

# FINANCIAL PERFORMANCE AND EFFICIENCY OF COOPERATIVE BANKS IN JAMMU & KASHMIR (INDIA)

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## ABSTRACT

This paper attempts to contribute to the cooperative banking efficiency literature by investigating the technical efficiency of cooperative banks operating in Jammu & Kashmir (J&K). The study applies Charnes, Cooper and Rhodes (CCR) model (1978) of Data Envelopment Analysis (DEA) and the Banker, Charnes and Cooper (BCC) model (1984). Banks under reference are treated as intermediaries between savers and investors. The estimated results show that three banks are relatively efficient when their efficiency is measured in terms of constant returns to scale and five banks are relatively efficient when their efficiency is measured in terms of variable returns to scale. By improving management of deposits, number of employees, loan advances and investment operations the less efficient banks can successfully achieve efficiency in resource utilization. The results also provide valuable insights to policymakers and managers for improving the efficiency and management of the cooperative banking sector.

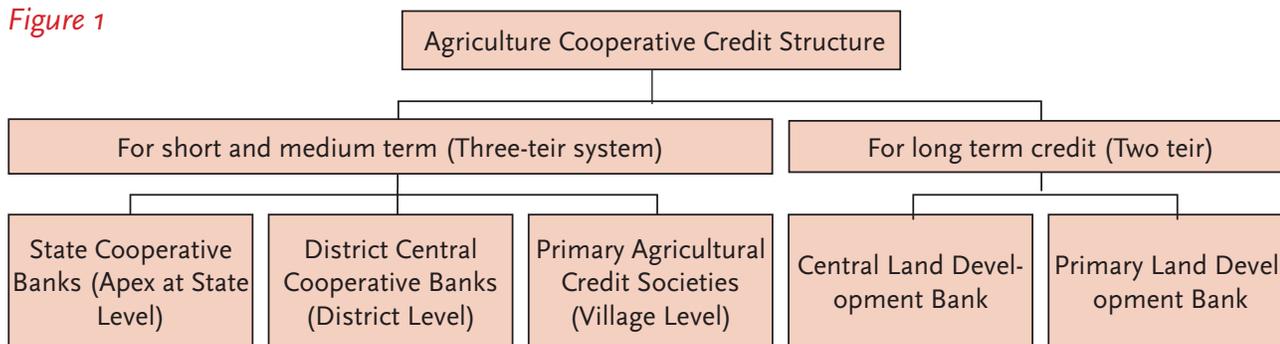
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**INTRODUCTION**

India has a vibrant banking system mainly consisting of: commercial banks, regional rural banks and cooperative banks. These banks play an important role in mobilizing and allocating financial resources. Apart from performing conventional banking functions these institutions act as medium of social and inclusive banking [See Anjum, 2011]. At the beginning of nineteenth century cooperative banks were established as a tool of state policy to provide adequate, timely and cheap credit to farmers and save them from the clutches of money lenders. Over the years these become an integral part of the multi-agency framework for credit delivery spread across the breadth and length of rural India. With more than 106 thousand outlets (averaging one ground level credit cooperative for every six villages) and a total membership of more than 120 million rural people Indian Cooperative Credit structure is one of the largest rural financial systems in the world [see Rangarajan 1972].

Maclagen Committee, in 1915 to study the problems and prospects of Cooperative Credit. On the recommendations of this committee a three-tier organisation (See Fig.1) of cooperatives for short term loans was setup comprising Primary Agricultural Credit Societies at the village level District Central Cooperative Banks at district level and State Cooperative Banks at state level. Government supported the cooperatives in the initial stages by supplying finance and guidance. The Cooperative Reforms Act of 1919 declared cooperation as a State subject. Accordingly legislative control over cooperatives was transferred from Central to Provincial governments. Regardless of these legal and administrative measures the growth of cooperatives was far from satisfactory. After independence in 1947 government's approach to cooperatives witnessed a paradigm shift. Based on the recommendations of the All India Rural Credit Survey Committee {(AIRCS) 1954} the government came to viewed cooperatives as vehicles of development for rural India.

Figure 1



Cooperatives were institutionalised in India through the enactment of the Cooperative Credit Societies Act. 1904. This Act covered primary cooperative credit societies only. Subsequently all types of credit and non-credit societies were brought under the ambit of Cooperative Credit Societies Act. 1912. Government appointed an expert Committee, called

During the early phases of planning the major sources of credit to rural households in India were either cooperative banks or informal credit institutions. However, share of formal agencies was only 7 percent during 1951. After the nationalization of commercial banks in 1969 the flow of credit to rural/agricultural households increased from 1.9% in (1972-73)

to 72.6% in (2008-09). The growth in the share of commercial banks credit to agriculture was accompanied by decline in the relative share of cooperative credit. It fell from 86.5% in (1972-73) to 17.5% in (2008-09) [see Economic Survey, GoI, 2009-10].

