Credit rating and bank behavior in India: Possible implications of the new Basel accord

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Abstract

The paper examines the impact of credit rating on capital adequacy ratios of Indian state-owned banks using quarterly data for the period 1997:1 to 2002:4. To this end, a multinomial logit model with multi credit rating indicators as dependent variable is estimated. The variables that can impinge upon capital adequacy ratio have been used as explanatory variables. Two separate models — one for long-term credit rating and another for short-term credit rating—have been estimated. The paper concludes that, both for short-term as well as for long-term ratings, capital adequacy ratios are an important factor impinging on credit rating of Indian state-owned banks.

Keywords: Capital adequacy; Credit rating; Multinomial logit model.

1. Introduction

The capital adequacy framework of the Basel Committee on Banking Supervision (BCBS) which was adopted by the G-10 countries in 1990 and by the rest of the world thereafter, has been the single most successful attempt in the move towards convergence of international standards in banking, enabling cross-country assessments and comparisons of internationally active banks.1 The results of a 1996 survey conducted by the BCBS indicated that 92 percent of the 140 participating countries had put in place a risk-weighted framework along the lines of the Basel approach (Musch, 1997). Yet, despite being acknowledged as a valuable framework for comparing risks associated with assets and allocating capital accordingly, it has been criticized for, among other reasons, its broad-brush approach and failure to provide disincentives for riskier exposures within the same broad asset class.

Some of the salient drawbacks of the existing framework which have been frequently commented upon include the following (Keeley, 1988; Demirguc-Kunt and Detragiache, 1998a). Firstly, a uniform risk weight (of 100 per cent) is assigned to all corporate borrowers in the non-financial sector, irrespective of widely differing perceptions on the associated risks. Secondly, all inter-bank loans are risk-weighted at a uniform 20 per cent, in spite of wide variations in the financial strength of banks. Additionally, under the framework, a loan to a weak bank is allotted a risk

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weight lower than that attached to a strong non-banking company. This absence of credit risk differentiation (the so-called "one-size-fits-all" approach), it is feared, might act as an incentive for banks to shift to lower quality/higher risk assets within the same asset category via arbitraging on such anomalies.

2. The new capital adequacy framework

In order to refine the earlier Accord to address some of these inconsistencies, the BCBS proposed a revised Capital Adequacy Framework in 1999 (Bank for International Settlements, 1999) based essentially on a three-pillar approach:

(1) A *minimum capital requirements pillar* which for the first time includes all areas of a bank's business and operations including retail banking, small and medium enterprises lending, information technology and operational risk.

(2) A *supervisory review pillar* which sets certain basic standards for bank supervision to minimise regulatory arbitrage.

(3) A *market discipline pillar* to enhance the role of other market participants in ensuring that an appropriate quantum of capital is held through higher disclosure requirements. The new Capital Accord is at an advanced stage of discussion and is likely to be operationalised sometime around year end 2006 (BIS, 2002).

The developing and emerging economies have, by and large, welcomed the revised Accord. However, several crucial issues need to be addressed in their context. First, the emerging economies, which are still grappling with structural issues and where banking remains the major form of financial intermediation, might face problems in the implementation of these international standards and hence, need some flexibility in the operationalisation of these proposals. Implementation of the revised guidelines at the national level would need to take into account country-specific characteristics. Harmonising banking standards is undoubtedly a difficult task, since national banking systems emerge in response to macroeconomic conditions and are shaped, to a large extent, by legislative, fiscal and political compulsions of different countries. The principles of flexibility and universal applicability would need to be reconciled and balanced in the new Accord, to enable banking systems in emerging economies to adopt the same, without substantial disruptions to their capital structure.

From the standpoint of developing economies, most of the criticisms pertain to the resource constraints which might be encountered by such economies in implementing these proposals.

Firstly, the new Accord is deemed as rather complex on account of its sophistication and could, over the next couple of years, shift scarce supervisory resources away from direct supervision towards implementation of these specific proposals. Secondly, as a corollary of the earlier point, this complexity of the new Accord would demand enormous supervision skills, which most domestic banks may find hard to obtain and even more difficult to retain. Finally, in view of the increased commitment of resources to capital regulation, bank capital may be viewed both by supervisors and the banks themselves, as a panacea for bank failure prevention. Overall, capital adequacy may become the sole concern of bank managements as well as the exclusive focus of supervisory attention, to the neglect of other important bank-specific parameters. This possibility has not escaped the framers of the new Accord, for they have cautioned against viewing capital ratios as the sole option for addressing fundamentally inadequate control or poor risk management in banks. There is the recurrent theme in the new Accord of strengthening risk management practices via several other measures (e.g. the application of internal exposure limits, improved internal controls, etc.).

