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Liquidity crisis in the inter-bank market, its implications and possible solutions

Written in April 2008; Revised in July 2008

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Year of study: Second (undergraduate)
Semester: Summer semester

Field of research: Financial management
Academic year: 2007/2008

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Acknowledgement

We would like to express our gratitude to Doc. RNDr. Ing. Ľudomír Šlahor,CSc for reviewing this work and discussing the current situation with us.

Introduction

The liquidity crisis, which emerged in late 2007, is in many aspects a completely new phenomenon, and a very dynamic one. Although it originated in the U.S., it has spread to Europe and throughout the world in a very short time. Nowadays, there are much more possibilities and ways to document the economic development as well as the movement in stock prices than there were in the past. However, surprisingly little has been written on the subject, probably because the crisis is still very recent and has not been fully contained yet. Nevertheless, having the unique opportunity to experience its effects, we try to examine this interesting phenomenon in this work.

Thus, the purpose of this work is to concisely outline and explain basic elements of the liquidity crisis of late 2007 that caused a credit crunch and was one of the factors that led to the stock market crash of January 2008. We also seek to explain the effects of these developments on businesses and financial markets. The third objective of this work is to analyze the solutions proposed by central bankers to contain the crisis, which are currently being discussed. Nonetheless, our ultimate goal is to construct this work in such a way, that it will be clear to understand both for students and for the broader public. During our analysis, we try to take into account all the publicly available data and information that has been published up to April 2008, as this is the time when we are completing this work.

PART I: Economic situation in early 2008

Since the outbreak of the liquidity crisis in the banking sector, a wave of pessimism has spread throughout the financial markets, gaining influence gradually. However, it has not been until recently, when both well-established theorists like Krugman, as well as experienced practitioners (e.g. Soros), started to sound the alarm [1]. Soros has even called the current crisis of the American economy “the worst one since the Great depression of 1930s” [2]. In this part, we will look at the causes of the liquidity crisis in detail and try to examine recent economic development in the U.S.

Four Dimensions of the crisis in the U.S. economy

According to the Merriam-Webster online dictionary, a crisis can be defined as „an unstable or crucial time or state of affairs in which a decisive change is impending“[3]. We have been able to identify four dimensions of what is being referred to as the U.S. economy crisis, namely:

- Crisis in the real estate market
- Economic recession
- Mortgage market crisis
- Liquidity crisis in the inter-bank market

The real estate market and mortgage market crisis

Crisis in the U.S. real estate market is closely connected with the crisis in the mortgage market. Actually, the whole system of mortgage lending that was in place until 2007 seems very dubious. The most important factors that caused the mortgage market crisis were lenience, excessive risk taking or sometimes even outright fraudulent behavior of the mortgage lenders [4]. The loans were awarded to practically everyone, often also to people with poor payment histories (so called subprime mortgages). As far as the real estate market kept growing, the banks issued mortgages sometimes exceeding the value of the property. Besides, the lenders were also often small brokerage-type companies, which had substantial incentives to issue as many loans as possible, regardless of the risk. Subsequently, they were able to almost immediately securitize them in form of mortgage-backed securities (MBSs) and sell them to investors, usually banks or pension funds. MBSs are debt obligations that represent claims to the cash flows from pools of mortgage loans. Mortgage loans are purchased from banks, mortgage companies, and other originators and then assembled into pools by a governmental, quasi-governmental, or private entity. The entity then issues securities that represent claims on the principal and interest payments made by borrowers on the loans in the pool, a process known as securitization[1] [5].

The most significant type of MBSs are so called Collateralized debt obligations (CDOs). CDOs are very sophisticated special investment vehicles. Essentially, a CDO is a corporate entity constructed to hold assets as collateral and to sell packages of cash flows to investors [6]. These entities are often managed by professionals from asset management departments of major investment banks. These consist of mortgages, obligations or other asset-backed securities. The managers sell obligations to investors, who will thus participate on the cash flows from the portfolio. Generally, there are several levels of these obligations. The safest (senior notes) carry the smallest proportion of interest. Then, there are so called junior notes, which carry medium risk and medium interest. The riskiest way to invest in CDOs is to invest via the equity notes that carry the highest interest. In case of a default, first the claims of senior bond owners will be accommodated. Subsequently, from the remainder, the claims of junior notes holders and finally, in case that enough money is left, those of the equity notes holders will be fulfilled. This implies that the riskiest way to invest in CDOs was to