Sustainability of the cooperative credit institutions have become a major concern. Money and credit markets in India are controlled, regulated and directed by Reserve Bank of India (RBI). It is mandated to use credit and monetary policies for ensuring financial health of the financial institutions. RBI has been effecting policy changes from time to time. Among a slew of policy changes in the financial sector reforms initiated by RBI in early nineties have impacted the financial markets in a significant manner. These reforms generated both expectations and apprehensions. Reform/liberalization measures sought to improve the bank efficiency in terms of operations and outreach. Several government appointed committees<sup>1</sup> had emphasized need to revitalize the banking sector. Acting upon these recommendations governments (both state and central) introduced number of Command and Control Measures (CCMs) and Market-Based Instruments to improve the efficiency and coverage of the banking sector. Consequent upon these policy measures the structure of the Indian banking sector has undergone significant changes in terms of scope, opportunities and operational flexibility. These changes were introduced with added vigour

and speed since the introduction of globalization and liberalization measures by the government in 1991. Although the reforms in the Cooperative Credit Sector did not receive the desired priority and attention yet a few major reforms were also introduced after 1991 [see Subramanian, 1999]. Notwithstanding these reforms, the cooperatives are still too weak to face ever increasing competition both from institutional (Commercial Banks in particular) and non-institutional (money lenders and traders) sources of credit.

Keeping in view the importance and vulnerability of Cooperative institutions various committees were set up by the government of India (GoI) to examine the problems and prospects of cooperative credit. These Committees were asked to propose concrete ways and means for their revitalization. The latest among these committees was the Vaidynathan Committee (GoI, 2004). It was mandated to chalk out an implementable action plan for reviving rural cooperative banking institutions. The Committee made widespread recommendations including that of reserved government capital for cooperatives. Recognizing the wide outreach of cooperative credit institutions (particularly among the weaker segments of the society) and their role in credit availability and deposit mobilization, efforts have been made to restore operational viability and financial health of these institutions. In 2004 government of India approved a revival package of Rs. 47400 million for the revitalizing the cooperative credit institutions through NABARD<sup>2</sup> [see Vaidynathan Committee GoI, 2004]. These measures have indeed yielded benefits but there are still areas of serious

1 All India Rural Credit Review Committee (B.Venkatappaiah, 1964), Committee on Cooperation (Mirdha Committee, 1965), Santhanam Committee (1969), Hazari Committee (1975), Agricultural Credit Review Committee (A. M. Khusro, 1989), Chaudhary Brahm Prakash Committee (1991), Task Forces to study the Cooperative Credit System and suggest measures for its strengthening (Capoor Committee, 2000), Expert Committee on Rural Credit (Vyas Committee, 2000), Balasaheb Vikhe Patil Committee (2002) and Advisory Committee on Flow of Credit to Agriculture and other Related Activities from the Banking System (Vyas Committee, 2004).

2 National Bank for Agriculture and Rural Development (NABARD) which is the implementing agency for the revival package for the short term cooperative credit structure released its first Annual Policy Statement of April, 2008.

concern. Many banks became insolvent and others are on the edge of mergers or acquisitions. Hence, it is in the fitness of things to re-examine the working of these institutions. This has become necessary for an informed reassessment of: specific regulatory, structural, operational and financial requirements of these institutions. This is vital to ensure their revival and sustainability in the competitive banking environment.

### **AN OVERVIEW OF J&K COOPERATIVE BANKS:**

The cooperative movement in Jammu & Kashmir was formally established in 1913. Important legislative and administrative changes were subsequently introduced in 1936. Before independence the cooperative movement was predominantly viewed as a credit arrangement to advance loans to farmers and save them from the clutches of money lenders. Money lenders were not only providing credit to farmers but also running shops in the villages and providing agricultural requisites/ necessities of life. After independence cooperative movement was restructured and rebuilt in 1953. Besides agricultural credit societies other types of cooperatives were also started. An integrated federal system was set up in each sector of cooperatives such as marketing, fertilizers, credit, dairy, poultry, etc. During 1953-54 to 2007-08 1720 cooperative societies in different fields were established. Membership also showed a rising trend and reached 579 thousands in the year 2007-08 (See Digest of Statistics 2007-08). However the Own Funds increased at a slower rate compared to the increase in Working Capital. For example Own Funds increased by about 50 times while the Working Capital recorded an increase of about 166 times from 1948-49 to 2005-06. The Owned Funds as a percentage of the working

capital has progressively declined from 54.47 percent in 1948-49 to 9.60 percent in 2007-08. Dependence of the cooperative credit societies on external borrowings reveals that the response of the people to the movement has not been commensurate with the State efforts [see Qasim 2007]. Three-tier structure of Rural Credit Cooperative--- with State Cooperative Bank at the apex level, District Central Cooperative Banks at the district level and Primary Agricultural Credit Societies (PACs) at the village level--- are key sources of credit in the State. Number of such societies in the State during 2008 was 765. During the year 2007-08 the PACs advanced Rs. 130 million as loans to the members. The Cooperative Banks have a network of 204 branches employing 1673 persons. At present there are nine banks under cooperative sector in the State--- four non-urban cooperative banks, four urban cooperative banks and J&K State Cooperative Agriculture and Rural Development Bank (SCARDB).

Urban Cooperative Banks provide banking facilities to urban and semi-urban population. As of now 120 Urban Cooperative Banks are functioning in the State. Their lending operations include provision of credit facilities to small traders, artisans and persons belonging to lower/middle income groups. These loans are advanced for: housing, business, education, consumption to non-farm sector activities. As mentioned above working of these banks is directly regulated and monitored by the Reserve Bank of India. These banks operate in their respective districts. The Kashmir Mercantile Bank operates within the area of Sopore and has only two branches. The Urban Cooperative Bank Anantnag and Devika Bank at Udhampur are both single branch banks. The Citizen Cooperative Bank has 11 branches

and operates in District Jammu. State Cooperative Agriculture & Rural Development Bank was established in 1962. In contrast to the above banks it commenced its operation in the entire State in 1964. It has the status of apex bank with 35 branches mainly provides credit for agricultural development to farmers.

