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FLUCTUATIONS IN BANKING SECTOR LIQUIDITY AS A SYMPTOM OF FINANCIAL INSTABILITY – SELECTED CONCLUSIONS BASED ON AN ANALYSIS OF THE BANKING SECTOR IN POLAND

1. Introduction

A bank's liquidity may be defined as "its ability to settle its liabilities in a timely manner and to obtain funds to finance an unexpected withdrawal of deposits, and its ability to generate a positive cash flow in a specified time horizon"[1]. This definition concentrates on the concept of current liquidity, but touches only indirectly on the problem of the term structure of assets and liabilities, the relationship between which affects funding liquidity, which is also defined as structural liquidity. This second kind of liquidity appears to be as important as the ability to settle current liabilities without disruption, because it is *de facto* what guarantees a bank's continuing activity. The liquidity problems of an individual financial institution and the liquidity of the market are intermingled, since market shallowness limits the possibility of selling assets in a relatively short time at a price that can be considered fair value. Markets are liquid if transactions undertaken by a given institution do

[1] Recommendation P on Monitoring Banks' Financial Liquidity, National Bank of Poland, Commission for Banking Supervision, Warsaw 2002.

not have a significant effect on the present and future price of an instrument[2]. The difficulty in realising assets and securing deposits from non-financial entities pushes banks towards the interbank market – the ability to secure funds there is associated with funding risk. The purpose of this article is to present the conditions in which liquidity is managed at the level of an individual bank, and the mutual relations between individual liquidity and the liquidity of financial markets. It also aims to demonstrate that fluctuations in the liquidity of financial markets are among the most important symptoms and consequences of financial instability. The background to the observations, which relate for the most part to the situation on the Polish interbank market, is the events in financial markets in the second half of 2008, resulting out of the subprime crisis on the American market. The article has been structured to achieve the objectives set out above. The starting point for these considerations is a definition of financial stability, emphasising individual and systemic liquidity as a condition of its preservation. The subsequent section is devoted to individual liquidity and its management, and then a section looking at the Polish market, presenting determinants of the liquidity of the banking sector and the role of the central bank in building confidence and liquidity.

2. Financial Liquidity as a *sine qua non* of Financial Stability

When applying a definition of functional financial stability, a financial system can be deemed stable if "it properly performs its basic functions, which means that it assures:

- an efficient flow of funds between its participants,
- the correct valuation of assets, and
- safe and efficient payments"[3].

Financial stability is listed among the objectives of the National Bank of Poland, which is charged with securing the liquidity, efficiency and safety of the payment system in the course of performing its regulatory, supervisory and operational functions[4]. This approach lies within the second part of the definition of financial

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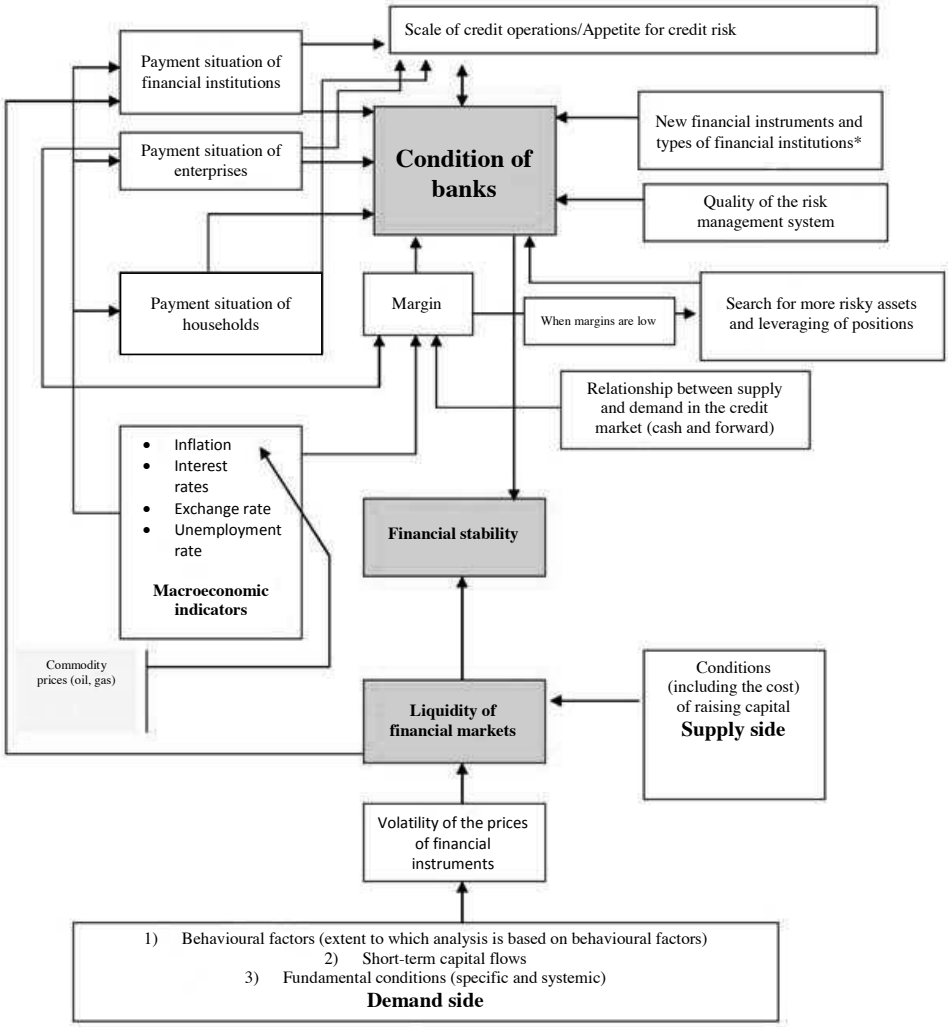
[2] G. Hałaj, *A Survey of Methods of Researching Banks' Liquidity*, "Bank i Kredyt" No. 07/2008, p. 16.