[1] For illustration, see the schemes in apendix 4.

purchase the equity notes. Nevertheless, many banks have invested in these securities in prospect of higher returns.[2]

Some banks went even further and issued “second mortgages” for the home-owners, which were subordinated to the first mortgages (i.e. in case of a foreclosure, first the main mortgage was paid and only then the second)[3]. Because of the complexity of ownership structure (funds buying banks that were buying CDOs), many of the investors were completely unaware of the risks posed by these securities. Further, there was a significant amount of free capital, owned mostly by oil-exporting countries, which had to be invested [7]. This excess capital caused the risk premiums to decrease significantly in 2007.

Despite the use of very sophisticated measures, even the rating agencies have failed to forecast the danger embedded in these securities, providing incorrect risk assessments of many MBSs. [8][4]. Furthermore, many Americans took loans purely for speculation purposes, anticipating an increase in price of the property.

Due to the flaws discussed above, it is only logical that after the FED increased interest rates, many of the borrowers were unable to pay their loans and defaulted[5]. This has led to many foreclosures with the properties selling on public auctions. As the mortgages became less available due to higher interest and the supply of housing increased dramatically, the prices of real estate in many U.S. states fell sharply. However, prices in a few states have not been affected yet [9].

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2 Some banks have even invested in so-called “CDOs square”. CDOs square are Special Purpose Vehicles similar to CDOs, with the only difference that they do not securitize pools of mortgages, but tranches of other CDOs, instead. This is a system similar to a fund of funds that was intended to provide massive diversification. However, it is virtually impossible to evaluate risk exposure of such an investment vehicle. Warren Buffett estimated that in order to do this, the analyst would have to read approximately 750 000 pages of materials, which is by no means possible [46]. Hence, these instruments can only be viewed as a wild bet on the general mortgage market trend, which, obviously, went very wrong.

3 For further discussion on lending standartds, see Dell’Ariccia,G. ; Igan, D.; Laeven,L.: Credit booms and lending standards: evidence from the subprime mortgage market

4 For example, Moody’s awarded the highest rating, AAA, to several risky structured products due to a computer bug in their models. In fact, the ratings should have been lower by 4 grades [47].

5 This is because of 2 factors: First, many mortgages offered smaller interest rates for the first year and then increased, or carried a variable interest rate, which had to reset every year according to FED rates. Hence, the monthly payments for many borrowers have increased significantly.

The economic recession

There are currently (in April 2008) several signs suggesting that the American economy has slipped into a recession. Among the most important are the earnings reported by U.S. Companies that are usually lower than expected. The main factors, which caused this negative development, are the pessimism of the Americans, who have significantly cut their spending, as well as the decline of the construction industry due to the real estate market crisis [10]. Moreover, the banking sector is facing serious problems, what makes the loans for both businesses and individuals less available.

Another serious concern is the increasing prices of food and oil, which will have an especially strong impact on the U.S. due to the ongoing weakening of dollar. Combined with continuing involvement in the Iraq campaign, these developments create serious inflationary pressures. Combined with the current economic slowdown, the situation could potentially evolve into stagflation [11]. Stagflation is a combination of slow economic growth or decline and rising prices. It was witnessed in the U.S. in 1970s, as an effect of the Vietnam War and Oil shocks and had serious impact on the welfare of American citizens [12].

The liquidity crisis

After the real estate bubble started to burst in 2007, many banks realized that some of their assets were likely to be affected by the crisis. The market with mortgage-backed securities has become totally illiquid in autumn 2007. Several banks started to announce write-downs as well as to adjust their profit estimates for future years. Among the most affected were the American banks Citigroup, Meryll-Lynch and Morgan Stanley, but also the European banks UBS AG and HSBC [13]. Most of these institutions are big, well-established investment banks, but also some smaller regional banks (Bayern LB), insurance (American International group) and reinsurance (Swiss Re) companies got involved[6].

