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## The VT Index as an Indicator of Market Liquidity Risk in Slovakia<sup>1</sup>

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### Abstract

*In this paper we construct a new market liquidity index for Slovakia (called the VT index) based on the calculation of using traditional indicators of market depth, resiliency, tightness, volatility and liquidity for four markets (money, foreign exchange, bond and stock market) and back-tested the index for the years 2001-2008. The VT index began decreasing in the first half of the year 2008 and continued to fall after Lehman Brothers' collapse in September 2008. Although market liquidity deteriorated globally, major liquidity problems were avoided by individual financial institutions in Slovakia, due to relatively strong macroeconomic fundamentals of the Slovak economy in the pre-crisis period.*

**Keywords:** *funding liquidity, global financial crisis, liquidity risk, market liquidity, regulation, Slovakia, VT index*

**JEL Classification:** G21, G32, G38

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### 1. Introduction

In 2007, the sub-prime mortgage crisis undermined the US financial market, resulting in global credit and liquidity shortages and impacting the structure of the world financial market. The pending turmoil started as a credit crisis (from mid-2007 until August 2008), later became a liquidity crisis (from Lehman Brothers collapsed in September 2008 until December 2008), and was followed by an

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economic crisis in 2009, a sovereign debt crisis in 2010 and a crisis of Europe since 2011. In this paper we focus on the liquidity crisis and related risk indicators.

The definition of liquidity risk can be described in many ways, and it is not easy to separate this risk from all other risks and still capture all of its drivers. However, liquidity in its broadest sense might be defined as a capacity to obtain funding when needed at a reasonable cost (CEBS, 2008a). Liquidity risk is then defined as a threat to this capacity to generate cash at fair costs. Many liquidity indicators can be found in risk management literature encompassing Golin (2001), Hull (2007), Sinkey (2002) or Sironi and Resti (2008). Volume liquidity indicators include, for instance, a liquid assets-to-total assets ratio, a liquid-assets-to-short-term liabilities ratio, a loan-to-deposit ratio or a newly proposed liquidity coverage ratio defined as total value of high quality liquid assets/net cash outflows (BCBS, 2009). On the other hand, trading liquidity indicators encompass an average bid-ask spread or an average daily turnover ratio in financial markets (both indicators we use in our research). However, these indicators were not very reliable during the global crisis since market prices were not available for some assets, and the key role played by off-balance sheet exposures and the main financial soundness indicators were, consequently, in many instances inaccurate. The importance of liquidity management and extra liquidity support has also materialized during the 2011 – 2012 sovereign debt crisis, when the European Central Bank (ECB) provided EUR 489 billion to European banks in December 2011 followed by another EUR 530 billion support in February 2012 to banks through longer-term refinancing operation (LTRO).

In this paper we discuss the liquidity risk that materialized during the global economic upheaval. Moreover, we create a new market liquidity index for Slovakia based on a liquidity index developed by Geršl and Komárková (2009) for the Czech financial market. This paper is organized as follows: after a brief introduction, we describe the background of liquidity risk management before and during the global crisis. In section three we discuss a methodology for the creation of the new liquidity index. The fourth section presents results our empirical study of market and funding liquidity risk in Central and Eastern European (CEE) countries. In conclusion we summarize the paper and state final remarks.

## **2. Liquidity Risk Management during the Global Crisis and Regulatory Response**

In this section we first present basic terms related to market liquidity and liquidity risk, which is important for our further research. Second, we discuss the global liquidity shortage followed by brief description of proposed regulatory measures in the field of liquidity risk management.

## 2.1. Basic Terms

Many definitions of liquidity risk exist; for example, BCBS (2010) defines banks' liquidity as the ability of the bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses. This definition is related to the funding liquidity problems of the bank, but when defining liquidity in general, we should always distinguish its two main types: market liquidity defines how difficult is to trade assets while funding liquidity defines how difficult is to obtain funding. While funding liquidity is institution-specific, market liquidity might be perceived as market-specific. Put differently, market liquidity highlights that a bank's liquidity situation relies not only on the bank itself but also on the behaviour of other market players (market pressure can result in fire sales or downward liquidity spirals as described, for example, by Černohorský, Teplý and Vrábel, 2010, or Vodová, 2011). Regulatory rules focus primarily on funding liquidity, while market liquidity usually exists outside the scope of regulation. One can compare this discrepancy to a similar situation of regulatory capital and economic capital in banking where banking regulation deals with regulatory capital, while economic capital is a risk proxy measured by the bank itself and hence unregulated (Teplý, Černohorský and Chalupka, 2010; Rippel and Teplý, 2011).

