Impact of Government Borrowing on Bank Liquidity Crisis: *An Econometric Analysis*

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Abstract: *This paper attempts to reveal the ultimate determinants affecting the recent liquidity position of commercial banks in Bangladesh. The whole scenario is presented through focusing on the various elements affecting the liquidity position in commercial banks over a period of time. This liquidity position of commercial banks is affected by many macro economic variables such as savings and investment, distribution of credit, interest rates and economic growth. The models developed in this paper divulge that some of the determinants such as share price Index, overall investment position of commercial banks, M_2 Currency, overall classified loans of commercial banks and outstanding amount of L/C significantly affect the liquidity position of commercial banks in Bangladesh. Although net government borrowing from banking sector also affects the liquidity position of commercial banks through creating crowding-out effect for private investors, the models mentioned in this study reveal that net government borrowing is not individually significant in explaining liquidity position of commercial banks rather this net government borrowing along with other variables is jointly significant in explaining liquidity position. As a corollary, this paper examines whether the so-called Government borrowing in recent years may cause the liquidity crisis in commercial banks of Bangladesh.*

Keywords: *Liquidity position (LP), Investment (INV), Classified loan (CL), Outstanding amount of letter of credit (OULC), Net government borrowing (NGB), Cash reserve ratio (CRR), M_2, Rescheduling, Loan against trust receipt (LTR)*

1. Introduction:

A liquid financial firm either has the right amount of immediately spendable funds on hand when they are required or can raise liquid funds in timely fashion by borrowing or selling assets. The main sources of funds of commercial banks are deposits (Liability of banks) that are applied (used) to provide credit to different clients in business & industry (borrowers) as advances (assets of banks). So bank deposits and credits have important responsibility on liquidity position which can be regulated through asset and liability management of a bank. Banks can exert indirect influence on deposits and advances

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through regulating interest rates (deposit & lending rate). The task of regulating the liquidity position of commercial banks depends on the degree of sensitivity of deposits and advances to interest rate. The government and the monetary authority can influence directly the overall liquidity scenario in commercial banks. In Bangladesh the totality of liquidity is indicated by what is called "broad money". A shortage of money restricts demand by making it more difficult to engage in transactions. This study analyzes the major reasons that depict why the shortage of broad money has been occurred in the recent money market of Bangladesh.

2. Literature Review:

According to **Aspachs et al. (2005),** there are some mechanisms that banks can use to insure against liquidity crises: banks hold buffer of liquid assets on the asset side of the balance sheet. A large enough buffer of assets such as cash, balances with central banks and other banks, debt securities issued by governments and similar securities or reverse repo trades reduce the probability that liquidity demands threaten the viability of the bank.

The second strategy is connected with the liability side of the balance sheet. Banks can rely on the interbank market where they borrow from other banks in case of liquidity demand. However, this strategy is strongly linked with market liquidity risk.

The last strategy concerns the liability side of the balance sheet, as well. The central bank typically acts as a Lender of Last Resort to provide emergency liquidity assistance to particular illiquid institutions and to provide aggregate liquidity in case of a system-wide shortage.

Bank-specific and macroeconomic determinants of liquidity of English banks were studied by **Valla and Saes-Escorbiac (2006)**. They assumed that the liquidity ratio as a measure of the liquidity should be dependent on following factors (estimated influence on bank liquidity in parenthesis): probability of obtaining the support from lender of last resort, which should lower the incentive for holding liquid assets (-), interest margin as a measure of opportunity costs of holding liquid assets (-), bank profitability, which is according to finance theory negatively correlated with liquidity (-), loan growth, where higher loan growth signals increase in illiquid assets (-), size of the bank (?), gross domestic product growth as an indicator of business cycle (-), short term interest rate, which should capture the monetary policy effect (-).

Determinants of liquidity risk of banks from emerging economies with panel data regression analysis are analyzed by **Bunda and Desquilbet (2008)**. The liquidity ratio as

a measure of bank's liquidity assumed to be dependent on individual behaviour of banks, their market and macroeconomic environment and the exchange rate regime, i.e. on following factors:

Total assets as a measure of the size of the bank (-), the ratio of equity to assets as a measure of capital adequacy (+), the presence of prudential regulation, which means the obligation for banks to be liquid enough (+), the lending interest rate as a measure of lending profitability (-), the share of public expenditures on gross domestic product as a measure of supply of relatively liquid assets (+), the rate of inflation, which increases the vulnerability of banks to nominal values of loans provided to customers (+),the realization of a financial crisis, which could be caused by poor bank liquidity (-), the exchange rate regime, where banks in countries with extreme regimes (the independently floating exchange rate regime and hard pegs) were more liquid than in countries with intermediate regimes.

The empirical analysis of the hypothesis that interest rates affect banks' risk taking and the decision to hold liquidity across European countries has been proved by **Lucchetta (2007).** The liquidity measured by different liquidity ratios should be influenced by: behavior of the bank on the interbank market – the more liquid the bank is the more it lends in the interbank market (+), interbank rate as a measure of incentives of banks to hold liquidity (+), monetary policy interest rate as a measure of banks ability to provide loans to customers (-), share of loans on total assets and share of loan loss provisions on net interest revenues, both as a measure of risk-taking behavior of the bank, where liquid banks should reduce the risk-taking behavior(-).

The effects of the financial crisis on the liquidity of commercial banks in Latin America and Caribbean countries investigated **Moore (2010).** According to him, Liquidity should depend on: cash requirements of customers, captured by fluctuations in the cash-to-deposit ratio (-), current macroeconomic situation, where a cyclical downturn should lower banks' expected transactions demand for money and therefore lead to decreased liquidity (+), money market interest rate as a measure of opportunity costs of holding liquidity (-).

Liquidity created by Germany's state-owned savings banks and its determinants has been analyzed by **Rauch et al. (2010).** According to this study, following factors can determine bank liquidity: monetary policy interest rate, where tightening monetary policy reduces bank liquidity (-), level of unemployment, which is connected with demand for loans (-), savings quota (+), level of liquidity in previous period (+), size of the bank measured by total number of bank customers (-), bank profitability (-).

Entirely unique is the approach of **Fielding (2005).** He considered these determinants of liquidity: level of economic output (+), discount rate (+), reserve requirements (?), cash-to-deposit ratio (-), rate of depreciation of the black market exchange rate (+), impact of economic reform (-), violent political incidence (+).

Studies cited above suggest that commercial banks' liquidity is determined both by bank specific factors (such as size of the bank, profitability, capital adequacy and factors describing risk position of the bank) as well as macroeconomic factors (such as different types of interest rates, interest margin or indicators of economic environment). It can be useful to take into account some other influences, such as the realization of financial crisis, changes in regulation or political incidents.

3. Objective:

The fundamental objective of this paper is to decide whether the so called government borrowing can be a major determinant of adjusting liquidity position of commercial banks in Bangladesh.