6 For details see Appendix 1.

The write-downs have provoked feelings of anxiety and fear across the financial markets. The overall liquidity of the financial markets has decreased significantly[7]. According to the estimates, losses of totally $ 400 billion worldwide were expected in November 2007 [14][8]. Although this amount is much smaller than the equity of the banks, fears about possible liquidity problems started to emerge in autumn 2007. In this period, it was very complicated to figure out, which particular banks were deeply involved in the subprime mortgage securities market and could be facing the threat of bankruptcy.

The fears were accompanied by a steep rise in the inter-bank interest rates, e.g. LIBOR (see Appendix 2).[9] Because the banks anticipated difficult times, they demanded much higher risk premium for their loans. Thus, the credit became hard to obtain for banks and they had to pass the burden of higher interest on to their customers. They also became reluctant to finance long-term business projects, what could have a significant impact on the companies. Hence, the mortgage and consumer credit rates rose sharply and the requirements for providing a loan tightened as well [16]. This state of late 2007 is by some theorists referred to as the credit crunch [17].

The increased rates, although only temporary, could have been one of the major causes of the possibly upcoming recession in the U.S[10].

7 See the Financial markets liquidity index according to BoE in Appendix 6 (Figure 14).

8 Since then, the estimates have increased to $ 1 trillion [15].

9 Some concerns have been expressed recently, according to which the LIBOR was not a reliable indicator of the inter-bank interest rates. According to some bankers, the banks are reluctant to report the true costs of their borrowing due to the fear of negative reactions by the stock market. Thus, the LIBOR may be undervalued [48]. If this was the case, it would constitute a major market deformation, as many traders follow this benchmark very closely. Hence, some analysts suggest replacing this indicator, which determines the relative payoffs of many derivatives, by other measures, such as the Overnight indexed swaps [49].

10 The rates have decreased shortly after the FED cut its prime rate.

PART II: Effects and implications of the liquidity crisis

Effects on the banking sector

Banking has been the industry most affected by the crisis in the U.S. Besides the huge write-downs and abundant losses, the trustworthiness of banks has been shattered. Many investors blame the bank executives for being too greedy and investing into assets regardless of their risk. Some executives are also being blamed for not reacting quickly enough to the crisis, or, like in the case of Hypo Real estate, for withholding important information and trying to earn profit based on it[11]. These practices became possible as in some countries; the banks can use sophisticated off-balance sheet vehicles or subsidiaries to invest into risky securities [19][12]. Such behavior has increased concerns of the investors even more, and combined with other factors, has ultimately led to a steep fall in stock prices of the financial institutions. This situation constitutes, especially for smaller banks, a potential risk of acquisition by their larger competitors or hedge funds.

Concerns about the financial stability of banks as well as of their trustworthiness have caused the fall of British mortgage lender Northern Rock in September 2007, which is considered the first victim of the liquidity crisis. In case of Northern Rock, rumors started to spread around the market about its possible bankruptcy declaration, not long after the bank announced its subprime write-downs. This caused panic among the bank’s customers and triggered a classic “run on the bank”. The bank was forced to declare insolvency within days and called for help to the Bank of England.

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11 The german bank Hypo real estate has consistently denied any involvement in the subprime securities. Later, on january 15, 2008, it announced a write-off of 390 million euro. Consequently, the share of H.R.E. fell by nearly 30 % in a few hours. Company’s management immediately stepped in and bought shares cheaply in large volumes [18].

12 Some banks, including Citigroup, have been accused of dubious accounting practices. For example, Citigroup has consolidated all of its mortgage-related assets into one SPV-type subsidiary and thus removed them from its balance sheet, making them invisible for the investors. Such practices bear a strong resemblance to the ones applied by Enron. Merill-Lynch and UBS have employed similar accounting techniques [50].

The central bank stepped in and provided the necessary cash. Northern Rock was later nationalized and is currently waiting for a buyer [20].

Another prominent victim of the liquidity crisis was the fifth biggest American investment bank, Bear Stearns. The bank, without any previous warning, has declared bankruptcy in March 2008 and called for FED as the lender of last resort. FED has promptly arranged a deal with JP Morgan Chase to provide a short-term loan to provide liquidity. After the deal, JP Morgan Chase proposed a deal to buy Bear Stearns shares for $ 2 per share, causing the share price to plummet by 70% in two days.[13] The fall of such a big bank, that was unthinkable a few years ago, has caused even greater uncertainty in the financial markets as well as even higher decrease in consumer spending [21].

