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## ANALYSIS OF LIQUIDITY RISK IN E-BANKING

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### Keywords

Redemption,  
Widespread,  
Withdrawal,  
Monitoring

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### Abstract

*In this study, an attempt is made to analyze the bankers' viewpoint towards the factors responsible for liquidity risk in e-banking, its impacts on the functioning of the banks and the measures for overcoming the risk by the selected public, private and foreign banks in India. A sample of 107, 104 and 100 bank employees is taken on the basis of judgement sampling from different branches of selected public, private and foreign banks respectively located in Haryana, Punjab, Chandigarh and Delhi. The primary data are collected with the help of pre-tested structured questionnaire on five point Likert Scale i.e. Strongly Disagree (SD), Disagree (A), Neutral (N), Agree (A), and Strongly Agree (SA). For coding and analyzing the data, weights are assigned in order of importance i.e. 1 to Strongly Disagree (SD), 2 to Disagree (D), 3 to Neutral, 4 to Agree (A) and 5 to Strongly Agree (SA). Statistical techniques such as mean, mode, standard deviation have been used for the analysis of data. ANOVA technique has been applied to test the hypotheses and validate the results of the study. The analysis shows that sudden increase in demand for redemption of electronic money is considered as the most important factor leading to the liquidity risk in selected banks. Further, bank may incur losses as it seeks to generate more costly sources of funds, more widespread withdrawal of deposits, failure to meet redemption of demands in a timely manner are found significant impacts of liquidity risk on the functioning of the selected public, private and foreign banks respectively. However, investment of funds in liquid assets followed by developing a monitoring system on usage are viewed as the most adopting risk management measures in the selected banks.*

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## **Introduction**

Indian banking sector is in the mid of an IT revolution these days. The public sector banks are in the process of making huge investment in technology. However, new private sector banks and foreign banks have an edge over public sector banks in the implementation of technological solutions. To be successful in this competitive environment, these banks have to take certain steps like cost reduction by economies of scale, better relations with the customers by providing better services and facilities to them. With the help of technology, the banks are now able to offer such products and services, which were difficult or impossible with traditional banking. India has been able to take one step in this direction - physical cash has been replaced by anytime, anywhere money, but these are more pronounced in foreign and private sector banks. The public sector banks are far behind in technology integration. Thus, there is a huge scope for automation in the banking industry ([www.centralbank.ie](http://www.centralbank.ie)). The service based areas of banks have perhaps been the largest beneficiary of e-banking. ATMs, credit cards, internet banking, mobile banking which are already widely used around the world, have yet to reach their full potential in India. These services and products are all expected to grow in the coming years. No doubt, e-banking provides so many benefits, but face to face contact between the bank and the customer is absent in e-banking transactions, which causes most of the problems like credit card frauds, fraud of internet, etc. Rising competition is forcing the banks to find innovative ways to reduce the cost of transactions and increase the profitability. Technology has been one of the major enabling factors for enhancing the customer convenience in the products and services offered by the various banks and help in enhancing service range but the security of the transactions is a major concern. While it mitigates some risks, but induces some risks also, which are highly interdependent and events that affect one area of risk also have ramifications for a range of other risk categories (*Singh, 2015*).

## **Review of Literature**

Various articles appeared in different journals on varied aspects of e-banking, which are restrictive in nature and do not give a comprehensive picture. *Ahmad et. al. (2010)* discussed the security issues on banking systems and stated that banking system intrusion shows the vulnerabilities that exist in financial institution and have been used by those illegal and unauthorized individuals or groups to intrude an area with secure environment.

With the developing of high technology and information system around the world, banking system should not be left behind in terms of security system and should keep a sharp eye when there is any vulnerability in authentication and authorization that may lead to confidentiality, availability and integrity issues. *Fatima (2011)* concluded that biometric based authentication and identification systems are the new solutions to address the issues of security and privacy. One thing that can be said with certainty about the future of the biometrics industry is that it is growing. Biometrics is finding its ways into all kinds of applications beyond access control. It is expected that more and more information systems/computer networks will be secured with biometrics with the rapid expansion of internet and intranet. *Adewuyi (2011)* concluded that the adoption of TCT has influenced the content and quality of banking operations and presented a great potential for business re-engineering of Nigerian banks. Thus, investment in ICT should form an important component in the overall strategy of banking operation to ensure effective performance. *Mermud (2011)* analyzed the internet bank branches in Turkey with regard to many dimensions and found that online customers admit that internet bank branches are safe and cheaper and understandable and saving extra time. Internet banking usage rate have increased in the last years, depending on the increase of educated users. The usage rate of the internet banking is significantly related with the education levels. Education and also income level makes an important difference in the usage of internet banking facilities. *Karimzadeh and Alam (2012)* examined the e-banking challenges in India and concluded that legal and security, socio-cultural and management, banking issues are accepted as challenges for the development of e-banking. But there is less awareness regarding new technologies and unsuitable software which are ranked respectively as the highest and lowest obstacles in India. *Osunmuyiwa (2013)* examined the various aspects of online banking risks, the risk management methods employed in mitigating these risks and recommended that banks that carry out online banking clearly should explain the privacy rule and communicate it to their clients.