Market liquidity, which is the focus of this paper, can be defined as the ability of market participants to execute financial transactions in assets of a given volume without causing a significant change in their prices (Geršl and Komárková, 2009, p. 2). On a related note, Kyle (1985) defines market liquidity risk as the probability that market transactions cannot occur or can take place only with a significant impact on market clearing prices. Moreover, Kyle (1985) distinguishes three basic dimensions of market liquidity (tightness, depth and resiliency). We expanded these dimensions by two others (volatility and liquidity) as is discussed in more detail in Section 3.1 – Applied Methodology.

## 2.2. The Global Crisis and Regulatory Responses

During the liquidity crisis in late 2008 the liquidity dried up and many financial institutions around the world were facing liquidity problems (for more details on the description of liquidity problems see Černohorská, Černohorský and Teplý (2009); Heider, Hoerova and Holthausen (2009), or IMF (2009b)). As a result, central banks reacted to the market stress and provided emergency liquidity (e.g. extra credit lines or special currency swap agreements) to the financial system in order to bolster confidence among market players and stabilize the situation. For example, in June 2009 the European Central Bank provided extra short-term facilities to banks worth EUR 340 billion compared to June 2007,

while the Federal Reserve (FED) increased short-term financing to banks by USD 190 billion during the same period (IMF, 2009b). However, despite the central bank liquidity support and lower policy interest rates, the crisis has deepened and spread around the world to become a global economic crisis (Teplý, 2010b; Buzková and Teplý, 2012).

During the global crisis, inter-bank lending stalled and capital markets froze, resulting in a liquidity crisis that subsequently highlighted inadequate liquidity buffers and poor liquidity risk management within some banks (Wyman, 2010). We should highlight that not all institutions were hit by the liquidity crisis such as the banks with strong balance sheets (i.e. banks with stable funding sources) as those in Slovakia and the Czech Republic. On the other hand, the financial institutions with weak balance sheets (i.e. banks with unstable funding sources) such as investment banks relying on short-term funding were facing liquidity shortages. Moreover, the liquidity pressure was also fuelled by an increasing perception of higher counterparty risk, because a failure of the counterparty providing liquidity might result in further liquidity problems of the borrowing bank (Heider, Hoerova and Holthausen, 2009).

The bank's liquidity management currently faces two challenges: to ensure availability of adequate sources of cost-effective funding and to ensure appropriate use of these sources. Moreover, liquidity management is getting to be more challenging as new complex financial products and derivatives are used. As a consequence of the above-mentioned facts, liquidity risk management regulation need to be revised; BCBS (2010) introduced new two liquidity ratios within the new Basel III proposal: the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR). The LCR requires that the stock of bank's liquid assets should be equal to, or higher than, the cash outflows expected under the 30-day stress scenario (i.e. this measure deals with short-term resilience of a bank). The NSFR implies that available sources should be higher than sources required to limit the over-reliance on short term sources of financing (i.e. this measure deals with both medium- and long-term resilience of a bank). However, we expect that the Basel III regulation of funding liquidity is not sufficient and will not prevent financial markets from future crises due to its expected calibration, delayed implementation and strong pressure from the banks' lobbyists.

Table 1 depicts new regulatory liquidity standards for financial institutions expected in the future in terms of funding liquidity (as indicated above, in the empirical part of this paper we deal with market liquidity, which remains untouched by regulatory proposals as per our definition). Global coordination of liquidity standards is needed; otherwise, there could be an overall cost to a country or region's attractiveness from more aggressive regulation underpinning the

competitiveness of financial institutions affected by this regulation. As already stated, stricter regulation of banks' funding liquidity would probably lead to a higher level of financial innovations and hence stronger incentives for regulatory arbitrage in this respect.