As the mentioned flaws begun to unfold, a lot of banking executives had to face pressures and calls for their dismissal. At least three major bank CEOs had to step down due to the involvement of their companies in the subprime business. These were Charles Prince of Citigroup, Stanley O'Neal of Merill-Lynch and lately Peter Wuffli, the CEO of UBS. Moreover, most banks are preparing major cuts in their workforce, especially in their investment banking divisions. The number of lay-offs throughout the sector only in the U.S. has been estimated on 200 000 [22].

Finally, the last important effect of the crisis is worsening of the ability to raise additional capital by issuing new shares. Investors are very careful about the bank stocks nowadays, as they suspect additional unpleasant surprises could be hidden in the banks' balance sheets. Therefore, many banks have to rely solely on borrowed money to ensure liquidity. Nonetheless, some major banks like Citigroup, Lehman Brothers or UBS have shown that they have no problems raising additional cash[14] via new stock emissions [23].

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13 After encountering resistance by the Bear Stearns'shareholers, JP Morgan Chase had increased its bid to $ 10 per share, which was later accepted.

14 The stock price of these institutions has responded immediately and rose substantially after the news.

Effects on the stock market

The events mentioned above have caused significant uncertainty among investors. This uncertainty has manifested in the increased amounts of volatility on the stock market, which did not concern only the banking stocks, but affected also other sectors. However, empirical evidence suggests that banking became after august 2007, and has remained until April 2008, the most volatile sector on the market[15]. Despite the loss of value in major stock indices (DAX, Dow Jones, NASDAQ), which followed the outbreak of the mortgage crisis, these indices were able to rally in winter 2007. Nonetheless, it was a complete surprise for many investors, as the prices tumbled by almost 20% in January 2008. For example, the German index DAX has suffered the biggest loss in its history [24]. The other indices did not do much better, either. The bank stocks were affected most, because they were the most volatile and sensitive component of the market. Due to severity of the losses suffered in January 2008, we believe that this period will be in the future referred to as the stock market crash of 2008.

A significant factor, which could have triggered the fall of stock prices, was, strangely enough, the interest rate cuts conducted by the FED. These cuts have caused the dollar to depreciate and thus caused losses to foreign investors owning U.S. shares. As the FED kept decreasing the interest rates and continued to express its readiness to continue the trend, many investors started to pull their money out of the U.S. economy, in order to avoid the exchange rate risk. This explains the decline in bond prices immediately after interest rates cut, the decline in stock prices a few days later as well as the massive depreciation of Dollar.

Since the crash in January, the stock prices have rallied a little, but the rise has not been too significant[16]. Although the government officials in the EU had been con-

15 For example, see the Appendix 3, where development of various stock indices is depicted. Clearly, the KWB banking index has lost in the last year the most of its value (approximately 35%), whereas the losses of other indices reached roughly 20%.

16Later, throughout June and July, they fell even deeper, leading many analysts to the belief that another bear market began.

tinuously declaring that the economy had been in a good shape and the companies were reporting increasing earnings, the stock prices did not increase significantly. This phenomenon can have various reasons. We believe that the main reason is uncertainty about future earnings of the companies. Pástor and Veronesi have proven that uncertainty about future profitability can increase the stock price of a company [25]. The current market situation suggests that the uncertainty about future profits can also decrease the stock price, if the expectations of the market are negative[17]. These expectations were probably also influenced by the negative economic outlook in the U.S.

Effects on hedge funds

Hedge funds are usually closed mutual funds, whose managers enjoy much discretion at their investing decisions [26]. They invest both in the stock market and in the market with derivative securities. Although hedge funds belong to the biggest investors in the financial markets (their overall assets are estimated at $ 2.68 trillion [27]), they are relatively unregulated. This arrangement poses significant threats, because hedge funds usually do not invest only their own money, but rather buy stocks on margin, with leverage ratios sometimes as high as 100:1. Using this tactics, the managers can earn significantly higher profits, but in times of market decline, they often face serious losses.

