

Efficiency and transparency effects on Eastern European financial markets

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Abstract The negative effect of financial crises on the emerging financial markets of Eastern Europe grew stronger due to a lack of transparency and low market efficiency. For this reason, our research focuses on transparency and efficiency measures with correlation to liquidity and volatility to gauge stock price reaction during two financial crises periods. Our findings revealed a very chaotic picture of the market and the presence of uncontrolled development. As it turned out, Eastern European financial markets did not meet our expectations regarding transparency, liquidity and risk. Hence, it calls into question the soundness of the rule of law, which raises doubts among investors. Our results demonstrated that Eastern European countries tend not to be characterized by transparency, which leads to limited market information and a greater likelihood of low-level stock market efficiency in terms of the Fama approach.

Keywords Financial crisis · Liquidity · Volatility · Emerging market · Eastern Europe

1 Introduction

Central and Eastern European countries reacted differently to the financial crises. This can be explained by their transition from different economic stages as well as policies concerning the economic and financial crises. Most of the observed financial markets

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are very young and are still in the process of being established and developed. Thus, more attention should be paid to their efficiency, an important feature of advanced and well-organized financial markets. In addition, asset and derivative pricing models tend to use statistical data to suggest market efficiency. However, the evidence shows that the real state of policy and corporate governance in emerging markets tends to be unreliable. Therefore, some countries manage financial crises better than others.

Thus, corporate governance reveals the problem of safe implementation of financial projects in weak institutional environments, as high entrance and monitoring costs raise investor fears and reduce trust. Moreover, increased disclosure increases investor awareness of the market, which leads to a lower cost of capital and boosts equity valuation.

It is worth noting that important policy decisions on transparency enforcement in Central and Eastern European financial markets have already been made. First, these policies were put forward as part of corporate governance reform in most of the countries. Second, a final Transparency Directive (from 17.12.2004) with later policy corrections was adopted by the European Commission. These policy actions outline the necessity of regulation, which should not only be aimed at monitoring and sanctioning important issues for the sake of investors but also defining the issues that should be disclosed in addition to integrating such policies into actual market conditions. Moreover, the financial costs of information disclosure must be taken into account as well.

As investments always carry some uncertainty, it is natural for investors to tread carefully in maximizing their returns and minimizing their risks. Hence, securities risk consists of systematic and unsystematic risks, where systematic risk represents the economic, political and sociological events that influence price.

The financial crisis was characterized by significant liquidity reductions and decreasing securities valuations. Therefore, it demonstrated the necessity of further research regarding stock market liquidity fluctuation and valuations, associations of transparency with transaction costs, the influence of institutional and internal factors, and variations in market uncertainty, as the importance of market liquidity grows during financial crises. Moreover, a sharp price drop in the market increases liquidity uncertainty due to a shortage of capital; therefore, stocks become more sensitive to liquidity. Thus, a number of researchers suggest that transparency is essential to improve stock liquidity and, thus, investor demand for them. Nevertheless, most investors find it important to be attentive to liquidity levels precisely at the moment of buying. In this way, it becomes more natural for them to follow stocks with predictable liquidity, as it raises the probability that the result will meet expectations. Hence, liquidity variance as well as timing are important for investor decisions. However, increased transparency levels lead to reduced earnings management, higher quality auditing, a higher level of market analysis and, in contrast, a decrease in low bid-ask spreads and greater liquidity; financial market uncertainty is more typical for environments with weak institutions and increased volatility, which require more transparency and market disclosure.

Our research object is to observe financial market Transparency and Efficiency with the use of Liquidity and Volatility Analysis. We discovered that Eastern European markets show little response to many economic and micro-economic indicators,

proving their current instability and confusion. Our findings underline that low liquidity and high volatility levels end in market weakness and difficult business conditions in Eastern Europe.

To achieve our research goal, we performed the following tasks: measurement of Eastern European market liquidity and volatility, risk observation, and analysis of financial effects during periods of financial crisis.

Our paper is organized as the following. We provided the recent literature review analyses in Section 2, described data used in our paper in Section 3 and methods in Section 4, presented our empirical research results in Section 5, gave conclusions and policy implications in Eastern European financial market in Section 6.

2 Literature review

The increased interest in emerging financial markets in recent years is explained by their growing attractiveness and rapid development. This article relates to a number of studies (Lang 2011; Ivanov et al. 2012; Chan et al. 2013; Albu et al. 2015) that deal with financial liquidity and volatility specificities in emerging markets. We focus on the Eastern European area because we suggest that it occupies a very important place in modern globalization processes (Allen et al. 2010; Vidovic 2011; Ivanov et al. 2012).

We agree with earlier studies (Berglöf and Pajuste 2005) on the strong country effect, which is a common feature of Eastern European financial markets. When talking about the degree of market disclosure, they confirm that Lithuanian and Polish companies tend to disclose less in their annual reports in contrast to Czech and Estonian companies. This evidence grew even stronger when Eastern European countries started implementing policy in response to conditions caused by the financial crises. These conditions made credit more expensive and less available to the private and public sector, reduced financial market liquidity, and caused the return of capital flows back to the main financial centers, a fall in stock markets and commodity prices and the growth of risk (Dabrowski 2010).

It was unavoidable that the financial crisis would affect market efficiency, which regulates prices, provides transparency and controls the influence of policy on financial markets. It reflects all available information in security prices. The following researchers (Ivanov et al. 2012) proved that publicly available information, including historical information, annual reports and announcements, can be seen in prices. However, as their research shows, in the case of Eastern European financial markets, price does not fully reflect all available public and private information, which signifies market inefficiency.

Our research agrees with previous studies (Vidovic 2011) that risk and liquidity of stocks have become one of the most important problems in Eastern European financial markets since the financial crisis. Their risk measure (Vidovic 2011) is based on variance, semi-variance, lower partial moment, mean absolute deviation and conditional value at risk. Such Eastern European countries like Poland, Turkey, Hungary and Slovenia are in the low risk level, whereas Romania and the Czech Republic are characterized by high risk levels (Vidovic 2011). Thus, high and positive coefficients of stocks reflected the current crisis situation in Eastern European financial markets and

showed very little diversification. This is in agreement with our results, which showed that the financial picture in the observed countries is chaotic and puzzling.

We explore the risk level in Eastern European financial markets by measuring volatility of financial stock market prices. This is done in order to define changes in the market within a certain period of time. According to previous research (Chan et al. 2013), a link between financial market liquidity and underlying stock volatility creates a high selection risk, which can be explained by an increased possibility of trading with informed investors and a high inventory risk. Therefore, it results in higher asset price volatility and, hence, lower asset liquidity. Less fluctuation in volatility and liquidity evidence a higher level of transparency in the market, as greater transparency is significantly associated with lower transaction costs and higher liquidity (Lang 2011). Another research paper studies the link between transparency and liquidity by examining the skewness of liquidity and market returns with a focus on the country institutional environment (Lang 2012). They prove a negative correlation of liquidity, volatility and transparency variables, which is in accordance with a few cases of extreme liquidity for stocks with greater transparency. Moreover, they suggest that transparent firms are less likely to be illiquid at inopportune times. Their findings assert the increased negative relation between transparency and liquidity during financial crisis.