4. Methodology:

The fundamental objective of this paper is to decide whether the so called government borrowing can be a major determinant of adjusting liquidity position of commercial banks in Bangladesh.

4.1 Research Type:

This is a descriptive research which is relevant to an inquisitive study as it requires some analysis on the reasons accelerating recent liquidity crisis in commercial banks of Bangladesh. It also includes the detailed analysis of econometric models used to reveal whether government borrowing may significantly affect the recent liquidity crisis in commercial banks of Bangladesh. In another part, this paper reveals the methods taken by Central Bank as well as commercial banks and other respective authorities to combat against this severe liquidity crisis in commercial banks of Bangladesh.

4.2 Types of Data:

Preparing this study requires the use of only secondary data related to numerical value of economic variables such as gross domestic product, net government borrowing (GB), liquidity position (LP), classified loans (CL), outstanding amount of L/C (OULC), DSE general share price index (DSI), overall investment of commercial banks (INV) etc collected from both online and documentary sources as depicted below:

4.3 Data Analysis Tools:

The following Econometric models are used to analyze the effect of economic variables such as gross domestic product, net government borrowing (GB), liquidity position (LP), classified loans (CL), outstanding amount of L/C (OULC), DSE general share price index (DSI), overall investment of commercial banks (INV) on liquidity position(LP) of commercial banks of Bangladesh as depicted below:

➢ **Model 01: LP**= $a_o+\gamma_1(SPI)+\gamma_2(NGB)+\gamma_3(OULC)+ \mu$

Where,

SPI= General share Price Index

NGB= Net Government Borrowing

OULC = Outstanding amount of L/C

γ_1= coefficient of General share Price Index (SPI)

γ_2= coefficient of Net Government Borrowing (NGB)

γ_3= coefficient of Outstanding amount of L/C (OULC)

μ= standard error of estimate

➢ **Model 02:** $LP = a_o+\gamma_1(SPI)+\gamma_2(NGB)+\gamma_3(INV)+\mu$

Where,

SPI= General share Price Index

NGB= Net Government Borrowing

INV= Overall Investment of Commercial Banks

$\gamma_1, \gamma_2, \gamma_3$ are coefficients of SPI, NGB and INV respectively

μ= standard error of estimate

➢ **Model 03:** LP= $a_o+\gamma_1(OULC)+\gamma_2(NGB)+\gamma_3(CL)+ \mu$

Where,

CL = Classified Loans

$\gamma_1, \gamma_2, \gamma_3$ are coefficients of OULC, NGB and CL respectively

μ= standard error of estimate

➢ **Model 04:** LP= $a_o+\gamma_1(NGB)+\gamma_2(OULC)+\gamma_3(M_2)+ \mu$

Where,

M_2= Broad Money; $\gamma_1, \gamma_2, \gamma_3$ are coefficients of OULC, NGB and CL respectively.
μ= standard error of estimate

5. Liquidity Position of Scheduled Banks:

Central Bank controls the liquidity position in the economy by the cash reserve ratio (CRR) and statutory liquidity ratio (SLR). In the recent monetary policy, central bank has increased the CRR and SLR ratio. Increase of excessive investments in the unproductive sectors such as consumer products and luxurious goods, real estate, and the capital markets etc. creates the stress on liquidity. In this situation, central bank is supplying liquidity help by REPO. As of June 2010, the total liquid assets of the schedule banks were **Tk. 87196.61 crore**. By the end of June 2011, this went up by Tk. 100564.96 crore. Currently, the amount of required liquidity SLR is BDT 66493.75 crore. The excess liquidity of the schedule banks decreased by Tk. 34071.21 core in June 2011 against BDT 34498.73 crore in June 2010 that means it decreased by 1.23 percent in 2011. Banks hold cash in tills and the excess cash reserves with the BB (which is around 10 percent of total liquidity) to meet immediate cash withdrawal needs of customers. Balance with Bangladesh Bank and unencumbered approved securities that are 6.58, 36.10 and 57.32 percent of the total liquidity assets.

### Table-01: Liquidity position of Money Market in Bangladesh

(Tk. in crore)

Bank Group	As of end June, 2011		As of end February, 2012[P]				
	Total Liquid Assets	Required Liquidity (SLR)	Cash in tills+ balances with Sonali Bank	Balances with Bangladesh Bank	Unencumbered approved securities	Total Liquid Assets	Required Liquidity (SLR)
1	2	3	4	5	6	7=(4+5+6)	8
State owned Banks	30146.85	19228.08	1199.13	7316.21	26260.90	34776.24	21557.42
Private Banks (Other than Islamic)	47857.65	34591.75	3474.95	14568.89	36254.42	54298.26	37889.78
Private Banks (Islamic)	13418.07	6386.33	1010.77	6532.06	3040.48	10583.31	8532.83
Foreign Banks	7969.63	5273.29	447.23	4945.56	4284.15	9676.94	5579.85
Specialised Banks*	1172.76	1014.30	222.80	1370.34	928.60	2521.74	2149.73
Total	100564.96	66493.75	6354.88 (+5.68)	34733.06 (+31.05)	70768.55 (+63.27)	111856.49	75709.61

Source : Department of Offsite Supervision.

Total liquid assets of the scheduled banks stand higher at Tk.111856.49 crore as of end February, 2012 against Tk.100564.96 crore as of end June, 2011. Required liquidity of the scheduled banks also stands higher at Tk.75709.61 crore as of end February, 2012

against Tk.66493.75 crore as of end June, 2011, Scheduled banks holding of liquid assets as of end February, 2012 in the form of cash in tills & balances with Sonali bank, balances with Bangladesh Bank and unencumbered approved securities are 5.68 percent, 31.05 percent and 63.27 percent respectively of total liquid assets.
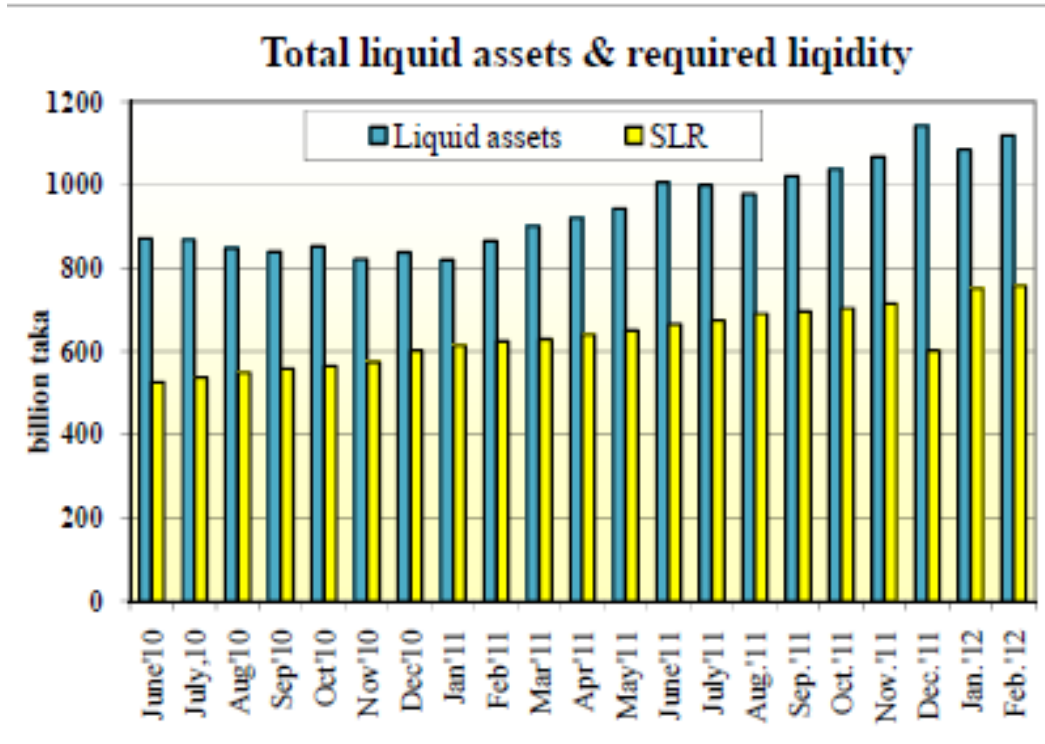
Source: Department of offsite supervision, Bangladesh Bank