When buying stocks on margin, hedge funds are subject to a procedure called "marking to the market", in which the current market value of their securities is daily assessed. The underlying logic is this: if they buy on margin, they have to deposit a certain sum of money in cash or risk-free securities as collateral at their broker, in order to obtain the loan, which they later invest. This sum is set as a percentage of the value of securities purchased. Thus, if the value of its securities declines, the hedge

17 We do not prove this hypothesis quantitatively here, as it is beyond the scope of this work. However, this could be an interesting subject for future research.

fund is called to deposit additional cash. If it does not do so, the broker closes its positions, repays the loan and then hands out the remainder back to the hedge fund.

Hedge funds can substantially shatter the stability of the financial markets. This was particularly true in the case of the LTCM[18], which had to be saved from bankruptcy by the FED in order to prevent collapse of the whole financial system [28].

Although there is very little information available on the current situation of hedge funds, some practitioners believe that a lot of them are going to collapse in 2008 as a result of the stock market decline [29]. This suggests that the crash of January 2008 could have been triggered by forced sales of assets of those hedge funds, which failed to meet the margin requirements. However, there is too little evidence on the matter to draw any conclusions.

Effects on insurance companies

Most general insurance groups have not been very affected (except for their share price) by recent crisis. However, there are insurance companies, which have dealt with bond insurance and sometimes have even insured the mortgage-backed securities. These companies have incurred great losses lately and some of them are on the verge of bankruptcy. For example, two major bond insurers, MBIA and AMBAC, had to be saved from bankruptcy by a loan arranged by major investment banks[19] [30].

Anyway, these banks did not arrange the loan as an act of sheer philanthropy. Rather, they did it to calm down the markets, as well as their own stakeholders (as these banks were the major customers of MBIA and Ambac). If the insurers went bankrupt, the banks' ratings would probably be downgraded due to the lack of hedging of their positions.

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18 Long Term Capital Management, a hedge fund led by several Nobel prize winners, collapsed in 1999 as a result of speculating in the bond market while buying on margin.

19 Wachovia corp., UBS, Barclays, Societe Generale, Citigroup and others.

According to our meaning, major insurance companies are unlikely to go bankrupt until the liquidity crisis persists, as the banks would immediately step in to rescue them in order to prevent any further negative effects .

Consequently, some investors consider the bond insurance business a very profitable investment. For example, Warren Buffet bought a stake in Swiss Re, a bond re-insurer company, through his company Berkshire Hathaway in January [31]. He has also offered to reinsure municipal bonds worth $ 800 billion [32].

Implications for bankers

In our point of view, the most important thing, which the bankers should concentrate on, is rebuilding the trust and confidence towards their partners and investors. This confidence was disrupted by the involvement in the subprime mortgage business, as well as by the hesitant and often misleading announcements of information. Moreover, sending senior executives away with more than generous retirement packages[20] and distributing bonuses while reporting losses, does not boost the investor confidence, either. Because of their involvement in the subprime business, the banks will have to lay-off tenths of thousands of employees and cut some of their operations, sometimes even the profitable ones [34].

Hence, the implications of this crisis for bankers are to improve Investor Relations as well as the risk management of their portfolios. Additionally, the banks are urged to review their credit issuing requirements in order to avoid issuing risky loans. According to our meaning, stricter requirements for borrowers can significantly mitigate the risk of future crises similar to the one of 2007.

Finally, bankers ought to review their liquidity management procedures as well, in order to be better prepared for liquidity crises that can emerge in the future [35].

20 For example, after his dismissal, Merill Lynch CEO Stanley O’Neal has received a retirement package of $ 161.5 million, leaving the company with an 8-billion subprime related write-down [33].

Implications for non-banking executives

For Non-banking companies and their executives, the depreciating dollar is currently the most serious problem. During the last year, USD has, as an effect of the subprime crisis and subsequent cuts in U.S. interest rates as well as the increasing deficit of the balance of trade, depreciated by nearly 20% against the EURO[21]. Particularly the European companies exporting into the U.S. suffer from this development.

However, the short-term exchange rate fluctuations can be overcome by exchange rate hedging (e.g. by buying financial derivatives such as forwards, futures or swaps, which specify the exchange rate of a future transaction). Nevertheless, a company cannot hedge against a continuous trend in the exchange rate development for the long term, as most of the financial derivatives have the maturity not exceeding a few months and their forward prices are being continuously adjusted.

On the other hand, the depreciating dollar can be advantageous for the American companies exporting to Europe. This could lead to a partial revival of the U.S. economy.