Our paper observes liquidity assets in Eastern European financial markets by measuring the average bid ask spread and price volume. In addition, we agree with other authors that liquidity or the ability of market participants to trade is a vital component of well-functioning markets and includes different dimensions such as the quantity or depth of the market, trading costs, the market impact of trades, and the speed of trade execution (Blau and Whitby 2015). Their measure of the bid-ask spread is based on the daily closing bid-ask spreads for the universe of stocks at the CRSP and on the calculation of spreads as the difference between the ask price and the bid price scaled by the midpoint of the closing ask and bid prices.

However, financial market liquidity can also be described as the ability to absorb smoothly the flow of buying and selling orders, which comes from the depth of buyers and sellers in the market and from the actions of market makers (Shen and Ross 2000). Hence, they define the bid ask spread as a simple measure of liquidity, as liquid markets are characterized by a narrow spread and illiquid by a wide spread. They state that the bid ask spread is the price of the market-makers service and is an increasing function of two variables: the size of the market maker's net long or short position and market price volatility. According to the authors, these variables increase the market maker's average cost of making a market and are priced in the bid ask spread.

Moreover, we note that another previous study (Huddart et al. 2012) examines the relation between volume and the location of the weekly closing stock price. Hence, they state that the increase in volume is pronounced with a longer time since the previous high or low was established. Moreover, they say that the increase in volume is distinct from a more general correlation between price and volume when the stock price crosses the limit of its trading.

Our volatility measure started by studying the current situation in Eastern European financial markets. The relationship between 12 emerging markets can be examined with the use of the GARCH volatility model in order to assess dynamic volatility behavior (Allen et al. 2010); we agree with their results that there is a high volatility

level in Eastern European countries, which is approximately the same for some of the countries (Hungary, Poland, Czech Republic, Romania and Slovakia) and less volatile in Bulgaria in the post-EU period and in Estonia and Lithuania in the pre-EU period.

The researchers (Murinde and Poshakwale 2001) investigated the main features of volatility in emerging markets with the use of the ARIMA, BDSL procedure and GARCH model. They found that in Eastern European financial markets, volatility has non-linear effects and has a persistent nature and, thus, does not explain expected returns for the market. Moreover, according to their research, none of the explored markets showed “the well-known day-of-the-week anomaly commonly reported in most stock markets”.

Additional papers on volatility (Égert and Kočenda 2005) proved the absence of any “robust cointegration relationship for any of the stock index pairs or for any of the extended specifications” in Eastern European financial markets. They discovered that there are “signs of short-term spillover effects both in terms of stock returns and stock price volatility”; however, such effects grow stronger from volatility to volatility in comparison with contagion effects from return-to-return series.

To investigate the link between stock prices or stock returns in financial markets, two volatility models can be built: with normally distributed errors and with skewed errors (Albu et al. 2015). This approach proved the existence of asymmetry phenomenon in market volatility, with approximately the same features in the case of Poland, Czech Republic and Hungary and different ones in the case of Romania. Hence, it confirmed our statement of the chaotic nature of Eastern European financial markets.

Our work observes the volatility of Eastern European financial markets based on measures of systematic and unsystematic risk. We agree with the explanation of systematic risk based on external factors, which affect the prices of all securities, such as economic, political, and sociological changes (Sujan and Govil 2013), where the systematic risk measure is performed by Beta, which is calculated by relating the returns on a security with the returns for the market. Sujan and Govil claim that only the systematic risk of an asset is an important determinant of the return on an asset. Moreover, they define unsystematic or diversifiable risk by internal factors, which are unique for a firm or industry and suggest that this risk can be eliminated by holding a large number of stocks. Their study argues that unsystematic risk can be easily diversified away by investors. Another study on systematic risk (Shin and Stulz 2000) proves that cash flows increase with systematic risk to an extent greater than required when checking the impact of the increase in systematic risk on the discount rate.

Fang et al. (2011) examine the cost and profit efficiency of banking sectors in six transition countries of South-Eastern Europe over the period 1998–2008. Using a stochastic frontier approach and regression analysis, the authors find that when proxied by progress in banking sector reforms, privatization and enterprise corporate governance restructuring, institutional development shows a positive impact on local bank efficiency. Brown et al. (2011) find that the low incidence of bank credit in firms in Eastern Europe compared to Western Europe is not driven by less need for credit or the reluctance of banks to extend loans. Moreover, additional transparency in conditions of credit eligibility may improve credit access. Siklos (2011) builds an index of central bank transparency and discovers improvements in transparency in Central and Eastern

Europe. However, enhancements in central bank transparency reported earlier appear to be a feature of the late 1990s and early 2000s.

3 Data

We measure liquidity and volatility in their relation to Eastern European financial markets. Our dataset covers 9 countries (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Turkey, and Ukraine), except Slovenia and Bulgaria due to different extension or soundness in time series recorded in the World Bank Database.

Besides we decided to exclude Russia from our analysis, because the country relates to big emerging economies (Hoskisson et al., 2000), indeed it is also a BRIC member,. Moreover due to its extensive territory, large population, establishment and international trade flows, local economic conditions in Russia are very different from the rest of Eastern Europe. With this in mind, a number of other literature sources consider Russia to be a very special case in Eastern Europe (for example, see Appel 2004, Shama 1992, Fleisher et al. 2005 and Mosley et al., 2004).

From Bloomberg and Datastream, we drew daily observations of stock price of 167 listed companies belonging to Blue chip Stock index of 8 countries in Eastern Europe Area and Turkey, for the sample period January 2003– April 2015. On the whole, our pooled regression models include 35136 observations. As for liquidity and risk variables, previous scholars tackled identical metrics to those we took into account in this research (see Chan et al. 2013; Francis et al. 2009; Lipson and Mortal 2009; Lin et al. 2014). For transparency variables, unlike other authors, we considered a public database, that is World Bank Data System. This database is one of the most powerful provider for conventional measures of socio- economic development, covering approximately 2300 indicators. After one-for-one checking, our final choice is represented by a set of specific variables described below. We focus on a public database, because this way everyone has an access to a particular socio-economic driver for a specific country by simply drawing data from the World Bank Data public depository.

With respect to other publicly available databases covering institutional development, we decided to use the World Bank Data System for several reasons. First, World Bank indicators have been implemented by previous scholars for similar topics (see Kaufmann and Kraay 2008; Kaufmann et al. 2004, 2009; Guillaumont and Chauvet 2001 and Beck et al. 2000). Moreover, we cite the work of Roumeen 2003 when investigating the transparency index. Second, this database is more extensive than others (the World Economic forum, for example; see Afonso et al. 2005). Indeed, there are also concerns about indicator coverage in a cross-country comparison analysis, in particular for specific small or developing economies. Lastly, the World Bank Data System exhibits better time series robustness with respect to similar databases. It makes it possible to perform a better cross-country investigation. The World Bank database contains a selected amount of financial and socio-economic system indicators that are readily available for a large number of countries (approximately 200) over the period 1960–2015. According to Thomas (2010), even if some data are available, there might be some problems due to bad quality and lack of comparability. According to Beck et al. (2010), any cross-country data collection exercise is subject to error due to different degrees of measurement quality and different accounting standards across

countries. However, such concerns can be addressed by the fact that raw data are from one source. In the same direction, according to Kaufmann et al. (2009), World Bank data permit meaningful cross-country comparisons, as well as the ability to monitor progress over time. In our approach, we prefer to use specific raw indicators of local efficiency and the transparency framework. We do not rely on aggregate data and instead choose to focus on expert assessments and polls and surveys of government officials, businesses and households. Indeed, surveys and polls from various sources do not share a common methodology, set of questions, definitions of terms or response measurement.

