Ind. Jn. of Agri. Econ.
Vol. 62, No. 4, Oct.-Dec. 2007

Supply Analysis of Institutional Credit to Agriculture for Major States in India

Gagan Bihari Sahu*

I

INTRODUCTION

There is realisation in most of the low-income countries that agricultural credit is an important element in their development efforts. The popularity of credit is partly due to the notion that loans are necessary to accelerate technological change in farming, and that formal credit is required to free farmers from their dependency on the unorganised sector. The agricultural credit policies, in general, aim to have positive influence on the total volume of institutional credit, the use of agricultural inputs, investment on machinery and irrigation, agricultural output and productivity, rural income distribution and so on. Therefore, to ensure sufficient and timely credit to agriculture sector at reasonable rate of interest the expansion of formal lending institutions, directed lending and subsidised credit policies were introduced at different points of time.

Undeniably, these resulted in a vast network of rural financial institutions, and rapid growth of lending to all sectors including agriculture. However, the rural banking system in India made tremendous quantitative achievement by neglecting the qualitative aspects of the credit delivery system (Shivamaggi, 2000). The inequalities in the banking system across the regions and social classes persisted (Bell, 1990). Elsewhere, it is also argued that the regions in India that are economically relatively backward have less access to institutional credit than those which are not (Reddy, 2001). Ramachandran and Swaminathan (2001) were also of the view that although the advances in the countryside increased substantially, such an increase was uneven, as was the case with green revolution, across regions, crops and classes.[1] However, there is a dearth of empirical studies dealing with causes of variation in the quantum of agricultural credit flow across the states in India. Hence, the present study has been undertaken to identify the factors influencing such a variation in agricultural credit flow to various states of India.

This paper seeks to address the above issues by confining the analysis to 14 major states, namely, Andhra Pradesh, Bihar (undivided), Gujarat, Haryana,

*Assistant Professor, Centre for Social Studies, Veer Narmad South Gujarat University Campus, Udhna-Magdalla Road, Surat – 395 007 (Gujarat).

The author is extremely thankful to D. Rajasekhar, S. Madheswaran and the anonymous referee for their constructive suggestions. The usual disclaimers, however, apply.

Karnataka, Kerala, Madhya Pradesh (undivided), Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh (undivided) and West Bengal. The rationale for the selection of these states is as follows: the 14 states account for 93 per cent of the population and 91.5 per cent of the net domestic product (NDP) in the country (Rao *et al.,* 1999); second, these states accounted, on an average, for 84.7 per cent of the total deposits in scheduled commercial banks[2] (SCBs) during the last twenty years; and third, 95 per cent of the total agricultural credit provided by SCBs went to these states.[3] Furthermore, to assess the variation in the supply of agricultural credit these states have been categorised into high, middle and low-income groups on the basis of per capita net state domestic product.

II

LITERATURE REVIEW

Easy accessibility of credit to regions and farmers, inadequately served earlier, was one of the important goals of nationalisation of commercial banks. The commercial (including Regional Rural Banks (RRBs)) and co-operative banks were directed to expand their rural branch networks and to intensify their lending to agriculture during the post-nationalisation period. The declared objectives of the new policy, known as "social and development banking" were to provide (i) banking services in previously unbanked or under-banked rural areas; (ii) substantial credit for specific activities including agriculture and cottage industries; and (iii) credit to certain disadvantaged groups. However, the proliferation of branches of commercial banks and expansion of credit occurred more around areas, where banking infrastructure had already been well developed (Rao, 1994). As a result, the emergence of commercial banks as the dominant supplier of agricultural credit led to a skewness in the distribution of credit across regions.[4]

This finding is also backed by Rath's study in 1989 where he argued that the induction of nationalised banks and subsequently the RRBs into the domain of agricultural credit has worsened rather than restore regional equality. His study reveals that the share of gross cropped area among states suggests a widening gap while examined in terms of the share of short-term credit disbursed for each of the states over time. A comparison between gross cropped area and loan disbursement in 1982-83 shows that the poorer states like Assam, West Bengal, Orissa, Bihar, Madhya Pradesh and Rajasthan while accounting for 40 per cent of the total gross cropped area received only about 16.6 per cent of the total short-term credit. As against this, the agriculturally developed states like Haryana, Punjab in the north and Andhra Pradesh, Tamil Nadu, Kerala and Karnataka in the south with only about 25 per cent of gross cropped area received about 55 per cent of the total crop loans (Rath, 1989).

Variations in the flow of agricultural credit across states have generally been explained by state's share in gross cropped area/net sown area,[5] irrigation facilities

and fertiliser consumption. In this context, Rath (1989) found that there was a close resemblance between the distribution of total fertiliser consumption among States, and the States' crop loans as percentage to the total value of fertiliser consumed in the farm sector in the country. In this connection, Rao (1994) argued that there was a broad correspondence between the infrastructural, institutional and technological development of regions and the level of credit flow and overdues.

In spite of a significant rise in the banking network, it is often said that the benefits of institutional credit have been largely shared by relatively prosperous regions of the country as well as more frequently by the richer sections of the rural population in each region. Though a number of studies are available on regional disparities in the disbursal of agricultural credit, hardly any studies are available on this subject which covers different states by drawing upon data from the recent period. Keeping in view the unprecedented changes that took place during the nineties in the flow of agricultural credit across states in India, an attempt has been made here to examine the extent of inter-state variations in the supply of institutional credit for agriculture by using data since 1981 to 2000.