Non-Urban Cooperative Banks comprise of J&K State Cooperative Bank (established in the 1954), Jammu Central Cooperative Bank (established in the year 1914), Baramulla Central Cooperative Bank (established in the year 1920) and Anantnag Central Cooperative Bank (established in 1923). In spite of consistent and concerted efforts to scale up the reach and spread of commercial banks and regional rural banks (RRBs) cooperative banking sector remains an important source of credit in the rural areas. Cooperative Credit Institutions provide cheap and decentralized credit services at low rate of interests [see Muley, 2007]. By the end of March 2007 these banks transacted business worth Rs. 22426 million out of which deposits accounted for 70.58%. Loan Outstanding worked out to be Rs. 6598.8 million and cost of management was Rs. 329.1 million. Under Kisan Credit Card Scheme 48872 farmers benefitted by the end of March 2007. The total number of Kisan Credit Cards issued was 65350 ending March 2007 out of which the relative share of cooperative banks worked out as 75 percent. Regardless of these impressive gains the failures are equally disquieting. Aside other factor Cooperative Credit Structure has suffered heavily due to political instability in the State particularly since 1989. Increasing Non-Performing Assets (NPAs), mounting overdues, unsound governance, unethical lending and high incidence of defaults are other major factors which have adversely

affected the functioning of these institutions. Rise in NPAs in particular has crippled their financial solvency, productivity and profitability. The proportion of overdues to outstanding loans of cooperative banks was more than 30 per cent during 1997 [see Gulati and Bathla, 2002]. During 2000-01 the average recovery performance was 58 percent which increased to 67 percent during 2006-07. The proportion of overdues to the loans outstanding was 42 percent in 2000-01 and 37 percent in 2006-07. The Cooperative Banks have failed to make recovery from over 46,800 defaulters whose outstanding stood at Rs. 1550 million. Table-1 shows the amount of NPAs of both non-urban and urban cooperative banks operating in the State. The amount of NPAs has increased but its proportion to the total loan outstanding has shown decreasing trend during the period (2000-01 to 2006-07). The NPAs of J&K State Cooperative Bank, Baramulla Central Cooperative Bank and Jammu Central Cooperative Bank as a percentage of outstanding loans and advances decreased by 26.9, 29.3 and 30.2 from 2000-01 to 2006-07 respectively. NPAs of Anantnag Central Cooperative Bank, Devika Urban Cooperative Bank, Citizen Cooperative Bank Limited and Jammu and Kashmir Mercantile Cooperative Bank Limited Sopore as a percentage of outstanding loans and advances worked out below 20 percent during the same period. Overall there has been a decreasing trend of NPAs of these banks during the period 2000-01 to 2006-07.

**Table-SI: Non-Performing Assets (NPAs) of Cooperative Banks in J&K**

S #	Bank	Non-Performing Assets (NPAs) Rs in Millions						
		2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
1	Baramulla Central Cooperative Bank	68.17 (29.3%)	70.74 (21.9%)	80.46 (15.8%)	70.70 (11.2%)	129.70 (16.4%)	126.42 (10.8%)	128.90 (11.6%)
2	Jammu Central Cooperative Bank	354.30 (30.2%)	394.57 (29.9%)	409.88 (28%)	451.67 (28.5%)	462.61 (26%)	425.12 (22.7%)	281.05 (13.8%)
3	J&K State Cooperative Bank	129.91 (26.9%)	140.97 (25.1%)	136.80 (21.7%)	153.64 (23%)	153.42 (21%)	197.63 (24.2%)	188.15 (23.9%)
4	Anantnag Central Cooperative Bank	1.3 (54.8%)	1.7 (55.6%)	1.93 (53%)	1.78 (44%)	127.0 (42.6%)	146.74 (41.1%)	165.10 (40.2%)
5	The Urban Cooperative Bank Ltd. Anantnag	1.83 (2.2%)	2.31 (7.3%)	1.92 (4.7%)	3.31 (7.4%)	2.04 (4.3%)	2.29 (3.9%)	2.51 (3.6%)
6	Citizen Cooperative Bank Limited, Jammu.	80.97 (13.5%)	115.81 (14.8%)	141.23 (14.6%)	269.03 (27.5%)	299.58 (31.9%)	313.94 (33.9%)	316.25 (33.6%)
7	Devika Urban Cooperative Bank, Udhampur	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	The Kashmir Mercantile Cooperative Bank Ltd. Sopore	2.36 (4.6%)	2.68 (6.1%)	4.58 (7.1%)	5.66 (9.5%)	6.79 (11.0%)	7.53 (10%)	8.76 (10.8%)

Source: J&K Cooperative Registrar

Note: Figures in parenthesis indicate the proportion of NPAs to the Loans outstanding

The NPAs of J&K State Cooperative Bank (estimated at Rs 188.15 million) worked out 23.9 per cent of their outstanding loans in the period 2006-07. The corresponding estimates for Baramulla Central Cooperative Bank and Jammu Central Cooperative Bank were 128.90 million (11.6 percent of loan outstanding) and Rs. 281.06 million (13.8 percent of their loan outstanding) during the same period (2006-07) respectively. For Anantnag Central Cooperative Bank the NPAs have increased from Rs. 1.38 million to Rs. 165.1 million -----54.8 percent to 40.2 percent of loan outstanding during the period 2000-01 to 2006-07. Devika Urban Cooperative Bank, Udhampur

had no NPAs during the same period. The NPAs estimates for Citizen Cooperative Bank Limited, Jammu increased from 13.5 percent to 33.6 percent of loan outstanding during the period of 2000-01 to 2006-07 and the NPAs estimates for The Kashmir Mercantile Cooperative Bank Ltd. Sopore has increased from 4.6 percent of loan outstanding to 10.8 percent during the same period. Three cooperative banks have turned bankrupt and are under notice from the NABARD and RBI. These banks include Jammu Central Cooperative Bank (JCCB), Anantnag Cooperative Bank (ACB) and Baramulla Cooperative Bank (BCB). Together these three banks have a cu-

mulative default of around Rs. 2350 million up to 2008[see Manohar Lal 2012].