3. New capital accord and ratings

At the heart of the revised Accord is an explicit emphasis on ratings. Risk differentiation between counterparties, be they sovereigns, banks, corporates, state-owned enterprises or securities firms, will be on the basis of either external or internal ratings. In fact, two options have been proposed for measuring credit risk: the *standardised approach* and the *internal rating-based approach*, of which the risk-weights under the former have been enlarged to encompass exposures to a broad category of borrowers with reference to the rating provided by external credit assessment institutions (ECAIs). Risk dispersion is proposed to be achieved by ranging the possible risk weights from a minimum of 20 per cent to a maximum of 150 per cent, depending upon the rating of the counter-party instead of the flat-rate of 20 per cent (for banks) or a uniform 100 per cent (for others) as at present. As observed in the *Third Consultative Document* of the Capital Accord by the BIS (2003), national supervisors would be responsible for determining whether an ECAI meets the six-fold criteria of objectivity, independence, transparency, disclosure, resources and credibility in discharging the rating process. Since internal rating (i.e. by banks) in India is in its infancy, a possibility for the near future is one based on external ratings. Therefore, the subsequent discussion is confined to this latter aspect only. The proposed risk weights under the new Accord for the three major categories of borrowers (viz. sovereigns, banks and corporates) are detailed in Table 1. So far as loans to other banks are concerned, two options have been

included — the first based on the risk weighting of the sovereign where the bank is incorporated, and the second based on the individual bank itself.

Table 1: Risk-weights of the New Basel Capital Accord:
Exemplified with Standard and Poor's Rating

Claim		AAA to AA-	A+ to A-	BBB+ to BBB-	BB+ to B-	Below B-	Unrated
Sovereign		0	20	50	100	150	100
Banks	Option 1[a]	20	50	100	100	150	100
	Option 2[b]	20	50	50	100	150	50[c]
Corporates		20	100	100	100	150	100

a: risk weighting based on risk weighting of sovereign in which the bank is incorporated
b: risk weighting based on the assessment of the individual bank
c: claims of a short original maturity les than six months on banks with a rating above BB+ would receive a weighting that is one category more favourable than the usual risk weight on the bank's claims subject to a floor of 20 per cent or the level of the risk weight applying to its country of incorporation.

It is important to bear in mind that there are several limitations to the use of external ratings in setting risk weights, salient among which include the following (Monfort and Mulder, 2000): Firstly, the relationship between sovereign ratings and repayment risks is a tenuous one, a fact forcibly brought forth in the aftermath of the recent Asian crisis. Secondly, sovereign ratings could in practice be pro-cyclical, in spite of the avowed aim of credit rating agencies to be cycle-neutral. This could lead to an increase in capital requirements of a bank during recessions and relax them during upturns, thus accentuating the fluctuations. Thirdly, the focus of rating agencies tends to be on "default risk", which is quite distinct from the goals of capital requirements under the new Accord viz., securing bank soundness and limiting the likelihood of insolvency (Greenspan, 1998; Jackson and Perraudin, 1999). Thus, to some extent there seems to be a mismatch between the objectives of the Accord and the instruments through which these objectives are sought to be achieved. Finally, option 1 (see Table 1) is unlikely to find favour in practice, since location is but an imperfect indicator of the financial strength of a bank, a case in point being the Japanese banks.

In the case of developing or emerging economies, the problem is compounded by the low penetration of credit rating agencies (Ferri *et al.* 2001). The Indian financial system provides testimony to this fact. The system was heavily regulated until 1992 and the state-owned banks had little incentive to go in for rating. Even in the currently liberalised scenario, several banks are still un-rated and only a few have had their short/long term obligations rated by agencies.

Additionally, the small and medium enterprises account for a significant share in the lending portfolio of banks, and they are numerous as well as geographically dispersed. It is unlikely that in developing countries all such enterprises will get themselves rated in the foreseeable future. In India, even the vast majority of corporates go un-rated. Stemming from this low penetration feature, is the fear expressed in some quarters that the total capital requirements under the new Accord will represent a steep enhancement over existing levels. As Table 1 indicates, claims on un-rated banks will be risk weighted at 50 per cent — a two and a half times increase over the current levels of 20 per cent. The non-performing loans for Indian banks might possibly entail higher capital commitments, since the un-provided portion of such loans would be allotted a risk weight of 150 per cent associated with the lowest quality credits. Nonetheless, it needs to be recognized that the capital adequacy ratios in India compares favorably with those in select OECD countries for the comparable period (Table 2).

