CHAPTER

20

SERBIAN FINANCIAL MARKET IN THE PRE-CRISIS AND POST-CRISIS PERIOD[*]

Jelena Z. Minović[1], *Boško R. Živković*[2]

Abstract

The paper analysis three important characteristics of financial market: level of (il)liquidity, liquidity risk premium and systematic risk in the pre-crises and the post-crises period, in case of Serbia. For this analysis, we used monthly data for BELEXline and BELEX15 indices as well as all stocks which these indices entailed in the period from October, 2005 to July, 2009, provided by the Belgrade Stock Exchange. Results of this paper suggest that Serbian market has low level of liquidity. Especially, the level of illiquidity for both indices increased in the post crises era in Serbia. Consequently, liquidity risk premium is decreased in the same period. Additionaly, results confirm that systematic risk which contained liquidity risk is increased even by 59% in the post crises period in Serbia.

Key words: *(Il)liquidity, liquidity risk premium, systematic risk, CAPM, Liquidity-adjusted CAPM.*

INTRODUCTION

The financial market in Serbia is, by its type, a frontier market. The main problem of the frontier markets impacting market liquidity are: small number of stocks with significant capitalization, small numbers of shares outstanding, infrequent and irregular trading, etc. Additionally, there are typically short time series of past trades, lack of transparency and readily accessible information about traded companies, as well as the appearance of the so-called invisible forms of risk, where illiquidity is the most important one. Due to all these factors frontier markets suffer from the increased level of systematic (market) risk [14]. The Belgrade Stock Exchange was the first re-established stock exchange after the Second World War in East Europe (1989). Nevertheless, up until early 2002, it existed as an organization without normal rules of the game. Only during that year the market began to operate in a more or less standard manner. The main classes of assets traded on Serbian market are shares issued as a result of a process of insider privatization model [23]. Large portion of the total capitalization on the Serbian frontier market is highly illiquid, i.e. many companies are listed on the exchange just de-jure rather than de-facto. In addition, only a small fraction of the company is typically floated. While this is typical of almost all economies in transition, Serbian market, in comparison with many other transition markets, may be even more illiquid. Hence, we claim that illiquidity is key risk factor in frontier market.

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[1] Jelena Minović, M.Phil., Theaching Assistent, Union University, Belgrade Banking Academy, Faculty for Banking, Insurance and Finance.

[2] Boško Živković, Ph.D., Full Professor, University of Belgrade, Faculty of Economics.

The Belgrade Stock Exchange has calculated and published the index BELEX*line* since April 2, 2007, as a benchmark for monitoring broad market movements [24]. BELEX*line* index is descriptive, in the statistical sense, and not investible. The index weighting is based on market capitalization. BELEX15 is a free-float market capitalization weighted price index, which follows the movements of the most liquid shares traded by the continuous method and fulfilling criteria for inclusion in the index basket [24].

According to the trading method, market can be divided into discontinuous and continuous market. These two markets differ widely. The discontinuous market is a one-way market. The main sellers of stocks on this type of market are individual owners who have obtained stocks, often for free, during the mass privatization procedure. The discontinuous trading market serves purposes which are completely different from the standard ones: instead of going public in order to raise additional capital, it serves the purpose of going private and taking over companies. The continuous market behaves differently from the discontinuous market. The key difference in comparison to the discontinuous market is in the manner in which supply and demand are created [23]. BELEX*line* is index on the discontinuous, while BELEX15 is index on the continuous market of the Belgrade Stock Exchange.

The occurrence of the world economic crisis (on October, 2008) leads to the lack of confidence directly caused a fall in liquidity and higher investment risk, leading to massive withdrawal of investors, pressure on the sell side, fall in prices and losses in trading. The spiral movement caused a further lack of available funds and deeper illiquidity. Lack of confidence and liquidity generated price depreciation which was the central feature of the business operations on the Belgrade Stock Exchange [24].