RBI had impressed upon banks from time to time to strengthen credit appraisal and NPAs supervision. The ratio of net NPAs to total advances outstanding should be less than 10 percent as per the RBI guidelines [see RBI 2004]. Against this background, NPAs scenario of cooperative banks operating in J&K warrants serious introspection. The NPA impacts the performance of these banks and reduces their interest income, the net worth and strengthens capital risk adequacy ratio. These in turn restrict recycling of funds and obstruct the desirable yields. Obviously these banks have to take effective measures to reduce the NPAs. This is necessary to protect the interests of depositors and increase creditworthiness of these banks.

Notwithstanding their seminal importance these banks have not been the subject of academic studies. Their performance is bound to be affected by the reforms already initiated and growing emphasis placed on profitability in the alternative sources of rural credit. It is, therefore, essential to understand how this new emphasis has impacted cooperative banks. The received literature on the banking sector performance has sidetracked these issues. Comprehensive analytical framework for measuring efficiency is obviously necessary and extremely relevant for their success. Against this background the present study attempts to analyze the technical/scale efficiency and the nature of returns to scale (i.e. Constant and variable returns) of cooperative banks operating in J&K.

The paper has been organized into five sections. A brief review of literature is provided

in section-II. Methodology and Data are discussed in Section-III. Section-IV presents the Results and Discussions. The conclusions are presented in Section-V.

## REVIEW OF LITERATURE

Though received literature on the financial performance and efficiency of banking sector is quite rich yet very few studies have evaluated the performance and efficiency of Cooperative banking sector in developing countries [see Battacharya, Lovell and Sahay, 1997]. Major focus of these studies has been to examine the efficiency of public, private and foreign banks using the non-parametric approach. To elaborate and contextualize this focus we review some of the important studies. This review is illustrative and does not underestimate the significance of those studies which we could not include in this review. The focus of this selective review is to delineate major: research gaps, research questions, received techniques of analysis and key policy inputs.

Battacharya, Lovell and Sahay (1997) measured the productivity efficiency of 70 Indian commercial banks for the period 1986-91. They employed Data Envelopment Analysis (DEA) using interest and operating expenses as input variables. Advances, investment and deposits were used as output variables. It was found that capital adequacy did not have a significant impact on the performance of public sector banks in India. However, they observed that there was an improvement in the performance of foreign banks and decline in that of Indian public sector banks. They also applied Stochastic Frontier Approach (SFA) to measure the variation in efficiency to a set of temporal, ownership and random noise components. Contrary to the preceding result pub-

lic sector banks turned out to be the most efficient while foreign banks were the least efficient in the utilization of vital resources.

Yue (1992) employed DEA approach to measure the efficiency of 60 Missouri banks for the period (1984- 1990). Banks' output included: interest income, non-interest income and total loans. Inputs consisted of: interest expenses, non-interest expenses and transaction and non-transaction deposits. The study applied two models viz., Charnels, Cooper and Rhodes Model (CCR) and Additive Model to estimate the technical efficiency of Missouri banks. The efficiency score estimated from both the models did not indicate scale inefficiency as a major source of overall technical inefficiency. Nevertheless, managerial incapability emerged as critical determinant of technical inefficiency.

Das (2009) also employed DEA approach to measure the performance of Indian Commercial Banking sector for the period 1992-2004 using: deposits, number of employees, fixed assets and equity as input variables. Investments, loans advanced and other non-interest fee based incomes as output variables. Two types of efficiencies were analysed, e.g. cost efficiency and profit efficiency. Estimated results indicate high levels of efficiency in costs and lower levels in profits thereby reflecting the importance of inefficiencies on the revenue side. Proximate determinants of profit efficiency suggest that big state-owned banks performed reasonably well and are more likely to operate at higher levels of profit efficiency. A close relationship was observed between efficiency and soundness as determined by bank's capital adequacy ratio.

Shah (2001) studied the performance of Credit Cooperatives in Maharashtra. A major objective of this study was to evaluate rural credit delivery system across all the districts and regions of Maharashtra with special focus on assessing the viability of these credit institutions in the era of financial sector reforms. The study concluded that the cooperative banking sector is plagued with various deficiencies that encroach the functioning of these credit institutions. Main determinants of these deficiencies were high transaction costs and poor repayment performance.

Rajesh and Patel (1999) attempted to evaluate the growth performance of Urban Cooperative Banks in India for the period from 1974-75 to 1993-94. Performance indicators included: number of banks, membership, share capital, reserves, deposits, borrowings, working capital, advances and overdues. The authors opined that though the Urban Cooperative Banks had made remarkable progress yet their borrowings and overdues had unfavorably enlarged during the study period.

Chander and Chandel (2010) studied financial viability and performance of cooperative credit institutions in Haryana for the period from 1997-98 to 2008-09 using Financial Analysis and Z-score Analysis. They used five key financial parameters namely profitability, liquidity, solvency, efficiency and risk. Under each of these five categories four different ratios were calculated and analyzed. The results revealed that four District Central Cooperative Banks, with approximately fifty branches, had not been performing well on all financial parameters used in the study. The banks performed well on one parameter but deteriorated on another. The derivations from the Z-score Analysis revealed that all the banks become a

part of weak performance or bankruptcy zone and were suffering from financial mismanagement and underutilization of resources.