Table 2: Capital adequacy ratios in India *vis-à-vis* select OECD countries: 1999

Country	Minimum capital	Required capital (% of risk weighted asset)	Actual capital (% of risk weighted asset)
India	INR 1 billion	8 9 (by March 2000)	11.5
Korea	Won 100 billion	8	10.8
Mexico	US $ 13 million	8	16.0
Czech Republic	Crown 100 million	8	13.6
Hungary	Forint 2 billion	8	15.0
Poland	Euro 5 million	8	13.1

Source: Hawkins and Mihaljek (2001)

4. Received Literature

In view of the foregoing discussion, the purpose of the present exercise is to understand whether credit rating is expected to be significantly affected by the capitalisation decision of banks. The significance of credit rating in the Indian context emanates from two onsiderations: (a) according to the regulations of the Securities and Exchange Board of India (SEBI), public issue of debentures and bonds convertible/redeemable beyond a period of 18 months need to have credit rating and (b) as per the Reserve Bank of India guidelines, a bank needs to have a minimum rating for issuance of Commercial Paper (CP). In order to undertake the empirical exercise, we study selected banks that have been assigned both long-term and short-term ratings by domestic rating agencies.5 Since we cannot predict with certainty whether capital adequacy ratio would affect bank ratings, we estimate the probability that capital adequacy will impinge on ratings and hypothesize that this probability is a function of a vector of explanatory variables.

Before carrying out the analysis, Table 3 presents the change in the average capital adequacy ratio for the sample banks over the period 1997 through 2002. As the table indicates, the average capital adequacy of these banks increased from 10.8 per cent at end March 1997 to 12.8 per cent at end March 2002.

Table 3: Select financial indicators of public sector bank 1997 to 2002 (percent)

Period (end-March)	CRAR	Other income (a)	Operating expense (a)	Net profit (a)
1997	10.0	1.3	2.9	0.6
1998	11.5	1.3	2.7	0.8
1999	11.2	1.2	2.7	0.4
2000	10.7	1.3	2.5	0.6
2001	11.2	1.2	2.7	0.4
2001	11.8	1.4	2.3	0.7

(a) As ratio to total asset

The literature on whether capital ratios impact credit ratings of banks is limited. The early studies on capitalisation decisions of banks were mainly confined to U.S. banks. Thus, Peltzman (1970), Mingo (1975), Dietrich & James (1983), Kimball & James (1983), all examined whether book market capital in the 1960s and 1970s reflected regulatory influence. Most of these studies observed that regulators were unable to influence changes in capital. Keeley (1988) in a subsequent study, however, concluded in favour of the hypothesis that the December 1981 regulatory regime shift in the U.S. had increased regulatory control of capital ratios. It is worth noting that none of these studies used the concept of credit rating in their analysis. More recently, Swindle (1995) attempted to separate the relative roles of the market and regulators using the CAMEL (Capital Adequacy, Asset Quality, Management, Earnings and Liquidity) rating of supervisors. The analysis suggested that banks with lower supervisory capital ratings had higher than expected increases in their primary capital ratios and to that extent, represented an important advance on earlier studies in attempting to explicitly incorporate supervisory ratings in understanding the response of capital-sufficient (respectively, deficient) banks to regulatory pressure. However, supervisory ratings are generally not within the public domain, and therefore, it is often difficult to evaluate, a priori, the extent to which supervisory rating is significant in influencing bank capital ratios.

The majority of the studies referred to above employ some proxy for regulatory pressure. In a significant departure from earlier studies, Kamin and von Kleist (1999) employed a linear

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mapping of ratings to risk with the top ratings Aaa (of Moody's) and AAA (of Standard and Poor's) being assigned a value of 1, and the lowest ratings B3 (of Moody's) and B- (of Standard and Poor's) getting a value of 16. Their analysis revealed that in those cases where sovereign ratings are assigned by both Moody's and Standard and Poor's, they were identical for 58 per cent of the issues and differed by one notch for 36 per cent of the issues. Subsequently, Monfort and Mulder (2000) used a dynamic error-correction model to discern the relationship between (sovereign) ratings and several crisis indicators in 20 emerging market economies. Their observed findings suggested modest efficiency gains of using sovereign credit ratings for capital requirements in emerging market.

