Financial Instruments and Capital Markets (3000 word) Economics

Coursework 1

The liquidity problems affecting money markets in 2007-08 have been described as "a run on repo". Describe in detail how a bank run arises. Explain the liquidity problems that affected the money markets in 2007-08, drawing analogies between these and a traditional bank run. Throughout your essay take care to explain the nature of the financial instruments and markets you discuss.

The entire world experienced a financial catastrophe during the year 2007-08 which affected even the developed nations like US, UK and others as well. Some of the nations are still not able to recover from the financial crisis though trying hardly for the same. Industry experts and scholars have compared this global financial crunch with the great depression that occurred in 1930s. The principle reason for comparing such global financial downturn is to properly identify, understand and prevent the factors in future that could create such financial crisis. The crisis during 2007-08 had a strong and adverse effect on the financial institutions at international level (Melvin and Norrbin, 2013). In this context, Chor and Manova (2012) expressed that prevalence of low interest rate in the United States before the global financial crisis led to bursting of housing bubble which further forced the banks to incur millions of dollars towards bad debts as a result of mortgage delinquencies. This clearly indicates that the commercial banks did not conduct appropriate credit examination of the individual customers or borrowers before extending credit. In other words, the commercial banks did not properly assess the capability of the individual borrowers to repay the loans. This makes the subprime mortgage market as one of the key triggers of the global financial crisis. In fact, the banking system itself seems to be responsible for the adverse impact of the global financial crunch. It seems that the financial crisis could have been easily avoided if the banks had conducted proper credit assessment of the borrowers. On the other hand, Fratzscher (2012) viewed that regulators can be held responsible for the low interest rates that prevailed prior to the financial downturn. The global recession had a drastic impact on a number of financial institutions and banks across the globe. A bank is also a part of the financial institution system that evidenced the impact of the financial crisis. Bank is a common place where customers

Deposit money and also borrow funds in case of needs. Here, it is important to note that banks use only a fraction of the total deposits made by the public to advance loans that is not possible to sale at higher prices in the market.

Table 1: Financial value of top British Banks

4 top British banking groups		
Banks	**Market capitalization (as on 3rd may, 2011)**	**Total assets (as on 31st Dec 2010)**
	Billion SEK	Billion SEK
HSBC	1765,9[52*]	15850[53**]
Royal Bank of Scotland	457,2[54*]	15252[55**]
Lloyds Bank	399,4[56*]	10406[57**]
Barclays	347,6[58*]	15620[59**]

*GBP/SEK rate as on 3rd May 9,96

** GBP/SEK rate as on 31st December 10,49

Demand deposit is yet another major financial tool in this regard that requires critical discussion. Demand deposits issued by banks allow depositors to withdraw respective assets from the bank at any point of time (Yang, 2012). Here, liquidity refers to the ease and convenience with which the assets can be converted into cash at any specific time. In this context, Bénétrix et al. (2015) viewed that bank runs are usually caused by the mismatch in which bank deposits or liabilities are more liquid compared to the loans or assets. In this context, Scott and Wellons (2004) mentioned that bank run can be defined as the situation in which all the depositors withdraw funds from respective bank accounts at the same time for the fear that the banks might fail. Speculations are the principle cause for such bank runs though existence of other factors cannot be ignored as well. During the global recession in 2007-08, the leading bank Lehman Brothers of the US also suffered financial crisis which further raised awareness about bank runs. Bank runs can be highly dangerous and have a long-term impact on the financial condition of a bank. However,

here it is interesting to note that while other banks were facing liquidity crunch due to withdrawal of deposits by the customers the Lehman Brothers experienced the crisis because of huge withdrawal of repurchase agreements known as repo. Hence the situation of Lehman Brothers is described as a run for repo.

In the view of Bertaut et al. (2012), liquidity is one of the most vital functions of any commercial bank. Depositors can withdraw respective deposits and assets at any time and such withdrawal by a large number of depositors can create pressure on the liquidity position of the commercial banks. This requires commercial banks to have an asset that can be utilized at any point of time. This can help in fighting the uncertainties associated with the withdrawal of deposits by the consumers. The situation can be worse if commercial banks fail to generate adequate liquidity. This can also affect the money market which is a part of the entire financial market in which highly liquid assets and short-term securities are traded.

