RELATIONSHIP AMONG INTEREST RATES, SUBSIDIES ON INTEREST, INVESTMENT IN SECURITIES AND AGRICULTURAL FINANCE

This chapter examines the growth of bank investments in securities, borrowings from the Reserve Bank of India, interest subsidies to farmers on short-term credit, branch expansion by commercial banks in rural areas and deposits held by the commercial banks. It also assessed the major determinants of agriculture lending by commercial banks. Multiple regression analysis is used to analyze the impact of crucial variables on the lending performance of commercial banks in the agriculture sector. Next section of this chapter empirically analyzes the following areas:

6.1 Pattern of Investment in Securities by Scheduled Commercial Banks

6.2 Borrowing from Reserve Bank of India

6.3 Agricultural Lending Rate of Commercial Banks

6.4 Credit Subsidy in Indian Agriculture

6.5 Rural Bank Branches of Commercial Banks

6.6 Composition of Commercial Bank Deposits

6.7 Determinants of Supply of Agricultural Credit

6.1 Pattern of Investment in Securities by Scheduled Commercial Banks

Commercial banks are the single biggest contributor to the Indian financial system, facilitating a large portion of the country's financial intermediation process. Like all other businesses, commercial banks also tend to be viable and profitable, but public sector banks also need to follow to broader social guidelines for the betterment of the society set by the Reserve Bank of India. By providing financial services, commercial banks serve individuals and institutions, loanable funds are considered to be banks raw material (Tayi and Leonard, 1988). Investments in wealth-generating assets, including loans, advances, and investments, constitute a bank's earnings. Besides the overall resource position of commercial banks, significant influence could be exerted on the commercial banks' investment portfolio by general macroeconomic conditions and policies. A bank's investments usually include government securities and other types of approved securities. Both State governments and the Federal Government issue government securities, treasury bills, national plan certificates and among others are some of the more common government securities. Securities approved pursuant to the Banking Regulation Act of 1949 are included in the category of other

approved securities. A variety of other approved securities includes shares of regional rural banks and securities of electricity and housing boards etc. Banks, financial institutions, and corporate have always considered government securities to be a good investment option. The biggest investors in government securities are commercial banks. Government securities have always been considered the best risk-free investment. Therefore, investors seeking risk-free investments should consider purchasing government securities. Statutory Liquidity Ratio (SLR) is an indication of the ratio of liquid assets to deposits, which at the moment requires that 25 percent of net time and demand deposits be held as liquid assets or SLR securities, typically government bonds. A significant portion of investments in government securities and other approved securities must satisfy the statutory liquidity ratio (SLR) requirement of the Reserve Bank of India. These securities can be used as collateral when banks borrow from the RBI to create a bank loan or as a means of meeting their funding needs. As a result, banks prefer to hold them since they are more liquid than loans and advances, regardless of their lower return. Central governments, State governments, and Semi-government authorities are the ones authorized to issue government securities. Under the Securities Contract Regulation Act of 1956, Section 16, the Reserve Bank of India has power over the market for government securities. Thus government securities can be regulated by the Reserve Bank of India. The maturities of government securities range from few months to more than 50 years (RBI: Report on Currency and Finance, 2007). Gold Bonds, National Defence Bonds, and Rural Development Bonds are among the most common Government securities issued in India. Furthermore, the Government of India also issues Treasury Bills, the International Development Agency and Special Rupee Securities. Regulation of government securities is carried out by the Reserve Bank of India through its open market operations and statutory liquidity ratios. A minimum amount of liquid assets must be available for banks at all time under the Bank Regulation Act. These assets include cash, gold, and other approved securities.

Table 6.1: Investment of Scheduled Commercial Banks in Securities

Year	Investment in Government Securities (Rs. Crores)	Investment in Other Approved Securities (Rs. Crores)	Total Investment (Rs. Crores)	Share of Investment in Government Securities (percentage)	Share of Investment in Other Approved Securities (percentage)
1980-81	9219	3967	13186	69.92	30.08
1981-82	10157	4984	15141	67.08	32.92
1982-83	12078	6257	18334	65.88	34.13
1983-84	13473	7772	21246	63.41	36.58
1984-85	18697	9441	28138	66.45	33.55
1985-86	19045	11509	30553	62.33	37.67
1986-87	24847	13735	38582	64.40	35.60
1987-88	30517	15987	46504	65.62	34.38
1988-89	35815	18847	54662	65.52	34.48
1989-90	42292	22078	64369	65.70	34.30
1990-91	49998	25067	75065	66.61	33.39
1991-92	62727	27469	90196	69.55	30.45
1992-93	75945	29711	105656	71.88	28.12
1993-94	101202	31321	132523	76.37	23.63
1994-95	117685	31568	149253	78.85	21.15
1995-96	132227	32555	164782	80.24	19.76
1996-97	158890	31624	190514	83.40	16.60
1997-98	186957	31748	218705	85.48	14.52
1998-99	223217	31377	254595	87.68	12.32
1999-00	278456	30488	308944	90.13	9.87
2000-01	340035	30125	370159	91.86	8.14
2001-02	411176	27093	438269	93.82	6.18
2002-03	523417	24129	547546	95.59	4.41
2003-04	654758	22830	677588	96.63	3.37
2004-05	718982	20172	739154	97.27	2.73
2005-06	700742	16712	717454	97.67	2.33
2006-07	776058	15458	791516	98.05	1.95
2007-08	958661	13053	971715	98.66	1.34
2008-09	1155786	10624	1166410	99.09	0.91
2009-10	1378395	6358	1384752	99.54	0.46
2010-11	1497148	4471	1501619	99.70	0.30
2011-12	1735018	2770	1737787	99.84	0.16
2012-13	2003653	2452	2006105	99.88	0.12
2013-14	2211194	1627	2212821	99.93	0.07
2014-15	2489751	2074	2491825	99.92	0.08