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Banks can also make use of materials like vendor oversight, assignment sheet; excel spreadsheet for risk assessment for policies amongst so many created from a range of date resources to carry out data safekeeping. *Singh and Chaudhry (2014)* analyzed the bankers' viewpoint towards various types of e-banking risks in selected public, private and foreign banks in India. The operational risk is found as the most important risk in e-banking in all the three categories of banks followed by reputational and legal risk, whereas strategic risk was considered as the least important risk in all the selected banks.

With this background, an attempt is made to examine the various aspects of liquidity risk in e-banking in selected public, private and foreign banks in India, which is the risk of losses due to inability of the bank to fulfill its obligations in full extent and arises as a result of misbalance in bank's assets and liabilities (including the case of untimely fulfillment of financial liabilities by one or several counterparties of the credit organization) and/or unforeseen necessity of immediate and one-off fulfillment by the bank of its financial liabilities.

### **Scope of the Study**

The present study is confined to the analysis of liquidity risk in e-banking in selected public, private and foreign banks in Haryana, Delhi, Chandigarh and Punjab.

### **Objectives of the Study**

The main objective of the study is to examine the various aspects of liquidity risk in e-banking in selected banks. In this broader framework, the following are the specific objectives of the study:

- (1) To analyze the factors leading to liquidity risk in e-banking in the selected banks.
- (2) To examine the impacts of liquidity risk in e-banking on the functioning of the selected banks.
- (3) To appraise the measures for overcoming the liquidity risk in e-banking in the selected banks.

### **Research Hypotheses**

The following hypotheses have been formulated and tested to validate the results of the study:

**H<sub>01</sub>:** There is no significant difference among the bankers' viewpoint towards the factors leading to the liquidity risk in e-banking in the selected banks.

**H<sub>02</sub>:** There is no significant difference among the bankers' viewpoint towards the impacts of liquidity risk in e-banking on the functioning of the selected banks.

**H<sub>03</sub>:** There is no significant difference among the bankers' viewpoint towards the measures to overcome the liquidity risk in e-banking in the selected banks.

### **Sample Profile and Data Collection**

For collecting data, all the banks have been divided into three categories *i.e.* public, private and foreign banks. A sample of 375 respondents (bankers) is taken from the various branches of the selected banks (125 respondents from each group). As the present study is of analytical and exploratory in nature and therefore use is made of primary data only, which are collected with the help of pre-tested structured questionnaire on five point Likert Scale *i.e.* Strongly Disagree (SD), Disagree (A), Neutral (N), Agree (A), and Strongly Agree (SA). After examination, 107 questionnaires from public sector banks, 104 from private sector banks and 100 from foreign banks were found complete and used for further analysis. Besides questionnaire, interviews and discussion techniques were also used to unveil the information.

### **Data Analysis**

The collected data were analyzed through descriptive statistical techniques like frequency distribution, percentage, mean, mode, standard deviation with the help of PASW 18.0 version. For coding and analyzing the data, weights are assigned in order of importance *i.e.* 1 to Strongly Disagree (SD), 2 to Disagree (D), 3 to Neutral, 4 to Agree (A), and 5 to Strongly Agree (SA). ANOVA technique was employed to test the hypotheses and validate the results.

### **Results and Discussions**

#### **(A) Factors Leading to Risk**

The factors leading to the liquidity risk in the selected banks are given in Table 1 (A) and 1 (B).

#### **Public Sector Banks**

59 respondents (55.1 per cent) put the sudden increase in demand for redemption of electronic money (Mean = 4.18, S.D. = 0.711) at the top as a factor leading to the liquidity risk, whereas it may be a problem for the banks who are specialized in electronic money schemes (Mean = 3.65, S.D. = 0.902) is considered as the next important factor by 53 respondents (49.5 per cent).