[3] O. Szczepańska, P. Sotomska-Krzysztofik, M. Pawliszyn and A. Pawlikowski, *Institutional Conditions for Financial Stability on the Basis of Examples from Selected Countries*, NBP Materials and Studies, Workbook No. 173, Warsaw, April 2004, p. 84.

[4] National Bank of Poland Operational Plan for 2007–2009, National Bank of Poland, Warsaw, January 2007, p. 7.

Figure 1. Interactions between the condition of the banking sector and the liquidity of financial markets and financial stability – potential sources of danger



* In particular this applies to hedge funds and to threats to financial stability arising from their redistribution of the credit risk Source: Own findings on the basis of Financial Stability Review, European Central Bank, December 2006.

stability, which is defined by an institutional-infrastructural concept in light of which the financial system is stable if the following conditions are met:[5]

- the key institutions of the financial system are stable,
- the financial infrastructure operates without disturbance,
- the key markets are stable, which means that transactions can be concluded in them at prices reflecting fundamental factors.

Both the functional and the institutional-infrastructural definitions stress the liquidity of individual financial institutions and of financial markets as necessary conditions of financial stability – without liquidity it is difficult to talk of the correct valuation of assets, the good condition of the banking sector or the effective allocation of resources. Figure 1 presents the interdependence between the economic-financial condition of the banking sector, its liquidity, and financial stability.

3. Management of a Bank's Liquidity – a Microeconomic Approach

Adequate liquidity is undoubtedly necessary for the correct and safe functioning of a bank, but unconditionally maximising it cannot be an objective. Liquidity stands in opposition to profitability, which is a function of banking risk, including liquidity risk. The essence of a bank's mission is the transformation of maturities. It is thanks to banks that it is possible to achieve contradictory purposes: the priorities of depositors, who are generally unwilling to deposit funds for long periods (and at any time have the option of breaking a deposit) and the purposes of borrowers, who feel a need for permanent financing by credit on a part of working capital, and also present a demand for the long-term financing of investments from external funds. It is thanks to the transformation described above and to the limitation of credit risk that banks earn their income – this is greater the longer funds are invested, which leads headlong into an conflict between the pressure to maximise liquidity and an orientation towards maximising income. The process of managing a bank's liquidity is similar in its sequence of mechanisms to the management of other risks. One may distinguish:

- the identification of the liquidity risk (definition of liquidity and of threats that may make it insufficient),
- the quantification of liquidity at various time horizons,

[5] G. Bardsen, K-G. Lindquist and D.P. Tsomocos, *Evaluation of Macroeconomic Models for Financial Stability Analysis*, Norges Bank, 14 February 2006, p. 6.

- ❖ the management of liquidity using external methods (taking into account precautionary supervisory norms) and internal methods (remedial, adapted to the specific ways in which each institution functions),
- ❖ monitoring the process and updating tools for quantifying and managing liquidity.

Liquidity is bound up with the ability to undertake transactions on an ongoing basis on a market in which there are at least several competing market makers who quote two-way prices for customarily accepted nominal amounts[6]. From the point of view of an individual bank, the greatest threats to liquidity are:[7]

- ❖ the drawdown of loans under unconditional credit lines and dynamic growth in credit operations,
- ❖ the withdrawal of deposits by the largest depositors and/or inadequate growth in deposits,
- ❖ a run on the banks,
- ❖ the exercise of bank guarantees,
- ❖ a fall in the value of the flow of funds from maturing assets,
- ❖ a growth in expenses unrelated to credit operations (growth in the bank's own costs, in the payment of dividends, etc.),
- ❖ insufficient inflow of deposits from transactions with clients that provide security for the settlement of interbank back-to-back transactions on a *mark-to-market* basis,
- ❖ a fall in demand for debt securities issued in the process of securitisation and/or limitation of access to funding from the interbank market, for exogenous or endogenous reasons.

Liquidity is a dynamic category, which means that its measurement should have a dual character – on the one hand it should concentrate on the most up-to-date financial statements, and on the other it should include scenario analysis, which gives answers to questions about the risks of the loss of liquidity in the future, taking into account the potential behaviour of third parties and structural changes that are reflected in the functioning of financial markets.[8] One can distinguish between measures of liquidity using three main criteria:

- ❖ the criterion of the time horizon: payment (immediate), current (seven-day), short-term (30-day), medium-term (one- to 12-month) and long-term (over 12-month) liquidity,[9]

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6 T. Weithers, *Credit Derivatives, Macro Risks and Systemic Risks*, University of Chicago, 20 April 2007, p. 37.

7 Recommendation P..., op. cit.

8 Ibidem.

9 Cf. Resolution No. 9/2007 of the Commission for Banking Supervision of 13 March 2007 on Establishing Binding Norms for Banks' Liquidity.

