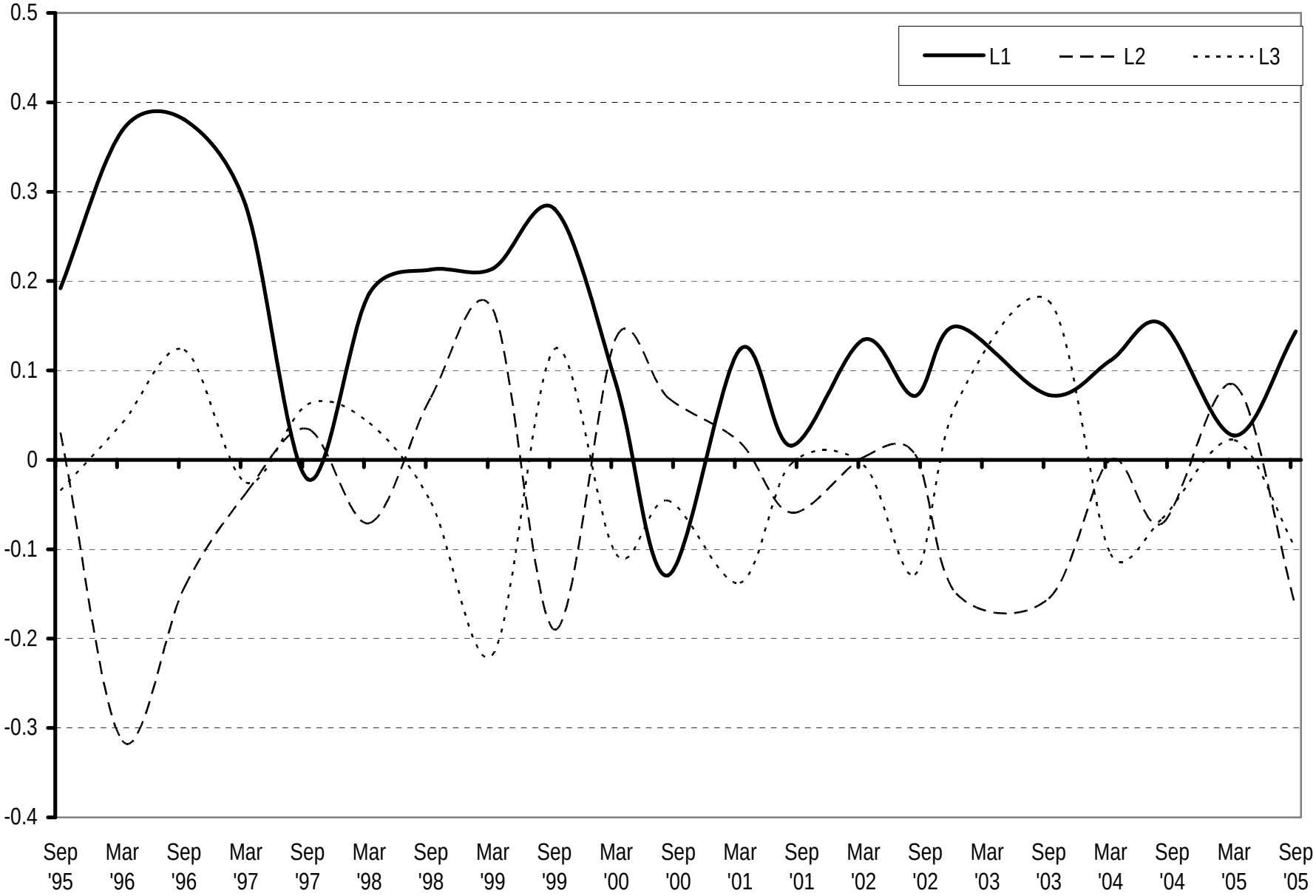


Figure 13: RUSSIA, coefficients of first three lags in AR(3) regression of returns series



B. Semi-strong-form results

The results of the semi-strong form tests are presented in Figure 14. This figure presents the F-tests for inclusion of contemporaneous macroeconomic variable, that is, test of significance of μ in (4.1), and for inclusion of lagged macroeconomic variables, that is, test of joint significance of β's in (4.2), the corresponding p-values, and the number of lags used, for all countries. Note that this research is impacted by the problem of macro data collection and measurement errors. To account for this we consider the narrower confidence intervals of 80%. So, if a t-statistic has the corresponding probability of lower than 0.20, it is considered as significantly different from zero.