**Private Sector Banks**

60 respondents (57.7 per cent) put the sudden increase in demand for redemption of electronic money (Mean = 4.20, S.D. = 0.644) at the top as an important factor leading to the liquidity risk, whereas it may be a problem for banks who are specialized in electronic money schemes (Mean = 3.99, S.D. = 0.770) is considered as the next important factor by 60 respondents (57.7 per cent).

**Table 1 (A): Factors Leading to Liquidity Risk**

Factors	N/P	Public Sector Banks					Private Sector Banks					Foreign Banks				
		SD	D	I	A	SA	SD	D	I	A	SA	SD	D	I	A	SA
Sudden increase in demand for redemption of e-money	N	0	3	10	59	35	0	1	10	60	33	2	5	6	53	34
	P	0	2.8	9.3	55.1	32.7	0	1.0	9.6	57.7	31.7	2.0	5.0	6.0	53.0	34.0
May be a Problem for banks who are specialized in e-money schemes	N	2	3	15	53	34	1	3	16	60	24	2	6	9	60	23
	P	1.9	2.8	14.0	49.5	31.8	1.0	2.9	15.4	57.7	23.1	2.0	6.0	9.0	60.0	23.0

**Note:** N/P = Number of Respondents/Percent.

**Source:** Survey

**Table 1 (B): Factors Leading to Liquidity Risk**

Factors	Public Sector Banks			Private Sector Banks			Foreign Banks			ANOVA	
	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	F (df=2,308)	Sig.
Sudden increase in demand for redemption of e-money	107	4.18	0.711	104	4.2	0.644	100	4.12	0.879	0.320	0.726
May be a Problem for banks who are specialized in e-money schemes	107	4.07	0.861	104	3.99	0.77	100	3.96	0.864	0.444	0.642

**Note:** N = Number of Respondents, S.D. = Standard Deviation.

**Source:** Survey

### **Foreign Banks**

53 respondents (53.0 per cent) put the sudden increase in demand for redemption of electronic money (Mean = 4.12, S.D. = 0.879) at the top and considered it as the most important factor leading to the liquidity risk, whereas it may be a problem for banks who are specialized in electronic money schemes (Mean = 3.96, S.D. = 0.864) is found as the next important factor by 60 respondents (60.0 per cent).

The results of ANOVA in Table 1 (B) show that there is no significant difference among the bankers' viewpoint towards the factors leading to the liquidity risk at 5 percent level of significance. Therefore, the null hypothesis ( $H_{01}$ ) is accepted.

### **(B) Impacts of Risk**

The impacts of liquidity risk on the functioning of the selected banks are shown in Table 2 (A) and 2 (B).

### **Public Sector Banks**

Bank may incur losses as it seeks to generate more costly sources of funds (Mean = 4.17, S.D. = 0.720) is viewed by 63 respondents (58.9 per cent) as the most significant impact on these banks. Reputational damage (Mean = 4.10, S.D. = 0.931) is considered as the next significant impact by 47 respondents (42.9 per cent), whereas widespread withdrawal of deposits (Mean = 3.78, S.D. = 0.955) is viewed as the third impact by 50 respondents (46.7 per cent). On the other hand, widespread redemption of electronic money (Mean = 3.77, S.D. = 0.853) is found as the next impact by 57 respondents (53.3 per cent). However, failure to meet redemption of demands in a timely manner (Mean = 3.67, S.D. = 0.855) is considered as the least important impact by 55 respondents (51.4 per cent).