Table 1  
**Perspectives of Liquidity Management Regulation**

Regulatory Topic	Possible Future Action	Implications	Examples
<i>Liquidity measurement</i>	Prescriptive measurement methodology and stressed parameters per product	Significant upgrade of data gathering, liquidity measurement and MIS* system capabilities	<b>Europe:</b> CEBS** guidance to compute stressed liquidity position by projecting cash/collateral flows in Basel III
<i>Intra-day, intragroup liquidity management</i>	<ul style="list-style-type: none"> <li>• Demonstrate self-sufficiency across all group entities</li> <li>• Buffers/commitments to withstand severe intra-day stress</li> </ul>	<ul style="list-style-type: none"> <li>• Need to quantify liquidity risk contribution by each group entity and account for trapped liquidity</li> <li>• Management of intraday exposure across settlement/payment systems</li> </ul>	<b>UK:</b> FSA*** guidance on measurement and management of intra-day and inter-group liquidity management as part of a bank's systems/controls requirements
<i>Contingency planning and liquidity buffers</i>	Formulaic specification of contingency/buffer requirements	<ul style="list-style-type: none"> <li>• Construction of liquidity buffer from diversified set of highly liquid assets, capability to execute contingency plans under stress</li> <li>• Regional parameter calibration</li> </ul>	<b>Switzerland:</b> SNB**** Outline on increased liquidity buffers across wholesale and retail funding
<i>Liquidity systems, controls and governance</i>	Inclusion of regulatory oversight on an operational basis	Establish and demonstrate robust capabilities to measure and monitor evolving liquidity situation with senior management oversight	<b>USA:</b> Inter-agency guidance on liquidity management including corporate governance, strategies, policies, procedures and risk limits
<i>Liquidity viable business models</i>	<ul style="list-style-type: none"> <li>• Forced separation of business areas to isolate and contain liquidity risks</li> <li>• Limitations on asset options available</li> </ul>	<ul style="list-style-type: none"> <li>• Implied shift in the source and maturity of funding and assets held by institutions</li> <li>• Quantification and inclusion of liquidity premium in pricing</li> <li>• Separation of investment banking and retail banking activities</li> </ul>	<b>Global:</b> BCBS***** consultation paper outline on differential buffer requirements (e.g. wholesale vs. retail funding) <b>UK:</b> The Vickers report: ring-fencing

Notes: \*MIS – Management Information System, \*\*CEBS – Committee of European Banking Supervisors, FSA\*\*\* – Financial Services Authority, \*\*\*\*SNB – Swiss National Bank, \*\*\*\*\* BCBS – Basel Committee on Banking Supervision.

Source: Authors based on Wyman (2010) and ICB (2011).

However, some steps undertaken seem to be positive. For instance, Independent Commission on Banking (ICB, 2011) in its “Vickers report” proposed to separate investment banking and retail banking activities, which should decrease the liquidity risk pertaining to UK retail banks (investment banking activities are

perceived riskier than retail banking activities). Furthermore, we would like to stress the importance of contingency planning and liquidity buffers as required by the Swiss National Bank, although no clear outcome has been achieved yet. All in all, despite some good intentions we expect that the proposed liquidity regulation will push banks to produce financial innovations in the field of deposit-liquidity products that will cause the next global financial crisis.

### 3. The Construction of the VT Index

For the creation of a new market liquidity index for Slovakia (named as the VT index after authors of this study), we follow Geršl and Komárková (2009), who developed an overall liquidity index for the Czech financial market based on the methodology applied by major central banks such as ECB (2007) or Bank of England (2007). In the first part of this section we described the applied methodology while in the second part we provide our empirical research.

#### 3.1. Applied Methodology

When creating a new market liquidity index (VT index) for the Slovak financial market, we use a similar approach applied by Geršl and Komárková (2009). However, not all data were available for all four markets (money, foreign exchange, bond and stock markets) and for all five dimensions (tightness, depth, resiliency, volatility and liquidity premium). As Table 2 demonstrates, all five dimensions have their own indicators only in the case of the money market.

The first dimension – *tightness of the markets* – is measured by the narrowness of bid-ask spreads on the money markets: the spreads between Bratislava Interbank Offered Rate (BRIBOR) and Bratislava Interbank Bid Rate (BRIBID) and other spreads with maturities of O/N, 1W, 2W, 1M, 2M and 3M. The second dimension – *market depth* – is measured by daily turnover in the markets except the FX market, while the third dimension – *market resiliency* – is measured by a return-to-volume ratio defined as daily changes in volume of traded bonds to daily turnovers on bond markets (measured by a daily change in the Slovak overnight index average (SKONIA) index). The fourth dimension – *volatility* – is measured as 30-day historical volatility of the SKONIA index for the money market, of SKK/USD exchange rate for the FX market, and as volatility of the SAX index for the stock market. This indicator is also connected to market resiliency, where higher volatility implies higher potential changes in asset prices. The last fifth dimension – *liquidity premium* – is defined as spreads between alternative assets with different degrees of liquidity (a spread between of 2W BRIBOR and NBS 2W REPO rate).