III

STATE-WISE FLOW OF AGRICULTURAL CREDIT

Table 1 reveals that the growth rate of total credit (for agriculture and other sectors) during the reform period was higher than that during the pre-reform period.[6] However, in the case of agricultural credit, the growth rate during the reform period was lower (10.9 per cent) than that during the pre-reform period (15.2 per cent). A comparison of growth rates of credit to agriculture between pre- and reform periods reveals that most of the states registered higher growth rates of credit to agriculture during the pre-reform period as compared to the later period except Punjab and Maharashtra. This clearly shows that the rate at which credit was disbursed to agriculture slowed down during the reform period.

It is evident from Table 1 that for states like Bihar, Rajasthan, West Bengal, Kerala, Karnataka, and Maharashtra, the growth rate of credit to agriculture was higher than that to all sectors during the period 1981-91. However, the growth rates of agricultural credit were much lower than those in the case of total credit for all the states during the period 1992-2000. Importantly, the growth rates of credit to all the sectors and to agriculture declined during the second sub-period in the case of middle and low-income states. But the decline in growth rates was steep in the case of agricultural credit, especially in the case of Bihar, West Bengal and Gujarat. For high income group states, although the growth rate of credit to all sectors increased during 1992-2000, it decreased in the case of agriculture. Thus, the growth rates of agricultural credit were uneven across the sub-periods as well as across the states.

TABLE 1. STATE-WISE ANNUAL AVERAGE GROWTH RATES OF OUTSTANDING CREDIT BY SCBs

(per cent)

States	1981 – 1991		1992 – 2000		1981 - 2000	
	Agriculture	Total	Agriculture	Total	Agriculture	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
High income states						
Gujarat	14. 7	16. 5	7. 5	16. 0	12. 4	15. 4
Haryana	14. 3	14. 9	9. 3	14. 7	9. 9	13. 0
Maharashtra	13. 8	13. 5	13. 9	18. 9	12. 2	16. 2
Punjab	10. 6	12. 8	10. 7	14. 8	9. 2	13. 1
Group Total	13. 0	14. 0	10. 9	17. 8	11. 0	15. 5
Middle income states						
Andhra Pradesh	13. 5	17. 9	12. 2	15. 3	11. 4	15. 9
Karnataka	17. 0	16. 6	13. 8	17. 7	13. 0	15. 3
Kerala	15. 2	14. 8	12. 6	16. 1	12. 1	14. 1
Tamil Nadu	17. 3	17. 6	10. 3	17. 2	13. 2	16. 7
West Bengal	17. 5	14. 5	3. 5	11. 5	10. 1	13. 3
Group Total	15. 9	16. 4	11. 4	15. 6	12. 2	15. 3
Low income states						
Bihar	16. 2	15. 9	4. 3	10. 7	12. 2	13. 8
Madhya Pradesh	19. 2	20. 8	12. 5	15. 3	14. 1	16. 3
Orissa	15. 9	20. 7	9. 9	11. 5	10. 1	13. 9
Rajasthan	16. 1	15. 8	12. 2	15. 6	12. 7	14. 9
Uttar Pradesh	15. 0	16. 8	9. 8	11. 8	12. 8	14. 3
Group Total	16. 3	17. 6	10. 0	13. 0	12. 7	14. 7
All major states	15. 2	15. 7	10. 9	16. 0	12. 0	15. 3

Source: Reserve Bank of India (various issues of *Banking Statistics* from 1981 to 2000).

Table 2 provides agricultural credit as a proportion to total net bank credit (ACBC) for four five-year periods beginning with 1981-85. In 1980s, except Gujarat and Maharashtra among high income group states and Tamil Nadu and West Bengal among middle income group states, the remaining states could meet the norms of agricultural lending, i.e., 18 per cent of net bank credit.

There was perceptible change in the level of credit provided to agriculture during the 1990s (Table 2). First, the priority sector norms in relation to agricultural lending were met in nine and eight states during 1991-95 and 1996-2000, respectively. Second, the norms were met in all the low-income states and a few high and middle-income states during 1996-2000. Third, in the case of West Bengal and Maharashtra, the priority sector norms were not met even during both pre- and reform periods. Importantly, ACBC in all major states put together declined from 14.7 per cent during 1991-95 to 11.7 during the period 1996-2000. Such a decline was uniform across states. The declining trend in the ACBC indicates the banker's preference to non-agricultural lending.

TABLE 2. STATE-WISE AGRICULTURAL SECTOR LENDING TO TOTAL CREDIT AND TOTAL DEPOSIT

(per cent)