**Table 2 (A): Impacts of Liquidity Risk on Banks**

Impacts	N/P	Public Sector Banks					Private Sector Banks					Foreign Banks				
		SD	D	I	A	SA	SD	D	I	A	SA	SD	D	I	A	SA
Bank may incur losses as it seeks to generate more costly source of funds	N	1	2	8	63	33	1	3	6	74	20	5	13	13	47	22
	P	.9	1.9	7.5	58.9	30.8	1.0	2.9	5.8	71.2	19.2	5.0	13.0	13.0	47.0	22.0
Widespread withdrawal of deposits	N	3	7	24	50	23	0	2	17	48	37	7	6	11	59	17
	P	2.8	6.5	22.4	46.7	21.5	0	1.9	16.3	46.2	35.6	7.0	6.0	11.0	59.0	17.0
Widespread redemption of electronic money	N	3	3	27	57	17	1	7	15	63	18	3	13	14	52	18
	P	2.8	2.8	25.2	53.3	15.9	1.0	6.7	14.4	60.6	17.3	3.0	13.0	14.0	52.0	18.0
Failure to meet redemption of demands in a timely manner	N	2	7	29	55	14	0	3	18	70	13	3	7	11	54	25
	P	1.9	6.5	27.1	51.4	13.1	0	2.9	17.3	67.3	12.5	3.0	7.0	11.0	54.0	25.0
Reputational damage	N	3	3	14	47	40	1	2	29	47	25	6	6	16	49	23
	P	2.8	2.8	13.1	43.9	37.4	1.0	1.9	27.9	45.2	24.0	6.0	6.0	16.0	49.0	23.0

**Note:** N/P = Number of Respondents/Percent.

**Source:** Survey

**Private Sector Banks**

Widespread withdrawal of deposits (Mean = 4.15, S.D. = 0.760) is found by 48 respondents (46.2 per cent) as the most significant impact on these banks, whereas the bank may incur losses as it seeks to generate more costly sources of funds (Mean= 4.05, S.D. = 0.674) is viewed as the next significant impact as per the opinion of 74 respondents (71.2 per cent). On the other hand, failure to meet redemption of demands in a timely manner (Mean = 3.89, S.D. = 0.637) by 70 respondents (67.3 per cent) and reputational damage (Mean = 3.89, S.D. = 0.823) by 47 respondents (45.2 per cent) are considered as the next significant impacts. However, widespread redemption of electronic money (Mean = 3.87, S.D. = 0.813) is found as the least significant impact by 63 respondents (60.6 per cent).



**Table 2 (B): Impacts of Liquidity Risk on Banks**

Impacts	Public Sector Banks			Private Sector Banks			Foreign Banks			ANOVA	
	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	F (df=2,308)	Sig.
Bank may incur losses as it seeks to generate more costly sources of funds	107	4.17	0.72	104	4.05	0.674	100	3.68	1.109	9.129	0.000*
Widespread withdrawal of deposits	107	3.78	0.955	104	4.15	0.76	100	3.73	1.043	6.534	0.002*
Widespread redemption of e-money	107	3.77	0.853	104	3.87	0.813	100	3.69	1.012	0.987	0.374
Failure to meet redemption demands in a timely manner	107	3.67	0.855	104	3.89	0.637	100	3.91	0.954	2.715	0.068
Reputational damage	107	4.1	0.931	104	3.89	0.823	100	3.77	1.062	3.314	0.038*

**Note:** N = Number of Respondents, S.D. = Standard Deviation, \*= Significant at 0.05 level of significance

**Source:** Survey

**Foreign Banks**

Failure to meet redemption of demands in a timely manner (Mean = 3.91, S.D. = 0.954) is considered as the most significant impact by 54 respondents (54.0 per cent), whereas reputational damage (Mean = 3.77, S.D. = 1.062) is found as the next potential impact as per the opinion of 49 respondents (49.0 per cent). On the other hand, widespread withdrawal of deposits (Mean = 3.73, S.D. = 1.043) is viewed as the next potential impact by 59 respondents (59.0 per cent). Widespread redemption of electronic money (Mean = 3.69, S.D. = 1.012) is found by 52 respondents (52.0 per cent) as the next potential impact. However, the bank may incur losses as it seeks to generate more costly sources of funds (Mean = 3.68, S.D. = 1.109) is considered as the least potential impact as per the responses of 47 respondents (47.0 per cent).

The results of ANOVA in Table 2 (B) show that there is a significant difference among the bankers’ viewpoint towards the bank may incur losses as it seeks to generate more costly sources of funds ( $p=0.00$ ,  $df=2$ , 308), widespread withdrawal of deposits ( $p=0.002$ ,  $df=2$ , 308) and reputational damage ( $p=0.038$ ,  $df=2$ , 308) as factors leading to liquidity risk at 5 percent level of significance. Therefore, the null hypothesis ( $H_{02}$ ) is rejected.

**(C) Measures to Overcome the Risk**

The measures to overcome the liquidity risk in the selected banks are given in Table 3 (A) and 3 (B).