Another important implication stems from experience of the credit crunch. After the first write-downs, as the LIBOR increased significantly and the banks started to have problems with liquidity, the interest rates for companies increased steeply, too. Such a state is referred to as the credit crunch. This situation was particularly troublesome for companies that did not have much net working capital at their disposal. Therefore, they had to take short-term loans for high interest. Hence, another implication of the liquidity crisis and the credit crunch for the non-banking companies is to maintain certain level of net working capital in order to be prepared for such periods. Moreover, for the time of liquidity crises, the companies should not take on excessive debt, as they could become dependent on their lenders.

21 For additional details, see Figure 5 in the Appendix 3.

Implications for investors

Recent decline in stock prices constitutes an opportunity to buy stocks of blue chip companies significantly cheaper, while (at least in Europe) maintaining almost the same level of earnings and economic condition as before. This is an ideal time to buy stocks especially for value investors[22]. Nevertheless, our recommendation for the investors is to act according the "buy what you know principle", as not all companies are in equally good situation. Therefore, we recommend the European investors to concentrate on European stocks, as the chances of negative economic development are smaller in this region and the necessity to hedge against depreciating dollar falls off in this case. However, attention should be paid to the European companies that conduct a part of their business or export their goods in the United States, as the strong EURO is likely to cause problems for these companies. Regarding the banks, we advice to the small investors not to invest in this field, unless they possess a significant knowledge of the current situation and have a vast experience in this field. [23] Nonetheless, some of the banks have probably the biggest potential for above-average returns. However, these are more than matched by the high risks that these investments carry.

As the market development in the next few months is very hard to forecast and most of the investors do not possess the ability to time the market [37], we think that using the "dollar cost averaging" method would now be the most appropriate way to invest. This method suggests that rather than investing all his funds at once, the investor should invest small portions of his fortune in regular intervals, spread between sev-

22 Value investors are investors who concentrate on the fundamental value of the company and buy its assets for the long term. These investors seek to find stocks undervalued by the market, in order to buy them cheaply and gain substantial profits later [36]. Famous investors like Warren Buffet or Peter Lynch are known for adhering to the principles of value investing.

23 In the current environment, the investors cannot rely on the traditional measures of financial analysis, such as earnings growth, P/E and PEG ratios and others, as reported in the financial statements issued by banks. This has two reasons, the first being off-balance sheet accounting, which is often used to understate losses. The second reason is complete unreliability of the gains reported. Due to the mark-to-the-market accounting method, which is legal by GAAP, the banks can treat decline in price of the bonds issued by them (that was, practically, caused by a decrease in their credit ratings and thus their trustworthiness) as a gain. Hence, from the investor's perspective, the banks clearly overstate their earnings [51].

eral months. Such a practice is very effective in the times of high uncertainty about the stock market development in the near future, as it significantly reduces the investor's exposure to the market risk[24].

PART III: Measures undertaken or considered to solve the crisis

Interest rate cuts

Since the outbreak of the mortgage market crisis in august 2007, Federal Reserve System has decreased its key interest rates from 5.25% to 2.25 %, cutting the rates gradually (totally 6 times)[25]. Especially surprising were the cuts performed in late January 2008, cutting the rate by 1.25% within two weeks, which were a reaction to the adverse developments in the stock market. Moreover, the FED has also decreased its margin requirements on the loans provided. Thus, the FED still accepts also the long-term CDOs with AAA ratings and lends for them as much as 90% of their par value [38]. Thus, the expected amount of cash provided by FED to the U.S. banking system is estimated at roughly $ 200 billion [39]. Although this tactics was successful at bringing a temporary liquidity to the inter-bank market and thus prevented the occurrence of crises like Bearn Stearns or Northern Rock, it has still been unable to solve the most important problem, namely to remove suspicion and uncertainty from the financial markets. On the contrary, this policy caused the dollar to depreciate, which raised even more concerns among foreign investors and caused many of them to close their U.S. positions.

Similarly, the Bank of England, started to decrease the interest rates as well. Despite the cuts being significantly smaller than those in the U.S., the effects were very similar. Although the interest rates for businesses and consumers were reduced

24 By having to invest in small parts, the investor is partially protected from sudden stock slumps, but he also loses the potential gains.