We use 9 indices for measurement of efficiency and transparency. Moreover, we split Local Efficiency Conditions into two components: Economic Efficiency and Legal Efficiency.

Index1 stands for business extent of disclosure (0 = less disclosure, 10 = more disclosure), index 2 indicates depth of credit information (0 = low, 8 = high) and index 3 stands for private credit bureau coverage (% of adults). Index 4 stands for ease of doing business (1 = most business-friendly regulations, 189 – weakest); index 5 – time to resolve insolvency (years); index 6 – strength of legal right (0 = weak, to 12 = strong); index 7 – cost of business start-up procedures (% of GNI per capita); index 8 – time required to start a business (days); and index 9 – start-up procedures to register a business (number).

We classify indices into three groups based on their meanings to obtain the most from their calculation. Hence, legal efficiency is defined by indices 5, 6; transparency – indices 1, 2, 3; and economic efficiency – indices 4,7,8,9. Our observation period ranges from January 2003 to April 2015. All economic data are drawn from the World Bank Database, while stock price and micro-economic control variables are downloaded from Bloomberg.

4 Methodology

In this paper, we investigate the relationship between Liquidity, Volatility, Transparency and Local economic system efficiency. The econometric we used, according to a large number of previous empirical papers – (eg. Barth et al. 2013; Chan et al. 2013; Lang 2011) - is a panel (pooled) model. We put year dummies for clustering error and for getting a year fixed effects model in order to avoid serial correlation. This allows us to estimate the model with OLS.

We select all stocks belonging to local market general index for 9 countries and we estimate pooled models as represented by 4 equations as follows:

$$Mod1 : AvBidAsk_{i,t} = \alpha + \sum_j \beta_j x_{j,i,t} + \sum_j \lambda_j W_{j,i,t} + \sum_k \gamma_k Stage_{k,i,t} + \varepsilon_{i,t} \quad (1)$$

$$Mod2 : Volume_{i,t} = \alpha + \sum_j \beta_j x_{j,i,t} + \sum_j \lambda_j W_{j,i,t} + \sum_k \gamma_k Stage_{k,i,t} + \varepsilon_{i,t} \quad (2)$$

$$\text{Mod3 : } Syst_{i,t} = \alpha + \sum_j \beta_j x_{j,i,t} + \sum_j \lambda_j W_{j,i,t} + \sum_k \gamma_k Stage_{k,i,t} + \varepsilon_{i,t} \quad (3)$$

$$\text{Mod4 : } UnSyst_{i,t} = \alpha + \sum_j \beta_j x_{j,i,t} + \sum_j \lambda_j W_{j,i,t} + \sum_k \gamma_k Stage_{k,i,t} + \varepsilon_{i,t} \quad (4)$$

where $AvBidAsk_{i,t}$ is the average of the Bid Ask Spread for i -th Stock, difference in price between the highest price that a buyer is willing to pay for an asset and the lowest price for which a seller is willing to sell it, $Volume_{i,t}$ accounts for the total number of shares traded on a security i on the current day; $Syst_{i,t}$ stands for Systematic risk, also known as “undiversifiable risk,” affecting the overall market, not just a particular stock or industry; $UnSyst_{i,t}$ stands for Unsystematic risk, also known as “nonsystematic risk,” or “specific risk,” or also “diversifiable risk” because it can be reduced through diversification. Following Damodaran’s approach (1996), we use the following formula to determine the systematic risk for i -th securities:

$$syst_i = \beta_i * \sigma_{mkt}$$

Where $syst_i$ is the systemic risk for i -th security, σ_{mkt} the standard deviation of market return, β_i is the Beta regression (OLS method) calculated as:

$$r_i = \alpha_i + \beta_i r_{mkt}$$

where r_i is the return of i -th security and r_{mkt} the return of market. The unsystematic risk is obtained as:

$$unsyst_i = \sqrt{\sigma_i^2 - syst_i^2}$$

where σ_i^2 represented the variance of the return of i -th security.

$x_{j,i,t}$ is a vector of variables representing both Economic Efficiency and Transparency conditions of a country area, $W_{j,i,t}$ is a set of control variables accounting for the level of Profitability (ebit, epsgrowth, grossmargin, returnonasset, returnoncamp, returncomeqy), Leverage (curratio, ltbttbt) and Size (cormarcap, currentpval) of each i -th stock taking into account. In particular, ebit means earnings before interest expenses and income taxes; epsgrowth represents the percentage increase or decrease of earning before extraordinary items by comparing current period with same period of a prior year; grossmargin represents the percent of total sales revenue that the company retains after incurring the direct costs associated with producing the goods and services sold by a company; returnonasset stands for ROA, returnoncamp is a metric that measures the return that an investment generates for capital contributors; returncomeqy is a measure of a corporation’s profitability by revealing how much profit a company generates with the money shareholders have invested; curratio stands for the Current Ratio, ltbttbt stands for all interest-bearing financial obligations that are not due within a year; cormarcap represent the current market capitalization; currentpval is a measure of a company’s theoretical takeover

price. Lastly $Stage_{k,i,t}$ is a set of dummy variables indicating different stages of the financial crisis. We use crisis period dummies to check whether our overall results are specific to certain period or capture influences present in data in other periods. To be specific, according to Ait-Sahalia et al. (2010, 2012), and Fiordelisi et al. (2014) we also focus on two recent crisis periods. To this end we include in models as explanatory variables dummy crisis period as follows: Dummy Crisis 1 (in tables showed as $Dummy_Crs1$) stands for Subprime crisis and it denotes the period 1st June 2007 – 14th September 2008. While Dummy Crisis 2 (in tables showed as $Dummy_Crs2$) covers Global financial crisis: 15th September 2008 – 1st May 2010. ($dummy_crs1$). Because some independent variables might be persistent over time, we also include year dummies to capture any fixed effect within the year and cluster standard errors by year in each regression. In table 1 we report the expected sign of the coefficient of each covariate with respect to target variable. Particularly, Table 1 shows what we would have expected while the results in tables from 3 to 7 (especially those summarized in Table 3) demonstrate what we actually found. Main Descriptive Statistic Indicators are showed in Table 2.

5 Empirical results

Liquidity assets in Eastern European financial markets are measured by $average_bid$ ask spread and price volume, while systematic and unsystematic risks are observed to identify Volatility.

Average_bid ask spread traditionally means the difference between the highest price a buyer is willing to pay for an asset and the lowest price at which a seller is ready to sell his asset. Different authors use their own approaches on the average_bid ask spread

Table 1 Stock price reaction – coefficient expected signs

	Average_bid ask spread	Volume	Systematic risk	Unsystematic risk
Index1. Business extent of disclosure (0 = less disclosure, to 10 = more disclosure)	–	+	–	–
Index 2. Depth of credit information (0 = low, to 8 = high)	–	+	–	–
Index 3. Private credit bureau coverage (% of adults)	–	+	–	–
Index 4. Ease of doing business (1 = most business-friendly regulations, to 189-the weakest)	+	–	+	+
Index 5. Time to resolve insolvency (years)	+	–	+	+
Index 6. Strength of legal right (0 = weak, to 12 = strong)	–	+	–	–
Index 7. Cost of business start-up procedures (% of GNI per capita)	+	–	+	+
Index 8. Time required to start a business (days)	+	–	+	+
Index 9. Start-up procedures to register a business (number)	+	–	+	+

Source: Author's elaboration with data from World Bank Data System, January 2003- April 2015