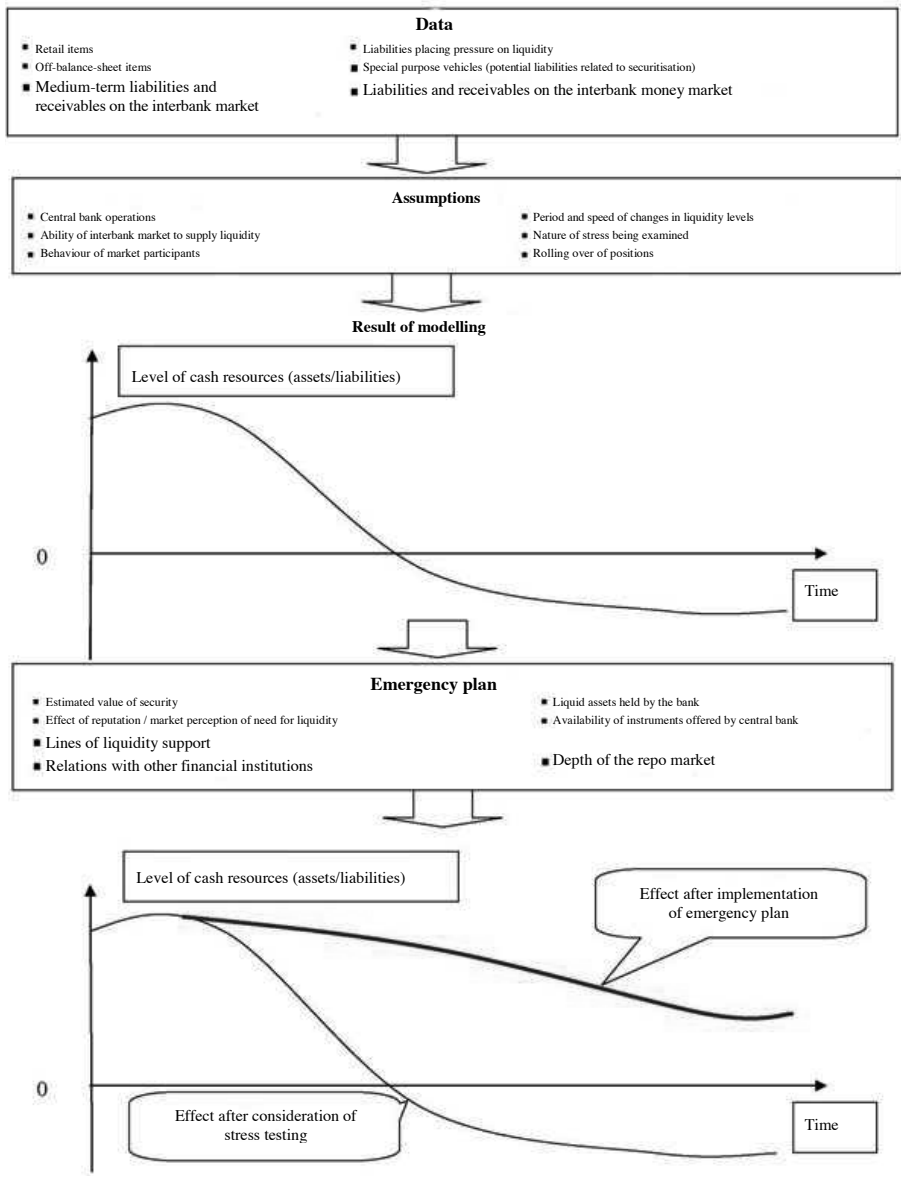
- the criterion of the source of data that are the basis for drawing conclusions about liquidity: indicative tools based on financial statements (static liquidity – an ex post depiction) and stress testing, the liquidity gap and analysis of cash flows (dynamic liquidity aimed at identifying future liquidity deficiencies – an ex ante depiction),
- the parametric criterion, including: a) measures of mismatching: of liquid resources (absolute liquidity, expressed in monetary units as a surplus or deficiency – e.g. a balance of flows, a liquidity gap) and of time (the time of survival without access to sources of liquidity, the $DCtD_{\alpha}$ day count to default), b) relative measures (percentage divergence between the volume of assets and liabilities that determine liquidity – e.g. the indicator of position in the financial sector, the indicator of the proportion of liquid assets in the balance sheet total, the indicator of the coverage of credits by deposits) and c) measures of threats (*LaR*, Liquidity at Risk)[10].

Forecasting future liquidity on the basis of the analysis of extreme conditions (stress testing) is of particular importance. *Stress testing* usually makes use of the liquidity gap method (the difference between assets and liabilities that mature in specified time periods), making extremely unfavourable but possible assumptions regarding the behaviour of depositors, access to sources of funding, possibilities of selling shares (by estimating *haircuts,* i.e. indicators of adjustments to the prices that may be obtained if demand is insufficient) and the repayability of outstanding claims. The result of the test of extreme conditions is compared with the liquidity buffer, i.e. total assets that can be turned into cash without substantial losses. Stress testing is also based on an attempt to estimate the consequences of a major participant's withdrawal from the market. *Stress testing* should also include events that are related to the specific nature of the bank in question's functioning (idiosyncratic factors), as well as changes in the overall market situation that have a negative effect on liquidity. *Stress tests* that are co-ordinated by central banks are particularly important since they make it possible to estimate the systemic effect of fluctuations in liquidity[11]. An example of an algorithm for analysis of extreme conditions is presented in Figure 2.

[10] For a broader description of methods of quantifying financial liquidity risks see M. Zaleska, *Assessment of a Bank's Economic-Financial Situation*, [in:] M. Zaleska (ed.), *Contemporary Banking*, Volume I, Difin, Warsaw 2007, p. 606 and G. Hałaj, op. cit., pp. 18–19.

[11] Ibidem, pp. 18–19.

Figure 2. Algorithm for an analysis of extreme conditions in the process of managing liquidity



Source: M. Hoccom, The Liquidity Crunch. Causes and Consequences, Lloyds TSB Corporate Markets, 10 June 2008, pp. 19–21.