25 For further details, see table 1 in Appendix 5.

slightly, the risk premiums in the inter-bank lending remained significant. The stock market remained cautious, experiencing only very limited gains.

On the other hand, the European central bank has refused to cut its rates due to the inflationary pressures, which caused accusations of inactivity. Besides, the European banks have not been so deeply involved in the crisis. Nevertheless, the necessity to decrease the rates may emerge shortly, as the depreciating dollar impacts the export industries.

Recent development suggest that interest rate cuts alone, no matter whether large or small, cannot solve the current crisis and remove the uncertainty from the financial markets. In addition, they may trigger strong inflationary pressures. Hence, some additional actions are needed.

U.S. economic stimulus plan

In February 2008, U.S. president George W. Bush signed the Economic stimulus Act after both the congress and the senate approved it. According to this act, approximately $ 150 billion[26] will be injected into the economy in form of tax rebates in order to boost consumer spending and thus repel the risk of a recession [40]. The tax breaks are supposed to create incentives both for individuals to increase spending and for businesses to invest their money into new equipment. However, Krugman suggests that this plan will probably not work, as the most tax breaks are going to be granted to social groups with the highest income, whose buying habits are not determined by size of their latest paycheck [41]. Moreover, many members of the low-income group will probably save the extra money obtained because of fear of a coming recession and possible unemployment. Hence, the effects of the economic stimulus plan are very hard to foresee.

26 This amounts to 1% of U.S. GDP.

Buyout of risky securities by the central banks

After the collapse of Bear Stearns, a wide discussion has started between the central bankers and bank executives about the possible solutions of the liquidity crisis, as the interest rate cuts proved to be insufficient. One of the ideas suggested was buying out all the mortgage securities at risk by the central banks [42]. This procedure could overcome the pessimism and fears of the financial markets and bring the situation on a stable level. However, this solution embodies three problems. Firstly, the inflation level, which is already on the rise, would increase even more. Secondly, if this solution would be taken, central banks of all the affected countries would have to agree on a common course of action[27]. An unanimous consensus of all concerned is thus highly improbable. Finally, this course of action would create a precedent and inspire the banks to take on excessive risk in the future, while relying on a central bank bailout. Moreover, it would help the banks with poor risk management, whereas their counterparts with sound risk policies would not get any compensation for their prudence. Hence, this plan is very unlikely to be put into practice.

Mortgage securities swap

The Bank of England has recently decided to provide a swap of mortgage-related securities for UK treasury bills in total worth of £ 50 billion for the British banks within the next 6 months [43]. For the swap, BoE will accept mortgage-backed securities with the highest rating (AAA), senior CDO tranches and corporate bonds as well. After entering the swap, a commercial bank will be subject to marking to the market (reviewed daily by the BoE)[28], whereby its solvency at the swap's maturity date will be ensured. In case the assets swapped for bonds drop in value, the commer-

27 This concerns at least the Bank of England, FED, Swiss central bank and the European central bank, which consists of 15 countries.

28 Like if the bank was investing on margin.

cial bank will be called upon to deposit additional collateral. However, there are doubts about the possibility to assess the value of mortgage-related securities, as there is currently no functioning market to establish the market price and even the most sophisticated financial models will most probably fail to take into account all the factors that influence the instruments' prices.

Subsequently, three years after the initial transactions (i.e. at the time of maturity), BoE will return to the commercial bank its mortgage-related securities (or the proceeds from them) and the commercial bank will return the treasury bills to the BoE plus pay a fee charged for the transaction by BoE[29] (a scheme of all transactions is depicted in Appendix 7).

We strongly believe that the Bank of England's solution is the best one that has been proposed to deal with the liquidity crisis. By temporarily swapping the risky securities for considerably safer and more liquid UK treasury bonds, the banks will have enough liquidity to weather any short-term market fluctuations that could arise. As the banks' liquidity increases, their reluctance to borrow funds to other banks or businesses will probably either disappear or lessen significantly, making credit more available for both companies and individuals. We believe that the investors shall also react positively, as the swap has the potential to calm down fears on the financial markets. The major argument for this is the fact that the probability of a sudden bankruptcy declarations like in cases of Bear Stearns or Northern Rock will diminish due to increased liquidity.