Table 2 Descriptive statistics – overall mean 2003–2014

	Transparency		Economic efficiency			Legal efficiency			Time to resolve insolvency (years)
	Business extent of disclosure index (0 = less disclosure to 10 = more disclosure)	Depth of credit information index (0 = low to 8 = high)	Private credit bureau coverage (% of adults)	Cost of business start-up procedures (% of GNI per capita)	Ease of doing business index (1 = most business-friendly regulations)	Start-up procedures to register a business (number)	Time required to start a business (days)	Strength of legal rights index (0 = weak to 12 = strong)	
BGR	10.0	4.4	2.8	4.5	37.0	6.6	26.4	9.0	3.3
CZE	2.0	5.3	63.7	9.2	45.5	9.4	24.9	6.4	5.8
EST	8.0	5.4	23.4	3.4	16.5	5.3	22.0	6.5	3.0
HUN	2.0	3.9	21.0	15.2	56.0	4.8	19.0	7.2	2.0
LVA	5.0	2.4	0.0	3.9	22.0	4.7	15.2	9.8	2.5
LTU	5.8	5.5	42.2	2.5	24.0	6.5	21.3	5.2	1.8
POL	7.0	5.7	63.1	17.2	31.0	7.7	36.6	8.2	3.0
ROU	8.9	4.2	26.0	4.3	49.0	5.3	12.9	8.9	3.7
RUS	6.0	3.5	22.6	4.1	63.0	8.0	26.5	4.8	2.0
SVN	3.6	1.2	36.3	4.9	48.5	5.3	29.6	4.2	2.0
TUR	8.7	5.0	38.1	19.5	53.0	6.7	8.7	4.6	3.3
UKR	2.8	2.4	12.1	8.1	104.0	10.3	28.1	8.5	2.9

Source: Author's elaboration with data from World Bank Data System, January 2003– April 2015

Table 3 Liquidity – bid_ask spread – overall sample – Eastern Europe Country and Turkey – sample period 2003 to 2013

	Mod.1		Mod.2		Mod.3		Mod.4		Mod.5	
	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.
Panel A - Legal rights										
Index 5	-0,08	0,06	-0,08	0,06	-0,08	0,06	-0,08	0,06	-0,09	0,06
Index 6	0,81***	0,04	0,81***	0,04	0,8***	0,04	0,8***	0,04	0,85***	0,04
Cormarcap					0	0	0	0	0	0
Currentpval					0	0	0	0	0	0
Curratio							0	0	-0,01*	0
Ltibt							0	0	0	0
Ebit									0	0
Epsgrowth									0	0
Grossmargin									0,02***	0
Retumonasset									0,02***	0,01
Retumoncamp									0,03***	0
Retumcomeqy									0,01***	0
Dummy_Crs1			-0,6*	0,36					-0,53	0,36
Dummy_Crs2			-1,47***	0,35					-1,48***	0,35
Years Effect	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Panel B-Efficiency										
Index 2	0,18***	0,05	0,18***	0,05	0,18***	0,05	0,19***	0,05	0,18***	0,05
Index 3	0,02***	0	0,02***	0	0,02***	0	0,02***	0	0,02***	0
Cormarcap					0	0	0	0	0	0
Currentpval					0	0	0	0	0	0
Curratio							0	0	-0,01*	0
Ltibt							0	0	0	0

Table 3 (continued)

	Mod.1	Mod.2	Mod.3	Mod.4	Mod.5
	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
	St. Err.	St. Err.	St. Err.	St. Err.	St. Err.
Ebit					0
Epsgrowth					0
Grossmargin					0,02***
Retumonasset					0
Retumoncamp					0,01
Retumomeqy					0,03***
Dummy_Crs1		-0,6*			0,01***
Dummy_Crs2		-1,47***			-0,54
Years Effect	yes	yes	yes	yes	-1,47***
Panel C - Transparency					yes
Index 1	0,17***	0,17***	0,16***	0,16***	0,14***
Index 4	0,09***	0,09***	0,09***	0,09***	0,09***
Index 7	0,1***	0,1***	0,1***	0,1***	0,09***
Index 8	0,18***	0,18***	0,18***	0,18***	0,18***
Index 9	-0,47***	-0,47***	-0,5***	-0,5***	-0,51***
Cormarcap			0,00	0,00	0,00
Currentpval			0,00	0,00	0,00
Curratio				0,00	0,00
Ltlibit				0,00	0,00
Ebit				-0,01	-0,01
Epsgrowth				0,00	0,00
Grossmargin				0,00	0,00
Retumonasset				0,02***	0,02***
				0,01	0,01

Table 3 (continued)

	Mod.1	Mod.2	Mod.3	Mod.4	Mod.5
	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.
Returnoncamp					
Returncomeqy					0,03***
Dummy_Crs1					0,01***
Dummy_Crs2					-0,53
Years Effect	yes	yes	yes	yes	yes
		-1,47*** 0,47	0,36		

$$Mod1 : AvBidAsk_{i,t} = \alpha + \sum_j \beta_j x_{j,i,t} + \sum_j \lambda_j W_{j,i,t} + \sum_k \gamma Stage_{k,i,t} + \varepsilon_{i,t} \quad (1)$$

$$Mod2 : Volume_{i,t} = \alpha + \sum_j \beta_j x_{j,i,t} + \sum_j \lambda_j W_{j,i,t} + \sum_k \gamma Stage_{k,i,t} + \varepsilon_{i,t} \quad (2)$$

$$Mod3 : Syst_{i,t} = \alpha + \sum_j \beta_j x_{j,i,t} + \sum_j \lambda_j W_{j,i,t} + \sum_k \gamma Stage_{k,i,t} + \varepsilon_{i,t} \quad (3)$$

$$Mod4 : UnSyst_{i,t} = \alpha + \sum_j \beta_j x_{j,i,t} + \sum_j \lambda_j W_{j,i,t} + \sum_k \gamma Stage_{k,i,t} + \varepsilon_{i,t} \quad (4)$$

where $AvBidAsk_{i,t}$ is the average of the Bid Ask Spread for i -th Stock, difference in price between the highest price that a buyer is willing to pay for an asset and the lowest price for which a seller is willing to sell it, $Volume_{i,t}$ accounts for the total number of shares traded on a security i on the current day; $Syst_{i,t}$ stands for Systematic risk, also known as “undiversifiable risk,” affecting the overall market, not just a particular stock or industry; $UnSyst_{i,t}$ stands for Unsystematic risk. $x_{i,t}$ is a vector of variables representing both Economic Efficiency and Transparency conditions of a country area. $W_{j,i,t}$ is a set of control variables accounting for the level of Profitability (ebit, epsgrowth, grossmargin, returnonasset, returnoncamp, returncomeqy), Leverage (curratio, lbtbt) and Size (comarcap, currentpval) of each i -th stock taking into account. $Stage_{k,i,t}$ is a set of dummy variables indicating different stages of the financial crisis. Because some independent variables might be persistent over time, we also include year dummies to capture any fixed effect within the year and cluster standard errors by year in each regression. ***, **, * denote that estimates are statistically significant at the 1, 5 and 10% levels. Source: Author’s elaboration with data from World Bank Data System, DataStream and Bloomberg. January 2003– April 2015

measure. For instance, (Blau and Whitby 2015) calculate spreads as the difference between the ask price and the bid price, with attention given to the midpoint of the closing ask and bid prices. (Shen and Ross 2000) consider the bid ask spread as an increasing function of variables like the size of the market maker's net long or short position and market price volatility. Results of our Average_bid ask spread measure can be seen in Table 3. We started our observation from Legal efficiency indices. The time to resolve insolvency (Index 5) shows negative meaning and does not answer the expected sign. The strength of legal rights (Index 6) is statistically significant and has a positive meaning but does not answer the expected sign. After that, we added dummy_crs1, dummy_crs2 variables in order to see how financial crises affected our indices and, thus, the average_bid ask spread meaning. It had no influence on our observation. In order to value Eastern European companies based on their current share prices and total number of outstanding stocks together with the current worth in sums of money and stream of cash flows, we used size variables such as current market capitalization and current value in our next measure. This caused almost no changes. Then, we tried to observe the influence of debt variables (current ratio and long term debt) in our model 4. Again, we saw no change. Thus, we put profitability indices in our measure. This changed the time to resolve the insolvency index (Index 5) to -0.09 with no statistical significance and increased the strength of legal rights (Index 6) to a positive meaning of 0.85 with statistical significance.