Source: Handbook of Statistics on Indian Economy and Economic Survey, Various Issues

6.1.1 Growth of Investment in Securities by Scheduled Commercial Banks

MODEL: 6.1

LOG (INS) = $\alpha_0 + \alpha_1 t + \mu_1$

Dependent Variable: Investment in Government Securities (INS)

Independent Variable: Time (1991-2014)

Table 6.2: Growth Rate of Investment in Government Securities both Instantaneous and Compound (1991-2014)

Dependent Variable: LOG(INS)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.05184	0.046871	235.7942	0.0000
TIME	0.160116	0.003280	48.81181	0.0000
R-squared	0.990851	F-statistic		2382.593
Adjusted R-squared	0.990435	Prob(F-statistic)		0.000000
Durbin-Watson stat	1.347664	**Instantaneous rate of growth**		**16.01**
Anti-Log(α_1)	1.173647	**Compound rate of growth**		**17.36**

Source: Author's Own Calculation

According to the results in the table above, the investment in government securities by scheduled commercial banks increased significantly by 16.01 percent per year during the period1991 to 2014.   During this period, the compound growth rate of investment in government securities by scheduled commercial banks was 17.36 percent. The result indicates that the coefficient of determination is 0.99. F statistics demonstrate that the overall model is statistically significant.

MODEL: 6.2

LOG (OS) = $\alpha_0 + \alpha_1 t + \mu_1$

Dependent Variable: Investment in Other Approved Securities (OS)

Independent Variable: Time (1991-2014)

Table 6.3: Growth Rate of Investment in Other Approved Securities both Instantaneous and Compound (1991-2014)

Dependent Variable: LOG(OS)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.14080	0.202771	54.94281	0.0000
TIME	-0.125826	0.014191	-8.866604	0.0000
R-squared	0.781348	F-statistic		78.61667
Adjusted R-squared	0.771410	Prob(F-statistic)		0.000000
Durbin-Watson stat	1.145287	**Instantaneous rate of growth**		**-12.58**
Anti-Log(α_1)	0.88176826	**Compound rate of growth**		**-11.82**

Source: Author's Own Calculation

The results in the above table show the decline in investment in Other Approved Securities by commercial banks during the period 1991 to 2014. Investment in Other Approved Securities by commercial banks fell at a rate of 12.58 percent per annum because the commercial banks shifted the investment to government securities. The majority of the investments by commercial banks are in government securities. This goes to show that banks are interested in deploying their funds in safe government securities rather than other securities where risks are involved (Ramasastri, et.al. 2004). Results indicate a coefficient of determination of 0.78. The overall model is statistically significant, as shown by F statistics.

MODEL:6. 3

LOG (TS) = α_0+ α_1 t + μ_1

Dependent Variable: Total Investments in Securities (TS)

Independent Variable: Time (1991-2014)

Table 6.4: Growth Rate of Total Investment in Securities both Instantaneous and Compound (1991-2014)

Dependent Variable: LOG(TS)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.33158	0.032112	352.8746	0.0000
TIME	0.145497	0.002247	64.74043	0.0000

R-squared	0.994778	F-statistic	4191.323
Adjusted R-squared	0.994541	Prob(F-statistic)	0.000000
Durbin-Watson stat	1.574727	**Instantaneous rate of growth**	**14.54**
Anti-Log(α_1)	1.15661426	**Compound rate of growth**	**15.66**

Source: Author's Own Calculation

The above table depicts the growth rate of total investment in securities by commercial banks in India. The result shows there is a significant positive trend of total investment in securities by commercial banks during the period under consideration. It increased at a rate of 14.54 percent per annum at the significance of five percent significance level. The compound growth rate of total investment in securities by commercial banks is 15.66 percent. The obtained R-squared and F-statistic are satisfactory in this regression model.