Quantitative norms for the management of a bank's liquidity should correspond to qualitative solutions – including those to be found in the Commission for Banking Supervision's resolution on establishing binding norms for banks' liquidity,[12] which include:

- the obligation of the bank to examine and confirm the bases on which it manages liquidity at least once a year,
- the need to prepare forecasts of cash inflows and outflows so as to identify their effect on the bank's liquidity at selected time horizons,
- the need to prepare an analysis of the effect of entities related to the bank on the level of the bank's payment liquidity.

The process of limiting liquidity risk based of the result of measuring it must be associated with concrete objectives, which in traditional deposit-credit banking are specified by liquidity rules. Modern banking, thanks to empirical research confirming the stability of certain deposits, the possibility of financing assets not from non-financial sector deposits alone, and the need to meet demand for relatively long-term finance, has systematically liberalised 19th-century liquidity norms. Liquidity management concepts (beginning with the most conservative) include:[13]

- the banking golden rule (there is no transformation of maturities – the period at which liabilities fall due are to correspond to those at which assets mature),
- the core demand deposits rule (abiding by the banking golden rule, apart from the assumption that there are core demand deposits, i.e. that certain deposits are stable and the maturity of liabilities is partially prolonged),
- the movements in assets rule (defining the quantity of assets that could be sold at any time without substantial losses, so as to maintain liquidity),
- the maximum liability rule (abiding by the principle that maturing liabilities should be covered by liquid assets, while potential losses from the premature sale of assets should be limited to the amount of the bank's own funds).

Limits are tools that are largely ancillary to the principles identified above, or to others (defined by a particular bank). In this area, Recommendation P proposes such limits as: on mismatching (with a possible distinction of ranges), on dependence on large deposits, and on deposits received from other banks and deposits made in them[14]. In practice, reaching goals in the form of achieving a specified relationship between assets and liabilities, as well as taking their maturities into account, makes it necessary to operate simultaneously on bank liquidity in four areas, as presented in Table 1.

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12 Resolution No. 9/2007 …, op. cit.

13 E. Kania and P. Rosiński, *Risk in Banking Operations*, [in:] K. Jajuga (ed.), *Risk Management*, Wydawnictwo Naukowe PWN, Warsaw 2007, pp. 196–197.

14 Recommendation P …, op. cit.

Table 1. Management of bank liquidity – balance sheet perspective

	Asset side of balance sheet	Liability side of balance sheet
Area of the bank's individual policies	• Possibility of financing by shareholders, • Limitation of scale of financing by introducing limits on the growth of credit operations and redefining the guidelines for credit policy (e.g. by excluding specified branches, reducing the investment horizon, reducing the maximum size of an individual loan, specifying more conservative marginal conditions for financing in such forms as a contribution from own funds and the method of estimating the financial surplus), • Non-renewal of existing financing arrangements insofar as borrowers are in a position to repay them or find refinancing, • Increase in the price of financing, • Pressure for securing with cash client transactions in derivatives in accordance with the *mark-to-market* principle, • Preference for products of the *unfunded risk participation* type	• General application in credit agreements of a covenant that obliges corporate clients to undertake a certain minimum level of turnover in their accounts in the bank, • Increasing the profitability of deposit products, • Introducing new deposit products, including more flexible ones that allow their liquidation without substantial losses before the agreed maturity date, but also favour long-term forms of saving, • Preferential treatment of deposit clients (giving priority to instructions lodged by them, lower servicing costs, non-standard products, etc.)
Area of market conditions	• Possibility of selling assets at a fair price, • Seeking ways of securitising assets	• Reserve sources of financing (e.g. bilateral agreements covering the risk of being cut off from financial markets), • Seeking to improve market image (improvement in rating, *public relations*) so as to achieve greater confidence among market participants, • Seeking instruments that provide support for interbank loans (e.g. government guarantees).

Source: Own findings.

4. Channels by Which the American Crisis Affected Banking Sector Liquidity

One of the direct reasons (apart from an excessively liberal credit policy) for the American crisis was an increase in interest rates, which caused a significant reduction in the quality of housing credits and problems with rolling-over funding for that portfolio. After taking that into account, banks decided to tighten their credit policies, which in turn caused a reduction in people's disposable income, which (through its effect on consumption) affected the real economy. The restriction of credit operations also caused a fall in the money supply, which contributed to liquidity shocks in the banking sector (the liquidity crunch). A sign of the beginning of the process set out above was the reduction in the tempo of credit operations. Another indication of the danger that liquidity problems might appear in the banking sector was the scale of operations to boost liquidity undertaken by the central bank. The volume of liquidity-supporting operations is determined by the level of the central bank's base rate – the desire to maintain it at a required level (and not at a lower one, for example because of a monetary target) is a factor that limits the supply of liquidity. One example is the United States – the growth rate of the 'Fed balance' (Fed Credit), which reflects the process of adding liquidity to the banking sector, fell consistently during 2007 as a result of the intention to maintain the Fed Funds Target Rate at the level of 5.25%[15]. Banks' liquidity problems, which were a consequence of the American crisis, were related directly to such processes as:[16]

- in view of the difficulty in placing new issues, the need to give liquidity support to special purpose vehicles established to undertake securitisation transactions,
- the need to purchase from special purpose vehicles the highest risk tranche of debt securities (the capital tranche) issued in securitisation transactions,
- excessive absorption of exposures related to financing the housing sector as a result of difficulties in transferring this risk (or exposure) to investors,
- discharging obligations relating to the supply of liquidity to hedge funds and other financial institutions,
- the need to assign resources to providing security for positions in derivatives (which were larger than usual because of increased market volatility),
- the worsening quality of the credit portfolio (reduced repayment rates),
- a lack of confidence in the interbank market,
- uncertainty in relation to future liquidity requirements.