When checking economic efficiency indices in Eastern Europe (Indices 4, 7, 8, 9), we found that most of them (ease of doing business (Index 4), time required to start a business (Index 8), cost of business start-up procedures (Index 7)) have a very low meaning but are positively related and reflect the expected sign. As for start-up procedures to register business (Index 9), they have negative meaning and do not respect the expected sign. Size variables (current market capitalization and current value) resulted in a slight decrease in start-up procedures to register a business (Index 9). Debt variables (model 4) caused no changes. Profitability variables ended in a decrease in cost of business start-up procedures to 0.09 (Index 7) and a very slight change in start-up procedures to register a business to 0.51 (Index 9).

Observation of transparency indices showed that the depth of credit information (Index 2) is at the low level and has a positive reaction with statistical significance but does not respect the expected sign. Private credit bureau coverage (Index 3) has a fully positive reaction that does not answer the respected sign. Transparency indices were not influenced by financial crises (model 2) or size variables (current market capitalization and current value) to a great degree, as we see only a slight decrease in business extent of disclosure (Index 1). Debt variables (model 4) slightly raised depth of credit information (Index 2), but it returned to its initial meaning when we checked the influence of profitability, which managed to decrease the business extent of disclosure (Index 1).

The result of our measure showed that control variables related to firm leverage level, long term debt and current ratio demonstrate the predominance of coefficients with negative signs or zero meaning. This confirms the weak financial health of the observed countries and growth in firm debt levels; moreover, the results show a decrease in the average_bid ask spread. Earnings before interest and tax and earnings per share variables are zero for all measures that shows no influence on the average_bid ask spread and, hence, on liquidity. Only profitability variables such as grossmargin,

Table 4 Liquidity – Volume – Overall Sample – Eastern Europe Country and Turkey – Sample Period 2003 to 2013 (thousands of shares)

	Mod.1	Mod.2	Mod.3	Mod.4	Mod.5	
	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	St. Err.
Panel A - Legal Rights						
Index 5	5439*** 1028	5439*** 1028	5425*** 1028	5396*** 1028	7026*** 1033	
Index 6	-12600*** 6588	-12600*** 6588	-12500*** 66193	-12400*** 6638	-12100*** 6672	
Comarcap			25,1*** 10,29	24,64*** 10,29	38,01*** 10,27	
Currentpval			-11,44 9,11	-11,49 9,11	-16,81 10,71	
Curratio				-3524*** 79377	-29888*** 7948	
Ltbtbt				11457*** 8173	-7634,51 8256	
Ebit					177,44 326,96	
Epsgrowth					224,24*** 154,68	
Grossmargin					-18308*** 44778	
Returnonasset					11428	
Returnoncamp					58032*** 26325***	
Returncomeqy					-11140*** 50392	
Dummy_Crs1	11100*** 4213316	65106 63162			86668*** 64562	
Dummy_Crs2					4336631	
Years Effect	yes	yes	yes	yes	yes	yes
Panel B-Efficiency						
Index 2	86474*** 9067	86474*** 90678	86274*** 90680	86006*** 90810	77013*** 90538	
Index 3	17138*** 59330,	17138*** 59329	16705*** 59344	16618*** 59638	23009*** 59409	
Comarcap			-7,9 10,34	-8,5 10,35	2,48 10,34	
Currentpval			-13,39 27198	-13,43 27198	-16,9 10,91	
Curratio				-24702*** 80822,	-207471** 81056	
Ltbtbt				78561 83107,	-39410 83947	

Table 4 (continued)

	Mod.1	Mod.2	Mod.3	Mod.4	Mod.5
	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.
	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.
Ebit					
Epsgrowth					54,65
Grossmargin					333,22
Returnonasset					252,88***
Returnoncamp					157,64
Returnomeqy					45634
Dummy_Crs1	11100***			41684***	
Dummy_Crs2	4213316			46243***	
Years Effect	yes	yes	yes	yes	yes
Panel C - Transparency					
Index 1	9644***	5593	99646***	57665	10800***
Index 4	5008***	1210	51203***	12111	54477***
Index 7	4612***	1514	46496***	15202	50034***
Index 8	-2159***	1105	-2125***	11150	-21240***
Index 9	247***	6263	2240***	6310	2179181***
Comarcap			-1,32	10,14	8,52
Currentpval			-20,04**	9,03	-26,66**
Curratio			-441277,7***	78819,31	-372046,6***
Libit			161531,4**	80678,46	75465,24
Ebit				212,11	
Epsgrowth				189,62***	
Grossmargin				-309286,5***	
Returnonasset				111715,5	

Table 4 (continued)

	Mod.1	Mod.2	Mod.3	Mod.4	Mod.5
	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.
Returnoncamp					
Returnomeqy					
Dummy_Crs1	1110000***				62296,39
Dummy_Crs2	4213316				49552,54
Years Effect	yes	yes	yes	yes	6397945
					6206123
				yes	yes
					yes

$$Mod1: AvBidAsk_{i,t} = \alpha + \sum_j \beta_j x_{j,i,t} + \sum_j \lambda_j W_{j,i,t} + \sum_k \gamma_k Stage_{k,i,t} + \varepsilon_{i,t} \quad (1)$$

$$Mod2: Volume_{i,t} = \alpha + \sum_j \beta_j x_{j,i,t} + \sum_j \lambda_j W_{j,i,t} + \sum_k \gamma_k Stage_{k,i,t} + \varepsilon_{i,t} \quad (2)$$

$$Mod3: Syst_{i,t} = \alpha + \sum_j \beta_j x_{j,i,t} + \sum_j \lambda_j W_{j,i,t} + \sum_k \gamma_k Stage_{k,i,t} + \varepsilon_{i,t} \quad (3)$$

$$Mod4: UnSyst_{i,t} = \alpha + \sum_j \beta_j x_{j,i,t} + \sum_j \lambda_j W_{j,i,t} + \sum_k \gamma_k Stage_{k,i,t} + \varepsilon_{i,t} \quad (4)$$

where $AvBidAsk_{i,t}$ is the average of the Bid Ask Spread for i -th Stock, difference in price between the highest price that a buyer is willing to pay for an asset and the lowest price for which a seller is willing to sell it, $Volume_{i,t}$ accounts for the total number of shares traded on a security i on the current day; $Syst_{i,t}$ stands for Systematic risk, also known as “undiversifiable risk,” affecting the overall market, not just a particular stock or industry; $UnSyst_{i,t}$ stands for Unsystematic risk. $x_{i,t}$ is a vector of variables representing both Economic Efficiency and Transparency conditions of a country area, $W_{j,i,t}$ is a set of control variables accounting for the level of Profitability (ebit, epsgrowth, grossmargin, returnonasset, returnomeqy), Leverage (curratio, libbt) and Size (comarcap, currentpval) of each i -th stock taking into account. $Stage_{k,i,t}$ is a set of dummy variables indicating different stages of the financial crisis. Because some independent variables might be persistent over time, we also include year dummies to capture any fixed effect within the year and cluster standard errors by year in each regression. ***, **, * denote that estimates are statistically significant at the 1, 5 and 10% levels. Source: Author’s elaboration with data from World Bank Data System, DataStream and Bloomberg, January 2003– April 2015

returnonasset, returnoncamp, returncomeqy show evidence of statistical significance in addition to being positively related. Minimum levels of profitability in Eastern Europe are scarcely met, which signifies little positive change in the average_bid ask spread and a slow increase in liquidity.