We used daily data for stocks from BELEX*line* and BELEX15 indices (http://www.belex.rs) in the period: October, 2005 – July, 2009. We split the sample into two sub-periods, namely ***the pre-crisis and post-crisis periods***, in order to investigate three important characteristics of financial market in Serbia: level of (il)liquidity, liquidity risk premium and systematic risk. All calculations in this paper are based on monthly level. Aiming at measuring illiquidity, we choose the price pressure (PP) measure as in Bekaert, Harvey and Lundblad (2007). In order to obtain and apply the corresponding illiquidity measure, we have written a programme within Microsoft Access package. After calculating return and illiquidity series on daily level, we have been averaged by months in order to obtain series on a monthly level. We analysed level of liquidity for both Serbia's indices in the pre-crises and post-crises period. Particularly, we found which year is the most illiquid and the least illiquid year in observed sample period. Additionaly, we analysed changes in the risk premium and changes in the systematic risk using different models (unconditional versions of the standard CAPM and the liquidity-adjusted CAPM), in the pre-crises and post-crises period, in Serbia.

The hypothesis are: that level of illiquidity increased in the post-crises era on Serbian market; the liquidity risk premium decreased in the post crises period; the level of systematic risk increased in the post-crises period on this stock market.

The rest of the paper is organized as follows. The Section 2 explores liquidity and presents its measuring. Additionaly, this section shows changes in level of illiquidity, in the post-crises era, for both indices from the Belgrade Stock Exchange. The Section 3 explores market risk premium in case of CAPM, and liquidity risk premium in case of LCAPM. This section shows changes in these risk premia in the pre-crises and post-crises period. This section analysis the main results concerning with systematic risk in Serbia. The Section 4 concludes.

LIQUIDITY AND ITS MEASURING

Liquidity is not easy to define and there is no common definition of liquidity anyway [22]. Liquidity is easier to recognize than to define [8]. Liquidity generally denotes the ability to trade large quantities quickly, at a low cost, and without moving the price. This definition clearly exists, and functions more often than not in G-7 countries. In the rest of the world, however, it is better to define liquidity as a market characterized by the ability to buy and sell securities with relative ease. Another definition that could be used in frontier markets explains that illiquidity arises when an asset or security cannot be converted to cash quickly, thus defining liquidity as the opposite of same [7]. Market liquidity refers to the ability to undertake transactions in such a way as to adjust portfolios and risk profiles without disturbing underlying prices. The dimensions of market liquidity include:

- market *depth*, or the ability to execute large transactions without influencing prices unduly;
- *tightness*, or the gap between bid and offer prices;
- *immediacy* or the speed with which transactions can be executed;
- and *resilience*, or the speed with which underlying prices are restored after a disturbance [8].

Obviously, there is a strong interaction between each of these dimensions and all of them must be monitored since the quality and availability of data varies widely across markets. These dimensions need to be applied at a disaggregated level for segmented markets and for individual products where substitutability from an investor's standpoint is limited or absent [11]. It was believed that market liquidity could be analysed in terms of objective exogenous factors. A market was thought likely to be liquid if:

- market infrastructure was efficient, leading to low transactions costs and thus narrow bid-ask spreads;
- there was a large number of buyers and sellers, implying that order imbalances could be quickly adjusted by small movements in prices;
- and the assets transacted had transparent characteristics, so that changes in perceptions of underlying value would be quickly translated into prices [8].

Liquidity is one the favourable characteristics required by the investors. Liquidity on stock exchange is generated by the so called market makers [6]. Speculative investors and market makers are the key players that bring about market or assets liquidity [13]. Indeed, liquidity is the condition for investors (regardless of the investors being individuals or institutions) to get returns from the expected changes in prices. They, however, generate demand which enables liquidity.

Liquidity has several aspects and cannot be described by one indicator only. Some of the most common measures (il)liquidity are as follows: Turnover, Bid-Ask spread, Roll's model (1984), Kyle's measure (1985), LOT's model (named by Lesmond, Ogden, and Trzcinka, 1999), Amihud's measure (2002) [2], Pástor-Stambaugh factor (2003) [20], and others. Thus, it is very difficult to cover liquidity with only one variable. Liquidity can be well described as a function of a number of variables, where each variable is an approximation for incomprehensible concept of liquidity [2]. So far evolution of ideas in this field shows that measuring market liquidity is not a trivial issue. Clark (2008) [7] study history and measurement of liquidity risk in frontier markets. Bekaert, Harvey and Lundblad (2007) [5] analyse measuring of liquidity for 19 emerging equity markets. Lesmond (2005) concludes that any measuring of liquidity has its advantages and disadvantages when used for estimation of liquidity among countries or within some country. Models based on the volume such as Amihud's measure and Turnover could be misleading in case of weak liquidity markets. This shortage is practically manifested in reduced scope of revenue which affects turnover, as well as null returns which influence Amihud's measuring [17]. Findings by Lesmond (2005), Bekaert, Harvey and Lundblad (2007) show that turnover are not a sustainable measure of liquidity in emerging markets. Neither is it a good measure for estimation of liquidity among countries nor within each country [17], [5]. Lesmond (2005) points out that it is very important to choose appropriate measure of liquidity because these measures are necessary for adequate estimation of the market efficiency [17].