6. Causes of Liquidity Crisis in Bangladesh:

The reasons accelerating liquidity crisis during recent years in money market of Bangladesh are revealed below:

6.1 *Depreciation of BDT value against US$:*

In the recent year, our country has experienced a decline in the value of Tk against US currency which has created has huge liquidity crisis in the banking sector. For this reason our country has failed to collect maximum amount of US dollar required to open letter of credit (LC) for local businessmen to import essential commodities for the country. As a result the importer is facing a severe crisis in their business.

Period	Exchange rate with US$		Appreciation / Depreciation (% Change)
	Period Average (BDT value Per $)	End Period (BDT value Per $)	
1993-94	40.00	40.25	-1.12
1994-95	40.20	40.10	0.37
1995-96	40.84	41.75	-3.95
1996-97	42.70	43.65	-4.35
1997-98	45.46	46.30	-5.72
1998-99	48.06	48.50	-4.54
1999-00	50.31	51.00	-4.90
2000-01	53.96	57.00	-10.53
2001-02	57.43	57.90	-1.55
2002-03	57.90	57.90	0.00
2003-04	58.94	60.43	-4.18
2004-05	61.39	63.75	-5.21
2005-06	67.08	69.67	-8.50
2006-07	69.03	68.80	1.26
2007-08	68.60	68.52	0.42
2008-09	68.80	69.06	-0.79
2009-10	69.18	69.45	-0.55
2010-11	71.17	74.15	-6.34
2011-2012 (up to June)	79.10	81.82	-9.38

6.2 *Adjustment in CRR & SLR:*

The banks need to reserve huge amount of money with Bangladesh Bank as it is mandatory for them to maintain the CRR and SLR. BB has recently increased the rate of CRR and SLR as a result the problem of liquidity crisis has been aggravated recently. The central bank during the last December raised the cash reserve requirement (CRR) by six percent for commercial banks. As the increased percentage of CRR and SLR the commercial bank is facing liquidity problem and for this reason to get rid of the problem banks are concentrated to generate more deposits. To generate more deposits they have to increase the deposit rate which has an adverse effect in the society.

6.3 *Adjustment in RM:*

The Reserve Money (RM) is the operating target in the annual monetary programme. The RM consists of currency with the public cash in tills and balances of scheduled banks and other financial institutions with Bangladesh Bank. In FY 2010-11 during July- May, reserve money increased by Tk. 10876.4 crore or 13.51 percent whereas it was Tk. 6286.00 crore or 9.06 percent for the same period of the previous fiscal year. The increase in reserve money occurred mainly for the increase in net domestic assets of Bangladesh Bank which is BDT 12067 crore or 62.50 percent in FY 2010-11 than that of the previous fiscal year.

Table 3: Movements of Reserve Money

Items	Outstanding stock (Crore TK.)				Changes in Outstanding Stocks			
	Jun, 08	Jun, 09	Jun, 10	May, 11	July–May 10/11	July–May 09/10	June–May 10/09	June–May 08/09
	1	2	3	4	5	6	7	8
1. Sources of Reserve money	52789.60	69390.10	80510.3	91386.7	10876.4 (+13.51)	6286.00 (+9.06)	11120.20 (+14.00)	16600.50
a) Net Foreign assets of Bangladesh Bank	32835.8	43244.9	61198.1	60014.30	-1183.8 (-1.934)	16004.30 (37.01)	-1183.80	10409.10
b) Net Domestic assets of Bangladesh Bank	19953.8	26145.2	19305.40	31372.40	12067 (+62.50)	-9717.70 (-37.17)	-6839.80	6191.40
2. Reserve Money (a+b)	52789.60	69390.10	80510.30	91386.70	10876.4 (+13.51)	6286.00 (9.06)	11120.20 (14.00)	16600.50
a) Currency Issued	35648.50	39448.70	50465.40	59170.50	8705.4 (+17.25)	9495.10 (24.07)	11016.70	3800.20
b) Deposits held with BB	17141.10	29941.40	30044.90	32216.20	2171.3 (+7.23)	-3208.50 (-10.72)	103.50	12800.30
Reserve money multiplier	4.10	4.27	4.51	4.70	0.19 (+4.21)	0.38	0.24	0.17

Source: Statistics Department, Bangladesh Bank

Reserve money recorded an increase of 16.63 per cent at the end of January, 2012 (y-o-y basis) compared to the increase of 18.73 percent in the corresponding time last year. The increase of reserve money growth occured mainly due to increase in net domestic assets of Bangladesh Bank by Tk. 12587.20 crore or 53.11 per cent. Net foreign assets of Bangladesh Bank are also increased by Tk. 1387.00 crore or 2.30 per cent during the period under report. Reserve money growth is expected to go down further as a