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[15] F. Shostak, *What Caused the Liquidity Crunch*, Ludwig von Mises Institute, 31.07.2007, www.mises.org, pp. 3–4 (10.11.2008).

[16] N. Frank and B. Gonzalez-Hermosillo, H. Hesse, *Transmission of Liquidity Shocks: Evidence from the 2007 Subprime Crisis*, IMF Working Paper No 08/200, August 2008, p. 6.

The liquidity of particular banks is a necessary condition, but insufficient in itself for the liquidity and stability of the banking sector – mutual confidence among banks is of fundamental importance and determines the scale of turnover in the interbank market, the spread and the maximum period of funding available[17]. A systematic approach to the liquidity problem points to two main areas where threats to the liquidity of individual banks arise. The first relates to "runs" on banks, namely to mass and largely psychologically-driven withdrawals of deposits from banks. The second is identified with the domino effect of a lack of liquidity or contagion by a lack of liquidity (the liquidity problems of a particular bank cause insufficient liquidity among some of its counterparties, etc.). This dependency demonstrates the bidirectional connections between bank liquidity and the liquidity of the system. The first case shows that causes may, but do not have to, arise outside the banking system and then, through the banking system, have an effect on an individual entity. The second case in turn confirms that the problems of an individual bank (liquidity, portfolio quality, solvency) can be transferred to its counterparties (the banking system)[18]. The definition of a liquid market requires that it is simultaneously:[19]

- tight, which means that it is sufficiently competitive to exert pressure for the reduction of transaction costs,
- immediate, which means that a given transaction can be undertaken at any selected time,
- deep, which means that incoming offers to buy and sell at prices that are close to current transaction prices produce balance in volume terms between supply and demand,
- broad, which means that a relatively large number of transactions of substantial size are concluded, without these operations significantly affecting market prices in the transactions that follow them,
- resilient, which means that, in the event of prices diverging from the equilibrium level derived from fundamental factors, offers appear that are directed at restoring equilibrium prices.

The risk of banking sector liquidity can be divided into market liquidity risk and funding liquidity risk. The liquidity of the market is determined by the degree of its completeness and symmetry of information, the quality of sales mechanisms (including the frequency and objectivity of valuations, the operation of a settlement institution as an intermediary, the market makers' ability to absorb business, the depth of the secondary market, etc.) Funding liquidity risk, meanwhile, is

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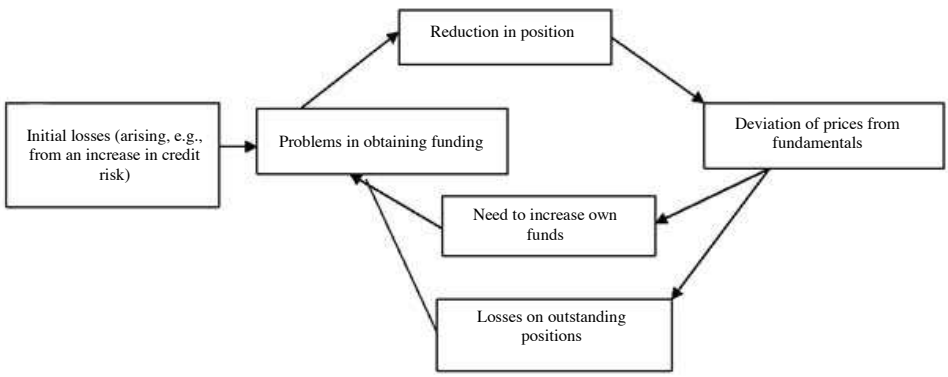
17 Recommendation P …, op. cit.
18 G. Halaj, op. cit, p. 22–23.
19 A. Sarr and T. Lybek, *Measuring Liquidity in Financial Markets*, "Working Paper" No. 02/232,/ IMF, Washington D.C. – cited by G. Hałaj, op. cit., p. 16–17, 24.

associated with a given financial institution's ability to obtain funding so that it is in a position to meet its payment obligations. Market liquidity risk grows into funding liquidity risk since banks have to cover losses related to securitisation transactions by obtaining funding. At the same time, irregular turnover and an inefficient "price discovery" process leads to an increase in asset price volatility, which stimulates stronger calls for increases in own funds and the strengthening of security, and hence for a reduction in the level of leveraging and limitations on the possibility of obtaining funds. On the other hand, funding liquidity risk can lead to market liquidity risk, since an inability to obtain funds in the market creates a need to realise assets rapidly (usually at prices that are significantly lower than fundamentals suggest – known as a fire sale), which produces a further reduction in leveraging, and in the possibility of obtaining funding supported by security[20]. The increasingly close relationship between market liquidity risk and funding liquidity risk arises from the fact that an increasing number of financial institutions are looking for funds from financial markets rather than making use of their own deposit base or own funds[21]. The process of converging market liquidity risk and funding liquidity risk leads to the appearance of the phenomenon that is referred to in the literature as a liquidity spiral.

Figure 3. The liquidity spiral – a spiral of losses and a spiral of calls for the replenishment of own funds



Source: M. Brunnermeier, Deciphering the 2007–2008 Liquidity and Credit Crunch, Journal of Economic Perspectives (forthcoming), draft as of 19 May 2008, p. 25.