Table 2: Credit loss ratio of British banks

Credit loss ratio	2006	2007	2008	2009	2010
Royal Bank of Scotland	**0,3418%**	**0,2029%**	**0,7969%**	**1,8228%**	**1,4115%**
Lloyds bank	**0,6793%**	**0,7341%**	**1,0625%**	**2,5173%**	**1,7583%**
HSBC	**1,0038%**	**1,4145%**	**2,2949%**	**2,4617%**	**1,2034%**
Barclays	**0,6877%**	**0,7250%**	**1,0635%**	**1,7494%**	**1,2178%**

It is important to note a bank is capable of creating and increasing liquidity even though the bank makes investment in illiquid assets (Rasmus, 2010). This phenomenon can be explained by a numerical example.

It is assumed that the concerned bank has no equity and that the total number of

depositors in the bank is 100 at T_0. These 100 depositors can be classified into two groups namely Group I and Group II. The Group I depositors make consumption at T_1 whereas depositors in the Group II consume at T_2. These assumptions are made only to make the example and calculation simpler. It is further assumed that all the depositors invest 1 unit each. It is the policy of the bank to provide $r_1 = 1.25$ to the investors withdrawing at T_1 whereas 55 out of total 100 investors make withdrawal at T_1. Hence, it indicates that the concerned bank makes liquidation of 1.25*35 = 43.75 units at T_1. Therefore, the remaining balance with the bank is 56.25 units calculated by deducting 43.75 from 100 that are expected to mature at T_2. Here, it is important to understand that the worth of the total portfolio held by the bank at T_1 is 1 * 100 = 100 units whereas the worth of the portfolio at T_2 stands at 2 * 56.25 = 112.50. However, the rest of the 45 depositors need to be repaid. Thus, each of the depositors receives $r_2 = 1.73$ which is calculated as $(100\text{-}43.75)^2 / 65$. Per unit 1.73 is dependent on the remaining amount of investments worth 56.25 at T_1. Therefore, it would not be inappropriate to state from the above observation that depositors prefer liquid assets over the illiquid ones. This can be attributed to the positive returns offered by the deposits as seen in the above example. In addition to this, demand deposits are also offered by commercial banks. These can be considered as the major reasons for people making investment in bank deposits.

The customers of commercial banks make a large volume of deposits however only a fraction of the total deposits are used by such banks to offer loans and the balance of the deposits are maintained by banks as reserve. This concept is termed as fractional reserve banking. For example, it is assumed that all the depositors deposits money at the same time which is T_0. It will be the practice of the bank to utilize these deposits to offer loans to the customers that will mature at T_2. Therefore, the value of the loan offered by a bank is usually greater than that of the present value of the concerned loan. The difference in the financial value of the loan at the time of maturity of the loan indicates the income earned by the bank. In other words, this gap represents interest rate or interest income. It

is interesting to note here that the depositors are not aware of the group type they would be at T_0 however depositors are only aware of the group type at T_1. This can be explained by the fact that Group II depositors need to wait till T_2 until Group I depositors makes

withdrawals at T_1. This situation represents a good equilibrium. On the contrary, bank run or a bad equilibrium results if both Group I and Group II depositors withdraw at T_1 as group II depositors might fear that everyone else would do so. In this context, Bishop (2004) expressed that it is not possible for a bank to predict the time when each depositor will withdraw deposits however it is a common assumption of all banks that all depositors would not make withdrawal at the same which causes a bank run. In other words, the banks do not have any concrete idea when each depositor will withdraw deposits but the same is only known to the depositors and this is one of the greatest challenges for any commercial bank.