However, the important issue for our analysis in this paper is the choice of appropriate measures of liquidity for frontier capital markets. Many of the more sophisticated measures of (il)liquidity could not be used for estimation of liquidity of the Serbian financial market, because of the lack of data and specific features of this market. In frontier markets, non-trading problems are particularly acute. As a measure of illiquidity for the Serbian market we use "price pressure" measure as in Bekaert, Harvey and Lundblad (2007). These authors used this illiquidity measure for emerging markets, and it turned reliable in estimation of illiquidity of these markets. This measure aims to incorporate potential price impact by using the length of the non-trading (or zero return) interval [5]. Bekaert et al. (2007) called this measure as price pressure of non-trading. These authors specified the limitations of this measure. First, information less trades (such as a trade by an index fund) should not give rise to price changes in liquid markets. The fact that there is not actually measure non-trading, but only a zero return, is consequently a potentially serious limitation. The market reaction to such a trade may also depend on the particular trading mechanism in place. Second, another concern is that there is no trading because of a lack of news. Third, it is possible that our price pressure measure artificially reflect other characteristics of the stock market. For example, markets with many small stocks may automatically show a higher level of non-trading compared to markets with larger stocks. The focus on a value-weighted measure mitigates this concern [5].

Daily price pressure (PP) measure is defined as follows:

$$\mathrm{PP}_{i,t} = \frac{\sum_{j=1}^{N} \omega_j \delta_{j,t} \left| R_{j,t,\tau} \right|}{\sum_{j=1}^{N} \omega_j \left| R_{j,t,\tau} \right|}, \tag{2.1}$$

where ω_j represents the weighting of the stocks in the market index [5]. In our case, the market index is BELEX*line* index. N is number of stocks, each indexed by j. Coefficient $\delta_{j,t}$ indicates no trade days (as proxied by zero return days) and the first day after a no trade interval when the price impact is felt.

$$\delta_{j,t} = \begin{cases} 1, & \text{if} \quad R_{j,t} \text{ or } R_{j,t-1} = 0 \\ 0, & \text{otherwise} \end{cases} . \tag{2.2}$$

Also,

$$R_{j,t,\tau} = \begin{cases} R_{j,t} & \text{if} \quad R_{j,t-1} \neq 0 \\ \prod_{k=0}^{\tau-1} \left(1 + R_{m,t-k}\right) - 1, & \text{if} \quad R_{j,t-1} = 0 \end{cases} . \tag{2.3}$$

Here τ represents the number of days the stock has not been trading and $R_{j,t,\tau}$ is an estimate of the return that would have occurred if the stock had traded. Because in frontier and emerging markets market-wide factors may dominate return behavior with respect to idiosyncratic factors, we use the value-weighted market return, $R_{m,t}$, as our proxy for the unobserved return. Note that when a stock does not trade for a lengthy interval, $R_{j,t,\tau}$ may become quite large and the price impact illiquidity measure (PP_t) may move to 1.0 [5].

We use data from the Belgrade Stock Exchange for the period October, 2005 – July, 2009. In order to calculate these illiquidity measures we used daily returns for stocks from BELEX*line* and BELEX15 indices, as well as daily returns on both indices. Daily returns are calculated as difference in log price at closing. The return of the market is a value-weighted index, BELEX*line*, comprised of all stocks available either in a given month or on a particular day in the sample. The second index of the Belgrade Stock Exchange is BELEX15, and it is the value-weighted portfolio consisting of the 15 most liquid stocks. Notation is as follows: BELEX*line* is termed with m, and BELEX15 is termed as p.

In order to get and apply corresponding illiquidity measure, we wrote program within Microsoft Access package. As a check we also computed two capitalization-weighted[3] illiquidity measure of BELEX*line* and BELEX15 indices, termed as $PP_{m,t}$, and $PP_{p,t}$, respectively. Hence, we get two illiquidity measures on daily basis. Then, daily illiquidity measures have been averaged across all days in a particular month.