[20] N. Frank, op. cit., p. 5–8.

[21] Speech by Jose Manuel Gonzalez-Paramo, Member of the Executive Board of the ECB, 2nd Spanish Capital Markets Forum, Madrid, 30 September 2008, www.mataf.net (04.11.2008).

5. The Actual and Potential Consequences of the American Crisis for Banking Sector Liquidity in Poland

The interbank market and shareholders funds are of ever-increasing importance in the funding of banks in Poland. In the face of pressure to obtain sources of funding for credit operations, of a reduction in the volume of resources corresponding to a negative funding gap that could be borrowed in the interbank market, and of the limited possibility of acquiring funds by issuing bonds, deposits from non-financial entities have become of greater importance, and their proportion has grown significantly in the course of the last year. At the same time, the interbank market has experienced a sudden reduction in liquidity caused by a collapse of the banks' confidence in each other, which was justified in relation to banks registered in Poland insofar as they have low financial strength ratings and a low level of mutual knowledge about competitors' portfolios. This is confirmed by the high level of implied credit spreads for Polish banks' issues in the Euromarket, which grew between July 2007 and October 2008 by about 150 basis points, i.e. from 2.5 times for 10-year papers to seven times for 2-year issues. The growing liquidity risk is also indicated by the fact that in the first half of 2008 the short-term liquidity gap increased (this tendency halted in the third quarter of 2008), principally as a result of expansion in the market for long-term bank credits. It should be added, however, that almost all large and medium-sized banks covered this gap with a portfolio of government debt. Smaller banks (in total accounting for about 12% of the sector's assets), meanwhile, conducted a policy of maintaining a liquidity gap that was high relative to bank size, without substantial coverage by government debt, which meant de facto significant dependence on the functioning of the interbank market[22]. These changes should be considered in terms of the consequences of the American crisis, which caused a decline in financial institutions' confidence in each other and gave rise to the process that has been characterised as *a* flight to liquidity and quality, which meant, among other things, an outflow of speculative capital from emerging markets, including Poland. In the context of the American crisis, the following factors appear to have affected banking sector liquidity in Poland:

- the potential to transfer liquid financial assets to parent banks,
- the fall in banks' confidence in each other, which was manifested in a fall in liquidity, a rise in the cost of funding and a shortening of its horizon,
- a reduction in the availability of non-resident banks' credit limits for banks registered in Poland, a result of which was a reduction in resident banks' limits for each other,

[22] *Survey of Financial System Stability – October 2008*, National Bank of Poland, Warsaw, October 2008, pp. 30–34.

- high volatility in exchange rates, which made it necessary to tighten the credit policy in the area of foreign currency funding, and to reassess exposure to clients who were subject to an exchange rate risk,
- expectations of weakening economic activity, necessitating a review of portfolios with a view to limiting the risk associated with them.

In view of the liquidity problems experienced by some banks owning financial institutions in Poland, the question arises as to the possibility of liquid financial assets being transferred by banks registered in Poland. In accordance with Polish Financial Supervision Authority guidelines, all transfers of liquid financial assets abroad should be preceded by appropriate information being filed with the Authority; this also covers potential transfers related to securing foreign liabilities. The information requirement also applies to fluctuations in liquidity, the level of which banks are meant to report to the supervisor daily. The risk of transfer is considered to be slight because of the relatively small size of Polish banks and, therefore their limited ability to help in relation to a parent bank's reputational risk (information on a parent bank turning to a subsidiary company in Poland for assistance could deepen the problems of the parent institution). Another factor that reduces the risk of transfer is that, if a Polish management board transferred funds abroad, it would be acting to the detriment of the institution it manages. There also remains the possibility of sanctions being imposed by the NBP (in accordance with a possible suggestion from the supervisor) in the form of cutting off central bank funding to a bank that transfers funds to its parent bank. Apart from the possibilities indicated above of limiting the scale of any transfer of liquidity, additional safeguards against uncontrolled transfers of liquidity are expected to be introduced, these being reflected, among other things, in a new definition of the coefficient of concentration[23]. One of the results of the American crisis for banks in Poland has been a reduction in the availability of funding in certain foreign currencies, and a rise in the cost of funding[24]. The lengthening absence of mutual confidence from the interbank market may have long-term negative consequences – enterprises deprived of funding will initially make use of their deposits, further reducing bank liquidity, and will then revise investment programmes, the effect of which may be to worsen the competitiveness of the economy and to increase unemployment, thus reducing consumption[25]. One consequence of the crisis is, as Hungary exemplifies, a reduction in the forecast rate of GNP growth, an increase

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[23] Ł. Wilkowicz, *The Risk of Transferring Cash Abroad from Poland is Very Small. A Discussion with Stanisław Kluza, Chair of the Polish Financial Supervision Authority*, "Rzeczpospolita" 22.10.2008.

[24] Ibidem.

[25] Cf. Piotr Czarnecki's Comments contained in: E. Twaróg, *Prime Minister! The Banks are Only Begging for a Gesture*, "Puls Biznesu", 22.10.2008, p. 6.

in public-sector indebtedness and the discouragement of planned tax reductions[26]. A specific reason for the growth in the liquidity risk of some banks in Poland has turned out to be the establishment of treasury limits on transactions that give protection against changes in exchange rates. Banks registered in Poland most frequently make use of relatively small credit limits extended by the investment banks that operate the market in over-the-counter derivatives – the reasons for this are:

- country risk, which limits the scale of potential operations by investment banks,
- continuing lack of pressure on banks in Poland to increase limits (as the scale of operations and the range of banks with which banks in Poland could co-operate largely corresponds to the existing limits),
- the pressure for liquidity in the American banking sector, which caused reduction (or withdrawal) of limits,
- the fall in confidence in emerging markets,
- the bankruptcy or financial problems of some investment banks.