Table 2  
Variables Used for the Calculation of the VT Index

Dimensions	Description	Money Market	FX Market	Bond Market	Stock Market
<i>Tightness</i>	Bid-ask spreads	O/N, 1W, 2W, 1M, 2M, 3M (Spread BRIBOR vs BRIBID)	–	–	–
<i>Depth</i>	Daily Turnover	SKONIA volume	–	Total daily bonds trading volume on Stock market Bratislava	Total daily stock trading volume on Stock market Bratislava
<i>Resiliency</i>	Return-to-volume ratio	Daily change in SKONIA index/daily turnover	–	–	–
<i>Volatility</i>	30-day historical volatility	SKONIA index	SKK/USD	–	SAX Index
<i>Liquidity Premium</i>	Spreads between assets with different degree of liquidity	2W BRIBOR and NBS 2W REPO rate	–	–	
<i>Indicator</i>	<b>Market Liquidity Indicator</b>				
		MM indicator	FX indicator	BM indicator	SM indicator

Note: O/N – overnight, W – week, M – month, BRIBOR (BID) – Bratislava InterBank Offered (Bid) Rate, SAX Index – main stock price index of the Bratislava Stock Exchange, SKK – Slovak Koruna, USD – United States Dollar, SKONIA – SlovaK OverNight Index Average.

Source: Authors based on Geršl and Komárková (2009).

Based on limited data availability, we assigned specific weights on the sub-indices that create the market liquidity indicator (VT index): the Money market indicator (MMI) has a weight of 2.0 (5 indicators available) because a money market usually suffers very quickly as an overall liquidity of the market deteriorates. The Stock market indicator (SMI) has a weight of 1.0 (3 indicators available), while the Foreign exchange indicator (FXI) and the Bond market indicator (BMI) were assigned by a weight of 0.5 (1 indicator available only). Market liquidity indicator (MLI) is then defined as:

$$MLI = \frac{2.0 * MMI + 1.0 * SMI + 0.5 * FXI + 0.5 * BMI}{4} \quad (1)$$

### 3.2. Empirical Analysis

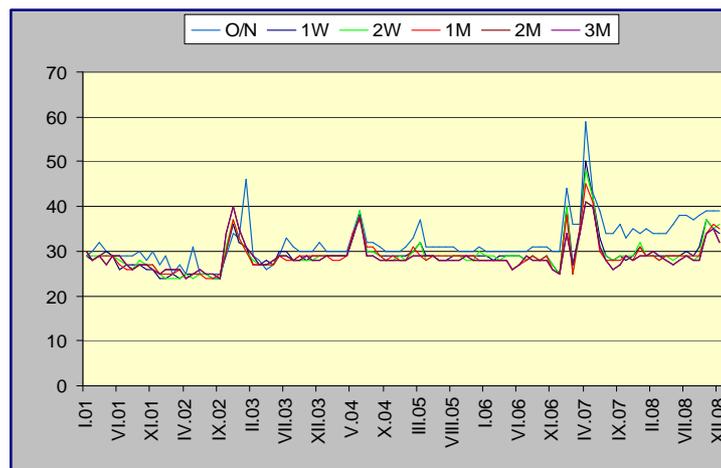
In this part we present the empirical results of our research. We have gathered data from public available sources such as the National Bank of Slovakia (NBS) and the Stock Exchange Bratislava (BSSE) for Slovakia and the Czech National Bank (CNB) Prague Stock Exchange (PSE) for the Czech financial market (for comparison of the Slovak and Czech market). For all four markets we finally get a standardized time series from 1 January 2003 to 31 December 2008, i.e. covering

both the pre-crisis period (until August 2008) and the liquidity stress period (September – December 2008). The original data were available daily but they were averaged to get the same duration for all factors enabling the calculation of monthly historical volatilities of these factors and consequently the creation of the market liquidity indicator (called the “VT index”).