We measured price volume in order to demonstrate its impact on liquidity. However, other researchers (Huddart et al. 2012) prove that there is an increase in volume when the stock price crosses the limit of its trading. Our findings showed the following (Table 4).

Legal efficiency indices (Indices 5–6) are positive with statistical significance. Our test in model 2 showed that financial crises did not influence the observed indices to a great degree. Then, we studied the impact of size variables. Current market capitalization is positive with statistical significance, while current value is negative, which caused a significant decrease. After measuring debt variables, we again observed a decrease in legal efficiency indices. The current ratio is negative with statistical significance when long-term debt is positive with statistical significance. Next, we observed the influence of profitability variables. We found a significant increase in the time to resolve insolvency and a decrease in the strength of legal rights. Profitability variables (returnonasset, returnoncamp, returnonsset, epsgrowth) are positive and statistically significant. Two profitability variables (grossmargin and returncomeqy) are negative. Such results showed a total reduction of liquidity in East European markets.

Transparency indices (Indices 1–3) are positive and statistically significant, answering with the expected sign. Moreover, they were not influenced by financial crises. Size variables (current market capitalization and current value) are negative, which caused a slight reduction. Debt variables reduced transparency even more. The current ratio is negative and statistically significant, while long-term debt is positive. Then, we measured the influence of profitability variables and it resulted in a sharp decrease. Two out of 6 profitability variables (grossmargin and returncomeqy) show negative meaning. This led to a reduction in liquidity in financial markets.

When we measured economic efficiency (Indices 4,7,8,9), we revealed a positive and statistically significant meaning, but only time required to start a business (Index 8) is negative and follows the expected sign. Again, financial crises showed no effect on the observed indices. The size variable current market capitalization is negative, while current value is negative and has statistical significance. Their influence resulted in an increase in the observed indices but a slight decrease in start-up procedures to register a business (Index 9). The influence of debt variables, where current ratio and long term debt are positively related and statistically significant, led to a sharp rise in all economic efficiency indices. The same happened with profitability indices; they rose, and the variables showed their negative impact for grossmargin and returncomeqy.

Table 5 exhibits the results of our Systematic risk measure. Some researchers reach this measure by observing the relation between returns on a security and the returns on the market (Sujan and Govil 2013). Moreover, others control the impact of an increase in systematic risk on the discount rate (Shin and Stulz, 2000). We identified the negative impact of time on resolve insolvency (Index 5), which meets the expected sign, and the negatively related influence of strength of legal rights (Index 6), where the expected sign was not followed. We therefore believe that legal efficiency indices are neglected in Eastern Europe. In model 2, we checked the influence of financial crises on observed indices, which brought no change. Then, we tested the influence of size

Table 5 Liquidity – Systematic risk – Overall Sample – Eastern Europe Country and Turkey – Sample Period 2003 to 2015

	Mod.1		Mod.2		Mod.3		Mod.4		Mod.5	
	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.
Panel A - Legal Rights										
Index 5	-1,24	1,33	-1,24	1,33	2,68***	1,01	2,68***	1,01	2,06***	1,02
Index 6	-15,35***	0,85	-15,35***	0,85	-5,6***	0,65	-5,75***	0,65	-5,98***	0,66
Comarcap					0***	0	0***	0	0***	0
Currentpval					0***	0	0***	0	0***	0
Curratio							-0,07	0,08	0,01	0,08
Ltbtbt							-0,23***	0,08	-0,14*	0,08
Ebit									0***	0
Epsgrowth									0***	0
Grossmargin									-0,3***	0,04
Returnonasset								-0,15	0,11	
Returnoncamp								0,17***	0,06	
Returncomeqy								0,07***	0,05	
Dummy_Crs1		1,75	8,44					-1,48	6,36	
Dummy_Crs2		-2,59	8,19					-3,06	6,17	
Years Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B-Efficiency										
Index 2	8,14***	1,19	8,14***	1,19	9,4***	0,88	9,51***	0,88	9,4***	0,88
Index 3	-0,95***	0,08	-0,95***	0,08	-0,75***	0,06	-0,77***	0,06	-0,77***	0,06
Comarcap					0***	0	0***	0	0***	0
Currentpval					0***	0	0***	0	0***	0
Curratio							-0,14*	0,08	-0,06	0,08
Ltbtbt							-0,17**	0,08	-0,07	0,08

Table 5 (continued)

	Mod.1	Mod.2	Mod.3	Mod.4	Mod.5	
	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.
Ebit					0***	0
Epsgrowth					0***	0
Grossmargin					-0,33***	0,04
Returnonasset				0,06	0,11	
Returnoncamp				0,08***	0,06	
Returncomeqy				0,04	0,05	
Dummy_Crs1		1,75		-1,59	6,38	
Dummy_Crs2		-2,59		-3,17	6,19	
Years Effect	Yes	Yes	Yes	Yes	Yes	Yes
Panel C - Transparency						
Index 4	0,68	0,16	0,13	0,12	0,11	0,12
Index 7	1,69	0,2	-0,44	0,15	-0,38	0,15
Index 8	2,02	0,15	-0,05	0,11	-0,02	0,11
Index 9	-13,55	0,84	-0,95	0,63	-1,2	0,63
Comarcap			0	0	0	0
Currentpval			0	0	0	0
Curratio				-0,1	-0,02	0,08
Ltbit				-0,08	0,02	0,08
Ebit					0	0
Epsgrowth					0	0
Grossmargin					-0,32***	0,04
Returnonasset				0,04	0,11	
Returnoncamp				0,11***	0,06	

Table 5 (continued)