	1981-85		1986-90		1991-95		1996-2000	
States	ACBC	ACBD	ACBC	ACBD	ACBC	ACBD	ACBC	ACBD
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
High income states								
Gujarat	15. 2	8. 0	14. 4	8. 4	14. 1	7. 6	9. 9	5. 4
Haryana	31. 3	29. 1	28. 5	22. 7	25. 0	16. 0	19. 2	10. 4
Maharashtra	6. 4	5. 5	7. 3	4. 8	5. 0	3. 0	4. 1	3. 1
Punjab	33. 4	19. 5	28. 3	12. 6	22. 8	10. 1	18. 6	7. 6
Group Total	13. 0	9. 7	12. 7	7. 9	9. 6	5. 6	7. 1	4. 6
Middle income states								
Andhra Pradesh	35. 7	25. 7	29. 5	23. 1	22. 6	17. 5	19. 7	14. 1
Karnataka	23. 2	18. 4	24. 3	20. 9	20. 8	14. 6	16. 9	11. 6
Kerala	17. 5	11. 5	18. 3	11. 8	15. 8	7. 6	13. 5	5. 9
Tamil Nadu	16. 9	14. 5	17. 4	16. 3	14. 1	12. 4	10. 7	9. 8
West Bengal	7. 1	3. 3	9. 7	4. 8	6. 5	3. 3	4. 8	2. 2
Group Total	19. 5	13. 0	19. 6	14. 1	15. 6	10. 4	13. 0	8. 4
Low income states								
Bihar	24. 5	9. 2	25. 7	8. 8	25. 7	9. 7	19. 8	5. 4
Madhya Pradesh	25. 6	15. 3	24. 8	16. 0	22. 5	13. 4	19. 5	10. 7
Orissa	31. 3	23. 7	25. 3	23. 2	20. 7	13. 4	19. 0	9. 0
Rajasthan	27. 9	19. 8	25. 9	18. 3	25. 0	13. 9	21. 3	10. 5
Uttar Pradesh	24. 2	10. 1	22. 2	9. 0	21. 8	9. 2	19. 5	6. 3
Group Total	25. 8	12. 6	24. 7	12. 1	23. 0	10. 9	19. 8	7. 6
All major states	17. 9	11. 7	18. 1	11. 2	14. 7	8. 6	11. 7	6. 8

Source: Reserve Bank of India (various issues of *Banking Statistics* from the year 1981 to 2000).

Agricultural credit as a proportion to total bank deposit (ACBD) indicates the extent to which the deposits mobilised in a state were lent to agriculture sector. The data in Table 2 reveal substantial inter-state differences in ACBD in one sub-period as well as between four sub-periods. In agriculturally prosperous states of Haryana, Andhra Pradesh and Karnataka, the ACBD was relatively higher for most part of the last two decades. The middle income state like West Bengal had the distinction of having the lowest ACBD throughout the period 1981-2000. The other two poorer states such as Bihar and Uttar Pradesh had lower ACBD all through during the same reference period. The situation of these states in terms of ACBD was even worse during the period 1996-2000. In Bihar, ACBD dropped from 9.2 to 5.4 per cent during the period 1981-2000, while in Uttar Pradesh it declined from 10.1 to 6.3 per cent during the same period. Importantly, the gap between ACBC and ACBD was generally large in the poorer states as compared to the agriculturally prosperous states.

It is evident that ACBD declined progressively in all the 14 major states taken together during the period 1981 to 2000. A consistent decline in the ACBD in all the major states indicates that banks have been diverting their funds to non-agricultural lending. Such a diversion seems to be more prominent in the backward states like Bihar, Uttar Pradesh and West Bengal. Nevertheless, the extent of diversion of funds out of deposits mobilised was equally high in developed states of Maharashtra, Kerala and Gujarat. This implies that agriculture in a state belonging to the high-income category need not necessarily receive higher priority in terms of allocation of

credit. Thus, the income status of the state (per capita income in this case) itself does not determine the supply of agricultural credit. We presume that supply side factors determine the level of credit made available to the agricultural sector. Such a presumption is borne out by the fact that the high per capita income in a particular state need not necessarily be due to high agricultural income. The non-agricultural sectors may have played an important role in determining the level of per capita income. If this is the case, bankers may give priority to non-agricultural sectors in their lending portfolio purely on the grounds of profitability. Since the proportion of agricultural credit to net bank credit has been declining over a period of time, it can be inferred that the bankers may not be considering lending to agricultural sector as profitable.

The foregoing discussion on rapid growth of credit to agriculture in the 1980s can generally be attributed to the supply-led approach adopted by the formal institutional agencies (Adams and Vogel, 1986; Gadgil, 1994; Shajahan, 1999; Kohli, 1999; Shivamaggi, 2000). The fall-out of such an approach could be considered as the contributing factor for the decline in the credit flow to agriculture in the 1990s. The literature suggests that a preoccupation to achieve quantitative targets in the 1980s ignoring the qualitative aspects resulted in high cost structure of operation and mounting overdues within the banking system. This became a threat to the viability of the financial institutions. Thus, the policy of competitive financial system was adopted in the provision of agricultural credit to improve the viability of financial agencies since 1991, especially after the introduction of banking sector reform. Although the target of agricultural credit was kept the same during the 1990s, there was a decline in the credit flow to agriculture. This, perhaps, could be because of credit rationing practices. The perceptions on risks involved in agricultural lending might have forced bankers to adopt price and non-price credit rationing to increase the efficiency and viability of financial institutions in the provisioning of agricultural credit.

IV

DISTRIBUTION PATTERN OF AGRICULTURAL CREDIT

Access to credit has been defined as the number of farmers obtaining formal credit to total farmers in a state at a particular point of time. For the analysis of distribution of credit by size-classes of landholdings, we have relied upon the data on operational holdings provided in quinquennial agricultural census. As per the latest published agricultural census data, state-wise number of operational holdings is available only for the years 1980-81, 1985-86 and 1990-91. The data on the total number of holdings in each state for these time-points have been used to examine the access to credit (Direct Finance[7] to Farmers) by different categories of farmers. However, for the year 1996-97, the number of farmers (operational holdings) has been calculated by the extrapolation method.[8] Since state-wise and size class-wise number of outstanding loan accounts on direct finance is available up to 1996–97, we

have calculated the number of farmers for the latest year to examine the position of access to credit.