Above illustrative review suggests that the researchers have attempted to:

- Delineate the determinants of profitability, productivity and efficiency of banking system;
- Compare the performance and efficiency of banking system across time;
- Assess the role of policy makers and managers;
- Study the role of the ownership structure and size of banks in affecting their efficiency performance.

To investigate these research questions the researchers have mostly employed DEA. This literature has indeed enriched our understanding about the underlying issues. However, there are indeed serious research gaps. Hence the scope and need for examining the role and performance of Cooperative Banking. As mentioned earlier these banks were set up with the objective of promoting sustainable banking practices and credit facilities in the vast and varied rural expanse. Despite their significance, wide spread and State support cooperative banks are financially weak and operationally inefficient/ineffective. Non-compliance to prudential norms of banking, lack of professional management, politicization of management, absence of proper supervisory mechanisms are some of the widely reported factors responsible for their poor performance (See Prasuna 2001). It is, therefore, necessary to analyze these problems and put in place sustainable corrective measures. The specificities of these problems should be identified

and analysed using effective tools of analysis. Given the heterogeneity and variations in the socio-economic environment in which Cooperative Credit Institutions have to operate location-specific studies are extremely necessary. It is against this background that the present study attempts to assess the performance of Cooperative Banks in Jammu and Kashmir using Data Envelopment Analysis. Specific objectives of the study are: 1) To study and examine the financial performance and efficiency of selected Cooperative Banks; 2) To identify and propose policy prescriptions for improving the performance of Cooperative Credit Institutions.

## METHODOLOGY AND DATA

Various techniques are used to estimate the efficiency of banks. These estimates are sensitive to the choice of techniques employed. Conventional techniques of financial indices are: balance sheet analysis, parametric technique and the non-parametric techniques based on linear programming [see Grazyna Wozniowska, 2008]. A parametric technique assumes a random component in the measurement of efficiency and non-parametric technique assumes absence of the same (differences in total costs/ profits are completely explained by differences in efficiency). There are three major Parametric Approaches for efficiency measurement e.g. Stochastic Frontier Approach (SFA), Thick Frontier Approach (TFA) and Distribution Free Approach (DFA). Among the Non-Parametric Approaches Data Envelopment Analysis (DEA) is widely used. It was first developed by Charnes et al., (1978) and is known as CCR Model [see Farrell, 1957]. Banker et al., (1984) further modified and extended this technique. This version is popularly known as BCC Model. DEA is a

methodology based on the concept of relative efficiency and is widely used in the productivity and efficiency analysis of financial institutions [see Brockett et al., 1997, Taylor et al., 1997, Saha and Ravisankar, 2000, Portela and Thanassoulis, 2007]. It enables us to compare several service units with each other and determine their relative efficiency. This technique produces a single score for each unit thereby making the comparison easy. Unlike ratios it can accommodate multiple inputs/outputs. These inputs and outputs can be in different units of measurement. DEA provides greater flexibility since it does not require a priori assumption on the functional relationship of inputs and outputs. However, it does not provide a mechanism for improving the performance of the best practice units that form the frontier. Therefore, for efficient decision making units (DMUs), no further improvement can be considered based on DEA results. Those DMUs indicated as efficient are only efficient in relation to others in the sample. It may be possible for a unit outside the sample to achieve a higher efficiency than the best practice DMU in the sample.

*DEA converts multiple inputs and outputs into a scalar measure of efficiency. Production frontier/envelopment has Constant Returns to Scale in the CCR model meaning thereby that proportional increase in inputs result in a proportionate increase in outputs. BCC model identifies whether a DMU is operating in increasing, decreasing or constant returns to scale [see Coelli et al., 1998]. The Decision Making Units under BCC model forms a convex combination by adding the convexity constraint  $\sum \lambda_j = 1$  [see Zhu, 2003]. Moreover, VRS specifications permit calculation of Technical Efficiency (TE) decomposed into two components e.g. Scale Efficiency*

*(SE) and Pure Technical Efficiency (PTE).*

*The present study first uses the CCR model to assess TE and then applies BCC model to identify PTE and SE in each DMU. Overall bank efficiency can be decomposed into scale efficiency, scope efficiency, pure technical efficiency and locative efficiency. However, the technical efficiency is the major criteria for measuring efficacy of banks. When a bank maximizes the output from the given level of inputs technical efficiency occurs. It is defined as a ratio of minimum costs that could have been expended to produce a given output bundle to the actual costs incurred. Its score varies between 0-100 percent. DEA measuring the technical efficiency of a given bank by calculating an efficiency ratio equal to a weighted sum of outputs over a weighted sum of inputs. For each DMU these weights are derived by solving an optimization problem which involves the maximization of the efficiency ratio for that DMU subject to the constraint that the equivalent ratios for every DMU in the set is less than or equal to 1. In this method any units on the efficiency frontier are said to be efficient and their efficiency rates equal 1. Units below the efficiency frontier line have efficiency rates less than 1 which show a level of their inefficiency. Efficiency rate defined in this way takes the values from 0 to 1. Optimal weights are obtained by solving the mathematical programming problem:*

*Subject to the constraints:*

$$(j = 1, 2, \dots, n)$$

$$\text{For } (r = 1, 2, 3 \dots s); (i = 1, 2, 3 \dots m)$$

Where  $h_o$  is the ratio of virtual outputs to virtual inputs, the  $u_r$  and the  $v_i$  are the weights

to be determined by the output  $r$  and input  $i$  respectively and the  $y_{ro}$  and the  $x_{io}$  are the observed output and input values of the DMU to be evaluated. The objective is to obtain weight  $(u_r, v_i)$  that maximises the efficiency ratio of DMU under evaluation subject to the constraint that all efficiency measures must be less than or equal to one.