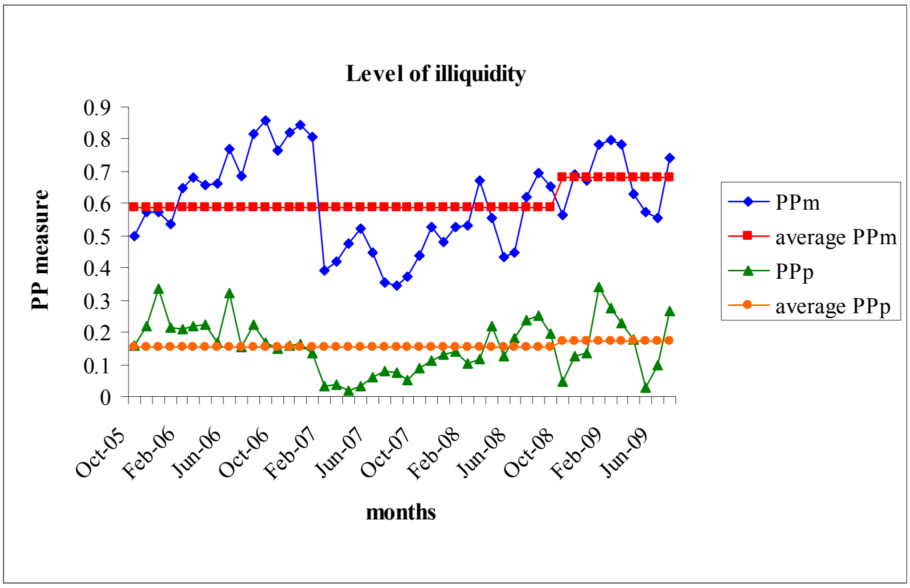
Table 20.1. An average value of monthly illiquidity measure of BELEXline ($PP_{m,t}$) and BELEX15 ($PP_{p,t}$) indices for every year in observed period

	2005	**2006**	**2007**	**2008**	**2009**	***average***
$PP_{m,t}$	0.549	0.729	0.465	0.588	0.695	0.605
$PP_{p,t}$	0.236	0.198	0.072	0.157	0.203	0.173

Source: authors' calculation

A selected illiquidity measure (PP) value ranges in interval between 0 and 1; with the value closer to 1 denoting extremely high illiquidity. In order to compare illiquidity for each year we calculated an average value of PP measure (see Table 20.1). For whole market, the most illiquid year was 2006 (mean of $PP_{m,t} = 0.729$), while the least illiquid year was 2007 (mean of $PP_{m,t} = 0.465$). For the most liquid stocks, the least liquid year was 2005 (mean of $PP_{p,t} = 0.236$), while the most liquid year was 2007 (mean of $PP_{p,t} = 0.072$). Bekaert, Harvey and Lundblad (2007) found that the least liquid country is Indonesia according to the value of PP measure (mean of PP = 0.776, [5]). The country with mean of PP measure = 0.158 is Taiwan [5], interpreting that Taiwan is the most liquid country of all 19 analysed emerging markets. In order to find level of markets' liquidity in Serbia, we have established some critical value. An average value of PP for all 19 analysed emerging markets in Bekaert et al. (2007) was 0.552 [5]. Then we decided to denote all values of PP measure above 0.552 as state of low liquidity. From Table 20.1 we see that mean of PP measure for BELEX*line* is 0.605, indicating that Serbian market is low liquid. On the other hand, mean of PP measure for BELEX15 is 0.173, indicating that this index (portfolio consisting of the 15 most liquid stocks) is highly liquid.

Figure 20.1. Level of illiquidity for BELEXline (PPm) and BELEX15 (PPp) indices, on monthly basis, and average value of these illiquidity levels, in the pre-crises and post-crises period



Source: authors' calculation

[3] Bekaert, Harvey and Lundblad (2007) computed value-weighted PP measure, too.

Figure 20.1 plots monthly illiquidity measure of market index (BELEX*line*), and portfolio of the 15 most liquid stocks (BELEX15), respectively. In order to test our hypothesis about increasing level of illiquidity in the post-crises era, we calculated average level of illiquidity for both indices in the pre-crises (October 2005-September 2008) and the post-crises periods (October 2008-July 2009). Results are summarized in Table 20.2.