There were substantial inter-state differences in the access to formal credit by the same category of farmers at one point of time as well as between different time points (Table 3). The access to formal credit by the small and marginal farmers had gone down in the year 1996-97 as compared to 1990-91 in all the states except Gujarat. Among the states, the proportion of marginal and small farmers having access to institutional credit was the highest in Punjab (26.7 per cent) in 1996-97 followed by Tamil Nadu and Andhra Pradesh. However, in states like Bihar, Madhya Pradesh, Uttar Pradesh, Haryana, and Maharashtra only 5 to 6.7 per cent of the marginal and small farmers had access to formal credit in the same year. For farmers with more than 2 hectares of operational holding (medium and large), 63.2 per cent of them were accessing formal credit in Tamil Nadu followed by Kerala (45 per cent), and Punjab (31.6 per cent) in 1996-97. The percentage of medium and large farmers having access to institutional credit was substantially lower in the states like Madhya Pradesh, Rajasthan and Maharashtra. It can be, therefore, concluded that even the same size of landholdings were having uneven access to formal credit across the states. This finding holds good for all size groups of farmers.

TABLE 3. STATE-WISE AND SIZE CLASS-WISE ACCESS TO DIRECT FINANCE BY THE FARMERS

(per cent)

States	Up to 2 hectares				Above 2 hectares			
(1)	1980-81 (2)	1985-86 (3)	1990-91 (4)	1996-97 (5)	1980-81 (6)	1985-86 (7)	1990-91 (8)	1996-97 (9)
High income states								
Gujarat	5. 6	13. 5	12. 9	14. 1	6. 4	14. 4	17. 5	10. 6
Haryana	7. 2	11. 6	11. 2	5. 0	11. 6	17. 7	18. 7	11. 4
Maharashtra	3. 6	7. 4	9. 4	6. 7	5. 4	10. 7	12. 0	9. 1
Punjab	21. 5	38. 0	41. 2	26. 7	22. 7	29. 7	42. 2	31. 6
Group Total	5. 6	11. 1	12. 0	8. 8	8. 0	14. 2	17. 0	11. 8
Middle income states								
Andhra Pradesh	16. 0	24. 7	23. 3	20.1	16. 3	23. 6	21. 9	24. 5
Karnataka	11. 3	20. 9	19. 1	11. 3	9. 2	15. 7	16. 4	15. 8
Kerala	15. 0	21. 0	17. 6	15. 5	21. 3	51. 2	45. 0	45. 0
Tamil Nadu	11. 8	19. 6	25. 8	20. 3	11. 7	24. 5	44. 9	63. 2
West Bengal	7. 4	12. 9	12. 0	10. 8	9. 2	11. 5	12. 4	17. 1
Group Total	12. 3	19. 8	20. 1	16. 3	12. 6	20. 5	23. 2	30. 5
Low income states								
Bihar	3. 6	5. 6	6. 7	5. 0	5. 7	11. 0	11. 7	11. 6
Madhya Pradesh	4. 0	7. 7	9. 3	5. 8	6. 0	7. 2	8. 0	7. 1
Orissa	8. 3	16. 2	18. 4	14. 4	9. 7	11. 7	11. 7	20. 2
Rajasthan	3. 3	9. 8	12. 4	8. 2	4. 4	6. 8	6. 7	5. 0
Uttar Pradesh	3. 3	5. 5	6. 3	5. 2	11. 3	18. 2	21. 4	18. 9
Group Total	3. 8	6. 9	8. 1	6. 2	7. 1	10. 4	11. 3	10. 3

Sources: 1) Reserve Bank of India (*Report on Currency and Finance*, Vol. II, for the years 1982-83, 1987-88, 1992-93, and 1997-98).

2) *Fertiliser Statistics 1999-2000*, Fertiliser Association of India, New Delhi.

Note: Figures on the number of accounts for all the years have been given for the period July-June except for the year 1980-81 (April to March).

The outstanding credit (direct finance) per loan account varies within and across states at one time point as well as between different time points (Table 4). The amount of credit per loan account was higher in the states belonging to high-income category as compared to those in the middle and low-income categories. For instance, the size of credit per loan account for small and marginal farmers was Rs.22,181 in Haryana, whereas it was only Rs. 4,862 in Orissa in 1996-97. Such variations could be found even among medium and large farmers. This suggests that farmers within the same size class of landholdings obtained substantially different loan amounts across the states.

TABLE 4. STATE-WISE AND SIZE CLASS-WISE OUTSTANDING CREDIT PER LOAN ACCOUNT

(Rs.)

	Up to 2 hectares				Above 2 hectares			
States	1980-81	1985-86	1990-91	1996-97	1980-81	1985-86	1990-91	1996-97
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
High income states								
Gujarat	3,145	4,890	7,162	16,773	9,389	14,849	17,474	27,321
Haryana	2,938	5,782	10,800	22,181	17,779	20,822	39,077	72,228
Maharashtra	3,280	5,663	7,823	13,118	8,557	11,194	16,839	33,330
Punjab	2,940	10,511	9,927	21,757	15,067	18,224	28,363	57,154
Group Total	3,121	6,526	8,349	15,954	11,782	14,705	22,102	41,681
Middle income states								
Andhra Pradesh	1,913	3,430	5,540	9,492	4,218	7,073	11,332	17,648
Karnataka	2,226	3,989	6,503	15,879	6,665	10,011	15,808	33,451
Kerala	1,500	2,645	5,095	8,897	7,425	10,695	16,066	8,771
Tamil Nadu	1,860	3,505	5,552	12,891	6,280	9,097	12,649	19,857
West Bengal	1,577	1,922	2,859	6,595	8,430	24,813	23,448	44,562
Group Total	1,800	3,172	5,278	10,675	5,611	9,526	13,655	21,341
Low income states								
Bihar	1,598	2,581	3,922	5,550	6,688	6,951	20,315	26,471
Madhya Pradesh	3,051	4,071	7,937	10,960	5,416	10,099	21,358	36,429
Orissa	1,359	2,877	2,875	4,862	1,664	4,070	8,490	8,535
Rajasthan	2,874	3,430	5,405	8,969	8,244	15,801	27,881	47,733
Uttar Pradesh	1,603	3,197	5,327	8,436	7,733	10,552	16,895	32,096
Group Total	1,786	3,136	4,938	7,481	6,373	10,172	19,382	31,023