Tightness of the money market was calculated through spreads between Bratislava Interbank Offering Rate (BRIBOR) and Bratislava Interbank Bidding Rate (BRIBID) for the six lowest maturities. These six spreads were standardized, as all of the factors in the sub-indices, to normal distribution with a mean 0 and a standard deviation 1 and then averaged to get a measure for tightness of the money market. Figure 1 shows that spreads oscillated around 30 basis points (bps) in the 2001 – 2008 period. The movements of all six in steady periods were close to each other with one exception – the O/N spread in times of bigger oscillation (1.Q 2003, 3.Q 2007, 4.Q 2008) differs from other spreads. In early phase of the crisis in April 2007 the O/N spread widened from 36 to 59 bps and did not return to the initial level from the early 2000s. The market liquidity stress in August 2008 affected money markets resulting in higher spreads on the Slovak money market (Vrábel, 2010). Figure 2 shows that the spread oscillation in the Slovak interbank sector was much higher than in the Czech Republic. Moreover, spreads in Czech Republic are three times smaller. On the other hand, Czech spreads soared dramatically compared to Slovak ones in 4.Q 2008 indicating that Slovak spreads already reflected higher market uncertainty while Czech spreads did not.

Figure 1

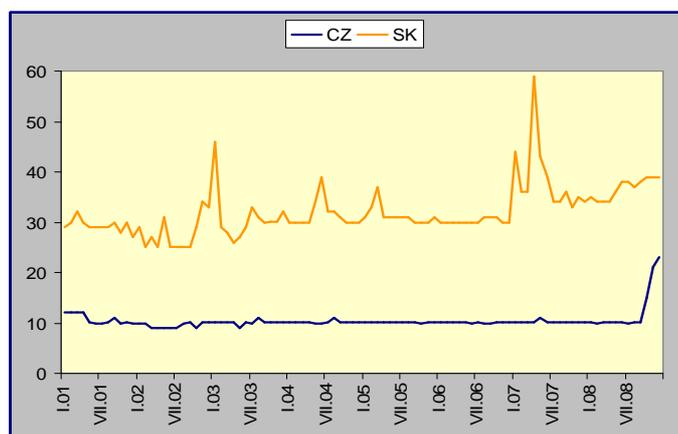
**Spread between BRIBOR and BRIBID (Slovakia) in 2001 – 2008**  
(monthly averages, in bps)



Source: Authors based on the NBS.

Figure 2

**Spread between O/N PRIBOR and O/N PRIBID and Spread between O/N BRIBOR and O/N BRIBID in 2001 – 2008 (in bps)**



Source: Authors based on the NBS.

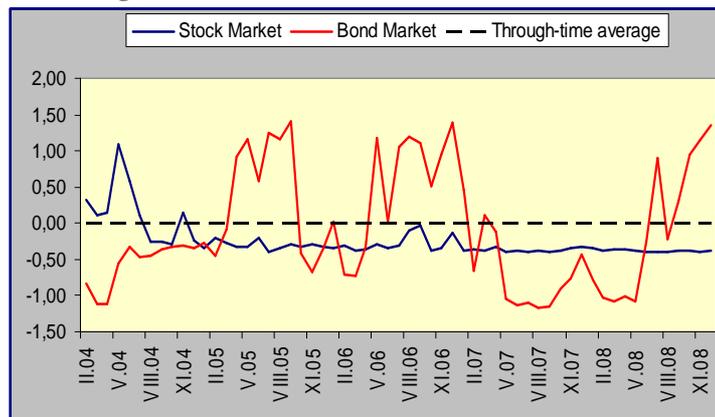
Market depth is measured by SKONIA volumes for the money market and by total trading volumes in both bond and stock markets. The higher trading volume should represent higher market depth implying better liquidity conditions. Trading volumes in bond and stock markets were calculated as an average daily volume for each month. Figure 3 demonstrates standardized values for both markets in the 2004 – 2008 period. The upper part of the noticeable “cycle” started in May 2008 followed by a sharp drop in August of the same year. This increasing trend continued also in the rest of 2008 during the period of worldwide liquidity stress. SKONIA volume development was deteriorating in the second half of 2008 (Fig. 4). After reaching its highest value of 7,084 in June 2008, it fell down to 2,248 in December 2008 indicating higher liquidity uncertainty in the Slovak financial market.