Moreover, we believe that this solution is also just for the society, because in all other cases (interest rates cuts, MBSs buyouts), the costs would ultimately be paid by the state, and thus by all taxpayers. However, in this case the losses will not be covered by the state, only postponed for later to give the banks time to recover. Hence, they will be carried by the banks' owners, what seems to be the most socially acceptable alternative, as they had earned above average profits on the risky mortgage investments before the subprime crisis emerged.

29 The interest charged will be the spread between the 3-month London Interbank interest rate (Libor) and the 3-month interest rate for borrowing against the security of government bonds, subject to a floor of 20 basis points [44].

Nevertheless, it is not known whether the 3 years swap guaranteed by the Bank of England will provide enough time for the banks to recover from their losses.

Part IV: Possible impacts on the Slovak economy

Fortunately, the Slovak economy, as well as all new EU-member states, have not been significantly affected by the liquidity crisis yet [45]. This claim is supported by the development of Bratislava Inter-bank Offered Rate (BRIBOR)[30], which has fluctuated in a narrow range and has shown substantially higher stability compared to LIBOR and other inter-bank rates. This progress was supported by strong economic growth as well as by the fact that the banks in Slovakia did not buy U.S. mortgage-related securities and have been maintaining significantly higher credit requirements for their clients than their American counterparts. Thus, the risk of liquidity problems within the Slovak bank sector seems to be negligible.

Nevertheless, many of the Slovak banks are likely to be affected by the crisis indirectly, because they operate as subsidiaries of foreign banks that are involved in the crisis and often face liquidity problems. Hence, some Slovak banks may be forced to restrict their lending activities for certain period of time and submit their free capital to their parent companies. However, the scope of these activities remains difficult to assess.

Nonetheless, there is another phenomenon that is expected to influence Slovak businesses, which export goods to the U.S, namely the interest rate cuts conducted by the FED, which were a direct effect of the liquidity crisis and have caused the depreciation of dollar. This constitutes a difficult situation particularly for the automotive industry, which is strongly export oriented.

[30] See Figure 13 in Appendix 5.

Further, the rising prices of oil and food on the international markets are very likely to increase the inflation level within the economy. However, this should not endanger the euro adoption, as these developments have a worldwide impact and as such are not likely to affect Slovakia's ability to fulfill the Maastricht criteria.

Still, in case Slovakia is successful to adopt euro as its new currency, the banks will be able to borrow money from the central bank for the rates valid in the euro zone. Moreover, the BRIBOR will probably also adapt and converge to the other major inter-bank interest rates in Euro. Therefore, we believe, that after the euro adoption, the liquidity crisis can influence the Slovak economy via changes in interest rates (in case the ECB decides to do so because of the lack of liquidity by major western banks).

Conclusion

Nowadays, in April 2008, the liquidity crisis is still a serious issue regarding the banking industry. Despite all the actions of the central banks, it still has not been completely contained. However, we are quite optimistic about future development in this matter, as new and very promising solutions are being implemented (especially the BoE's swap scheme).

In this paper, we have analyzed the causes of the liquidity crisis, its effects and its potential impacts on particular economic subjects. Due to the lack of literature available on the topic, we had to base our research mostly on publicly available articles from the press. Nevertheless, we believe we have constructed a concise and a rather clear picture both of the current situation and the past events. Moreover, we have analyzed the possible solutions of the crises and elaborated some implications for various parts of society. Finally, we have also briefly discussed possible effects on the Slovak economy, which, as it seems, are not very significant, at least in the short run.

However, the topic discussed in this work offers much more space for further research. Focusing on the development of stock prices and their reactions to various events and news during the crisis period would be especially interesting. Nevertheless, such research would require much endeavor and if it aimed to use some quantitative methods, it would be both tedious and very time consuming. Hence, conducting such a research remains a big challenge for the future.

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List of abbreviations:

$ - United States Dollar

£ - British pound

BoE – Bank of England

BRIBOR – Bratislava Inter-Bank Offered Rate

CDOs – collateralized debt obligations

ECB – European Central Bank

FED – Federal reserve system

H.R.E – Hypo Real Estate

LIBOR – London Inter-Bank Offered Rate

LTCM- Long Term Capital Management

MBSs – Mortgage-backed securities

SPV – Special Purpose Vehicle

U.S. – United States

USD - United States Dollar