	Mod.1		Mod.2		Mod.3		Mod.4		Mod.5	
	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.
Returncomeqy										
Dummy_Crs1		1,75	8,65					0,01	0,05	
Dummy_Crs2		-2,59	8,39					-1,68	6,4	
Years Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-3,19	6,21	Yes

$$Mod1 : AvBidAsk_{i,t} = \alpha + \sum_j \beta_j x_{j,i,t} + \sum_j \lambda_j W_{j,i,t} + \sum_k \gamma_k Stage_{k,i,t} + \varepsilon_{i,t} \quad (1)$$

$$Mod2 : Volume_{i,t} = \alpha + \sum_j \beta_j x_{j,i,t} + \sum_j \lambda_j W_{j,i,t} + \sum_k \gamma_k Stage_{k,i,t} + \varepsilon_{i,t} \quad (2)$$

$$Mod3 : Syst_{i,t} = \alpha + \sum_j \beta_j x_{j,i,t} + \sum_j \lambda_j W_{j,i,t} + \sum_k \gamma_k Stage_{k,i,t} + \varepsilon_{i,t} \quad (3)$$

$$Mod4 : UnSyst_{i,t} = \alpha + \sum_j \beta_j x_{j,i,t} + \sum_j \lambda_j W_{j,i,t} + \sum_k \gamma_k Stage_{k,i,t} + \varepsilon_{i,t} \quad (4)$$

where $AvBidAsk_{i,t}$ is the average of the Bid Ask Spread for i-th Stock, difference in price between the highest price that a buyer is willing to pay for an asset and the lowest price for which a seller is willing to sell it, $Volume_{i,t}$ accounts for the total number of shares traded on a security i on the current day; $Syst_{i,t}$ stands for Systematic risk, also known as “undiversifiable risk,” affecting the overall market, not just a particular stock or industry; $UnSyst_{i,t}$ stands for Unsystematic risk. $x_{j,i,t}$ is a vector of variables representing both Economic Efficiency and Transparency conditions of a country area, $W_{j,i,t}$ is a set of control variables accounting for the level of Profitability (ebit, epsgrowth, grossmargin, returnonasset, returnoncamp, returncomeqy), Leverage (curratio, libbt) and Size (comarcap, currentpval) of each i-th stock taking into account. $Stage_{k,i,t}$ is a set of dummy variables indicating different stages of the financial crisis. Because some independent variables might be persistent over time, we also include year dummies to capture any fixed effect within the year and cluster standard errors by year in each regression. ***, **, * denote that estimates are statistically significant at the 1, 5 and 10% levels. Source: Author's elaboration with data from World Bank Data System, DataStream and Bloomberg, January 2003- April 2015

Table 6 Liquidity – unsystematic risk – overall sample – Eastern Europe Country and Turkey – sample period 2003 to 2015

	Mod.1	Mod.2	Mod.3	Mod.4	Mod.5
	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
	St. Err.	St. Err.	St. Err.	St. Err.	St. Err.
Panel A - Legal rights					
Index 5	11,56***	11,56***	12,97***	12,98***	12,5***
Index 6	-9,93***	-9,93***	-7,08***	-7,41***	-7,46***
Comarcap			0***	0***	0***
Currentpval			0***	0***	0***
Curratio				-0,11*	-0,13**
Ltbtbt				-0,51***	-0,51***
Ebit					0***
Epsgrowth					0***
Grossmargin					0,1***
Returnonasset					0,09
Returnoncamp					0,05
Returncomeqy					0,04
Dummy_Crs1	2,18	2,80			4,97
Dummy_Crs2	-1,15	5,11			4,82
Years Effect	yes	yes	yes	yes	yes
Panel B-Efficiency					
Index 2	-1,31*	-1,31*	-0,93	-0,8	-0,76
Index 3	0,26***	0,26***	0,34***	0,32***	0,32***
Comarcap			0***	0***	0***
Currentpval			0***	0***	0***
Curratio				-0,16**	-0,17***
Ltbtbt				-0,2***	-0,21***
				0,06	0,06
				0,06	0,07

Table 6 (continued)

	Mod.1	Mod.2	Mod.3	Mod.4	Mod.5
	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.
Ebit					St. Err.
Epsgrowth					0
Grossmargin					0
Returnonasset					0,04
Returnoncamp					
Returncomeqy					
Dummy_Crs1		2,18			
Dummy_Crs2		-1,15			
Years Effect	yes	yes	yes	yes	yes
Panel C - Transparency					
Index 4	0,45***	0,10	0,27***	0,1	0,26***
Index 7	0,75***	0,12	0,05	0,12	0,01
Index 8	1,12***	0,09	0,45***	0,09	0,47***
Index 9	-5,38***	0,53	-1,16**	0,5	-1,24**
Comarcap			0***	0	0***
Currentpval			0***	0	0
Curratio					
Ltbtbt				0,06	-0,18***
				0,06	-0,25***
Ebit					0***
Epsgrowth					0
Grossmargin					0***
Returnonasset					0,07***
Returnoncamp				-0,08	0,09
				0,07***	0,05

Table 6 (continued)

	Mod.1	Mod.2	Mod.3	Mod.4	Mod.5
	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.
Returncomeqy					
Dummy_Crs1		2,18		0,05***	0,04
Dummy_Crs2		-1,15		1,53	5,14
Years Effect	yes	yes	yes	yes	yes

$$Mod1: AvBidAsk_{i,t} = \alpha + \sum_j \beta_j x_{j,i,t} + \sum_j \lambda_j W_{j,i,t} + \sum_k \gamma_k Stage_{k,i,t} + \varepsilon_{i,t} \quad (1)$$

$$Mod2: Volume_{i,t} = \alpha + \sum_j \beta_j x_{j,i,t} + \sum_j \lambda_j W_{j,i,t} + \sum_k \gamma_k Stage_{k,i,t} + \varepsilon_{i,t} \quad (2)$$

$$Mod3: Syst_{i,t} = \alpha + \sum_j \beta_j x_{j,i,t} + \sum_j \lambda_j W_{j,i,t} + \sum_k \gamma_k Stage_{k,i,t} + \varepsilon_{i,t} \quad (3)$$

$$Mod4: Unsyst_{i,t} = \alpha + \sum_j \beta_j x_{j,i,t} + \sum_j \lambda_j W_{j,i,t} + \sum_k \gamma_k Stage_{k,i,t} + \varepsilon_{i,t} \quad (4)$$

where $AvBidAsk_{i,t}$ is the average of the Bid Ask Spread for i -th Stock, difference in price between the highest price that a buyer is willing to pay for an asset and the lowest price for which a seller is willing to sell it, $Volume_{i,t}$ accounts for the total number of shares traded on a security i on the current day; $Syst_{i,t}$ stands for Systematic risk, also known as “undiversifiable risk,” affecting the overall market, not just a particular stock or industry; $Unsyst_{i,t}$ stands for Unsystematic risk. $x_{i,t}$ is a vector of variables representing both Economic Efficiency and Transparency conditions of a country area, $W_{j,i,t}$ is a set of control variables accounting for the level of Profitability (ebit, epsgrowth, grossmargin, returnonasset, returnoncamp, returncomeqy), Leverage (curratio, lbtbt) and Size (comarcap, currentpval) of each i -th stock taking into account. $Stage_{k,i,t}$ is a set of dummy variables indicating different stages of the financial crisis. Because some independent variables might be persistent over time, we also include year dummies to capture any fixed effect within the year and cluster standard errors by year in each regression. ***, **, * denote that estimates are statistically significant at the 1, 5 and 10% levels. Source: Author's elaboration with data from World Bank Data System, DataStream and Bloomberg, January 2003- April 2015

variables on legal efficiency indices, which significantly increased and showed statistical significance. Debt variables are negatively related. However, they did not affect legal efficiency indices a great deal; only strength of legal rights (Index 6) changed its meaning to -5.98 . Next, we tested the influence of profitability variables, which brought some reduction. Only two profitability variables, grossmargin and returnoncamp, have statistical significance. This indicates mixed effects and raises the risk level for Eastern Europe financial markets.