The indicator for market resiliency was defined for the money market as daily changes in the SKONIA index over a daily turnover. In general, the amount of daily trading volume should have a higher impact on the price under tightened liquid conditions on the market. In the observed period, the higher daily change of the SKONIA index with respect to the daily trading SKONIA volume, the more illiquid is the money market (Fig. 5). Market volatility was measured by 30-day historical volatilities calculated as a standard deviation from an average in each month. For the money market we used the SKONIA index, while for the

FX market we have chosen the exchange rate of SLK/USD.<sup>2</sup> Stock market volatility is defined by volatility in the SAX index. The more volatile is the indicator, the less liquid is the market.

Figure 3

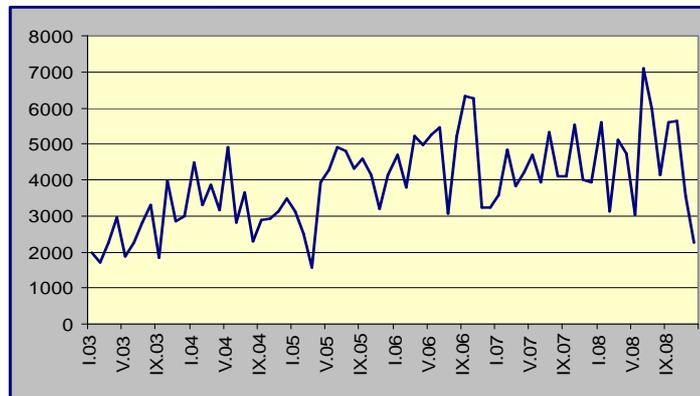
**Average Daily Trading Volume of Shares and Bonds in February 2004 – December 2008 (standardized –  $N(0,1)$ , monthly data from as standard deviation from periods' average)**



Source: Authors based on the NBS.

Figure 4

**SKONIA Volumes in January 2003 – December 2008 (monthly data)**



Source: Authors based on the NBS.

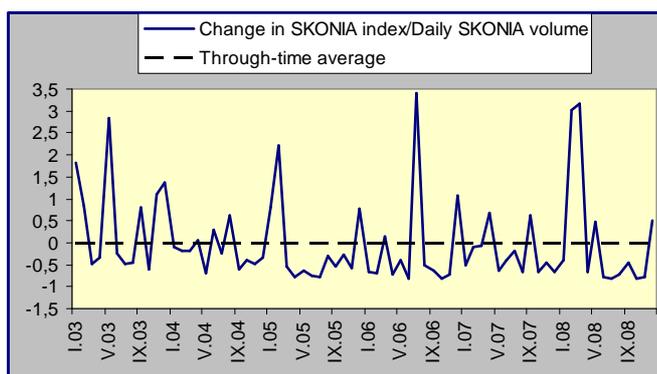
Figure 6 shows that the SAX index the index reached the record level of 478.97 in May 2005. However, during the time of liquidity stress the index plunged from 458.78 in August 2008 to 352.47 in December of the same year.

<sup>2</sup> Slovakia adopted Euro as of January 1, 2009, so we have opted for USD instead of EUR in order to some observe market volatility at the end of 2008.

On the other hand, volatility of the SKONIA index stood at the same level at that time (Fig. 7).

Figure 5

**Daily Changes of SKONIA Index/ SKONIA Volume in January 2003 – December 2008 (standardized –  $N(0,1)$ , monthly data from as standard deviation from periods' average)**



Source: Authors based on the NBS.

Figure 6

**The SAX Index in January 2001 – December 2008 (daily data)**



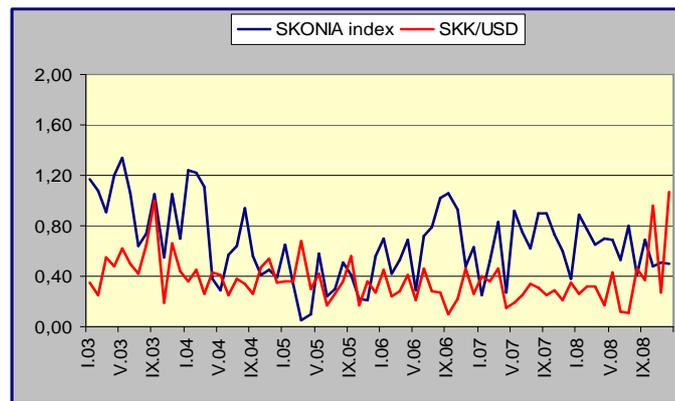
Source: BSSE.