The reduction in the availability of limits extended by organisers of the market in over-the-counter derivatives, which is related to the effect of back-to-back proceedings (most client transactions are "closed" on the interbank market to restrict the bank's exposure to market risk), means de facto that it is necessary to settle transactions on the interbank market on a mark-to-market basis, while in the case of many corporate clients, banks have not been able to enforce the security deposits required. Therefore, the need to settle deposit liabilities to counterparties on the market in over-the-counter derivatives (for the most part global investment banks) in the face of an insufficient inflow of deposits from clients who were placing funds in treasury instruments (in September and October 2008 this concerned exporters), gave rise to unfavourable fluctuations in the liquidity of banks registered in Poland.

6. The Central Bank's Actions to Affect Banking Sector Liquidity in Poland

The central bank's actions to affect banking sector liquidity should be based on a diagnosis of the current state of liquidity – five different positions can be distinguished in this regard:[27]

[26] H. Koziel, *The Crisis is Haunting Eastern Europe*, "Parkiet" 18.10.2008.
[27] G. Pietrzyk, *Banking Sector Liquidity*, "Gazeta Bankowa" No. 6 (954), 5–11 February 2007, p. 16.

- structural insufficiency of liquidity – the central bank is a net creditor of the banking sector (a condition that is inseparably related to an operational insufficiency of liquidity),
- operational insufficiency of liquidity – in successive compulsory reserve maintenance periods, after previously absorbing all surpluses in bank funds through long-term operations, the central bank conducts operations that supply liquidity to the banking sector,
- structural excess of liquidity – the central bank is a net debtor of the banking sector (this may be accompanied by an operational insufficiency of liquidity),
- operational excess of liquidity – the part of excess liquidity that is absorbed by the central bank in operations with an initial maturity shorter than the period for the maintenance of compulsory reserves,
- operational liquidity balance – a transitional phase between operational excess and insufficiency of liquidity.

A measure of the liquidity of the interbank market is the spread between short-term interest rates and overnight index swap contracts. In the middle of October 2008, the WIBOR-OIS spread reached a record level of 110 basis points. In the case of West European countries and the United States, analogous spreads reached an even higher level – in some cases oscillating around 300 basis points. Substantial spreads between interbank rates were one of the reasons for the adoption of a series of initiatives (including international initiatives) aimed at restoring confidence in the interbank market.[28] These initiatives were concerned principally with guaranteeing transactions on the interbank market and rescuing banks (by nationalisation or by recapitalisation through purchases of preference shares and purchases of bonds with maturities of up to five years) and were in many cases the consequences of agreements reached by the leaders of Euroland (the Eurogroup) and the United Kingdom and Slovakia during their Paris summit on 13 October 2008. They also included the "Confidence Package" announced by the NBP, which contained a series of measures aimed at rebuilding confidence, and therefore liquidity, on the interbank market, as well as individual liquidity. The implementation of the "Confidence Package" meant *de facto* acceptance by the NBP of the role of leader of the interbank market charged with the task of rebuilding the złoty and the foreign currency interbank market[29]. The "Confidence Package" included:[30]

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[28] Ł. Wilkowicz, *The NBP and the Government Are Trying to Maintain Stability*, "Parkiet" 14.10.2008.

[29] R. Grzyb, *Guarantees Cover Most Deposits*, "Gazeta Prawna" 15.10.2008 and Ł. Wilkowicz, *The NBP*..., op. cit.

[30] Ł. Wilkowicz, *The Risk*..., op. cit., R. Grzyb, *The NBP Confidence Package is Sufficient if the Situation in the West Calms Down*, "Gazeta Prawna" 16.10.2008 and Euromoney Polska SA (17.10.2008).

- the introduction of currency swaps and the announcement on 24 October 2008 of a calendar for these operations in the period from 27 October 2008 to 31 December 2008,
- the introduction of three-month open market supply operations (extending the period of repo transactions),
- the introduction of foreign currency deposits as security for refinancing credits,
- the expansion of the list of assets securing credits taken by commercial banks from the NBP (to include, among other assets, shares quoted on the Warsaw Stock Exchange),
- the introduction of modifications to the operating system for Lombard credits (reduction in the *haircut* for security),
- the continued issue of seven-day money bills as the principal instrument sterilising an excess of liquidity,
- the introduction (as required) of greater frequency of open market operations so as to react to changes in liquidity and to stabilise the POLONIA rate around the reference rate.

Open market operations are of particular significance. Their implementation in accordance with the results of empirical research substantially reduces the inefficiency that results from an inability to obtain protection against idiosyncratic risk and aggregate uncertainty relating to the demand for liquidity. It also improves the efficiency of the allocation of funds within the financial system. The temptation for misuse and problems related to negative selection restrain the central bank's application of the open market operations policy to restore the liquidity and efficiency of the interbank market (by neutralising idiosyncratic and aggregate uncertainty). As Bhattachararya and Gale[31] have demonstrated in regard to these limitations, the central bank supplies the sector with liquidity to an inadequate extent[32]. A problem that many economists feel was not sufficiently identified in the "Confidence Package" is banks' liquidity in relation to the CHF (the NBP offered currency swaps only in relation to two currency pairs, EUR/PLN and USD/PLN), one of the consequences of which has been a limitation in the availability of housing loans in that currency, which in turn has translated into reduced average credit capacity and which may give rise to a deepening stagnation in the

[31] S. Bhattacharya and D. Gale, *Preference Shocks, Liquidity and Central Bank Policy*, [in:] W. Barnett, K. Singleton (eds.), *New Approaches to Monetary Economics*, Cambridge University Press, 1987, pp. 69–88.