6.2 Borrowings from Reserve Bank of India

According to the Reserve Bank Act of 1934, the Reserve Bank of India provides loans to scheduled commercial banks. The two major functions of banks are accounting and transactions, followed by portfolio management (Fama, 1980). Having a Central Bank that offers support services to banks in difficulty is given a special character by this joint role. Financial intermediaries experiencing difficulty would benefit from such assistance beyond the usual assistance (Goodhart, 1987). The primary purpose of commercial banks borrowing from the central bank is to meet reserve requirements before the end of the business day, when they have very little cash on hand. Commercial banks rely on the Reserve Bank of India for financial assistance in times of crisis. The Reserve Bank of India lends money to commercial banks in exchange for securities and bonds, which they are required to repurchase at a fixed price on specified dates. The Reserve Bank of India can also lend funds without requiring a repurchase agreement, securities or collateral to commercial banks at higher rates of interest. The commercial bank borrows money from the Reserve bank of India and loans it to its customers at a higher interest rate, thus making profits in the process.

Table 6.5: Commercial Bank Borrowings from Reserve Bank of India

Year	Borrowings from RBI (Rs. Crores)
1980-81	589
1985-86	954

1990-91	3468
1995-96	4847
2000-01	3896
2005-06	1488
2010-11	5031
2014-15	158202

Source: Handbook of Statistics on Indian Economy, Various Issues

The table above summarizes the borrowing patterns of commercial banks from the Reserve Bank of India. In 2014-15, the commercial banks' borrowings increased by Rs.158202 crores compared to Rs.589 crores in 1980-81. From 1980 to 2014, commercial bank borrowing from the RBI fluctuated in accordance with the requirements of commercial banks.

6.2.1 Growth Rate of Borrowings from Reserve Bank of India

MODEL:6.4
LOG (RBIB) = $\alpha_0 + \alpha_1 t + \mu_1$
Dependent Variable: Reserve Bank Borrowing (RBIB)
Independent Variable: Time (1991-2014)
Table 6.6: Growth Rate of Reserve Bank Borrowing both Instantaneous and Compound (1991-2014)

Dependent Variable: LOG(RBIB)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.352521	0.842347	7.541450	0.0000
TIME	0.107081	0.058952	1.816415	0.0430
R-squared	0.930413	F-statistic		329.9364
Adjusted R-squared	0.930886	Prob(F-statistic)		0.008259
Durbin-Watson stat	1.958903	**Instantaneous rate of growth**		**10.70**
Anti-Log(α_1)	1.1130244	**Compound rate of growth**		**11.30**

Source: Author's Own Calculation

The results of instantaneous and compound growth rate show a significant positive trend of borrowings of commercial bank from RBI during the study period into consideration. The regression model depicts that the compound growth rate of commercial bank borrowings from RBI is 11.30 percent. Further, the result shows that reserve bank borrowings by commercial banks increased at a rate of 10.70 percent per annum, significant at 5 percent

level. Here the value of the coefficient of determination is 0.93 which means the independent variable in the model can explain 93 percent of the variation in the dependent variable. The F test for the overall model shows that it is significant.

6.3 Agricultural Lending Rate of Commercial Banks

Interest rates refer to the payment made by the borrower to the lender in return for the money borrowed. In other words, it is the cost of borrowing. Essentially, it's the rate at which commercial banks lend money to their customers. Several factors affect a commercial bank's lending rate, including the bank rate and the repo rate. There is a close relationship between the bank rate (is the lending rate at which the central bank extends long-term loans to the commercial banks) and the interest rate. Interest rates generally increase with a rise in bank rate and fall with a decrease in bank rate. Commercial banks' borrowing cost is increased when the central bank (RBI) raises its bank rate, resulting in an increase in lending rates across sectors of the economy. As a result of a low bank rate, banks can borrow more at a lower interest rate. Central bank offer commercial banks short-term loans at the Repo rate. The repo rate works just like the bank rate. As the repo rate increases, the lending rates of commercial banks will rise. A cheap monetary policy is often adopted by developing countries in the agricultural and industrial sectors. In other words, investors are encouraged to borrow more, to invest when market interest rates are low. It increases the economy's capital formation. Small farms, small businesses and small craftspeople have a low interest rate on loans offered to them, and a high interest rate is charged on loans for unproductive purposes. Interest income may encourage financial institutions to increase agricultural credit, if it exceeds or is at least equal to lending costs. Credit flow is heavily influenced by interest rates when it comes to the supply side. Commercial banks generally borrow money at a lower interest rate from the central bank, financial markets, and other institutions, and lend at a higher rate to make a profit. A bank charges interest on loans extended to borrowers and pays it on deposits received by the bank. In India, the banking sector's lending activities were enormously regulated during pre reform period. This includes an administered interest rate structure, strict reserves, and a credit allocation pattern to particular sectors. In October 1994, the Reserve Bank of India mandated that banks announce designated prime lending rates (PLRs) and later in the year 2003 a benchmark prime lending rate (BPLR) for banks was introduced for a transparent lending system. This rate later became the basis for floating-rate products. Increasing the proportion of agricultural credit disbursed by commercial banks

could have been possible due to the deregulation of interest rates. Changes in interest rate affect directly and indirectly cost of production in the agricultural sector. Commercial banks offer loans to the agriculture sector at various interest rates, depending on the size of the loan. Current interest rate policy is regulated by the Reserve Bank of India through monetary policy. Commercial banks have been offering lower interest rates on short-term agricultural loans in recent years.