As for Transparency indices (Indices 1–3), the depth of credit information (Index 2) is positively related with statistical significance, which does not follow the expected sign. Private credit bureau coverage (Index 3) is negative with statistical significance, which follows the expected sign. The business extent of disclosure (Index 1) has a negative meaning as well as statistical significance; therefore, it follows the expected sign. As we found out, the financial crises had no effect on the indices. Size variables led to a slight rise in observed indices, as did debt variables, which are statistically significant and negative. Test of profitability indices led to a slight decrease in depth of credit information (Index 2). Most profitability variables show statistical significance, and only grossmargin is negative.

Economic efficiency indices (Indices 4, 7, 8, 9) acted in the following way. Ease of doing business (Index 4), time required to start a business (Index 8), and cost of business start-up procedures (Index 7) are positive, which meets the expected criteria. Start-up procedures to register a business (Index 9) is negative. As can be seen from our test in model 2, financial crises did not affect the observed indices to a great degree. Size variables increased start-up procedures to register a business (Index 9). Debt variables had no serious effect on economic efficiency indices; however, current ratio and long-term debt were negative. Profitability variables ended in a slight decrease in start-up procedures to register a business (Index 9), while other indices were increased. Only two out of six profitability variables, grossmargin and returnoncamp, are statistically significant. Our observations indicate an unstable situation in Eastern European financial markets and a high risk level.

As for unsystematic risk (Table 6), Sujan and Govil (2013) confirm its dependence on large number of stocks which can even eliminate it. Our Unsystematic risk measure is reached in the following way (See Eq.3). Legal efficiency indices follow the expected signs and are both statistically significant. Time to resolve insolvency (Index 5) is positive, while strength of legal rights (Index 6) is negative. Our results for model 2 testing showed no effect of financial crises on observed indices. Size variables caused an increasing effect on indices. Debt variables current ratio and long-term debt are negative and caused slight growth in legal efficiency indices. Profitability variables brought a slight decrease in legal efficiency indices. All profitability variables show statistical significance, while only returnonasset is negative.

Transparency indices demonstrated negative meaning for depth of credit information (Index 2), which has statistical significance and follows the related sign, while private credit bureau coverage (Index 3) has positive meaning with statistical significance and does not follow the expected sign. Business extent of disclosure (Index 1) rose under the size variables. Our observation showed no influence of financial crises on transparency indices. Size variables brought some growth, as did debt variables, where current ratio and long-term debt are negative with statistical significance. Profitability

variables in module 5 showed little influence on indices. Profitability variables show mixed effects; only *returnonasset* has negative meaning.

Economic efficiency indices have statistical significance and follow the expected sign with the exception of the negative influence of start-up procedures to register a business (Index 9). We found that financial crises did not affect economic efficiency to a great degree. Under the influence of size variables, start-up procedures to register a business (Index 9) increased in terms of its meaning when other variables were reduced. Debt variables are negative with statistical significance. It ended in a slight reduction in indices. Most profitability indices are positive with statistical significance. Under this influence, the ease of doing business (Index 4) and the cost of business start-up procedures (Index 7) as well as start-up procedures to register business (Index 9) were slightly reduced; time required to start a business (Index 8) showed little growth. These results shed light on the growth of risk in the financial markets of Eastern Europe, proving that unsystematic risk does not depend on the size of a company in Eastern Europe.

6 Conclusion

The evidence of recent economic events reveals many negative processes in emerging markets. Eastern European countries, with their attempts to reconstruct their market models according to international economic standards, found themselves in a puzzling and uncertain place. When allocating their financial activities overseas, they met with certain obstacles that had negative effects on financial market liquidity and price formation, raised risk, and negatively influenced resource allocation processes in these countries. It is clear that this affected investor decisions concerning Eastern European financial markets. Moreover, despite the bank-dominated financial systems in Eastern European countries, their financial markets are still being transformed to meet with the approval of world leaders. Indeed, they appear more sensitive to current economic changes, which explains their higher volatility level in comparison with well-established financial markets.

The real state of things showed some illiquidity of stocks, which brought liquidity volatility and liquidity skewness, ending with negative images of companies in financial markets.

A lack of financial market transparency in Eastern European emerging markets prevents access to financial market information and harms market efficiency. Moreover, due to such insecurity and uncertainty, investment flows are significantly reduced. Financial market transparency raises the credibility of institutions and introduces rationality; truthful and comprehensive information is provided to investors, particularly in hard economic conditions. A high level of financial market transparency informs important asset allocation decisions and reduces interest and exchange rates and prevailing market risks. Moreover, a high level of transparency is crucial for central banks as it helps to set inflation policy and market regulations.

Our findings demonstrated that during the observed period (2003–2014), Eastern European financial markets were not able to reach the minimum expected criteria of Transparency and Efficiency indices for Liquidity and Volatility Analysis. In addition, our measure showed low Liquidity and high Volatility levels. This is in agreement with

weakness in financial markets and difficult business conditions. Our findings agree with studies devoted to average bid-ask spread and price volume measures with a link to liquidity (Blau and Whitby 2015; Shen and Ross 2000; Huddart et al. 2012; Dabrowski 2010) and systematic and unsystematic risk measures for volatility (Sujan and Govil 2013; Shin and Stulz 2000). Moreover, our results support statements about the inefficiency of Eastern European financial markets (Ivanov et al. 2012) and the inherent strong country effect in the observed area (Berglöf and Pajuste 2005).

The contribution of this work to the existing literature is twofold.

On the one hand, poor efficiency and transparency in the Eastern European markets are interesting from the point of view of both local policy makers and the convergence process within the EU.

For local policy makers, the usefulness of the results lies in the following evidence. We used non-synthetic indexes of efficiency and transparency in our approach. We considered a set of raw indicators on the basis of the previous literature and Economic theory, such as proxy of stock market efficiency and transparency conditions. Such an approach allows local policy makers to implement policies that aim to improve each indicator that shows a causal effect on the efficiency and transparency setup of the local stock market. In addition, through the results of this study, policy makers might realize the importance of each level to promote better transparency and efficiency conditions. Finally, if better efficiency and transparency levels in local stock markets are achieved, they can generate a greater degree of financial development in the affected area and, through this channel, reinforce capital flows between European countries. This will bring a higher level of non-inflationary and sustainable growth. In fact, the existence of a causal relationship between financial and economic development is amply proven by both the theoretical and empirical research. The economic historian Douglass North (North and Thomas 1996) and his followers drew attention to institutional prerequisites for economic growth. For that matter, it is also related to the important issue of convergence of economies and financial markets in EU countries (for example, Turkey and Ukraine work on joining the EU).

Under current European credit market conditions, indirect financing schemes, which are different from the traditional banking system, increase their importance in business financing.

More efficient markets begin a virtuous circle, where money is directed to the best investment opportunities. The issue of market efficiency, which is related to transparency and the information set available to investors – in a Fama framework as well – is widely discussed among academicians. In addition, greater transparency and market efficiency favor the integration of European financial centers (see Acharya and Bisin 2005 and Bekaert, et al., 2007).

A closer alliance of Eastern European markets with the community of EU financial investors implies multiple benefits. Mainly, Eastern European companies gain perspectives on financing, including selling stocks to non-resident investors.

This way, a dual objective is achieved: On one hand, more resources become available for financing business projects, so it promotes their development. On the other hand, it brings greater fund diversification. In the case of banking market frictions in firm loan financing, it also helps reduce financial stress on the same companies.

Moreover, private investors are the first beneficiaries of financial integration. They benefit directly from minor brokerage costs due to increased competition; they have access to a wider range of financial instruments, as well as increased opportunities for portfolio diversification. In their turn, financial service providers can exploit the potential economies of scale and scope offered by a broader market.

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