Source: Reserve Bank of India (*Report on Currency and Finance*, Vol. II, for the years 1982-83, 1987-88, 1992-93 and 1997-98).

One important finding from Tables 3 and 4 is that while the percentage of farmers accessing formal credit during the 1990s was declining in most of the states, the loan amount per account kept on increasing. This implies that there was concentration of formal loan in favour of a particular group of borrowers, and that the banks practised both price and non-price credit rationing methods in the borrower selection and fixation of the credit limit.

The amount of credit per hectare of operational holding is calculated in Table 5 to examine the state-wise variations. This analysis has been undertaken only for 1980-81, 1985-86 and 1990-91 as the data on area under different size-classes of operational holdings are available only for these time points. As in the case of the

access and amount of credit obtained per loan account, there have been substantial inter-state differences in the amount of credit per hectare of operational holding within and across different sizes of farmers. Per hectare amount of credit obtained by farmers in low-income category states was lower than that obtained by the farmers from middle and high-income category states. This holds good in the case of both categories of farmers at all time points. For instance, the average credit per hectare of operational holding in low-income category states was Rs. 659 for the farmer with holdings up to 2 hectares in 1990-91, whereas, it was Rs. 4,161 in the case of Punjab, the high income state. In the case of other middle and high-income category states like Kerala, Tamil Nadu, Andhra Pradesh, and Haryana also per hectare credit was sufficiently higher than that of low-income category states at one as well as different points of time even for the same size of holdings.

TABLE 5. STATE-WISE AND SIZE CLASS-WISE OUTSTANDING CREDIT PER HECTARE OF OPERATIONAL HOLDING

(Rs.)

	Up to 2 hectares			Above 2 hectares		
States	1980-81	1985-86	1990-91	1980-81	1985-86	1990-91
(1)	(2)	(3)	(4)	(5)	(6)	(7)
High income states						
Gujarat	181	681	928	108	408	606
Haryana	231	842	1,478	330	691	1,491
Maharashtra	132	443	791	89	247	456
Punjab	629	4,115	4,161	618	924	2,084
Group Total	189	768	1,071	174	409	789
Middle income states						
Andhra Pradesh	406	1,160	1,785	141	355	565
Karnataka	282	933	1,411	115	315	560
Kerala	784	1,995	3,797	393	1,267	1,612
Tamil Nadu	377	1,227	2,607	173	528	1,396
West Bengal	183	383	524	222	840	824
Group Total	358	1,024	1,769	150	428	729
Low income states						
Bihar	120	287	549	88	188	609
Madhya Pradesh	147	382	888	52	128	319
Orissa	137	590	677	43	125	279
Rajasthan	110	389	775	46	141	257
Uttar Pradesh	95	326	594	220	504	972
Group Total	114	358	659	81	197	422

Note: Data on area under operational holdings has been collected from the Fertiliser Association of India, New Delhi, 1999-2000 (*Fertiliser Statistics*), and corresponding loan amount for these categories of farmers has been collected from the Reserve Bank India (*Report on Currency and Finance,* Vol.II) for the years 1982-83, 1987-88 and 1992-93.

V

DETERMINANTS OF FLOW OF CREDIT

It has been observed earlier that there were substantial inter-state differences in the supply of credit per loan account as well as per hectare of operational holding at

one and different time points even for the same size-class of landholdings across states. What explains these differences? Before we go into the details of the analysis, two aspects need to be mentioned. First, since the data on the characteristics of households obtaining formal credit are not available at the state levels, the analysis on variations in credit availability per loan account is quite difficult. Second, as the availability of data on operational holdings is confined to only three time points, a rigorous analysis is difficult. Therefore, an attempt has been made in this section to examine the factors which contribute to the variations in the amount of credit per hectare of gross cropped area. Hence, credit per hectare of gross cropped area (GCA) has been considered as the dependent variable in the analysis. The *a priori* model on the determinants of supply of agricultural credit has been specified with the following variables.

(i) Percentage of Irrigated Area to Gross Cropped Area (AIR[9])

From the supply side, the flow of credit can be said to be dependent upon the lender's assessment as regards the repayment capacity of the borrower. It is assumed that irrigation facility can increase the level of production and in turn, the repayment of the loan. Thus, AIR has been specified as an important variable that determines the supply of credit and is expected to be positively associated with CGA.

(ii) Percentage of Area under Commercial Crops to Gross Cropped Area (CCP)

The farmers cultivating commercial crops[10] are likely to demand more funds to meet their cost of production. Besides, bankers often assume that the commercial crop growers are safe borrowers in terms of repayment. Thus, an increase in the CCP may positively influence the supply of agricultural credit.