Table 6.7: Average Interest Rate of Scheduled Commercial Banks

Year	Average Interest Rate : All Sectors (Percent)	Average Interest Rate: Agriculture Sector (Percent)
1991-92	16.8	14.8
1992-93	17	15.7
1993-94	16.5	15.5
1994-95	16	15.3
1995-96	17.1	15.7
1996-97	16.9	15.7
1997-98	16.2	15.3
1998-99	15.4	15.2
1999-00	14.8	14.8
2000-01	14.1	14.4
2001-02	13.7	13.9
2002-03	13.3	13.3
2003-04	13.2	13
2004-05	12.57	12.45
2005-06	11.97	11.7
2006-07	11.91	12.01
2007-08	12.34	11.77
2008-09	11.47	10.99

Year		
2009-10	10.53	9.99
2010-11	11.44	11.11
2011-12	12.57	11.98
2012-13	12.01	10.63
2013-14	12.01	10.89
2014-15	12.01	10.82

Source: Handbook of Statistics on the Indian Economy and Database on Indian Economy, Various issues

The above table indicates the lending rate of scheduled commercial banks to all sectors of the economy and particularly to the agriculture sector. According to the figures in the above table, during the year 1991-92, the average lending rate of commercial banks to agriculture was 14.8 percent per annum, while the average lending rate for commercial banks to all sectors was 16.8 percent per annum which declined to 10.82 percent per annum in case of agriculture lending and 12.01 percent in case of all sector lending during the year 2014-15. The figures in the above table show that the average rate of interest charged by commercial banks on agriculture loans has remained low compared to the average lending rates of commercial banks to all sectors for most of the period under consideration. During some years 2000 to 2002 and 2006-07, average interest rates charged by commercial banks to the agriculture sector were higher than the average interest rate charged by commercial banks to all sectors.

Table 6.8: Interest Rate of Direct and Indirect Agriculture Credit by Scheduled Commercial Banks

Year	Average Interest Rate: Direct Finance to Agriculture (Percent)	Average Interest Rate: Indirect Finance to Agriculture (Percent)
2005-06	11.33	12.1
2006-07	12.31	11.56
2007-08	11.8	11.71
2008-09	11.3	10.53
2009-10	10.63	8.97

2010-11	11.36	10.44
2011-12	11.98	11.97
2012-13	10.55	11.1
2013-14	10.87	11.31
2014-15	10.8	11.2

Source: Handbook of Statistics on the Indian Economy, Various issues

In the table above are the average lending rates for direct agricultural credit and indirect agricultural credit by commercial banks. According to the figures in the above table, the average commercial bank lending rate for direct agricultural credit is lower than the lending rate for indirect agricultural credit.

6.4 Credit Subsidy in Indian Agriculture

Agricultural subsidies are rationalized in large economic contexts because they help to stimulate economic growth by increasing agricultural production, employment and investment. A major component of subsidies must also be that they are more of a tool to help farmers to take risks than anything else. Subsidies can also be applied specifically to promote the use of new agricultural inputs or transfer income to farmers, perhaps keeping them on an equal footing with the non-farming community. In developing countries, the subsidies are generally directed towards the promotion of new inputs, while in developed countries the income is transferred to the farming communities. Agriculture subventions are typically provided in two ways: First, in a free-market environment, the government may set prices of agricultural products very high, or alternatively, farmers may obtain input materials far below their production costs. Second, High prices for farm products are primarily achieved by isolating the domestic market from the external economy through restrictive trade policies. However, farmers can be offered inputs used for farming at a price that is lower than the market price. Normally, the government prefers to subsidize inputs over the above two alternatives. Agricultural intervention by the government is intended to achieve a variety of economic and social objectives. Although agricultural GDP with the developing countries tends to be higher than its counterpart in developed countries, the subsidy levels there are much lower (Koo and Kennedy, 2006). Credit subsidy is perceived to have two components: interest subsidies due to concessional interest rates on loans to agriculture, and default

subsidies due to bad debts owed by agriculture. In this study, we only considered interest subsidy for analysis purposes.

Table 6.9: Subsidy on Agriculture Credit in India

Year	Interest Subsidy (in crores)
1991-92	695.68
1995-96	493.09
2000-01	1520.61
2005-06	1701.00
2010-11	3000.10
2013-14	8137.19
2014-15	7632.28

Source: Government of India, Union Budget, various issues

6.4.1 Growth of Interest Subsidy in Indian Agriculture

MODEL: 6.5

LOG (IS) = $\alpha_0 + \alpha_1 t + \mu_1$

Dependent Variable: Interest Subsidy (IS)

Independent Variable: Time (1991-2014)

Table 6.10: Growth Rate of Interest Subsidy to Agriculture Sector (1991-2014)

Dependent Variable: LOG(IS)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.156019	0.408245	10.18020	0.0000
TIME	0.202225	0.028571	7.077914	0.0000
R-squared	0.894855	F-statistic		500.9686
Adjusted R-squared	0.880985	Prob(F-statistic)		0.000000
Durbin-Watson stat	2.179450	**Instantaneous rate of growth**		**20.22**
Anti-Log(α_1)	1.2241234	**Compound rate of growth**		**22.41**

Source: Author's Own Calculation

The table above shows that the interest subsidies for the agricultural sector have increased during the study period. During the period 1991-2014, growth rate of interest subsidies to the agricultural sector showed a significant positive trend. Results indicate that interest subsidy on agricultural advances has increased at 20.22 percent per annum. The compound growth rate of interest subsidies on agricultural advances is 22.41 percent. The coefficient of determination is 0.88 as determined by the results. This model's overall significance is demonstrated by F statistics.