consequence of tightening stance following by BB. Reserve money multiplier increased to 4.83 at the end of January, 2012 from 4.52 of end June, 2011.
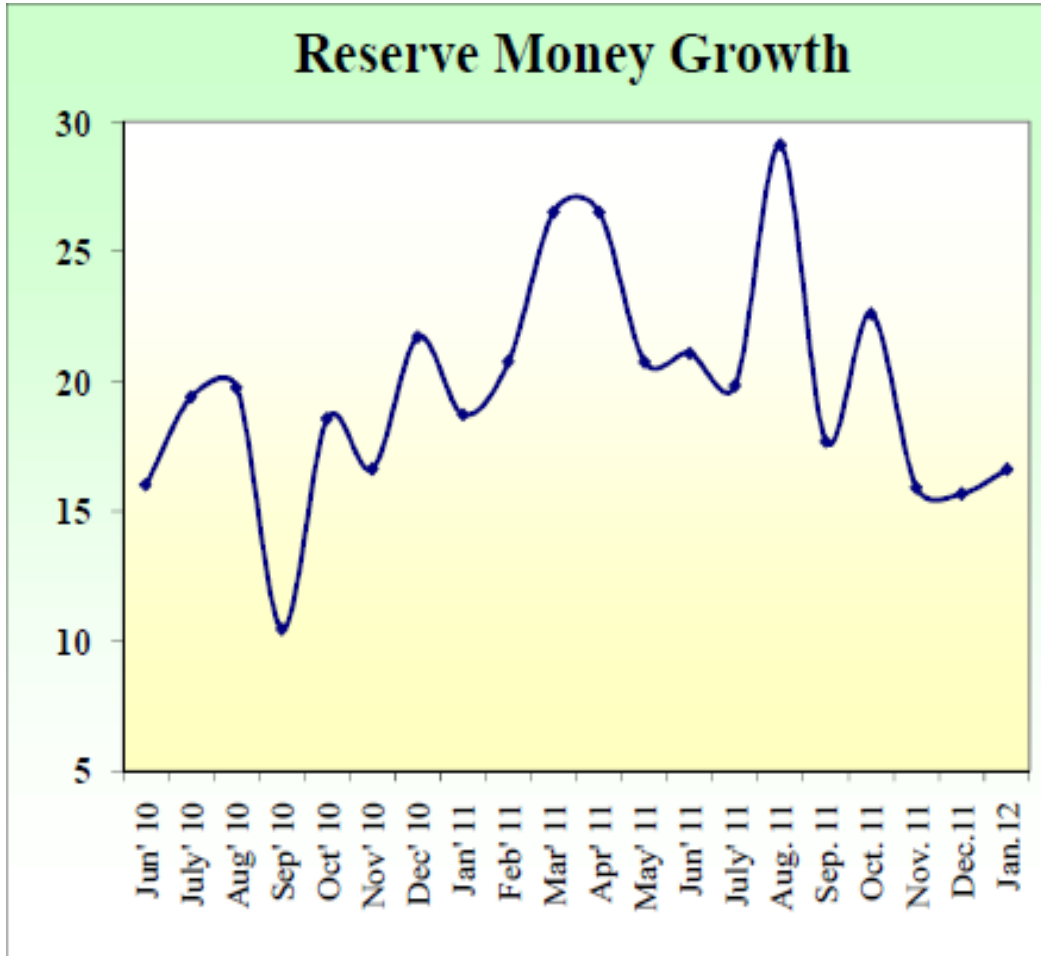
6.4 Government borrowing from the Banking Sector:

Government credit from banking sector that would create extra burden to the country's banking sector and it creates more liquidity crisis in that sector. The government has already borrowed Tk 110 billion from the country's banking sector to meet the existing budget deficit during last 10 months (July 2010 to April 2011), while last year it repaid Tk 87.92 billion loans. In the recent future the commercial banks will be unable to provide loan to the private sector.

(In crore Taka)

Year	Net borrowing of the Govt. from the banking system [1]	Net non-bank borrowing of the Govt. from the public [2]	Total domestic financing	Net foreign financing [3]	Total financing	Total financing as % of GDP[@] at current market price	Outstanding Domestic debt (end of the period)	Total outstanding domestic debt as % of GDP[@] at current market price
1	2	3	4=(2+3)	5	6=(4+5)	7	8	9
2001-2002	2487.10	4711.47	7198.57	5782.82	12981.39	4.75	45181.76	16.54
2002-2003	-1103.10	4795.22	3692.12	6560.78	10252.90	3.41	48873.88	16.26
2003-2004	1246.20	4598.94	5845.14	3597.30	9442.44	2.84	54719.02	16.43
2004-2005	3106.60	2907.56	6014.16	6236.68	12250.84	3.30	60733.18	16.38
2005-2006	5667.80	2758.90	8426.70	7236.80	15663.50	3.77	69159.88	16.64
2006-2007	4937.20	4373.53	9310.73	7591.15	16901.88	3.58	78470.61	16.61
2007-2008	11531.50	4008.68	15540.18	7016.78	22556.96	4.13	94010.79	17.22
2008-2009	10527.40	4405.51	14932.91	7037.17	21970.08	3.57	108943.70	17.72
2009-2010	-4376.00	12256.14	7880.14	10218.86	18099.00	2.62	116823.84	16.92
2010-2011[R]	19384.10	3012.93	22397.03	7470.38	29867.41	3.79	139220.87	17.68
July-January, 2010-11[R]	1027.20	3081.85	4109.05	4539.81	8648.86	-	120932.89	-
July-January, 2011-12[P]	16275.60	986.11	17261.71	4083.86	21345.57	-	156482.58	-

@ : Source-National Accounts Statistics, BBS. P=Provisional ; R=Revised

6.5 *Abnormal long-term financing and unsatisfactory recovery position of short-, medium- and long-term loans:*

The abnormal long-term finance and unsatisfactory recovery position of short-, medium- and long-term loans will adversely affect the liquidity situation. As a corollary, the ultimate reason of liquidity crisis, if any persisting in the financial sector, may be the non-recovery of loans. The overall percentage of recovery of loan is very alarming. By now the state-owned banks have taken many steps to recover their old loans but could not show any improvement. The state-owned public limited companies should give due consideration to waiver of interest. But the businessmen or traders who failed to repay loans due to various reasons cannot afford to bear the burden of huge interest and suit costs. Disbursement of agricultural credit during July-January, 2011-12 was marginally lower by 0.56 percent while recovery increased by 8.72 percent relative to the same period last year. However, disbursement under "non-farm rural credit" (loan for poor rural people for income generating activities) during the same period fell by 30.66

percent. However since micro-finance institutions provide a large share of non-farm rural credit this fall from the formal sector is unlikely to have choked aggregate supply of credit to the non-farm sector.

a. Agricultural credit

(In crore taka)

Month	2011-12^P		2010-11^R	
	Disbursement	Recovery	Disbursement	Recovery
July	469.05	1545.79	683.06	1067.53
August	497.79	492.73	520.34	429.28
September	809.27	633.55	788.32	933.36
October	812.35	796.46	855.89	695.82
November	1153.49	744.96	959.35	846.05
December	1258.97	1161.83	1295.43	1120.53
January	758.89	761.69	689.87	552.25
July - January	5759.80	6137.00	5792.26	5644.81
	(-0.56)	(+8.72)	(+14.06)	(+17.44)

b. Non-farm rural credit

(In crore taka)

Month	2011-12^P		2010-11^R	
	Disbursement	Recovery	Disbursement	Recovery
July - January	915.57	966.59	1320.40	1156.96
	(-30.66)	(-16.45)	(-0.27)	(-8.45)

Overdue & Outstanding:

Year	2011-2012^P			2010-2011^R		
End-Month	overdue	outstanding	overdue as % of outstanding	overdue	outstanding	overdue as % of outstanding
January	6549.75	23772.61	27.55	6731.16	23957.60	28.10
	(-2.70)	(-0.77)		(+7.20)	(+15.39)	

Source: Agricultural Credit Department.