The above problem cannot be solved as stated because the difficulties associated with non-linear (fractional) mathematical programming representing infinite number of solutions. This problem was solved by introducing a new constraint developed by Charnes and Cooper (1978) which converts the above nonlinear programming problem into a linear one. In this model, the denominator has been set equal to 1 and the numerator is being maximised. By introducing this constraint, the input-oriented CCR primal model can be written as: Model (M1)

*Subject to:*

$$\lambda_j \geq 0 \quad (j = 1, \dots, n) \\ (r = 1, \dots, s), \quad (i = 1, \dots, m.)$$

Variables defined in Model (M1) are the same as those defined in equation (1). An arbitrarily small positive number,  $\epsilon$  is introduced in Model (M1) to ensure that all the known inputs and outputs have positive weight values. In general more the restrictions to the linear programming problem, more difficult it is to solve the problem. For any linear program, by using the same data, the dual problem of the linear program can be built. Solutions of the primary (initial) program and the dual program are identical. Solution under dual program reduces the number of restrictions of the DEA model. That is why in the empirical

analyses the dual program of the DEA model is preferred. This model is able to identify any apparent slack in inputs used or output produced. It further provides insights on the possibilities for increasing output and/or conserving input in order to help an inefficient decision making unit to become efficient. The dual program of the linear programming Model (M1) can be written as: Model (M2)

*Subject to:*

$$\lambda_j \geq 0 \quad (j = 1, \dots, n), \quad \theta_0 \leq 1$$

In this Equation,  $\theta_0$  denotes the efficiency of DMU<sub>0</sub> while  $y_{rj}$  is the amount of  $r$ th outputs produced by DMU<sub>0</sub> using  $x_{ij}$  amount of  $i$ th input. Both  $y_{rj}$  and  $x_{ij}$  are exogenous variables and  $\lambda_j$  represents the benchmarks for a specific DMU under evaluation [Zhu, 2003]. Slack variables are represented by  $s_i$  and  $s_r$ .

BCC Model: CRS assumption is only appropriate when all the DMUs are operating at an optimal scale. Imperfect competition, constraints on finance, etc. may cause a DMU to operate at sub-optimal scale. Banker, Charnes and Cooper in 1984 suggested an extension of CRS account for variable returns to scale situations. CRS linear programming problem can be easily modified to account for Variable Returns to Scale by adding the convexity constraint to Model (M2). The BCC model can be written as:

*Subject to:*

$$\sum \lambda_j = 1, \quad (j = 1, \dots, n), \quad \theta_0 \leq 1$$

**Scale Efficiency:** It is interesting to investigate whether inefficiency in a DMU is caused by inefficient operation of the DMU itself or by

the disadvantageous conditions under which the DMU is operating. To answer this question we compared the estimated results using CCR and BCC models. Fully efficient DMU in both the CCR and BCC models indicate that it is operating in the Most Productive Scale Size (MPSS) (Banker et al., 1984). If all DMU's are not operating at the optimal scale Use of the CRS specification will result into measures of technical efficiency which are confounded by scale efficiencies (SE). Use of VRS specification will permit the calculation of the TE devoid of these SE effects. This procedure provides technical efficiency scores which are greater than or equal to those obtained using the CRS model.

$$TE_{CRS} = PTE_{VRS} * SE \text{ where}$$

$$TE_{CRS} = \text{Technical efficiency of constant returns to scale}$$

$$PTE_{VRS} = \text{Technical efficiency of variable returns to scale}$$

$$SE = \text{Scale of efficiency}$$

Hassan *et. al.*, (1990) suggest that from the measures of technical efficiency and pure technical efficiency it is possible to derive a measure of scale efficiency as:

$$S = T / PT$$

$$S = CRS / VRS$$

Where  $0 \leq S \leq 1$  since  $CR \leq VR$ .

If the value of S equals 1 the firm is scale efficient and all values less than 1 reflect scale inefficiency. If scale inefficiency exists ( $S < 1$ ) the source of inefficiency is the result of operating

at either increasing ( $NI < VR$ ) or decreasing ( $NI = VR$ ) returns to scale.

### Data

Data for the purpose of analysis has been compiled from the website<sup>3</sup> of Cooperative Registrar J&K. The study takes into consideration the data for the period (2000-01 to 2006-07)<sup>4</sup>. Financial statements were individually obtained for each bank. We have used four parameters---- deposits, number of employees as inputs and loans advanced and investments as outputs. Computation was performed using Online DEA frontier Software program.