Now we turn to the results. First, consider the results obtained for Poland. We see that two macro variables are significant contemporaneously, namely exchange rate and budget deficit, and none are significant with lag. Therefore, although many macroeconomic signals are not reflected in changes of Warsaw Stock Exchange index, we cannot reject the hypothesis of semi-strong efficiency. Stock prices react to changes in macro variables quickly and fully.

Second, consider the results for Ukraine. We see that most macro variables have significant influence on stock index contemporaneously and at the same time, their influence with lag is insignificant. Therefore, Ukrainian stock market is efficient in terms of these variables (M0, export, import, GDP and budget deficit). However, we also see that M1 is reflected in prices both contemporaneously and with lag, therefore, stock market is inefficient in pricing this macro factor. Overall result is that Ukrainian stock market demonstrates both efficient and inefficient pricing of macroeconomic factors. We can reject the hypothesis of semi-strong efficiency.

Finally, the results for the Czech Republic, Hungary, Russia and Slovakia show yet another pattern. There are some variables significant contemporaneously and some other significant with lag. This means that the macro variables that have this property influence stock market with some delay. To understand, whether it is a feature of data discovery or a sign of inefficiency, we need to make further tests. If we see that these variables influence stock market with a one-month lag, we may explain this as a feature of data discovery by noting that macroeconomic data takes some time to collect. However, as you can see in Figures 15-20, this is not the case. In these figures the regressions of stock market prices with contemporaneous and lagged values of macro variables (as in equation 4.2) are presented. As we can see, for all variables the influence on stock market is significant with two or three lags. Obviously, it means that the markets are inefficient. Recall the definition of efficiency: quickly and fully reflect all available information. These markets reflect the information available from macro variables not quickly (with lag) and not fully (during more than one period). Therefore, for these cases we reject the hypothesis of semi-strong efficiency.

The overall result is that only for Poland we cannot reject the hypothesis of semi-strong efficiency. For all of the rest five countries this hypothesis can be rejected.

Figure 14. Semi-strong form tests results, values of F-test and their p-values

	Ukraine			**Czech Republic**		
	Contemporaneous variable adds explanatory power	Lagged variable adds explanatory power	Number of lags	Contemporaneous variable adds explanatory power	Lagged variable adds explanatory power	Number of lags
Exchange Rate	0.74 (0.391)	0.33 (0.567)	1	0.34 (0.562)	0.21 (0.649)	1
M0	4.25 (0.042)**	0.83 (0.440)	2	1.13 (0.291)	1.11 (0.293)	1
M1	2.29 (0.133)†	2.44 (0.121)†	1	0.67 (0.414)	0.54 (0.465)	1
PPI	0.18 (0.675)	0.52 (0.718)	4	1.33 (0.250)	0.32 (0.573)	1
CPI	0.04 (0.843)	0.11 (0.900)	2	1.24 (0.268)	0.67 (0.416)	1
Export	7.23 (0.008)***	1.24 (0.293)	2	0.59 (0.442)	0.96 (0.448)	5
Import	8.58 (0.004)***	0.62 (0.606)	3	2.73 (0.101)†	1.32 (0.262)	5
Industrial Production	1.83 (0.180)†	0.43 (0.786)	4	0.64 (0.423)	2.17 (0.118)†	2
Budget Deficit	3.75 (0.056)*	0.76 (0.519)	3	1.96 (0.164)†	0.23 (0.947)	5
	Hungary			**Poland**		
	Contemporaneous variable adds explanatory power	Lagged variable adds explanatory power	Number of lags	Contemporaneous variable adds explanatory power	Lagged variable adds explanatory power	Number of lags
Exchange Rate	6.42 (0.013)**	0.04 (0.839)	1	9.47 (0.003)***	0.01 (0.908)	1
M0	0.29 (0.590)	0.97 (0.450)	6	0.02 (0.892)	0.03 (0.874)	1
M1	0.00 (0.993)	0.20 (0.657)	1	0.04 (0.845)	1.41 (0.247)	2
PPI	2.59 (0.110)†	1.22 (0.300)	2	0.35 (0.553)	1.47 (0.227)	1
CPI	0.56 (0.455)	0.16 (0.692)	1	1.10 (0.297)	1.16 (0.283)	1
Export	0.18 (0.668)	1.52 (0.188)†	5	1.26 (0.264)	0.72 (0.612)	5
Import	0.00 (0.959)	0.83 (0.508)	4	0.89 (0.349)	1.35 (0.257)	5
Industrial Production	0.71 (0.402)	0.56 (0.455)	1	0.94 (0.335)	0.53 (0.665)	3
Budget Deficit	0.89 (0.348)	2.02 (0.118)†	3	4.67 (0.033)**	1.07 (0.346)	2