C. Industrial Credit:

Disbursement of industrial term loans during October-December 2011 stands higher at Tk. 9867.84 crore as compared to Tk. 9450.19 crore during October- December 2010. At the same time, recovery of industrial term loans is higher at Tk. 8360.98 crore during October-December 2011 against Tk. 6533.88 crore during October-December, 2010. Overdue of industrial term loans at the end of December, 2011 stands at Tk. 6482.57 crore which was 8.66 per cent of the outstanding position at the end of December, 2011.

According to BB, data to be released by next week, the disbursement of the industrial loans by banks and non-bank financial institutions grew by 3.09 per cent in July-December of this financial year whereas the loan disbursement rose by 30.21 per cent in the same period of the previous financial year. Banks and NBFIs disbursed Tk. 54,162.76 crore as industrial loans in July-December this financial year against Tk. 52,536.77 crore in the first six months of FY 2010-11. The total loan disbursement in July-December of FY 2009-10 was Tk. 40,345.91 crore. The data showed that the growth in recovery of the industrial credit in July-December of FY 2011-12 increased by 17.89 per cent compared to a 32.05-per cent growth in the same period of the previous financial year. The credit recovery in the first half of the current financial year stood at Tk. 47,029.50 crore against Tk. 39,892.70 crore in the same period of the FY 2010-11. The loan recovery in July-December of FY 2009-10 was Tk. 30,208.03 crore.

4.7 Rescheduling of short term loan to Long term loan:

Rescheduling the repayment mode of short term credit to long term debt is another major cause of liquidity crisis in recent years. According to the recent survey, it has been criticized that some of the importers of daily necessary goods have taken short term loan cognizant as LTR (loan against Trust receipt) to finance their import transactions and failed to repay the installment within the repayment schedule of the debt. Banks sanctioning these short term (may be for 60 or 90 days maturity) debts called as LTR are also suffering from liquidity crisis due to not having adequate provisions against these loans if the importers fail to repay the debt within due time. Thousand corers of this type of loan have been rescheduled as the Banks didn't perform any credit analysis while sanctioning the loan. As a consequence, the importers have abused the significance of LTR so that this 3-months short term loan has been rescheduled to 5 years long term loan to defeat the NPL ratio (Non- performing loan to total loan ratio). During the period January-February 2011, information regarding the net amount of LTR (Loan against trust receipt) rescheduled to long term loan although disbursed as short term loan from several banks to finance import transactions are scheduled below:

Period	Name of the Banks	LTR Disbursement	Maturity	% of LTR Disbursement rescheduled to Long term loan
January-February 2011	Sonali Bank Ltd	More than 6000 corer TK	90-120 days	50-60%
January-February 2011	Agrani Bank Ltd	More than 3000 corer TK	90-120 days	40-50%
January-February, 2011	Janata Bank Ltd	More than 4000 corer TK	90-120 days	40-55%
January-February, 2011	EXIM Bank Ltd	More than 1600 corer TK	90-120 days	60%
January-February, 2011	NCC Bank Ltd	More than 1200 corer TK	90-120 days	75%

Source: The Daily prothom-alo: www.prothom-alo.com/print/news/238292

6.6 *Financial scandal of Destiny 2000 Ltd:*

There was almost 5000 corer Taka deposited in 443 bank accounts in favor of 37 institutions operated under Destiny 2000 Ltd. Among this 5000 corer Taka, more than 4975 corer Taka has already been withdrawn and channeled through illegal medium to foreign countries. According to BB report, there are 113 branches of Destiny 2000 Ltd and 20 branches of Destiny Multipurpose Co-operative society Ltd. The recent financial information of Destiny Multipurpose Co-operative society Ltd is depicted below:

Period	Total Assets (in corer TK)	Promotional Expense (in corer TK)
June, 2010	731	Insignificant
June, 2011	999	Insignificant
March, 2012	3350	710

Source: The Daily prothom-alo: www.prothom-alo.com/print/news/238255

According to the above information, it's quite perplexing in viewing that total assets of Destiny 2000 Ltd has been increased drastically as compared to the earlier periods which remains unrevealed to the public. In fact, these types of multipurpose co-operative

institutions drive up the recent liquidity crisis as the public fund has been channeled in favor of the bank accounts of these institutions that consistently withdraw the fund from their accounts and channel the fund to foreign countries through illegal mediums of transactions.

6.7 Maturity mismatch in assets & Liabilities:

In yearly period, the commercial banks perform activities of investment banks, and for investment banks to also perform activities of commercial banks (i.e. to borrow short and to lend long). As a result there is a combination problem of liquidity risk and credit risk and the problem becomes more uncontrollable and severe.

6.8 *Relationship of liquidity with the reserve and call money rate:*

Excess reserve with Bangladesh Bank has been decreased by BDT70 billion in first six months, indicating an active money market.

Figure 1: Excess reserves (BDT bn)

Source: Bangladesh Bank
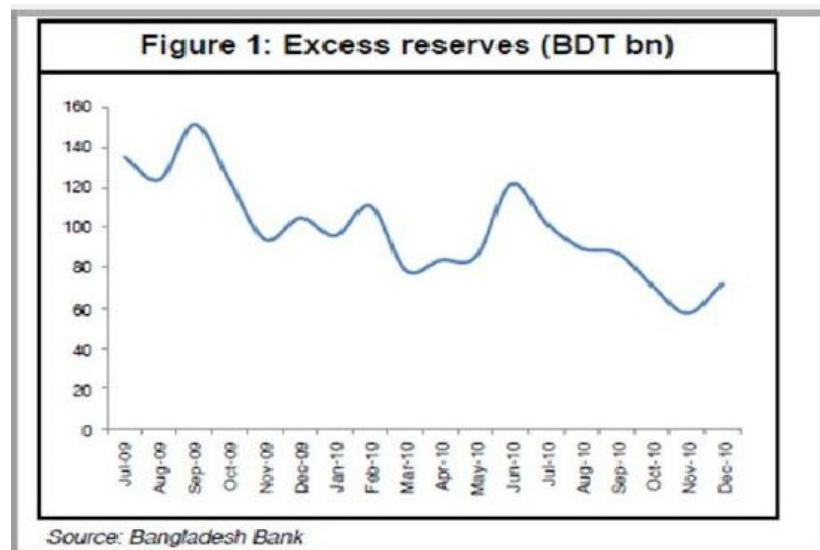
7. Econometric Modeling:

The following econometric models are developed to analyze the degree of effect of each of the economic variables such as gross domestic product, net government borrowing (GB), Liquidity position (LP), classified loans (CL), outstanding amount of L/C (OULC), DSE general Share Price Index (DSI), overall investment of commercial banks (INV) on liquidity position (LP) of commercial banks of Bangladesh:

Variables used in Modeling

Variables	Explanation	Type of Variables
LP	Overall Liquidity position of Commercial Banks	Dependent
SPI	DSE General share Price Index	Independent
M_2	M_1+Time Deposit	Independent
OULC	Outstanding L/C Position of Commercial Banks	Independent
CL	Overall Classified Loan in Commercial Banks	Independent
INV	Overall Investment of Commercial Banks	Independent
NGB	Net Government Borrowing from Banking Sector	Independent

Model 01: $LP = a_o + \gamma_1(SPI) + \gamma_2(NGB) + \gamma_3(OULC) + \mu$

The results along with explanation of this model are summarized below:

Coefficients (Standerdized)	21.609	1.435	-1.267	.874
S.E	.798	.000	.000	.007
t-value	27.085	4.385	-3.443	3.874
p-value	0.000	0.022	0.041	0.030
R	0.949	High degree of positive relationship		
R^2	.901	90.1% of variability in Liquidity Position is explained by all explanatory (independent) variables		
Adjusted R^2	.803			
D-W Value	1.212	Suspects the presence of first order autocorrelation		
Error term (μ)	0.83813	the total amount of error or variability in the dependent variable (Liquidity Position) that can't be explained by the linear effect of the all independent variables		

So, the Model is: **LP**= 216.09+1.435(SPI)-1.267(NGB)+0.874(OULC)+ 0.838

In the above calculated multiple regression equation, **a**= 216.09, $\gamma_{1=}$ 1.435, $\gamma_{2=}$ -1.267 and $\gamma_{3=}$ 0.874

This multiple regression equation reveals that **ŷ(LP)** is dependent on DSE general Share Price Index (SPI), net government borrowing from banking sector and another independent variable named Outstanding L/C position of commercial banks (OULC).

If the coefficients are 0, then we may conclude that the **LP** will be 216.09 regardless of general Share Price Index (SPI), net government borrowing from banking sector and another Outstanding L/C Position of Commercial Banks

The coefficient $\gamma_{1=}$ 1.435 expresses that if DSE general Share Price Index (SPI) increases by 1 percent, **LP** will also be increased by 1.435% ceteris paribas because of existing a **positive relationship** between the share Price Index (SPI) and **LP** along with the condition that the other things especially the other independent variables remain same.

The coefficient $\gamma_{2=}$ -1.267 expresses that if the net government borrowing from Banking Sector NGB increases by 1 percent, **LP** will also be decreased by 1.267% Ceteris Paribas because of prevailing **negative relationship** between the NGB & **LP** along with the condition that the other things especially the other independent variables remain same.

The coefficient $\gamma_{3=}$ 0.874 expresses that if outstanding L/C position of commercial banks (OULC) increases by 1 percent, **LP** will also be increased by 0.874% ceteris paribas because of existing a **positive relationship** between the OULC and **LP** along with the condition that the other things especially the other independent variables remain same.

The **T-test** is used to determine whether each of the individual independent variable is significantly related to the dependent variable. In this model, all values are provided by the SPSS software. Using $\alpha=0.05$, we can deduce that the P-values of all coefficients are less than 0.05. Hence, all parameters are statistically significant in case of individual test regarding the significance of the independent variables separately. As a corollary, three independent variables: NGB, SPI & OULC are individually statistically significant in explaining liquidity position (LP, dependent variable).

ANOVA (Analysis of Variance) for Model 01:

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.270	3	6.423	9.144	.041(a)
	Residual	2.107	3	.702		
	Total	21.377	6			

a Predictors: (Constant), NGB, SPI, OULC

b Dependent Variable: LP

In case of ANOVA (Analysis of variance), the total sum of squares can be divided into two components: the sum of squares due to Regression (SSR) and the sum of squares due to Error (SSE) as shown below:

SST=SSR+SSE.

Where, **SST**= Total sum of squares

SSR= sum of squares due to regression

SSE= sum of errors due to error

If H_0 is rejected, we have enough evidence to deduce that three of the parameters are not equal to zero and that the overall relationship between LP ($\hat{Y}$) and other three independent variables (NGB, SPI & OULC) is significant. However, if H_0 is accepted, we don't have the sufficient evidence to deduce that a significant relationship exists between dependent and independent variables.

If H_0 is accepted, MSR provides an unbiased estimate of σ^2, and the value of MSR or MSE becomes larger. To determine how large values of MSR/MSE must be to reject H_0, we make use of the fact that if H_0 is true and the assumptions about the multiple regression model are valid, the sampling distribution of MSR/MSE is an F-distribution with p degrees of freedom in the numerator and (n-p-1) in the denominator. The summary of F-test is given below:

F= MSR/MSE= 6.423/0.702= 9.144

Moreover, according to P-value, it has been deduced that F-Test rejects null hypothesis (Ho) and expresses that there independent variables (NGB, SPI, OULC) are jointly significant on dependent variable (LP).

Model 02: $LP = a_o + \gamma_1(SPI) + \gamma_2(NGB) + \gamma_3(INV) + \mu$

The results along with explanation of this model are summarized below:

Coefficients (Standerdized)	20.161	3.360	1.393	-3.236
S.E	0.720	0.001	0.010	.008
t-values	27.995	3.987	4.179	-3.471
p-values	0.000	0.028	0.025	0.040
R	0.950	High degree of positive relationship		
R^2	0.903	90.3% of variability in Liquidity Position is explained by all explanatory (independent) variables		
Adjusted R^2	0.805			
D-W Value	2.344	Suspects the presence of first order autocorrelation		
Error term (μ)	0.8326	the total amount of error or variability in the dependent variable (Liquidity Position) that can't be explained by the linear effect of the all independent variables		

So, the estimated model is: *LP=20.161+3.360(SPI)+1.393(NGB)-3.236(INV)+0.8326*

In the above calculated multiple regression equation, **a**= 20.161, $\gamma_{1=}$ 1.435, $\gamma_{2=}$ 1.393 and $\gamma_{3=}$-3.236

This multiple regression equation reveals that **ŷ(LP)** is dependent on DSE general Share Price Index (SPI), net government borrowing from banking sector and another independent variable named overall investment of commercial banks (INV).

If the coefficients are 0, then we may conclude that the **LP** will be 20.161 regardless of general Share Price Index (SPI), net government borrowing from banking sector (NGB) and overall investment of commercial banks (INV).

The coefficient $\gamma_{1=}$ 3.360 expresses that if DSE general Share Price Index (SPI) increases by 1 percent, **LP** will also be increased by 3.360% ceteris paribas because of existing a positive relationship between the share Price Index (SPI) and **LP** along with the condition that the other things especially the other independent variables remain same.

The coefficient $\gamma_2 = 1.393$ expresses that if the net government borrowing from banking Sector NGB increases by 1 percent, **LP** will also be increased by 1.393% ceteris paribas because of prevailing positive relationship between the NGB & **LP** along with the condition that the other things especially the other independent variables remain same.