(iii) Credit-Deposit Ratio (CDR)

The deposit is one of the important sources of loanable funds and is assumed to be positively related with the supply of credit. The increase in the volume of deposits can enhance the volume of agricultural credit provided that bankers perceive lending to agriculture is profitable. However, the CDR can increase due to either more flow of agricultural credit or non-agricultural credit or both. Hence, even if CDR increases, this may not necessarily increase the supply of agricultural credit. Thus, increasing CDR may or may not lead to more supply of agricultural credit.

(iv) Density of Bank Branches Per 1,000 Farmers (DBB)

It is explained in the literature that the problem of mounting overdues, poor quality of lending and recalcitrant attitude of the borrowers contributed to the

cumulative losses to formal financial institutions during the pre-reform years.[11] This adversely affected the viability and efficiency of the rural banking system. Therefore, during the reform years and especially after 1993-94, the loss making bank branches were directed to close down or merge them with their sponsored bank branches. The data show that only the rural bank branches have been so far closed down. Thus, with the increasing population size, the access to banking facility by rural population might have come down. Hence, it is important to see the relationship between banking facility and provisioning of agricultural credit. In this context, we have taken into account the density of bank branches per thousand farmers. As per the latest agricultural census, the number of farmers for each state is available only for the years 1980-81, 1985-86 and 1990-91. So, we have calculated the number of farmers for the rest of the years by extrapolation method (see, Note 8) by using 1980-81 and 1990-91 figures, and calculated the DBB in each state.

Model Specification

Thus, in the model, the dependent variable CGA is a function of the explanatory variables of AIR, CCP, DBB and CDR. Since different states have different characteristics, we have used panel data regression model to capture the individuality. The individual effect is assumed to be constant over time and specific to the individual states. Hence, differences across the states can be captured in differences in constant term.[12] Two alternative functional forms, viz., linear and log-linear models have been compared for the pooled data. Sargan's criterion has been used to choose between the linear and log-linear specifications. The Sargan's criterion as given by Godfrey and Wickens (1981) is computed as:

$$S = \frac{[\delta_u]^T}{[g\,\delta_v]^T}$$

Where g stands for the geometric mean of the dependent variable of the linear model, $\delta_u$stands for the residual sum of square of the linear model, $\delta_v$is the residual sum of square of the log-linear model, and T represents the number of observations. According to Sargan's criterion, if S>1, then the log-linear model is preferred for the interpretation.[13] Since our estimation result[14] shows that 'S' is greater than one, it indicates log-linear as the correct functional form.

The basic framework for using the pooled regression model can be specified as

$$Y_{it} = \alpha_i + \beta' X_{it} + \in_{it}$$

There are *k* regressors in X_{it} excluding the constant term. The individual effect, α_i which is taken to be constant over time *t* and specific to the individual cross-section

unit *i*. If we take α_i to be the same across all units, then ordinary least squares provides consistent and efficient estimates of α and β. There are two basic frameworks used to generalise this model. The Fixed Effect and Random Effect approach takes α_i to be a group-specific constant and group-specific disturbance term in the regression model, respectively. With this background, we have used Fixed and/ Random Effect model to estimate the pooled regression parameters. The estimated equation is as follows:

$$\log (GCA)_{it} = \alpha_i + \beta_1 \log (AIR)_{it} + \beta_2 \log (CCP)_{it} + \beta_3 \log (DBB)_{it} + \beta_4 \log (CDR)_{it} + \in_{it}$$

Based on the least square residuals, we obtain a Lagrange Multiplier (LM) Test statistic of 495.54 which far exceeds the 95 per cent critical value for chi-square with one degree of freedom (3.84). At this point, we conclude that the classical regression model with single constant term is inappropriate for these data. Keeping the fundamental difference in the two approaches in mind, we have applied Hausman Test for the Fixed vs. Random Effect model. The test statistics is 73.09. The critical value from the chi-square table value with four degrees of freedom is 9.48, which is less than the calculated value. The Hausman test statistics indicate that the Fixed Effect model is appropriate. Thus, the hypothesis that the individual state-specific effects are not correlated with the regressors in the model can be rejected. Hence, of the two alternatives considered, the Fixed Effect Model appears as a better choice for the interpretation, which is reported in Table 6. Since it is a log-log model, the coefficients can be interpreted as elasticity.

TABLE 6. DESCRIPTION, EXPECTED SIGN, AND COEFFICIENT OF VARIABLES IN THE LOG-LINEAR MODEL

Variables (1)	Expected Sign (2)	Fixed Effect Model		Random Effect Model	
		Coefficient (3)	t – value (4)	Coefficient (5)	t – value (6)
Constant		-	-	2.38 *	2.12
AIR	+	2. 85*	11.79	1.98 *	10.36
CCP	+	0. 26	1.29	0.64 *	4.01
DBB	+	1. 43 *	6.98	1.22 *	6.49
CDR	+, -	- 0. 71 *	- 4.13	- 0.87 *	-5.25

Lagrange Multiplier Test = 495.54,
Fixed vs. Random Effects (Hausman) = 73.09, No. of observations = 280.
Note: * at 1 per cent level of significance.