**Public Sector Banks**

Investment of funds in liquid assets (Mean = 4.55, S.D. = 0.662) is found as the most adopting measure by 68 respondents (63.6 per cent) in these banks, whereas developing a monitoring system on usage (Mean = 4.27, S.D. = 0.808) is considered as the second most adopting measure as per the opinion of 49 respondents (45.8 per cent). On the other hand, conducting regular and comprehensive audits (Mean = 3.98, S.D. = 0.801) is viewed as the least adopting measure as viewed by 54 respondents (50.5 per cent).

**Table 3 (A): Measures to Overcome Liquidity Risk**

Measures	N/P	Public Sector Banks					Private Sector Banks					Foreign Banks				
		SD	D	I	A	SA	SD	D	I	A	SA	SD	D	I	A	SA
Investment of funds in liquid assets	N	0	1	7	31	68	1	1	4	24	74	4	9	12	42	33
	P	0	0.9	6.5	29.0	63.6	1.0	1.0	3.8	23.1	71.2	4.0	9.0	12.0	42.0	33.0
Developing a monitoring system on usage	N	0	4	12	42	49	1	0	10	41	52	4	11	14	51	20
	P	0	3.7	11.2	39.3	45.8	1.0	0	9.6	39.4	50.0	4.0	11.0	14.0	51.0	20.0
Conducting regular and comprehensive audits	N	0	5	20	54	28	0	4	12	55	33	8	5	12	53	22
	P	0	4.7	18.7	50.5	26.2	0	3.8	11.5	52.9	31.7	8.0	5.0	12.0	53.0	22.0

**Note:** N/P = Number of Respondents/Percent

**Source:** Survey

**Table 3 (B): Measures to Overcome Liquidity Risk**

Measures	Public Sector Banks			Private Sector Banks			Foreign Banks			ANOVA	
	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	F (df=2,308)	Sig.
Investment of funds in liquid assets	107	4.55	0.662	104	4.63	0.699	100	3.91	1.083	22.730	0.000*
Developing a monitoring system on usage	107	4.27	0.808	104	4.38	0.74	100	3.72	1.036	16.738	0.000*
Conducting regular and comprehensive audits	107	3.98	0.801	104	4.13	0.759	100	3.76	1.102	4.279	0.015*

N = Number of Respondents, S.D. = Standard Deviation, \*= Significant at 0.05 level of significance

**Source:** Survey

### **Private Sector Banks**

Investment of funds in liquid assets (Mean = 4.63, S.D. = 0.699) is found as the most adopting measure by 74 respondents (71.2 per cent) in these banks, whereas developing a monitoring system on usage (Mean = 4.38, S.D. = 0.740) is viewed as the second most adopting measure as per the opinion of 52 respondents (50.0 per cent). On the other hand, conducting regular and comprehensive audits (Mean = 4.13, S.D. = 0.759) is considered as the next best adopting measure as viewed by 55 respondents (52.9 per cent).

### **Foreign Banks**

Investment of funds in liquid assets (Mean = 3.91, S.D. = 1.083) is viewed as the most adopting measure by 42 respondents (42.0 per cent) in these banks, whereas developing a monitoring system on usage (Mean = 3.72, S.D. = 1.036) is considered as the second most adopting measure as per the opinion of 51 respondents (51.0 per cent). On the other hand, conducting regular and comprehensive audits (Mean = 3.76, S.D. = 1.102) is found as the least adopting risk management measure by 53 respondents (53.0 per cent).

The results of ANOVA in Table 3 (B) show that there is a significant difference among the bankers' viewpoint towards the investment of funds in liquid assets ( $p=0.00$ ,  $df=2$ , 308), developing a monitoring system on usage ( $p=0.002$ ,  $df=2$ , 308) and conducting regular and comprehensive audits ( $p=0.015$ ,  $df=2$ , 308) at 0.05 level of significance as measures for overcoming the risk of liquidity risk. Therefore, the null hypothesis ( $H_{03}$ ) is rejected.

### **CONCLUSIONS**

To sum up, sudden increase in demand for redemption of electronic money is considered as the most important factor leading to the liquidity risk in selected banks. Further, bank may incur losses as it seeks to generate more costly source of funds, more widespread withdrawal of deposits, failure to meet redemption of demands in a timely manner are found significant impacts of liquidity risk on the functioning of the selected public, private and foreign banks respectively. However, investment of funds in liquid assets followed by developing a monitoring system on usage are viewed as the top most adopting measures for overcoming the risk of liquidity risk in the selected banks.

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