## RESULTS AND DISCUSSIONS

Input-Oriented Technical Efficiency (Constant Return to Scale)

The results of the study through intermediate approach based on Constant Return to Scale under the CCR Model are presented in Table-2. The estimated results shows that three banks e.g. The J&K State Cooperative Bank, Citizen Cooperative Bank Limited Jammu and The Kashmir Mercantile Cooperative Bank Ltd. Sopore recorded the consistency in efficiency scores i.e. 1 for almost all of the years from 2000-01 to 2006-07. Technical efficiency scores of Baramulla Central Cooperative Bank and The Urban Cooperative Bank Ltd. Anantnag have increased from 76% (0.765) in 2000-01 to 100% (1.000) in 2006-07 and from 73% (0.737) in 2000-01 to 97% (0.971) in 2006-07 respectively. But efficiency scores of Jammu Central Cooperative Bank, Anant-

<sup>3</sup> <http://www.jkcooperative.org>

<sup>4</sup> Comparable data of the banks under reference were available only for this period. Selection of the reference period was guided by this consideration. This period was also free from major kinks in the cooperative sector

nag Central Cooperative Bank and Devika Urban Cooperative Bank Udhampur recorded a decreasing trend. Technical efficiency of Jammu Central Cooperative Bank decreased from 80% (0.801) in 2000-01 to 75% (0.754) in 2006-07. Similarly in case of Anantnag Central Cooperative Bank and Devika Urban Cooperative Bank Udhampur technical efficiency declined from 75% (0.752) in 2000-01 to 66% (0.664) in 2006-07 and from 100%

(1.000) in 2000-01 to 91% (0.913) in 2006-07 respectively. Mean Technical Efficiency of these banks increased from 88% in 2000-01 to 91% in 2006-07.

### INPUT-ORIENTED PURE TECHNICAL EFFICIENCY (VARIABLE RETURN TO SCALE)

BCC Model results are reported in Table -3. The average pure technical efficiency of the

Table-2: Input-Oriented Technical Efficiency (Constant Returns to Scale)

DMU No.	Decision Making Units (DMUs)	Input-Oriented Technical Efficiency (CRS)						
		2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
1	Baramulla Central Cooperative Bank	0.765	0.725	0.900	1.000	1.000	1.000	1.000
2	Jammu Central Cooperative Bank	0.801	0.789	0.811	0.815	0.783	0.815	0.754
3	J&K State Cooperative Bank	1.000	1.000	1.000	1.000	1.000	1.000	1.000
4	Anantnag Central Cooperative Bank	0.752	0.687	0.811	0.741	1.000	0.797	0.664
5	The Urban Cooperative Bank Ltd. Anantnag	0.737	0.827	0.857	0.795	0.732	0.957	0.971
6	Citizen Cooperative Bank Limited, Jammu.	1.000	1.000	1.000	1.000	1.000	1.000	1.000
7	Devika Urban Cooperative Bank, Udhampur	1.000	1.000	1.000	1.000	0.918	0.985	0.913
8	The Kashmir Mercantile Cooperative Bank Ltd. Sopore	1.000	1.000	1.000	0.929	0.827	1.000	1.000
Mean Technical Efficiency		0.882	0.879	0.921	0.910	0.902	0.944	0.913

Source: Authors' Estimates

banks under reference varied from 0.966 (2000-01) to 0.958 (2006-07) exhibits the marginal decreasing trend in their efficiency level at variable return to scale. Number of efficient banks during the reference period increased thereby showing consistency in their performance for almost every year with score 1. These banks were: Jammu Central Cooperative Bank, J&K State Cooperative Bank, Citizen Cooperative Bank Limited Jammu, Devika Urban Cooperative Bank Udhampur and The Kashmir Mercantile Cooperative Bank

Ltd. Sopore. The pure technical efficiency of Baramulla Central Cooperative Bank and The Urban Cooperative Bank Limited Anantnag has increased from 77% (0.772) in 2000-01 to 100% (1.000) in 2006-07 and from 95% (0.958) in 2000-01 to 100% (1.000) in 2006-07 respectively. While for Anantnag Central Cooperative Bank pure technical efficiency score has decreased from 100% in 2000-01 to 79% (0.798) during 2005-06 and further decreased to 66% (0.665) for the year 2006-07.

*Table-3: Input-Oriented Pure Technical Efficiency (Variable Return to Scale)*

DMU No.	Decision Making Units (DMUs)	Input-Oriented Pure Technical Efficiency (VRS)						
		2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
1	Baramulla Central Cooperative Bank	0.772	0.726	0.901	1.000	1.000	1.000	1.000
2	Jammu Central Cooperative Bank	1.000	1.000	0.950	1.000	1.000	0.825	1.000
3	J&K State Cooperative Bank	1.000	1.000	1.000	1.000	1.000	1.000	1.000
4	Anantnag Central Cooperative Bank	1.000	1.000	1.000	1.000	1.000	0.798	0.665
5	The Urban Cooperative Bank Ltd. Anantnag	0.958	1.000	1.000	0.986	0.874	0.966	1.000
6	Citizen Cooperative Bank Limited, Jammu.	1.000	1.000	1.000	1.000	1.000	1.000	1.000
7	Devika Urban Cooperative Bank, Udhampur	1.000	1.000	1.000	1.000	1.000	1.000	1.000
8	The Kashmir Mercantile Cooperative Bank Ltd. Sopore	1.000	1.000	1.000	0.997	1.000	1.000	1.000
	Mean Technical Efficiency	0.966	0.966	0.981	0.998	0.984	0.949	0.958