[32] F. Allen, E. Carletti and D. Gale, Interbank Market Liquidity and Central Bank Intervention, document prepared for presentation at the Public Policy Conference in November 2008 and published in the Carnegie – Rochester Series, 9 June 2008, pp. 2, 4.

construction sector[33]. The supply of CHF liquidity other than through a CHF/PLN currency swap is possible through the NBP adopting the position of intermediary between foreign commercial banks and Polish institutions, and also through the agreement with the Swiss National Bank (SNB) on EUR/CHF swaps[34] which was finally concluded on 7 November 2008. Since 17 November 2008, the NBP has participated in weekly currency swap operations of the SNB and the Eurosystem. The agreement provides for the SNB to supply the NBP with CHF in return for EUR, while the NBP supplies its counterparties with CHF in return for PLN[35].

Another measure that could rebuild confidence between banks and which is worth considering is a temporary guarantee for loans on the interbank market. The addition of this instrument to the palette used by the NBP requires, however, rapid legislative changes, and appears to be necessary, unlike the prerogatives that central banks have in some European countries in the area of recapitalisation of banks. However, the dominant view in this question is that such an instrument could not function without an element of co-insurance, meaning at least the partial liability of banks that take part in interbank transactions. In many bankers' opinion, temporarily guaranteeing interbank liabilities (this relates particularly to Euromarket issues by banks registered in Poland and to their rollover risk in the context of guarantees extended by the governments of other countries whose banks have found themselves in a worse economic-financial position than banks in Poland), even if the banks have to bear the cost of the guarantee,[36] is a necessary condition and may suffice in rebuilding confidence in the banking sector.[37]

Other measures that could stimulate the interbank market are:

- a system of incentives for banks that are active in this market, consisting of preferential access to particular kinds of transactions,[38] and
- a reduction in the level of compulsory reserves[39].

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33 E. Więcław, *The NBP is Not Selling Francs*, "Rzeczpospolita" 18.10.2008 and Ł. Wilkowicz, *The Risk*..., op. cit.

34 P. Rutkowski, Ł. Wilkowicz, M. Kowalczyk and H. Kozieł, *The World's Financial System Needs Repair*, "Parkiet" 16.10.2008.

35 www.nbp.pl (10 November 2008).

36 This is justifiable, since the cost would be borne principally by banks that have not adapted their liabilities to match the structure of their assets, creating systemic risk.

37 Cf. Piotr Czarnecki's Comments..., op. cit, p. 6 and R. Grzyb, *Guarantees Cover* ..., op. cit.

38 E. Więcław, *Polish Banks: Get Ready for Worse Times. A Discussion with Andrzej Stopczyński, Managing Director of the Bank Supervision Department in the Polish Financial Supervisory Authority*, "Rzeczpospolita" 22.10.2008.

39 P. Rutkowski, Ł. Wilkowicz, M. Kowalczyk and H. Kozieł, op. cit.

6. Final Conclusions

The analysis undertaken in this article demonstrates the strong and reciprocal relationships between individual liquidity and banking sector liquidity, as well as the mutual dependence of market liquidity risk and funding risk, which are components of banking sector liquidity risk. In turn, fluctuations and the insufficiency of banking sector liquidity can be identified as a symptom of a lack of financial stability – liquidity is thus a *sine qua non* of financial stability. The American crisis shows a further connection: individual liquidity and banking system liquidity in a given country are a function of the liquidity of other national banking systems, because of dynamic globalisation and the integration of finances and of banks' growing dependence on funding from financial markets rather than from their traditional deposit base of individuals and non-financial institutions. As a result, stable economic fundamentals (the real sphere), individual and sectoral liquidity and banks' solvency, arising from such things as the application of conservative supervisory regulations, do not in today's world constitute a guarantee of effective immunisation against the financial crisis. To put it briefly, the global crisis that is "infecting" successive economies and institutions requires global, i.e. co-ordinated, intervention by central banks and governments. In the long term, the conclusion that losses (liquidity problems, solvency problems, etc.) are to be internationalised has, however, a demotivating undertone for those who recognised the priority of safety at the cost of lower competitiveness when they established principles for the functioning of national banking systems. That conclusion is also in a way an "incentive" to undertake actions that can lead to abuse. It seems that change in the global financial system is unavoidable. Various concepts are being considered, including that recommended by J.C. Trichet, President of the European Central Bank, of a return to the Bretton Woods system. The Bretton Woods system, in Trichet's opinion, is a system of macroeconomic, monetary and market discipline. The establishment of new exchange rate regimes will, however, not suffice. An increase is postulated in the role of the state in financial markets through broadening the range of instruments used in interventions, aimed on the one hand at defending an exchange rate, and on the other at improving liquidity. Another initiative is the establishment of international supervisory institutions – the expansion of the role of the IMF has been mentioned in this regard. Apart from aid to countries threatened by crisis (or undergoing a crisis) the active monitoring of economies from the point of view of the quality of supervision and of excessive escalation of credit operations is recommended. The Fund would act in this case as an early warning institution. Making supervision international might also mean establishing supervision for the 30 largest European banks; such an initiative has

been supported by J.M. Barroso, President of the European Commission and by Gordon Brown, the Prime Minister of the United Kingdom.[40]

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[40] Ibidem.

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