The positive and statistically significant coefficient of AIR indicates that 1 per cent increase in the irrigated area as a percentage of gross cropped area will lead to 2.85 per cent increase in the credit obtained per hectare of gross cropped area. This suggests that, in any state, larger percentage of gross area irrigated to gross cropped area leads to a greater flow of agricultural credit by formal financial institutions. Since irrigation facility reduces uncertainty of crops, bankers probably give priority

to lend more in the irrigated belt. The positive and significant coefficient of DBB implies that 1 per cent increase in the bank branch per thousand farmers will lead to 1.42 per cent increase in the credit per hectare of gross cropped area. Thus, the states with higher DBB may be in a better position in terms of providing qualitative credit to the agricultural borrowers. During the reform years the loss making bank branches were directed to close down or asked to merge with the sponsored banks. This happened only in the rural areas. As a consequence, the DBB might have come down, which, in turn, lead to lower supply of agricultural credit.

Though the variable CCP has an expected positive sign, it is not significant. The coefficient of CDR is negative and significant which means 1 per cent increase in the CDR leads to 0.71 per cent decrease in the supply of credit per hectare of gross cropped area. This suggests that even if we increase the CDR it may enhance the supply of credit to non-agriculture sectors. Hence, as long as the bankers do not perceive lending to agriculture as profitable, increasing CDR itself is not enough for better provisioning of agricultural credit. On the whole, the farmers in the irrigated area or/and with high density of bank branches are most likely to benefit from formal financial institutions.

The intercepts of fixed effect model for 14 states are given in Table 7. This difference in intercepts can be attributed to the unique features of each state. Although the evidence supports that the Fixed Effect estimates are generally held to be downward biased estimates of the true effects, they are an improvement over cross-section data estimates (Johnston and Di Nardo, 1997).

TABLE 7. STATE-SPECIFIC INTERCEPTS OF FIXED EFFECT MODEL

States	Coefficient	t – values
(1)	(2)	(3)
Gujarat	- 0.78	- 0. 66
Haryana	- 2.52 ***	- 1. 86
Maharashtra	2.16 ***	1. 88
Punjab	- 4. 41*	- 3. 40
Andhra Pradesh	0.20	0.15
Karnataka	1.23	1. 03
Kerala	3.58 *	3. 33
Tamil Nadu	0.03	0. 02
West Bengal	0.02	0. 02
Bihar	- 0.33	- 0. 27
Madhya Pradesh	1. 01	0. 88
Orissa	0.47	0. 39
Rajasthan	- 0.23	- 0. 20
Uttar Pradesh	- 1.70	- 1. 32

Note: *** and * indicate 10 and 1 per cent level of significance.

VI

CONCLUDING REMARKS

This paper analyses inter-state disparities in the flow of agricultural credit. The study reveals that the growth rate of agricultural credit was higher during pre-reform

period compared to the reform period in most of the states. It is also observed that the growth rate of agricultural credit was uneven during the sub-periods as well as across the states. Since the ACBD has been declining for all the major states, it suggests that bankers are utilising lower and lower amounts of deposits mobilised for agricultural lending. This situation, however, seems to be more prominent particularly in the case of backward states like Bihar, Uttar Pradesh, and West Bengal. The analysis on access to formal credit and the outstanding loan amount per account reveals that there are inter-state differences in the access to credit as well as the loan amount obtained by farm households even for the same size class of landholding.

The proportion of irrigated area to gross cropped area, and density of bank branches per 1,000 farmers have been identified as the most important factors influencing the supply of credit to agriculture across states. Importantly, the negative coefficient of CDR indicates that an increase in CDR need not necessarily ensure more supply of credit to agriculture sector. This will happen only when the bankers perceive the agricultural lending to be profitable. The implication of this finding is that for better provisioning of agricultural credit, the increasing CDR should be backed by more irrigation facility and banking infrastructure.

Received January 2006. *Revision accepted September 2007.*

NOTES

1. It is stated that households with an asset holding of less than Rs. 10,000 depended on informal sources for 67 to 91 per cent of their credit needs, whereas those with assets above Rs. 1 lakh depended on such sources only to the extent of 5 to 24 per cent of their total borrowing (Haque and Verma, 1988).

2. The scheduled commercial banks consist of State Bank of India and its associates, nationalised bank, Regional Rural Banks (RRBs), foreign banks, and other Scheduled Commercial Banks (in the private sector).

3. These data have been obtained from *Banking Statistics* published by the RBI.

4. Relative shares of different regions in outstanding direct finance of commercial banks in 1984 shows that the southern region with only 19 per cent of the cultivated area in the country accounts for 73 per cent and 52 per cent of short-term and total loans outstanding respectively in the country. Whereas, the eastern and central regions with nearly 42 per cent of the cropped area of the country account for only about 9.4 per cent of short term loans and 15.5 per cent of the total loans outstanding (Rao, 1994).

5. Data for the years 1972 and 1982 on the short-term credit flow to agriculture by commercial banks and co-operatives show that the coefficients of variation (C.V.) in credit per hectare of net sown have increased over the years, suggesting that regional disparities in the flow of agricultural credit have widened during the reference period (Dadibhavi, 1988).

6. The period 1981 to 1991 has been considered as the pre-reform period, while 1992 to 2000 as reform period.

7. The direct finance covers both short-term and long-term loans. Short-term loans (including crop loans) are given for the purchase of production inputs, such as, seeds, fertiliser, pesticides, etc., and to meet the cost of cultivation, which includes labour charges for carrying out agricultural operations, irrigation charges, etc. Term (medium/long) loans are granted for development purposes like development of irrigation potential, purchase of tractors and other agricultural implements and machinery, improvement of land, development of plantations, construction of godowns and cold storages, purchase of pump sets/oil engines, plough animals (bullocks), etc.

8. The number of farmers in the current year $(Y_t) = Y_0 (1 + r)^t$, where Y_0 stands for number of farmers in the base year, r stands for rate of growth, t represents time periods, and $r = (Y_t / Y_0)^{1/t} - 1$.