Figure 14, continued

	Russia			**Slovakia**		
	Contemporaneous variable adds explanatory power	Lagged variable adds explanatory power	Number of lags	Contemporaneous variable adds explanatory power	Lagged variable adds explanatory power	Number of lags
Exchange Rate	1.97 (0.164)†	0.06 (0.806)	1	0.98 (0.325)	0.59 (0.557)	2
M0	14.73 (0.00)***	0.45 (0.502)	1	0.84 (0.362)	0.10 (0.758)	1
M1	0.30 (0.585)	2.04 (0.093)*	4	0.00 (0.949)	0.14 (0.712)	1
PPI	0.22 (0.641)	0.11 (0.978)	4	0.09 (0.761)	0.24 (0.788)	2
CPI	0.12 (0.731)	0.68 (0.563)	3	2.00 (0.161)†	0.66 (0.419)	1
Export	0.21 (0.650)	0.76 (0.520)	3	0.97 (0.326)	0.05 (0.821)	1
Import	0.02 (0.880)	0.77 (0.511)	3	0.28 (0.597)	1.92 (0.098)*	5
Industrial Production	n/a			1.07 (0.303)	0.64 (0.529)	2
Budget Deficit	0.07 (0.789)	1.58 (0.184)†	4	n/a		

Notes:
*** – denotes significance at 99% CI, ** – significance at 95% CI, * – significance at 90% CI, † – significance at 80% CI.

Figures 15–20: Regressions of selected macro variables in contemporaneous values and lags for selected countries

Figure 15: Czech Republic, Industrial Production

	Coef.	t-statistic
Contemp.	–1.410	–1.02 (0.308)
1st Lag	–0.677	–0.43 (0.664)
2nd Lag	2.282†	1.45 (0.149)
3rd Lag	0.387	0.26 (0.794)

Figure 16: Hungary, Export

	Coef.	t-statistic
Contemp.	0.045	0.51 (0.612)
1st Lag	0.031	0.29 (0.769)
2nd Lag	0.125	1.04 (0.303)
3rd Lag	0.217†	1.63 (0.107)
4th Lag	0.094	0.75 (0.457)
5th Lag	0.159†	1.47 (0.143)
6th Lag	–0.061	–0.64 (0.521)

Figure 17: Hungary, Budget Deficit

	Coef.	t-statistic
Contemp.	0.058	0.91 (0.365)
1st Lag	0.048	0.55 (0.581)
2nd Lag	0.123†	1.33 (0.187)
3rd Lag	0.183**	2.08 (0.041)
4th Lag	0.030	0.44 (0.660)

Notes:
** – denotes significance at 95% CI, † – significance at 80% CI.

Figure 18: Russia,
M1

	Coef.	t-statistic
Contemp.	–0.00004	-0.87 (0.385)
1st Lag	0.00004	0.73 (0.468)
2nd Lag	0.00008†	1.42 (0.157)
3rd Lag	0.00014***	2.61 (0.010)
4th Lag	0.00003	0.61 (0.545)
5th Lag	–0.00011**	-2.04 (0.044)

Figure 19: Russia,
Budget Deficit

	Coef.	t-statistic
Contemp.	–0.00009	–1.01 (0.315)
1st Lag	–0.00023†	–1.58 (0.117) †
2nd Lag	–0.00031*	–1.82 (0.071) *
3rd Lag	–0.00024†	–1.38 (0.169) †
4th Lag	–0.00014	–0.90 (0.369)
5th Lag	0.00007	0.70 (0.486)

Figure 20: Slovakia,
Import

	Coef.	t-statistic
Contemp.	–0.0003	–1.25 (0.215)
1st Lag	–0.0001	–0.39 (0.698)
2nd Lag	–0.0005†	–1.57 (0.119)
3rd Lag	0.0002	0.50 (0.620)
4th Lag	0.0001	0.39 (0.697)
5th Lag	0.0003	1.01 (0.313)
6th Lag	0.0003	1.08 (0.284)

Notes:
*** – denotes significance at 99% CI, ** – significance at 95% CI, * – significance at 90% CI, † – significance at 80% CI.

Chapter 6

CONCLUSIONS

By the results of the tests we may divide the countries into two groups. The first group includes Poland, Hungary and Slovakia. The results of the tests for Poland allow us not to reject the hypothesis of efficiency, both weak- and semi-strong-form. The semi-strong-form test demonstrates that the Polish capital market reacts quickly and fully to macroeconomic fundamentals. The weak-form test shows that it is operated by professional enough participants and is liquid enough, so that prices are adjusted within a trading day.