6.5 Rural Bank Branches of Commercial Banks

In developing economies, it is difficult to distinguish between urban and rural areas since urban areas are not much different from rural areas. Therefore, the definition of rural areas poses a challenge. It is however possible to categorize rural areas according to their infrastructure and population size (Mbat, 1982). In 1969, it was determined that the classification of bank offices would be based on the 1961 census of the population. Since 2001, the figures are based on the 1991 Census of the population. From 2006 onwards, they are based on data from the 2001 Census of the population. There are four groups of bank branches in India: Rural, Semi-Urban, Urban and Metropolitan, according to the RBI. These four groups were identified by the Reserve Bank of India based on data from the Indian census. The population density is used to classify bank branches as urban, semi-urban, rural, or metropolitan. In rural areas, there are less than 10,000 inhabitants, in semi-urban areas, there are more than 10000 and less than 1 lakh inhabitants, in urban areas, there are between 1 lakh to 10 lakh inhabitants and in metropolitan areas, there are more than 10 lakh inhabitants. Commercial banks were expected to become more prominent in rural credit markets by expanding bank branches and by increasing direct lending.

Table 6.11: Branches of Scheduled Commercial Banks

Year	Rural Branches (Numbers)	Total Branches (Numbers)
1980-81	15105	32419
1985-96	30185	51385
1990-91	34791	59752
1995-96	33004	62367
2000-01	32734	65412

2005-06	32082	68355
2010-11	30083	85036
2013-14	36719	106347
2014-15	41895	117761

Source: Basic Statistical Returns of Scheduled Commercial Banks, Various issues

The number of scheduled commercial banks branches increased from 32419 in year 1980 to 117761 in year 2014. The total number of branches increased during the year 1980 to 2014. A fluctuating trend can be observed in the rural branches. In rural areas, there has been an increase in coverage by scheduled commercial banks from 15105 in year 1980 to 41895 in year 2014. Commercial banks' rural branches have increased in number by 6689 during 1991 to 2014. Additionally, it is clear from the above table that during the period 1990 to 2010, rural bank branches has declined as a result of mergers and the closure of loss making branches.

6.5.1 Growth Rate of Rural Bank Branches of Commercial Banks

MODEL: 6.6

LOG (SCBR) = $\alpha_0 + \alpha_1 t + \mu_1$

Dependent Variable: Rural Bank Branches of Commercial Banks (SCBR)

Independent Variable: Time (1991-2000)

Table 6.12: Growth Rate of Rural Bank Branches of Commercial Banks both Instantaneous and Compound (1991-2000)

Dependent Variable: LOG(SCBR)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.48704	0.012973	808.3484	0.0000
TIME	-0.010495	0.002091	-5.019501	0.0010
R-squared	0.759003	F-statistic		250.19539
Adjusted R-squared	0.728878	Prob(F-statistic)		0.001028
Durbin-Watson stat	1.433736	**Instantaneous rate of growth**		**-1.045**
Anti-Log(α_1)	0.98955988	**Compound rate of growth**		**-1.044**

Source: Author's Own Calculation

According to the results presented in the table above, the growth rate of rural branches of scheduled commercial banks has consistently contracted between the period 1991 and 2000. The rural branches of scheduled commercial banks registered a downward and negative trend during 1991 to 2000. The number of commercial bank branches in rural areas increased by 183 between 1991 and 1993, but after 1993 they began to decline. The coefficient of determination of is 0.75 as shown in the results, and F statistics indicate that the overall model is statistically significant.

MODEL: 6.7

LOG (SCBR) = α_0+ α_1 t + μ_1

Dependent Variable: Rural Bank Branches of Commercial Banks (SCBR)

Independent Variable: Time (2000-2014)

Table 6.13: Growth Rate of Rural Bank Branches of Commercial Banks both Instantaneous and Compound (2000-2014)

Dependent Variable: LOG(SCBR)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.24100	0.106976	95.73166	0.0000
TIME	0.007759	0.006099	1.272283	0.02256
R-squared	0.8110728	F-statistic		1618. 704
Adjusted R-squared	0.8042323	Prob(F-statistic)		0.0000
Durbin-Watson stat	1.348880	**Instantaneous rate of growth**		**0.77**
Anti-Log(α_1)	1.00778917	**Compound rate of growth**		**0.78**

Source: Author's Own Calculation

During the period 2000 to 2014, a significant positive trend can be found in both the instantaneous and compound growth rates of commercial banks rural branch expansion. The regression model depicts that the compound growth rates of commercial banks rural branches is 0.78 percent. Further, the result shows that growth rates of commercial banks rural branches increased at a rate of 0.77 percent per annum, significant at 5 percent level. The value of the coefficient of determination is 0.81 which means the independent variable in the model can explain 81 percent of the variation in the dependent variable. Considering the overall model, the F test indicates it is statistically significant.