We calculated liquidity premium for the money market as a spread between 2W BRIBOR and 2W REPO rate set by the NBS. The wider the spread, the higher a liquidity premium is requested and the market is less illiquid (Geršl and Komárková, 2009). Figure 8 illustrates that the spread in the Czech Republic are more steady than the one in Slovakia. At the end of 2008 the spreads moved in different direction in both countries, however. While the Czech Republic recorded a steep increase indicating lowering liquidity, the Slovak spread was falling

only slightly, which corresponds to the above-mentioned discussion on spreads on interbank markets (Fig. 2). Another reason might be connected with Euro adoption in Slovakia as of 1 January 2009, because in late 2008 Slovak REPO rates were already synchronized to the REPO rates of the ECB.

Figure 7

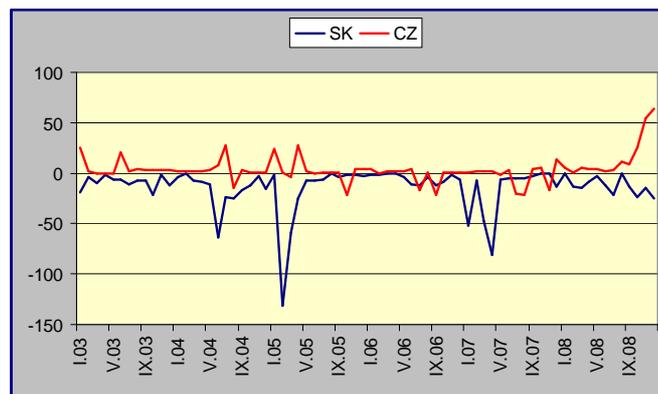
**30-day Historical Volatilities of SKONIA Index and SKK/USD and of the SAX Index in January 2003 – December 2008 (monthly data)**



Source: Authors based on NBS and BSSE.

Figure 8

**Spread between 2W BRIBOR and 2W REPO Rate (NBS) in Slovakia and spread between 2W PRIBOR and 2W REPO Rate (CNB) Jan 2003-Dec 2008, monthly data**



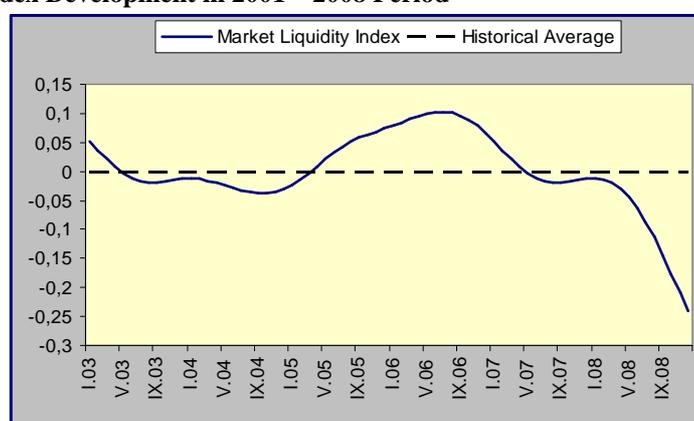
Source: Authors based on NBS.

In the last stage of our empirical analysis, we get a standardized time series for every market in the period of January 1, 2003 – December 31, 2008 through using the Hodrick-Prescott filter. After getting a smoothed time series, we applied Equation (1) and got an overall market liquidity index for the Slovak financial

market (VT index), defined as a standard deviation from historical average (Fig. 9). Evolution of the VT index looks very similar to the index for the Czech financial market developed by Geršl and Komárková (2009, p. 587). The VT index started to fall in the first half of the year 2008 and continued to fall after Lehman Brothers' collapse in September 2008. When comparing to the Czech market, Slovakia reported a smaller magnitude of decrease of the VT index, which corresponds to our previous findings.

Figure 9

**The VT Index Development in 2001 – 2008 Period**



Source: Authors.