Hungary and Slovakia occupy the second place within the group. For these two countries we can not reject the hypothesis of weak-form efficiency. However, the semi-strong-form tests show that some macroeconomic fundamentals are reflected in stock market prices not quickly.

The second group includes the Czech Republic, Russia and Ukraine. For these countries we reject the hypotheses of both weak- and semi-strong-form efficiency. It demonstrates that the stock market indices of these countries are moved by not professional and/or speculative operators. The time-dependent test of weak-form efficiency that we conducted shows that while for the Czech Republic and Russia coefficients of price lags converge towards zero, this is not the case for Ukraine.

Our findings have close correspondence with the history of development of institutions in these countries after the breakdown of USSR. The main distinctive feature is whether the countries opted for the Big Bang or gradualism in privatiza-

tion. We see that the Big Bang, which was chosen by the Czech Republic, Russia and Ukraine, led these countries to the worst results from the group. The better performance of Slovakia is not in accord with this argument. Nevertheless, it can be explained from the standpoint of its EU accession in 2004. Country's small population and the fact that it was closed for foreign investment up until recently mean that it was easier for the state to organize the necessary levels of stability, enforcement and transparency in Slovakia as compared to larger countries, e.g., the Czech Republic or Russia.

Poland and Hungary that opted for gradualism demonstrate different results. These countries did not rush with privatization. The case of Poland, which from the very beginning aimed at stability in three dimensions: macroeconomic stability, control of corruption and banking system cleanup, is now seen to be the best of those presented. The policymakers in Hungary, in contrast, put more emphasis on successful selling of country's enterprises to foreign investors. This may explain the worse performance of Hungary compared to Poland. In both cases, they proceeded slowly and not only adopted the strict legal framework of western type from the beginning, but were able to enforce it. This allowed managers, workers and general public to get familiar with this new environment without a shock therapy.

We cannot label Ukrainian case as the worst. Ukrainian stock market exhibits the closest ties with the real economy, because the number of macroeconomic factors that are significant is the highest among all countries. However, the fact that the coefficients of lagged price do not show signs of convergence to efficiency as in case of Russia and the Czech Republic is disturbing. In general, Ukraine has experienced all features of Big Bang approach: weak legal system and enforcement, tunnelling of capital, growth of special interests groups that are not interested in transparency, and finally negative experience about privatization shared

by most of country's population. Unfortunately, the transition is not over. However, the steps that Ukraine should take in order for its stock market to grow are shown by the more successful examples of other countries.

Let us look at this situation from the standpoint of institutional economics, presented in section 3.2. Recall the tree institutions most important for the development of a capital market described there: state powers, institutional technologies and the chains of trust. All three need further development in case of Ukraine. The state powers are weak in Ukraine. First, because the financial-industrial groups that have appeared during mass privatization have their special interests apart from transparency and openness. Widespread corruption allows these groups to reach their targets without regard to the laws. Second, because interests that came to power after the Orange revolution cannot find agreement which further weakens the state.

The institutional technologies are also poor. On the one hand, the stock market is overregulated by the state. On the other hand, the regulation rights are dispersed between the Securities and Stock Market State Commission (SSMSC), National Bank of Ukraine and other authorities. As Strategy Group for Development of the Ukrainian Securities Market (2000) points out, the following features related to the institutional technologies require improvement:

- The market infrastructure was formed from the standpoint of servicing privatization, and not development of the capital market itself;

- Excessive orientation of state policy towards strategic investors and preservation of the state share in the statutory funds of joint stock companies;

- No working mechanism of protection of minority shareholders;

- Capital market regulation is segmented and regulatory rights are poorly defined;

- Pension reform implementation is delaying, thus not allowing the capitalization of the Ukrainian capital market to grow;

- Policy implementation is not coordinated;

- Property rights are not well-defined.

Note, however, that the institutional technologies are perhaps the easiest to change compared to the other two factors.

The chains of trust are weak as well. Although relatively small groups of people that are directly related to one of existing exchanges may trust to the members of their group, there is no accord between such exchanges as PFTS, Ukrainian Stock Exchange, Donetsk Stock Exchange, Pridneprovsk Stock Exchange and a few other exchanges. This is seen from their refusal to unite into one stock exchange system. Besides, general public does not have the experience and, what is more important, trust in the capital market.

Institutions are indeed important for the development of markets. As it was mentioned above, there is no sense in looking separately at institutions and markets, because markets are always embedded in institutions. Ukrainian policymakers should approach the issue from the point of view of institutional economics: strengthen state powers, enhance institutional technologies and nurture the chains of trust.

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