MODEL: 6.8

LOG (SCBR) = $\alpha_0 + \alpha_1 t + \mu_1$

Dependent Variable: Rural Bank Branches of Commercial Banks (SCBR)

Independent Variable: Time (1991-2014)

Table 6.14: Growth Rate of Rural Bank Branches of Commercial Banks both Instantaneous and Compound (1991-2014)

Dependent Variable: LOG(SCBR)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.42353	0.037848	275.4062	0.0000
TIME	-0.002246	0.002649	-0.848055	0.04055
R-squared	0.831656	F-statistic		719.1970
Adjusted R-squared	0.822360	Prob(F-statistic)		0.0000
Durbin-Watson stat	1.314315	**Instantaneous rate of growth**		**-0.22**
Anti-Log(α_1)	0.99775652	**Compound rate of growth**		**-0.21**

Source: Author's Own Calculation

As indicated by the results shown in the table above, the overall growth rate of rural branches of scheduled commercial banks has decreased during the study period. During the period 1991 to 2014, scheduled commercial banks rural branches showed a declining trend in growth. A downward trend is evident in the instantaneous and compound growth rates of rural branches of scheduled commercial banks. There was a decline in rural branches of commercial banks due to mergers, swapping, and due to the alternative mechanisms of delivery of financial services. Branches that were not viable in rural areas were permitted to be remodeled as satellite offices or were allowed to even shut the operations; the scheduled commercial banks avoided any expansions in rural areas because that was the easy option (Akhtar and Parveen, 2014). As per the results, the coefficient of determination is 0.83. The overall significance of the model is demonstrated by F statistics.

6.6 Composition of Commercial Bank Deposits

Commercial banks get their funds majorly from deposits. Commercial banks rely primarily on deposits for funding. Among the many uses of the collected money is it's used to pay interest on accounts and to conduct other transactions. Funds are also obtained

through capital, reserves, Surpluses and bank borrowings. Term deposits, current account deposits, and savings deposits make up the deposits of commercial banks. Another facet of the distribution of deposits is according to the three different types or categories - current, savings and fixed (Tyagarajan, 1982). Eighty percent of the total funds come from these deposits. More than 50 percent share of deposits is made up of term deposits. Among deposits, fixed deposits are the most popular category. Total deposits of commercial banks growth was primarily driven by the growth of fixed deposits. During 1973-77, almost two thirds of the total deposits growth was accounted for fixed deposits, in the years following; it slowed, as the percentage of savings deposits jumped up to one-third. Banks use these sources primarily to back their financial assets, which are loans and advances that comprise 48.6 percent of the bank's total assets. One of the most important components of a commercial bank's assets is its investments.

Table 6.15: Scheduled Commercial Bank Deposits in India

Year	Demand Deposits (Rs. Crores)	Time Deposits (Rs. Crores)	Aggregate Deposits (Rs. Crores)	Demand Deposits/ Aggregate Deposits (Percentage)	Time Deposits/Aggregate Deposits (Percentage)
1980-81	7798	30190	37988	20.53	79.47
1981-82	8383	35350	43733	19.17	80.83
1982-83	9984	41374	51358	19.44	80.56
1983-84	11312	49284	60596	18.67	81.33
1984-85	14132	58113	72244	19.56	80.44
1985-86	15612	69792	85404	18.28	81.72
1986-87	19227	83496	102724	18.72	81.28
1987-88	20247	97798	118045	17.15	82.85
1988-89	23342	116808	140150	16.66	83.34
1989-90	28856	138103	166959	17.28	82.72
1990-91	33192	159349	192541	17.24	82.76
1991-92	45088	185670	230758	19.54	80.46
1992-93	46461	222111	268572	17.30	82.70
1993-94	56572	258560	315132	17.95	82.05
1994-95	76903	309956	386859	19.88	80.12
1995-96	80614	353205	433819	18.58	81.42
1996-97	90610	414989	505599	17.92	82.08
1997-98	102513	495972	598485	17.13	82.87
1998-99	117423	596602	714025	16.45	83.55
1999-00	127366	685978	813345	15.66	84.34
2000-01	142552	820066	962618	14.81	85.19
2001-02	153048	950312	1103360	13.87	86.13

2002-03	170289	1110564	1280853	13.29	86.71
2003-04	225022	1279394	1504416	14.96	85.04
2004-05	248028	1452171	1700198	14.59	85.41
2005-06	364640	1744409	2109049	17.29	82.71
2006-07	429731	2182203	2611933	16.45	83.55
2007-08	524310	2672630	3196939	16.40	83.60
2008-09	523085	3311025	3834110	13.64	86.36
2009-10	645610	3847216	4492826	14.37	85.63
2010-11	641705	4566264	5207969	12.32	87.68
2011-12	625330	5283752	5909082	10.58	89.42
2012-13	662299	6088155	6750454	9.81	90.19
2013-14	713921	6991639	7705560	9.27	90.73
2014-15	794029	7739256	8533285	9.31	90.69