The mechanism of a bank run can be better explained through a numerical example. Returns on a project is indicated by $R_1 = 1$ and $R_2 = 2$. The total fund at the disposal of the bank at T0 is 100 units because of 1 unit of deposits by all the 100 depositors. The bank provides $r_1 = 1.2$ to those investors withdrawing at T_1. The rest of the investments determine the return at r_2 indicated by t_2. The bank is thus required to pay 55 * 1.2 = 66 units to the depositors withdrawing funds at t_1. The yield calculated at t_2 is 68 which is obtained through (100-66)*2. This further results in a r_2 of 1.5111 arrived at by dividing 68 by 45. It is assumed that the group II depositors are rational in nature and hence would wait till if feasible. The situation indicates a good equilibrium. On the contrary, if 75 depositors make withdrawals at t_1 while the number of investors and the return rate remains unchanged then the bank needs to liquidate 1.2 * 75 = 90 units. Therefore, the yield at t_2 is (100-90) * 2 = 20 resulting in a r_2 of 0.80 per unit which is obtained by dividing 20 by 25. All the 100 depositors is expected to prefer t_1 but it is not possible for the concerned bank to pay 1.2 * 100 = 120 units which creates chances of getting default as the bank has only 100 units of portfolio at t_1. This situation indicates a case of bank run also known as a bad equilibrium. However, the bank provides r_1 to group I depositors and r_2 to group II depositors at the respective maturity date of t_1 and t_2. Here, it is important to note that the proceeds released by the bank at the maturity date is greater than the initial deposits made by the customers because the interest paid by the bank gets added to the initial deposits of the investors.

In the above example, depositors under group I are the ones having immediate financial obligations with no other sources to meet such obligations. However, a bank run occurs

when both group I and group II depositors withdraw deposits because of fear of losing the deposits as a result of any negative rumor in the market. News or rumors like a concerned bank is going to be liquidated can motivate the depositors to withdraw investment at the same time thereby causing a bank run. In this context, Canterbery (2011) viewed that the views, beliefs and behavior of majority of the depositors affect the other depositors in case of a bank run. In addition to this, a long queue in a bank comprising of the customers came to withdraw funds can create a feeling among the other depositors that the bank might not be left with adequate resources to liquidate the deposits of other depositors. This can also lead to a bank run. These factors have led the banks and the government to develop specific strategies to prevent a bank run. Deposit insurance schemes created by the government are one of such initiatives taken by the government to prevent bank runs (Peláez and Peláez, 2009). In addition, commercial banks also take all necessary initiatives to convince customers about the safety of the deposits. In the case of Northern Rock, the government had to enter the scene and take over the bank to protect the existence of the bank and the interest of the depositors.

Northern Rock was the first bank in the UK in 2007 that suffered a bank run (Naas and Lysne, 2010). However, the aggressive attitude and strategy of the bank towards rapid business expansion can be considered for the situation. The Northern Rock had inadequate funds to meet the increased demands for loan. This forced the bank to approach to the American Wholesale market that mainly comprises of doggy financial instruments. The situation turned worse for Northern Rock during 2007-08 when consumers feared bank fail and ran to banks for withdrawing deposits. As a result of this situation, Northern Rock faced tough liquidity crunch as it ran out of money to repay the deposits to the customers. In fact, the bank could not succeeded in reestablishing the confidence among the people of America and therefore the government of the country took over the bank in 2008 and it got nationalized. As mentioned by Haas and Lelyveld (2014), the takeover of the Northern Rock bank in America by the government saved the bank from getting non-existent.

Studies reveal that increased credit in any economy is often followed by a financial crisis. Haas and Lelyveld (2014) stated that a boom in the subprime mortgage market of America prior to the latest financial crisis seems to have influenced the commercial banks

to use short-term liquid assets for funding long-term ones. This can be attributed to the inadequate quantum of deposits with the banks to advance loans to the customers to meet the high demand for loans. In fact, credit boom seems to have resulted in the issue of asset-backed securities that are associated with the functioning and development of shadow banking system. Under the approach of shadow banking system, the main product is the off-balance sheet finance that is funded through private or personal collateral.

In the case of Northern Rock, securitization seems to be the main response in case of traditional banking system that is fast losing popularity among the participants in the money market. Money market involves dealings and transactions related to highly liquid assets and short-term debts and therefore became the principle target with the rise in demand for liquidity (Higgins, 2013).