9. To calculate AIR we have taken data from *Indian Agricultural Statistics* (Department of Agriculture and Co-operation, Ministry of Agriculture, Government of India) for the years 1980-81 to 1992-93. For the remaining years, the same data have been collected from *Fertiliser Statistics* (the Fertiliser Association of India, New Delhi), and *Statistical Abstract* (Director of Economics and Statistics, Ministry of Agriculture).

10. It includes area under oilseeds (viz., groundnut, seasamum, rapeseed and mustard oil, linseed, castorseed, nigerseed, safflower, sun-flower and soyabeen), cotton, jute and mesta, tea, coffee, tobacco and sugarcane. These data have been collected from *Indian Agricultural Statistics* (1980-81 to 1992-93), and for the rest of the years from *Statistical Abstract*.

11. For more detailed discussion on these issues, see Von Pischke, Adams and Donald, 1983; Braverman and Guasch, 1986; Khusro, 1989; Vyasulu and Rajasekhar ,1991; Kahlon, 1991.

12. It is possible to allow the slopes to vary across the states. However, it requires considerable complexity in the calculation.

13. If S<1, than the linear model is preferred over log-linear model.

14. The estimated results are g = 916.2, δ_u= 404491026.8, δ_v= 0.132415, T = 280, and S = $(3334083.6)^{280}$.

REFERENCES

Adams, D.W. and Robert C. Vogel (1986), "Rural Financial Markets in Low-Income Countries: Recent Controversies and Lessons", *World Development*, Vol. 14, No. 4, pp. 477 - 487.

Braveman, A. and J.L. Guasch (1986), "Rural Credit Markets and Institutions in Developing Countries: Lessons for Policy Analysis from Practice and Modern Theory", *World Development*, Vol. 14, No. 10, pp. 1253-1267.

Bell, Clive (1990), "Interactions between Institutional and Informal Credit Agencies in Rural India", *The World Bank Economic Review*, Vol. 4, No. 3, pp. 297-327.

Dadibhavi, R.V. (1988), "Dimensions of Regional Disparities in Institutional Credit to Agriculture", *Indian Journal of Agricultural Economics*, Vol. 43, No. 3, July-September, pp. 374-380.

Gadgil, M.V. (1994), "Formal Agricultural Credit System in India: Shape of Things to Come", *Indian Journal of Agricultural Economics*, Vol. 49, No. 3, July-September, pp. 476-490.

Godfrey, L.G. and Wickens, M.R. (1981), "Testing Linear and Log-linear Regressions for Functional Form", *Review of Economic Studies*, Vol. 48, pp. 487-496.

Haque, T. and Sunita Verma (1988), "Regional and Class Disparities in the Flow of Agricultural Credit in India", *Indian Journal of Agricultural Economics,* Vol. 43, No. 3, July-September, pp. 356-363.

Johnston, J. and J. Di Nardo (1997), *Econometric Methods*, (4th Edition), McGraw Hill, New York.

Kahlon, A. S. (1991), "Rural Overdues: Borrower's Angle", *Economic and Political Weekly*, Vol. 26, No. 5, March (Annual Number), pp. 243 – 246.

Khusro, A.M. (1989), "*A Review of the Agricultural Credit System in India: Report of the Agricultural Credit Review Committee"*, Reserve Bank of India, Bombay.

Kohli, Renu (1999), "Rural Bank Branches and Financial Reform", *Economic and Political Weekly*, Vol. 34, No. 3 and 4, January 16-22/23-29, pp. 169 – 174.

Ramachandran, V.K. and Madhura Swaminathan (2001), *Does Informal Credit Provide Security? Rural Banking Policy in India*, International Labour Office, Geneva.

Rao, C.H. Hanumantha (1994), "Policy Issues Relating to Irrigation and Rural Credit in India", in G.S. Bhalla (Ed.) (1994), *Economic Liberalisation and Indian Agriculture*, Institute for Studies in Industrial Development, New Delhi.

Rao, M.G., R.T. Shand and K.P. Kalirajan (1999), "Convergence of Incomes across Indian States", *Economic and Political Weekly*, Vol. 34, No. 1 and 2, January 2-8/9-15, pp. 167-188.

Rath, Nilakantha (1989), "Institutional Credit for Agriculture in India", *Journal of Indian School of Political Economy*, Vol. 1, No. 2, April-June, pp. 239-267.

Reddy, Y.V. (2001), "The Future of Rural Banking", in Raj Kapila and Uma Kapila (Eds.) (2001), *India's Banking and Financial Sectors in New Millennium*, Academic Publication, New Delhi.

Shajahan, K.M. (1999), "Priority Sector Bank Lending: How Useful?, *Economic and Political Weekly*, Vol. 34. No. 51, December 18-24, pp. 3572-3574.

Shivamaggi, H.B. (2000), "Reforms in Rural Banking: Need for Bolder Approach", Economic *and Political Weekly*, Vol. 35, No. 20, May 13-19, pp. 1714–1718.

Von Pischke, J.D., Dale W. Adams and Gordon Donald (1983), *Rural Financial Markets in Developing Countries: Their Use and Abuse*, The Johns Hopkins University Press, Baltimore, Maryland, U.S.A.

Vyasulu, Vinod and D. Rajasekhar (1991), "Management of Rural Credit: Issues for 1990s", *International Journal of Development Banking*, Vol. 9, No.1, pp. 47-53.