Table 20.2. An average value of monthly illiquidity measure of BELEXline ($PP_{M,t}$) and BELEX15 ($PP_{p,t}$) indices in the pre-crises (October, 2005 – September, 2008) and post-crises (October, 2008 – July, 2009) period. Increased value of illiquidity level on October, 2008 is termed as difference between average value of PP measure in the post-crises and in the pre-crises period

	pre-crises	**post-crises**	**post-pre**
$PP_{M,t}$	0.586	0.679	9.26%
$PP_{p,t}$	0.153	0.172	1.88%

Source: authors' calculation

Results from Table 20.2 suggest that hypothesis about increased level of illiquidity in the post-crises era can not be rejected. Hence, level of market illiquidity (BELEX*line*) increased by 9.26% in the post crises period in Serbia, as well as level of illiquidity of BELEX15 index increased by 1.88%, too in this period.

Table 20.3. The value of illiquidity measure of BELEXline ($PP_{M,t}$) and BELEX15 ($PP_{p,t}$) indices, on monthly level, in the post-crises period

	Oct-08	**Nov-08**	**Dec-08**	**Jan-09**	**Feb-09**	**Mar-09**	**Apr-09**	**May-09**	**Jun-09**	**Jul-09**
$PP_{M,t}$	0.562	0.691	0.673	0.785	0.796	0.785	0.629	0.572	0.554	0.741
$PP_{p,t}$	0.045	0.124	0.134	0.341	0.277	0.230	0.175	0.030	0.100	0.266

Source: authors' calculation

In the post-crises period (October, 2008 – July, 2009), maximum level of market's illiquidity was on February, 2009, when was the peak of the crises in Serbian market. For the most liquid stocks, minimum level of liquidity was on January, 2009 (see Table 20.3). It is commonly thought that low level of liquidity is, therefore, one of the key problem areas facing small frontier markets.

SYSTEMATIC RISK AND RISK PREMIUM IN SERBIA

Battalio, Greene and Jennings (1998) calculated a liquidity premium as follows:

$$\mathrm{LP}_t = I\left(P_t - M_{t-1}\right), \tag{3.1}$$

where P_t denotes traded price at time *t*, and M_t is the mid price at time *t*. *I* is the direction of trade indicator. *I* equals 1 for buyer initiated trades and -1 for seller initiated trades [3], [22]. Lee and Ready (1991) defined trade indicator variable as follows:

$$I = \begin{cases} 1, & P_t > M_{t-1} \quad (\text{buyer initiated}) \\ 0, & P_t = M_{t-1} \quad (\text{undetermined}) \\ -1, & P_t < M_{t-1} \quad (\text{seller initiated}) \end{cases} \; [15]. \tag{3.2}$$

This liquidity premium is positive if the buyer pays more or if the seller pays less than the spreas midpoint [22].

Hibbert et al. (2009) [12] present literature review of theoretical and empirical evidence of liquidity premium. The literature associated with the liquidity premium are the papers by Amihud and Mendelson (1986), Amihud (2002), Brennan and Subrahmanyam (1996), Nguyen, Mishra, Prakash and Ghosh (2006), Nguyen and Puri (2007). On the other hand, the literature associated with the liquidity risk premium, and liquidity risk are the papers by Jacoby, Fowler and Gottesman (2000), Amihud and Mendelson (1986), Pástor and Stambaugh (2003), Acharya and Pedersen (2005), De Jong and Driessen (2005), Chordia, Subrahmanyam and Anshuman (2001), Hasbrouck and Seppi (2001), Martínez et al. (2005), Kamara, Lou and Sadka (2008), Bekaert, Harvey, and Lundblad (2007) for emerging markets. Clark (2008) study history and measurement of liquidity risk in frontier markets [7].