Source: Basic Statistical Returns of Scheduled Commercial Banks, Various issues

MODEL: 6.9

LOG (TD) = α_0 + α_1 LOG (DD) + α_2 LOG (TID) + μ_1

Dependent Variable: Total Deposits (TD)

Independent Variable: Demand Deposits (DD)

Independent Variable: Time Deposits (TID)

Table 6.16: Contribution of Demand Deposits and Time Deposits in Total Deposits (1991-2014)

Dependent Variable: LOG(TD)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.412964	0.006483	63.70124	0.0000
LOG(DD)	0.134714	0.005983	22.51637	0.0000
LOG(TID)	0.863857	0.005030	171.7468	0.0000
R-squared	0.999990	F-statistic		1013.757
Adjusted R-squared	0.999989	Prob(F-statistic)		0.000000
Durbin-Watson stat	1.853011			

Source: Author's Own Calculation

The above table illustrates the contribution of demand deposits and time deposits in total deposits of commercial banks from 1991 to 2014. As per the results in the above table, time deposits have a higher contribution to commercial banks' total deposits than demand deposits. The time deposit coefficient is 0.86. It implies that one percent increase in time deposits leads

to a 0.86 percent increase in total deposits. Coefficient of demand deposit is 0.13, it implies that a one percent increase in demand deposits leads to 0.13 percent increase in total deposits of commercial banks.

6.6.1 Growth Rate of Commercial Bank Deposits

MODEL: 6.10
LOG (TID) = α_0 + α_1 t + μ_1
Dependent Variable: Time Deposits (TID)
Independent Variable: Time (1991-2014)

Table 6.17: Growth Rate of Time Deposits both Instantaneous and Compound (1991-2014)

Dependent Variable: LOG(TID)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.180656	0.016419	437.3338	0.0000
TIME	0.166408	0.001149	144.8156	0.0000
R-squared	0.998952	F-statistic		20971.57
Adjusted R-squared	0.998904	Prob(F-statistic)		0.000000
Durbin-Watson stat	1.461062	**Instantaneous rate of growth**		**16.61**
Anti-Log(α_1)	1.1810548	**Compound rate of growth**		**18.10**

Source: Author's Own Calculation

The above table provides the Instantaneous and Compound growth rate of time deposits of commercial banks from 1991 to 2014. According to the results, the time deposits of commercial banks increased significantly over the study period by 16.61 percent annually and 18.10 percent compounded. F-statistics demonstrate that the overall model is statistically significant.

MODEL: 6.11
LOG (DD) = α_0 + α_1 t + μ_1

Dependent Variable: Demand Deposits (DD)

Independent Variable: Time (1991-2014)

Table 6.18: Growth Rate of Demand Deposits both Instantaneous and Compound (1991-2014)

Dependent Variable: LOG(DD)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.804961	0.058802	98.72067	0.0000
TIME	0.138634	0.004115	33.68779	0.0000
R-squared	0.980983	F-statistic		1134.867
Adjusted R-squared	0.980119	Prob(F-statistic)		0.000000
Durbin-Watson stat	1.607879	**Instantaneous rate of growth**		**13.86**
Anti-Log(α_1)	**1.148703597**	**Compound rate of growth**		**14.87**

Source: Author's Own Calculation

From 1991 to 2014, both the Instantaneous and Compound growth rate of demand deposits of commercial banks are shown in the table above. Demand deposits at commercial banks increased by 13.86 percent annually and 14.87 percent compounded during the study period, as per the results. F statistics demonstrate that the overall model is statistically significant.

6.7 Determinants of Supply of Agricultural Credit

MODEL: 6.12

$TC = \alpha_0 + \alpha_1 (INS) + \alpha_2 (IR) + \alpha_3 (IS) + \alpha_4 (SCBR) + \alpha_5 (RBIB) + \alpha_6 (TD) + \mu_1$

Dependent Variable: Total Agricultural Credit (TC)

Independent Variable: Investment in Securities (INS)

Independent Variable: Interest Rate (IR)

Independent Variable: Interest Subsidy (IS)

Independent Variable: Rural Bank Branches (SCBR)

Independent Variable: Reserve Bank Borrowing (RBIB)

Independent Variable: Total Deposits (TD)

- **Total Agricultural Credit (TC):** refers to the total amount of direct and indirect credit supplied to the agricultural sector by commercial banks. It is expressed in rupees crore.

- **Investment in Securities (INS)***:* In this study, it is referred to investment in both central and state government securities by the commercial banks. Banks may have less loanable funds available as the proportion of investments in securities outweighs total deposits. In this analysis, the value is expressed in rupees crore.