The coefficient $\gamma_3 = -3.236$ expresses that if overall investment of commercial banks (INV) increases by 1 percent, **LP** will also be decreased by 3.236% ceteris paribas because of existing a inverse relationship between the INV and **LP** along with the condition that the other things especially the other independent variables remain same.

The **T-test** is used to determine whether each of the individual independent variable is significantly related to the dependent variable. In this model, all values are provided by the SPSS software. Using $\alpha=0.05$, we can deduce that the P-values of all coefficients are less than 0.05. Hence, all parameters are statistically significant in case of individual test regarding the significance of the independent variables separately. As a corollary, three independent variables: NGB, SPI & INV are individually statistically significant in explaining the Liquidity position (LP, Dependent variable).

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.297	3	6.432	9.279	.050(a)
	Residual	2.080	3	.693		
	Total	21.377	6			

a Predictors: (Constant), INV, NGB, SPI

b Dependent Variable: LP

In case of ANOVA (Analysis of variance), the total sum of squares can be divided into two components: the sum of squares due to Regression (SSR) and the sum of squares due to Error (SSE) as shown below:

SST=SSR+SSE.

Where, **SST**= Total sum of squares

SSR= sum of squares due to regression

SSE= sum of errors due to error

if H_0 is rejected, we have enough evidence to deduce that three of the parameters are not equal to zero and that the overall relationship between LP ($\hat{Y}$) and other three

independent variables (NGB, SPI & INV) is significant. However, if H_0 is accepted, we don't have the sufficient evidence to deduce that a significant relationship exists between dependent and independent variables.

Before interpreting the F-test, we need to know the concept of **Mean Square.** In the multiple regression models, SST has (n-1) degrees of freedom, SSR has p (number of independent variables) degrees of freedom and SSE has (n-p-1) degrees of freedom. Hence, the mean square due to regression (**MSR**) is SSR divided by p and the mean sum of square due to error (**MSE**) is SSE divided by (n-p-1).

If H_0 is accepted, MSR provides an unbiased estimate of σ^2, and the value of MSR or MSE becomes larger. To determine how large values of MSR/MSE must be to reject H_0, we make use of the fact that if H_0 is true and the assumptions about the multiple regression model are valid, the sampling distribution of MSR/MSE is an F-distribution with p degrees of freedom in the numerator and (n-p-1) in the denominator. The summary of F-test is given below:

F= MSR/MSE= 6.423/0.693= 9.279

Moreover, According to P-value, it has been deduced that F-Test rejects Null Hypothesis (Ho) and expresses that there independent variables (NGB, SPI, INV) are jointly significant in explaining dependent variable (LP).

Model 03: LP= $a_o+\gamma_1(OULC)+\gamma_2(NGB)+\gamma_3(CL)+\mu$

The results along with explanation of this model are summarized below:

Coefficients (Standerdized)	13.913	-2.211	0.661	2.333
S.E	2.093	0.000	0.007	0.029
t-values	6.647	-3.649	2.919	4.041
p-values	0.007	0.036	0.062	0.027
R	0.942	High degree of positive relationship		
R^2	0.887	88.7% of variability in Liquidity Position is explained by all explanatory (independent) variables		
Adjusted R^2	0.773			
D-W Value	2.557	Suspects the presence of first order autocorrelation		
Error term (μ)	0.8988	the total amount of error or variability in the dependent variable (Liquidity Position) that can't be explained by the linear effect of the all independent variables		

So, the Model is: LP= 13.913-2.211(OULC)+0.661(NGB)+2.33(CL)+ 0.8988

In the above calculated multiple regression equation, **a**= 13.913, $\gamma_{1=}$ -2.211, $\gamma_{2=}$ 0.661 and $\gamma_{3=}$ 2.33

This multiple regression equation reveals that **ŷ(LP)** is dependent on outstanding L/C position of commercial banks (OULC), net government borrowing from Banking Sector (NGB) and another independent variable named overall classified loan in commercial banks (CL).

If the coefficients are 0, then we may conclude that the **LP** will be 13.913 regardless of outstanding L/C position of commercial banks (OULC), net government borrowing from banking sector (NGB) and overall classified loan in commercial banks (CL).

The coefficient $\gamma_{1=}$ -2.211 expresses that if outstanding L/C position of commercial Banks (OULC) increases by 1 percent, **LP** will also be decreased by 2.211% Ceteris Paribas because of existing a negative relationship between OULC and **LP** along with the condition that the other things especially the other independent variables remain same.

The coefficient $\gamma_{2=}$ 0.661 expresses that if the net government borrowing from banking sector NGB increases by 1 percent, **LP** will also be increased by 0.661% ceteris paribas because of prevailing positive relationship between the NGB & **LP** along with the condition that the other things especially the other independent variables remain same.

The coefficient $\gamma_{3=}$ 2.33 expresses that if overall classified loan in commercial banks (CL) increases by 1 percent, **LP** will also be increased by 2.33% ceteris paribas because of existing a positive relationship between the CL and **LP** along with the condition that the other things especially the other independent variables remain same.

The **T-test** is used to determine whether each of the individual independent variable is significantly related to the dependent variable. In this model, all values are provided by the SPSS software. Using α=0.05, we can deduce that the P-values of all coefficients are less than 0.05. Hence, all parameters except government borrowing (**NGB**) are statistically significant in case of individual test regarding the significance of the independent variables separately. As a corollary, two independent variables OULC & CL are individually statistically significant in explaining the liquidity position (LP, Dependent variable).

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.954	3	6.318	7.820	.063(a)
	Residual	2.424	3	.808		
	Total	21.377	6			

a Predictors: (Constant), CL, NGB, OULC

b Dependent Variable: LP

In case of ANOVA (Analysis of variance), the total sum of squares can be divided into two components: the sum of squares due to Regression (SSR) and the sum of squares due to Error (SSE) as shown below:

SST=SSR+SSE.

Where, **SST**= total sum of squares

SSR= sum of squares due to regression

SSE= sum of errors due to error

if H_0 is rejected, we have enough evidence to deduce that three of the parameters are not equal to zero and that the overall relationship between LP ($\hat{Y}$) and other three independent variables (CL, NGB, OULC) is significant. However, if H_0 is accepted, we don't have the sufficient evidence to deduce that a significant relationship exists between dependent and independent variables.

If H_0 is accepted, MSR provides an unbiased estimate of σ^2, and the value of MSR or MSE becomes larger. To determine how large values of MSR/MSE must be to reject H_0, we make use of the fact that if H_0 is true and the assumptions about the multiple regression model are valid, the sampling distribution of MSR/MSE is an F-distribution with p degrees of freedom in the numerator and (n-p-1) in the denominator. The summary of F-test is given below:

F= MSR/MSE= 6.423/0.693= 9.279

Moreover, According to P-value, it has been deduced that F-Test accepts Null Hypothesis (Ho) and expresses that there independent variables (CL, NGB, OULC) are jointly insignificant in explaining Dependent variable (LP).