Standard Capital Asset Pricing Model (CAPM by Sharpe (1964), and Lintner (1965)) is a one-period, static model with one factor, namely market risk. This model represents the equilibrium relationship between market risk and expected return in liquid markets. In this model the risk-premium of portfolio (assets) is proportional to the market risk premium, with a beta coefficient of proportionality. The premium for the market portfolio represents the expected excess return over the risk-free rate that a representative investor expects to get in order to decide to invest in the market portfolio [21]. The unconditional version of CAPM is:

$$E\left(R_t^p - R_t^f\right) = \beta_p^{CAPM}\left[E\left(R_t^m - R_t^f\right)\right], \tag{3.3}$$

where R_f is the risk free rate, the risk premium is $E\left(R_t^m - R_t^f\right)$. In our case, R_t^m and R_t^p, are the monthly return series of an value-weighted market index (BELEX*line*), and portfolio of the most liquid stocks (BELEX15), respectively. The Republic of Serbia's Treasury Bills (T-bills)[4] are used as the risk-free rate. The Republic of Serbia's T-bills represent averaged weighted rate[5] for each month (in percents) on annually basis. For calculation of the risk premium with monthly data we have divided the observed T-bills rate by 12.

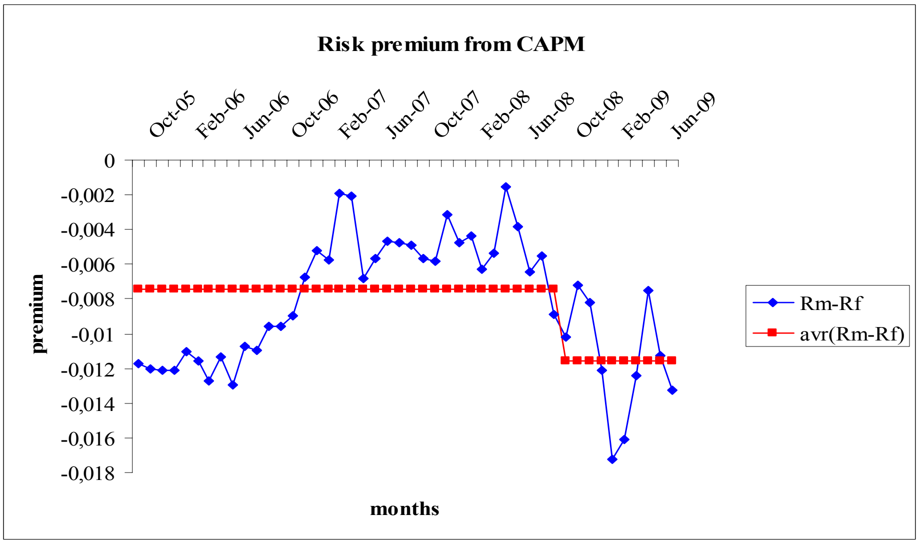
Thus, in the standard CAPM, risk of portfolio (assets) is determined by covariance between portfolio (assets) returns and the market portfolio. This is because it is assumed that the investor invests in a well-diversified portfolio [21]. The systematic undiversifiable risk in CAPM is:

$$\beta_p^{CAPM} = \frac{Cov\left(R_p, R_m\right)}{Var\left(R_m\right)} \tag{3.4}$$

[4] The Treasury Bills (T-bills) are issued by the Republic of Serbia, and observed on the website of the National Bank of Serbia (http://www.nbs.rs).

[5] For months without given data, we have carried out extrapolation between two points in months when the data was available.

Figure 20.2. Level of market risk premium from CAPM, on monthly basis, and average value of this risk premium, in the pre-crises and post-crises period



Source: authors' calculation

It is reasonable to expect systematic liquidity shocks to affect the optimal behavior of agents given that stocks tend to perform badly in recessions which may, of course, be easily characterized by aggregate liquidity restrictions. Hence, we may expect a higher expected return on stocks highly sensitive to systematic liquidity shocks. As discussed by Pastor and Stambaugh (2003) [20], when investors face an economic recession, and their overall wealth decreases, they may be forced to liquidate some assets to pay for their purchases. Unfortunately, this is relatively more costly when liquidity is lower, particularly when wealth has dropped and marginal utility is higher. Moreover, these effects will be even more pronounced for assets that react strongly to changes in market-wide liquidity crises. Therefore, investors will require a systematic liquidity premium to hold such highly sensitive assets [18]. Many studies argue that investors require higher expected returns (a liquidity premium) as a compensation for holding less liquid securities. There is widespread evidence that liquidity (both in terms of a security's individual characteristics and its systematic risk) is priced in the security market [19]. In order to introduce the level of (il)liqudity in context of risk premium or systematic risk, we consider an extension of CAPM called Liquidity-adjusted CAPM (LCAPM), introduced by Acharya and Pedersen (2005). Acharya and Pedersen (2005) studied equilibrium asset pricing with liquidity risk – the risk arising from unpredictable changes in liquidity over time. They are shown that a security's required return depends on its expected illiquidity and on the covariances of its own return and illiquidity with market return and market illiquidity. It gave rise to a liquidity-adjusted capital asset pricing model (LCAPM) [1]. LCAPM model is derived from a framework similar to the CAPM. In it the risk-averse investors maximize their expected utility under a wealth constraint by replacing the cost-free stock price, $P_{i,t}$, with a stochastic trading-cost-adjusted stock price, $P_{i,t} - \psi_{i,t}$. Here, $\psi_{i,t}$ is the level of trading cost in an overlapping-generations economy [16]. Acharya and Pedersen (2005) show how the CAPM in an imaginary economy translates into a CAPM in net returns for the original economy with illiquidity costs [19].