The global financial crisis involves a run on securitization principally repos that are linked with shadow banking. In fact, the conventional banking model started becoming less profitable because of the rising competition given by the mutual funds operating in the money market. In this context, Eun et al. (2012) stated that money market mutual funds refer to those financial institutions in the money market that allows investors to diversify investment risks by investing in the common pool of funds that mainly invests in government and other reputed companies. Traditional bank run refers to the run by depositors for insured demand deposits because of fear about losing deposits because of growing chances of bank failure. Instability of commercial banks is the principle cause of traditional bank run (Fratzscher, 2012). Here it is important to note that key objective of the deposit insurance is to eliminate incentives to withdraw funds. However, the deposit insurances might not be able to prevent bank runs completely because bank runs can occur if there are future probabilities of bank failure.

In the view of Peláez and Peláez (2009), repo agreements are secured in nature which ensures regulators and firms that occurrence of a bank run is unlikely. A repo agreement allows a lender to provide a loan amount which is lower than the value of the collateral securities. However, the market experts and financial analysts were in shock when bank runs occurred during the global financial crisis during 2007-08. A repo can be defined as an agreement between two parties or agents through which one party purchases an asset from the other against a certain amount while the concerned asset is sold as collateral. However, the party makes promise to repurchase the particular asset at a specific price on a later date. This price includes both the original purchase price and an additional amount as well. This amount is referred to a haircut. In other words, a haircut is the difference between the financial value of a concerned asset and the amount of deposit. The amount of deposit is usually lower than the value of the asset. The increase of haircuts was evidenced during the latest financial crisis due to uncertainty in the banking industry and turning of events from the subprime markets. In fact, the rise in the repo market became so severe that it resulted in the reduction of investment in the repo market as assets became more risky than ever before. This initiative seems to have benefited the investors however the same has increased the expense level of the borrowers. The risk level had sharply risen during the financial crisis period that prevented the investors to stay away from making investments which were concluded from a drop in lending. The increase was backed by the investors on account of the risk associated with selling the collateral securities derived from the repo market in an illiquid market in case of default by the borrower.

Commercial papers were another major instrument in the money market that were used by banks and financial institutions to meet both short-term and long-term financial obligations. In this context, Higgins (2013) stated that banks and financial institutions during the global recession in 2007-08 used asset-backed commercial paper (ABCP) to meet long-term funding needs.

On the other hand, inter-banking lending was also observed as a widely used funding source by the banks during the financial crisis. Under this system, commercial banks offer loans to each other for short-term period at a mutually agreed interest rate. The loan is unsecured in nature and the London Inter-Bank Offered Rate plays a crucial role in

inter-bank lending process. LIBOR is the average interest rate at which commercial banks offer loans to each other. As mentioned by Eun et al. (2012), LIBOR rate increases with the rise in uncertainties in the money market.

Diamond & Dybvig model:

Diamond & Dybvig model is one of the popular models in respect of bank runs. The model mainly indicates the mix of illiquid assets and liquid liabilities by banks that result in self-fulfilling panic behaviour among the depositors. The model was developed by Douglas W. Diamond and Philip H. Dybvig in 1983.

The model seeks to capture the key elements of a bank's functions. The model highlights the problem of bank run and considers two main parties involved in the bank run process. These parties are depositors and Banks. The model assumes three major time periods which are yesterday, today and tomorrow indicated as T0, T1 and T2.

The above discussion on the financial crisis during 2007-08 indicates that the repurchase agreement was the principle force contributing to the financial crisis as the repo market is one of the fastest and largest growing markets across the globe. However, the role of other money market instruments in the financial crisis cannot be denied as well. The banks and other financial institutions need to take initiatives to prevent the occurrence of such crisis in future.

Banks offer loans that are not possible to be sold at a high price quickly whereas banks issue demand deposits that allow depositors to withdraw money from the bank at any time. This leads to a mismatch of bank's liquidity as the liabilities of the banks are more liquid than the liquidity of the assets. This mismatch in liquidity often leads to bank runs when a large number of depositors approach a bank to withdraw funds. Diamond & Dybvig model explains the reasons why banks prefer to issue deposits that are more liquid than the assets and the causes for bank runs. The model suggests that suspension of convertibility of deposits into cash by banks can help in stopping bank runs. In addition, deposit insurance is yet another tool to stop bank run as it assures customers of getting the deposits back irrespective of the number of depositors approaching a bank for withdrawing

funds.

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