Model 04: $LP = a_o + \gamma_1(NGB) + \gamma_2(OULC) + \gamma_3(M_2) + \mu$

The results along with explanation of this model are summarized below:

Coefficients (Standerdized)	19.217	0.522	-1.774	1.979
S.E	1.148	0.007	2.447	0.001
t-values	16.735	2.147	-4.154	3.629
p-values	0.000	0.121	0.041	0.036
R	0.930	High degree of positive relationship		
R^2	0.864	86.4% of variability in Liquidity Position is explained by all explanatory (independent) variables		
Adjusted R^2	0.729			
D-W Value	1.99~2	Suspects no presence of first order autocorrelation		
Error Term (μ)	0.9828	the total amount of error or variability in the dependent variable (Liquidity Position) that can't be explained by the linear effect of the all independent variables		

So, the Model is: $LP = 19.217 + 0.522(NGB) - 1.774(OULC) + 1.979(M_2) + 0.983$

In the above calculated multiple regression equation, **a** = 19.217, $\gamma_1 = 0.522$, $\gamma_2 = -1.774$ and $\gamma_3 = 1.979$

This multiple regression equation reveals that **ŷ(LP)** is dependent on outstanding L/C position of commercial banks (OULC), net government borrowing from banking sector (NGB) and another independent variable named M_2 (M_1+Time Deposit)

If the coefficients are 0, then we may conclude that the **LP** will be 19.217 regardless of outstanding L/C position of commercial banks (OULC), net government borrowing from banking sector (NGB) and overall M_2 (M_1+Time Deposit).

The coefficient $\gamma_1 = 0.522$ expresses that if net government borrowing from banking Sector (NGB) increases by 1 percent, **LP** will also be increased by 0.522% Ceteris Paribas because of existing a positive relationship between NGB and **LP** along with the condition that the other things especially the other independent variables remain same.

The coefficient $\gamma_2 = -1.774$ expresses that if the outstanding L/C position of commercial banks (OULC) increases by 1 percent, **LP** will also be decreased by 1.774% Ceteris Paribas because of prevailing inverse relationship between the OULC & **LP** along with the condition that the other things especially the other independent variables remain same.

The coefficient $\gamma_3 = 1.979$ expresses that if Overall M_2 (M_1+Time Deposit) increases by 1 percent, **LP** will also be increased by 1.979% Ceteris Paribas because of existing a positive relationship between the M_2 (M_1+Time Deposit) and **LP** along with the condition that the other things especially the other independent variables remain same.

The **T-test** is used to determine whether each of the individual independent variable is significantly related to the dependent variable. In this model, all values are provided by the SPSS software. Using $\alpha=0.05$, we can deduce that the P-values of all coefficients are less than 0.05. Hence, all parameters are statistically significant except coefficient γ_1 for net government borrowing from banking sector (NGB) in case of individual test regarding the significance of the independent variables separately. As a corollary, two independent variables: OULC & M_2 (M_1+Time Deposit) are individually statistically significant in explaining the Liquidity position (LP, Dependent variable).

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.480	3	6.160	6.377	.081(a)
	Residual	2.898	3	.966		
	Total	21.377	6			

a Predictors: (Constant), M2, NGB, OULC

b Dependent Variable: LP

In case of ANOVA (Analysis of variance), the total sum of squares can be divided into two components: the sum of squares due to Regression (SSR) and the sum of squares due to Error (SSE) as shown below:

SST=SSR+SSE.

Where, **SST**= Total sum of squares

SSR= sum of squares due to regression

SSE= sum of errors due to error

If H_0 is rejected, we have enough evidence to deduce that three of the parameters are not equal to zero and that the overall relationship between LP ($\hat{Y}$) and other three independent variables (NGB, OULC & M2) is significant. However, if H_0 is accepted, we don't have the sufficient evidence to deduce that a significant relationship exists between dependent and independent variables.

If H_0 is accepted, MSR provides an unbiased estimate of σ^2, and the value of MSR or MSE becomes larger. To determine how large values of MSR/MSE must be to reject H_0, we make use of the fact that if H_0 is true and the assumptions about the multiple regression model are valid, the sampling distribution of MSR/MSE is an F-distribution with p degrees of freedom in the numerator and (n-p-1) in the denominator. The summary of F-test is given below:

F= MSR/MSE= 6.160/0.966= 6.377

Moreover, According to P-value, it has been deduced that F-Test accepts Null Hypothesis (Ho) and expresses that there independent variables (M_2, NGB, OULC) are jointly insignificant in explaining dependent variable (LP).

8. Findings:

The major findings after analyzing the above qualitative and quantitative evaluations are revealed below:

- net government borrowing (NGB) is not individually significant in influencing the overall liquidity position of commercial Banks of Bangladesh.

- rescheduling of short term loan to long term loan and the rules thereof exert major influence in deteriorating the overall liquidity position of commercial banks.

- the abuse of loan against trust receipt (LTR) and loan against imported merchandise (LIM) causes rescheduling of these loans that accelerate the further deterioration of liquidity position of commercial banks in Bangladesh.

- currency devaluation against dollar due to international increase of petroleum price as well as reduction in foreign aid or grants also accelerate the liquidity crisis in recent years.

- the more NPL to Total Loan ratio also cognizant as Infection ratio is, the more deteriorating the liquidity position is.

- government borrowing along with all explanatory variables is jointly statistically significant in influencing the overall liquidity position of all commercial Banks in Bangladesh although NGB is not individually significant in influencing liquidity position.

- in each of the Econometric models mentioned in this paper, there is a high degree of positive relationship between liquidity position and all other explanatory variables.

- all explanatory variables mentioned in each of the models developed in this paper have explained significant proportions of recent Liquidity position of commercial banks in Bangladesh.

9. Conclusions:

One of the most crucial undertakings in the management of any financial institution is ensuring adequate liquidity at all times, no matter what emergencies may appear. A financial firm is considered to be liquid if it has easy access to immediately spendable funds at reasonable cost at precisely the time those funds are needed. Interest rates are so important in controlling liquidity that these rates really dictate how expensive it is to borrow. Low interest rates mean credit is cheap, so businesses and investors are more likely to borrow. However, liquidity crisis refers to drying up of liquidity, which could reflect a fall in asset prices below their long run fundamental price; or deterioration in external financing conditions; or a reduction in the number of market participants or simply difficulty in trading assets. A liquidity crisis is usually unpredictable and can be due to either a lack of confidence in the specific bank, or some unexpected need for cash. Although Net Government Borrowing from banking sector affects the liquidity position of commercial banks through creating Crowding-out effect for private investors, this paper has concluded that the models mentioned in this study reveal that Net Government Borrowing is not individually significant in explaining Liquidity position of commercial banks rather This Net government borrowing along with other variables is jointly significant in explaining liquidity position.

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