The unconditional version of LCAPM by Acharya and Pedersen (2005) is:

$$E\left(R_t^p - R_t^f\right) = E\left(PP_t^p\right) + \beta_p\left[E\left(R_t^m - PP_t^m - R_t^f\right)\right], \tag{3.5}$$

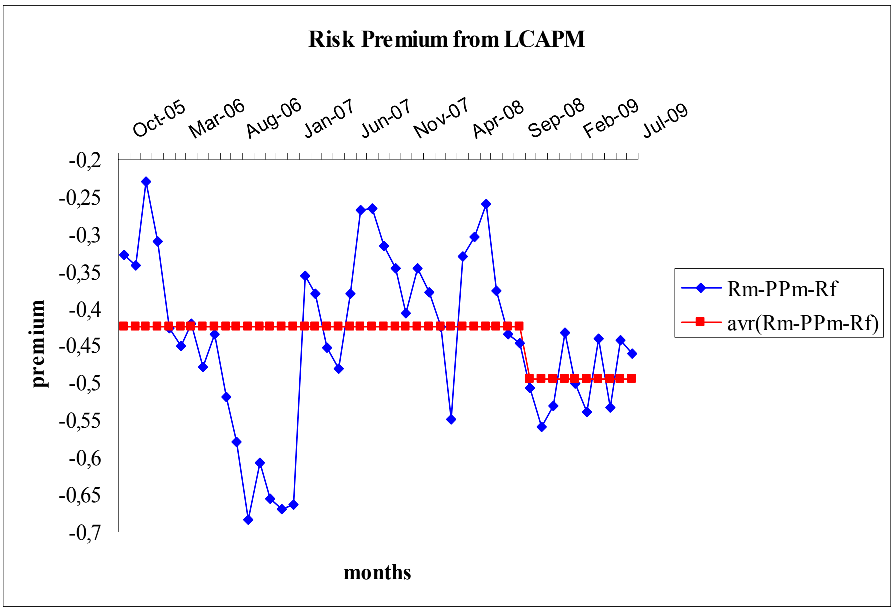
Superscripts p and m represent the portfolio p (BELEX15) and aggregate market (BELEX*line*), respectively. PP is the price pressure illiquidity measure, and the risk premium is defined as

$E\left(R_t^m - PP_t^m - R_t^f\right)$. Liquidity risk premium is calculated as the market risk premium as in the standard CAPM, but corrections to the level of illiquidity are introduced. The systematic liquidity undiversifiable risk in LCAPM is:

$$\beta_p^{LCAPM} = \frac{\operatorname{cov}\left(R_t^p - PP_t^p, R_t^m - PP_t^m\right)}{\operatorname{var}\left(R_t^m - PP_t^m\right)}. \tag{3.6}$$

This unconditional LCAPM is obtained assuming the independence over time of returns and illiquidity measures and constant conditional covariance of innovation in illiquidity and returns. This version of LCAPM is used by Kuan-Hui Lee (2006), Gianluca Marcato (2005), Chollete, Næs, and Skjeltorp (2007), Bongaerts, de Jong, and Driessen (2007), Panyanukul (2009) for the bonds in emerging market, Fang, Sun and Wang (2006) for the Japanese stock market. Some of the limitations of static (unconditional) version of LCAPM are: it is simplistic, does not explain the time-variation in liquidity, and liquidity risks. Then, it does not consider the impact of different holding periods on liquidity [1]. By using monthly return and liquidity, it is implicitly assumed that the investors' holding period is one month, which is a very strong assumption [16]. In reality, neither market nor liquidity risk are constant in time, hence the testing of static models would give unrealistic results.