- **Interest Rate (IR):** refers to the lending rate or interest rate charged by commercial banks on agricultural credit. In order to analyze the interest rate, it is expressed as percent. Here the interest rate is calculated as a weighted average of the annual rate.

- **Interest Subsidy (IS):** refers to the subsidies granted by the central government to commercial banks on agricultural loans. Values are expressed in rupees crore.

- **Rural Bank Branches (SCBR)**: refers to the number of rural bank branches of scheduled commercial banks in comparison to total number of bank branches. The values are expressed in numbers.

- **Reserve Bank Borrowing (RBIB):** refers to the borrowings from the central bank by commercial banks. These values are expressed in rupees crore.

- **Total Deposits (TD)**: refers to the deposits made to commercial banks in the form of time deposits. Values are expressed in rupees crore.

Table 6.19: Determinants of Supply of Agricultural Credit (1991-2014)

Dependent Variable: TC				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	215165.6	126533.7	1.700461	0.0173
INS	-0.355721	0.121824	-2.919960	0.0095
IR	21303.95	9507.741	2.240695	0.0387
IS	-6.785795	9.317468	-0.728287	0.0474
SCBR	3.164871	3.328754	0.950767	0.0350
RBIB	0.453733	0.315180	1.439599	0.0481
TD	0.222898	0.040468	5.507943	0.0000
R-squared	0.995061	F-statistic		570.8508
Adjusted R-squared	0.993318	Prob(F-statistic)		0.000000
Durbin-Watsonstat	2.574406			

To examine the impact of important selected determinants of supply of agricultural credit, the ordinary least square (OLS) method is utilized. The results provided in the above table clearly show that there is a negative association between the supply of credit to the agricultural sector and investment in securities by scheduled commercial banks. A similar picture emerges from the second important determinant that is interest subsidy. The coefficient of investment in securities is -0.3557. The negative and statistically significant coefficient of INS indicates that an increase in investment in securities by one crore rupees reduces the supply of agricultural credit by Rs. 0.3557 crores. It indicates that the proportion of investment in central and state government securities from total bank deposit is inversely linked with the share of agriculture sector bank credit. The findings of this study are consistent with the findings of a previous study by Iqbal and Ariful, 2014. The value of Durbin-Watsonstat is 2.574406, which indicates the absence of autocorrelation. The estimated coefficient value of interest subsidy is -6.785795. The negative and statistically significant coefficient of interest subsidy (IS) implies that an increase in interest subsidy by one crore rupees reduces the supply of agricultural credit by 6.785795 crores. Further the figures mentioned in the above table shows the value of R^2 and F-statistics. R^2 that is the coefficient of determination demonstrates the explained and unexplained variation of the dependent variable in the regression model. The value of R^2 is 0.99, it indicates that 99 percent variation in the dependent variable which is the supply of agricultural credit is predicted by selected independent variables jointly and the rest only one percent is explained by the variables which are not included in the model. The value of F - Statistics is 570.85 and the value of Prob(F-statistic) is 0.0000, which indicates that the overall model is significant at 5 percent significance level.

The estimated coefficient of interest rate is positive and significant which indicates that even if the interest rate increases, it leads to more supply of agricultural credit. The value of the coefficient (interest rate) is 21303.95, which indicates that a one percent increase in interest rate leads to an increase in agricultural credit supply by Rs.21303.95 crores. As the interest rate rises, more commercial banks will be eager to issue agricultural credit. Conversely, if the interest rate on agricultural credit falls, the quantity of agricultural credit supplied will decrease.

The value of the estimated coefficient of reserve bank borrowing (RBIB) is 0.4537. It shows that an increase in the commercial bank borrowing from the reserve bank of India by one crore leads to an increase in the agricultural credit supply by Rs.0.45373 crores. By this, we may say that the more the commercial banks borrow from RBI more will be the funds available with commercial banks for further lending.

The estimated coefficient of SCBR is 3.1648.The coefficient of Rural Bank Branches (SCBR) is positive and statistically significant at 5 percent significance level, it indicates that higher rural banking coverage is associated with more agriculture credit in rural areas.

The estimated coefficient of total time deposits of commercial banks is 0.2228, which indicates that a one crore increase in total time deposits leads to a Rs.0.2228 crore increase in the supply of agricultural credit. The availability of agricultural credit will increase as time deposits at schedule commercial banks increase.

Summary of Results

Growth rate (Percentage)

Variable	1991-2014
INS	16.01
OS	-12.58
TS	14.54
RBIB	10.70
IS	20.22
SCBR	-0.22
SCBR	0.77 (2000-2014)
SCBR	-1.045 (1991-2000)
TID	16.61
DD	13.86

Source: Author's Own Calculation

Impact of Independent variable on dependent variable

Dependent Variable	Independent Variable	Degree of Impact
TD	DD	0.13 (%)
TD	TID	0.86 (%)
TC	INS	-0.35 (Crore)
TC	IR	21303.95 (%)
TC	IS	-6.78 (Crore)
TC	SCBR	3.16 (Numbers)
TC	RBIB	0.45 (Crore)
TC	TD	0.22 (Crore)

Source: Author's Own Calculation