Source: Author's Estimates

**INPUT-ORIENTED SCALE EFFICIENCY**

Scale Efficiency (SE) score for each bank can be obtained by taking a ratio of technical efficiency (TE) score to pure technical efficiency (PTE) score. Decomposing technical efficiency into pure technical efficiency and scale efficiency allows us to gain insight into the main sources of inefficiencies. The value of scale efficiency (SE) turned out to be 1 implying that the bank is operating at Most Productive Scale Size (MPSS). This corresponds to constant returns to scale. At MPSS, the bank operates

at minimum point of its long-run average cost curve. Further,  $SE < 1$  indicates that the bank has experienced Overall Technical Inefficiency (TIE) because it is not operating at its optimal scale size. An assessment of Table-4 reveals that mean SE for cooperative banks has increased from 91.4% to 95.5%, and SE scores range from a minimum of 0.687 to maximum of 1. Average level of Scale Inefficiencies (SIE) in the cooperative banking sector in the study area is to the tune of about 4.9 percent. Only two banks attained SE score equal to 1 and are, thus, operated at MPSS. The remaining six

*Table-4: Input-Oriented Scale Efficiency*

DMU No.	Decision Making Units (DMUs)	Input-Oriented Scale Efficiency (SE)						
		2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
1	Baramulla Central Cooperative Bank	0.990	0.998	0.954	1.000	1.000	0.992	1.000
2	Jammu Central Cooperative Bank	0.800	0.789	0.853	0.815	0.783	0.750	0.754
3	J&K State Cooperative Bank	1.000	1.000	1.000	1.000	1.000	1.000	1.000
4	Anantnag Central Cooperative Bank	0.752	0.687	0.910	0.741	1.000	0.834	0.999
5	The Urban Cooperative Bank Ltd. Anantnag	0.770	0.827	0.950	0.806	0.830	1.000	0.971
6	Citizen Cooperative Bank Limited, Jammu.	1.000	1.000	1.000	1.000	0.958	1.000	1.000
7	Devika Urban Cooperative Bank, Udhampur	1.000	1.000	1.000	1.000	0.918	0.994	0.913
8	The Kashmir Mercantile Cooperative Bank Ltd. Sopore	1.000	1.000	0.991	0.932	0.827	1.000	1.000
Mean Technical Efficiency		0.914	0.913	0.957	0.912	0.915	0.959	0.955

*Source: Authors' Estimates*

banks are operated outside the frontier had either Decreasing Returns to Scale or Increasing Returns to Scale. In addition, the majority of banks were operating with scale efficiency above 80 percent.

### **SUMMARY AND CONCLUDING REMARKS**

The present study attempted to assess the financial performance of cooperative banks operating in Jammu & Kashmir and to highlight the factors which are affecting their performance. In its formative years the objective of the cooperative credit movement had been to advance loans to farmers and save them from the clutches of money lenders. Cooperatives have been operating in J&K for more than nine decades. Though their achievements are quite substantial yet failures are equally disquieting. The rising trend in membership, working capital and deposits show are indeed encouraging. But inadequate own fund as a percentage of the working capital has progressively declined from 54.47% in 1948-49 to 9.60% in 2007-08. It clearly reflects the dependence of these banks on external borrowings and less participation of business community in the activities of banks which needs serious attention by the management. The study has employed Data Envelopment Analysis (DEA) to estimate the relative efficiency of 8 cooperative banks operating in Jammu & Kashmir during the period 2000-01 to 2006-07. Using the intermediation approach, two inputs variables used were: customer deposits and number of employees. Output variables included loans advanced and investments to calculate the Technical Efficiency (TE), Pure Technical Efficiency (PTE) and Scale Efficiency (SE) scores. The estimated results show that 3 banks are relatively efficient when their efficiency is measured in terms of 'constant

returns to scale' and 5 banks are relatively efficient when their efficiency is measured in terms of 'variable returns to scale' which indicates that the scale ineffectiveness is the main reason for the inefficiency among reviewed cooperative banks. Overall, the analysis leads to the conclusion that the efficiency of cooperative banks from the perspective of intermediaries is not very high but somewhat volatile with the average efficiency about 90 percent under constant returns to scale and about 97 percent under variable returns to scale during the reference period. The reasons for this are: poor recovery of loans, the very bad experience with NPAs and lack of skilled staff. So there is need to eliminate the problem of NPAs and poor recovery rate of loans from the cooperative banking sector. Urgent attention should be accorded to: test out the diversion and misuse of cooperative bank credit; ensure effective supervision of loans; strengthen the share capital base; boost banking investment operations; employ skilled manpower and mobilize deposits and advances through more innovative deposits and loan advances schemes. In order to regenerate rural credit delivery system through cooperatives, mismanagement, poor recovery performance, and NPAs, need to be tackled with more fiscal jurisprudence. These ineffectiveness's can be worked out through state government policy intervention e.g., proper implementation of the Revival Package from NABARD and conforming to the rules and regulations specified by RBI from time to time for restructuring the credit cooperatives. The findings of the present study may help to provide some directions for developing efficient financial services in the rural financial sector which is one of the ways of poverty alleviation in the country. Moreover, the findings may provide motivation to policymakers to restructure/rebuild the cooperative banking

sector at the state level as well as at the national level.

Among other factors “Financial Inclusion” is contingent on the financial viability of cooperative banks which form the backbone of rural financial system in India. Financial performance of these banks has potential to engage the rural populations in productive activities. A comprehensive support and complementary policy measures can indeed go a long way in revitalizing cooperative sector and generate positive externalities. This in turn can accelerate rural transformation. Hence, there is need for innovative and judicious reforms, which could restructure the entire cooperative banking sector so as to enable it to face the challenges of globalization/ privatization and meet the growing credit needs of the economies. Both state (through formal state owned commercial banks) and market have failed to ensure inclusive credit and related financial services across the regions and weaker sections of the society. Under these circumstances Cooperative Credit Institutions can shoulder very important role as effective means of social banking and inclusive access to credit.

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