However, due to limited data available, our research has been completed only until the end of the year 2008 and based on fewer indicators than used by Geršl and Komárková (2009), which may have affected our conclusions. When constructing the VT index, we assigned different weights for each market mainly due to the missing data for the Slovak bond market, which partially reverse the decrease of this index at the end of 2008. As a consequence, one could argue that the decrease of the VT index should have been a little stronger. The highest weight was put on the money market, where the fall in the index was mainly driven by higher bid-ask spreads and a fall in SKONIA volumes. The other factors decreasing the deterioration of the index were higher volatilities of the SAX index on the stock market and of the SKK/USD exchange rate on the FX market. Not surprisingly, the VT index decreased in 2008 indicating tightening liquidity conditions on the Slovak financial market. This fact implies a worsened liquidity situation in the Slovak market but does not imply that the market suffered by the crisis significantly (i.e. the liquidity situation in Slovakia was still manageable). On the other hand, the Slovak banking sector was resilient due to the relatively strong underlying macro-financial fundamentals of the Slovak economy.

This proves the fact that the Slovak financial market has not been strongly affected by the liquidity crisis in late 2008 (NBS, 2009), which was caused by several reasons. First, Slovak banks follow a conservative banking business model that results partly in holding a minimum amount of toxic assets and partly because of their strong focus on stable funding (demonstrated through a lower loan-to-deposit ratio of Slovak banks) and enhanced by a limited exposure allowed by their parent Western European banks. Second, Slovak banks have provided less FX loans to their clients than other CEE countries such as Hungary or Baltic states and recorded lower private credit growth than these countries in the pre-crisis period. Third, Slovakia did not report significant external macroeconomic imbalances in terms of current account deficit and government indebtedness. Last but not least, the Slovak market did not suffer huge liquidity problems as it is not heavily integrated in the global markets and therefore the global liquidity shortage was imported to Slovakia (i.e. the problem did not arise in Slovakia itself). All these four factors have contributed to the resiliency of the Slovak economy during the global turmoil and although market liquidity deteriorated, it did not cause unmanageable liquidity problems for individual financial institutions in Slovakia and no bank runs occurred.

## **Conclusion**

The pending global economic upheaval started as a credit crisis from mid-2007 until August 2008; later a liquidity crisis occurred from September 2008 until December 2008 followed by an economic crisis in 2009, a sovereign debt crisis in 2010 and a crisis of Europe since 2011. In this paper we focused on banks' liquidity risk management before and during the pending crisis. As a consequence of the liquidity crisis, liquidity risk management regulation needs to be revised. We see five main issues to be updated in coming years: liquidity measurement, intra-day and intra-group liquidity management, contingency planning and liquidity buffers, liquidity systems, controls and governance, and finally liquidity viable business models. However, we expect that proposed liquidity regulations are not sufficient and will not prevent financial markets from future crises due to their expected delayed implementation and strong pressure of banks' lobbyists.

We developed a new market liquidity index for the Slovakia (called VT index) based on the calculation of using traditional indicators of market depth, resiliency, tightness, volatility and liquidity for four markets (money, foreign exchange, bond and stock market). Evolution of the VT index looks very similar to the index for the Czech financial market developed by Geršl and Komárková (2009). The VT index started to fall already in the first half of the year 2008 and

continued to fall after Lehman Brothers' collapse in September 2008. On the other hand, the Slovak banking sector was resilient due to relatively strong, underlying macroeconomic fundamentals of the Slovak economy. This proves the fact that the Slovak financial markets per se has not been strongly affected by the liquidity crisis in late 2008, which was caused by several factors. First, Slovak banks held a minimum amount of toxic assets, partly because of the strong focus on a traditional banking business deposit-loan model and partly due to a limited exposure allowed by their parent Western European banks. Second, Slovak banks have provided less FX loans to their clients than other CEE countries and recorded lower private credit growth than most of these countries in the pre-crisis period. Last but not least, Slovakia did not report significant external macroeconomic imbalances in terms of current account deficit and government indebtedness. All these factors have contributed to the resiliency of the Slovak economy during the global turmoil and although market liquidity deteriorated, it did not cause unmanageable liquidity problems for individual financial institutions in Slovakia.

Despite the above-mentioned findings, there are still several ways in which our research can be improved. First, the research provided on other Central European countries may reveal interesting facts about different liquidity risk features among these countries. Second, a similar paper can be done on a larger sample of data (we used the monthly data covering the 2001 – 2008 period) and using more variables in dimensions in four markets. Finally, other research might include other econometric methods such as a panel data analysis and other related methods of analysis.

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