Figure 20.3 Level of liquidity risk premium from LCAPM, on monthly basis, and average value of this risk premium, in the pre-crises and post-crises period



Source: authors' calculation

In order to test our hypothesis about decreased level of risk premium in the post-crises period, we calculated average level of risk premium for both, standard CAPM, and LCAPM models, in the pre-crises (October, 2005–September, 2008), and in the post-crises period (October, 2008–July, 2009). Using equations (3.4) and (3.6) we calculated systematic risk from standard CAPM and LCAPM models, in these two sub-periods, in order to test our hypothesis about increased level of systematic risk in the post-crises period in Serbia. Results are summarized in Table 20.4.

Results from Table 10.4 about risk premium from CAPM and LCAPM suggest that hypothesis about decreased level of risk premium in the post-crises period can not be rejected. Hence, the liquidity risk premium in LCAPM decreased by 6.97% in the post crises era in Serbia (see Figure 20.3), until the market risk premium in standard CAPM is decreased by 0.41%, too in this period (see Figure 20.2).

From Table 20.4 we see that systematic risk is increase only by 3% in the post crises period when we used beta from standard CAPM (equation (3.4). Using beta from LCAPM (equation (3.6)) we get that systematic risk is increased, even by 58.7% in the post-crises era in Serbia. However, our results suggest that hypothesis about increased level of systematic risk in the post-crises period can not be rejected.

Table 20.4. An average value of (liquidity) risk premium, and value of systematic risk in case of CAPM and LCAPM, in the pre-crises and post-crises period

	pre-crises	**post-crises**	**post-pre**
Rm-Rf	-0.0074	-0.012	-0.41%
Rm-PPm-Rf	-0.425	-0.495	-6.97%
beta CAPM	1.14	1.17	3%
beta LCAPM	0.281	0.869	58.7%

Source: authors' calculation

These results about risk premia and systematic liquidity risk confirm the fact that level of liquidity must be included into model. Emerging and frontier capital markets are in this sense a modelling challenge and require creation of new models [4]. The beta coefficient from standard CAPM is not good indicator of systematic risk. As is well known, standard CAPM model focuses on only factor or risk, namely, market risk. Fama and French (1992) [9] show that, even for developed markets, CAPM does not perform too well. Pros and cons of the CAPM model are presented in reference [6]. Thus, they propose to include in the model additional risk factors. In order to explain stock returns on the U.S. market, Fama and French (1993) [10] identify three common risk factors: an overall market factor (the excess market return), factor related to firm size and factor related to the ratio of book and market value of companies. The results by Fama and French (1992, 1993) significantly improve the performance of the model with respect to a single-factor model. Acharya and Pedersen (2005) find that their LCAPM model significantly improves upon the standard CAPM results, too.

CONCLUSION

In this paper we analysed three important characteristics of Serbian frontier financial market: level of (il)liquidity, liquidity risk premium and systematic risk in the period: October, 2005 – July, 2009. We used monthly data for BELEX*line* and BELEX15 indices from the Belgrade Stock Exchange. Especially, we focused on two sub-periods of observed sample: the pre-crises and the post-crises period. Generally, low level of liquidity is, therefore, one of the key problem areas facing small frontier markets. These markets have been burdened by an increased level of systematic risk. Our results showed that Serbian frontier market has low level of liquidity. Results of analysis suggest that, for whole Serbian market, the most illiquid year was 2006, while the least illiquid year was 2007. Particularly, in the post crises period level of illiquidity for both indices increased. The maximum level of market's illiquidity observed on February, 2009, when was the peak of the crises in Serbian market. Even, market illiquidity increased by 9%, in the post crises period.[6] Consequently, liquidity risk premium decreased by 7% in this period. The occurrence of the world economic crisis leads to a sudden increase in systematic liquidity risk by 59%, consequently.

One direction for future research is to examine behaviour of illiquidity and its volatility as well as systematic liquidity risk, over time, on the Serbian market. Another direction is to explore the impact

[6] Our PP measure underpriced illiquidity since the turnover for both Serbian indices decreased by about 70%. The level of illiquidity would be higher if the equally-weighted measure is used, instead of the value-weighted.

of illiquidity and liquidity risk on expected asset returns in Serbian stock market. It is interesting to consider the impact of different holding periods on liquidity, too.

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