5. Empirical estimation

The phenomenon as to whether credit rating impinges on the capital position of banks is difficult to quantify in a single, continuous variable. Therefore, attention focuses on an indicator variable that identifies the credit rating status of the bank. The econometric problem attempts to relate this discrete indicator to other, usually continuous, economic series. The main econometric approach employed in such studies is the multinomial logit model (Greene, 1990), which is designed to identify the conditions under which one observes one or another of a set of $(n + 1)$ discrete outcomes.7 Formally, the model's dependent variable is an indicator y that can take on values 0; 1; 2; : : : ; n that identify $(n + 1)$ possible outcomes. The explanatory variables X determine the "utility" of each outcome according to

$$U(alternative \ \ i) \ = \beta^{"} X(i) + \psi(i); \quad i = 0, 1, 2, ..., n \tag{1}$$

In this case, $X = X(k; t)$ is the vector of explanatory variables with k indexing banks ($k =1; 2,. ,N$) and t indexing time ($t = 1; 2; : : : T$) and denotes the error term. These "utilities" can be interpreted as the probabilities of observing the different outcomes, given the realization of the explanatory variables. It may be noted that the model allows the parameters _i to differ across outcomes. For each observation, one obtains outcome i if it offers the maximum "utility"; in other words,

U (alternative *i*) > U (alternative *j*) for j ≠ i   (2)

One can interpret this approach as assuming that the realized outcome for each observation is that with the highest probability of occurrence under those conditions. As a normalisation, the parameters _0 for alternative i = 0 are set to zero, and the logistic functional form is assumed, such that,

$$U(\text{alternative} \quad i) = \frac{\exp(\beta' X)}{\sum_{j=0}^{n} \exp(\beta'_j X)} \tag{3}$$

The model can then be estimated by a Maximum Likelihood procedure. Once the parameters are estimated, it is possible to calculate the probability of occurrence of each possible outcome, both within the sample and out-of-sample. For each observation, the "predicted" outcome is the one with the highest conditional probability. Formally, let P(k; t) be the dummy variable that takes a value of two when the rating of bank k indicates highest safety, one when it reflects high safety and zero otherwise. β is a vector of n unknown coefficients and F((β'X(k; t)) is the cumulative probability distribution function evaluated at (β'X(k; t). Then the log likelihood function of the model is:

$$Ln \quad L = \sum_{t=1,2,\dots T} \sum_{k=1,2,\dots,N} \{P(k,t)\ln[F(\beta' X(k,t)] + (1 - P(k,t))\ln[1 - F(\beta' X(k,t)]\} \tag{4}$$

When interpreting the regression results, it is important to note that the coefficients on the right hand side reflect the effect of a change in the explanatory variable on $\ln[P(k; t)/(1-\ln P(k; t)]$. Therefore, the increase in the probability depends on the original probability and thus upon the initial values of the independent variables and their coefficients. While the sign of the coefficient does indicate the direction of change, the magnitude depends on the slope of the cumulative distribution function. In other words, a change in the explanatory variable will have different effects on the probability of rating, depending on the bank's initial rating status.

In the binomial case, it is possible to introduce "fixed effects", which are meant to capture certain permanent differences between individuals in a panel of data, using the conditional likelihood procedure introduced by Chamberlain (1984). In particular, the methodology deals with data that has a group structure.

6. The dataset and variables

The study employs quarterly off-site monitoring and surveillance (OSMOS) data for selected Indian state-owned banks which have obtained long/short-term rating over the period 1997:1 to 2002:4.8 Several points about the data are in order. Firstly, consequent upon the introduction of off-site returns for banks since 1997, banks operating in India have been directed to submit data

on mandated aspects of liquidity, solvency and asset quality on a quarterly basis. The data have to be submitted within a stipulated time frame (typically within one month after the close of the quarter), and therefore, the timeliness of the information obtained enables the authorities to monitor and understand trends in important banking variables, However, it needs to be recognised that the data is unaudited. Notwithstanding this shortcoming, the short time lag with which such data is obtained enables one to decipher, with a reasonable degree of accuracy, several broad trends of bank behaviour. To the extent that SOBs constitute a sufficiently heterogeneous sample and comprise the bulk of the banking system in India,9 a study confined to SOBs, in our view, suffices to draw broad inferences about the impact of capital adequacy on credit rating for the banking system as a whole.

As regards the information on bank ratings, the data set comprises quarterly observations on ratings by the two primary domestic rating agencies, Credit Rating and Information Services of India Limited (CRISIL) and Investment Information and Credit Rating Agency of India Limited (ICRA) over the sample period.10 Both these agencies assign short/medium as well as long-term rating to domestic obligations of banks. The dependent variable derives from the consideration of the rating (short/medium-term and long-term) assigned to a state-owned bank by a domestic credit rating agency. During the period under consideration, 12 state-owned banks (SOBs) were assigned long-tem rating and 19 of them were assigned short/medium-term rating.

Several features of the rating process deserve a mention. First, the ratings of the SOBs over the sample period reveal that most of these banks have gone to one of the two domestic rating agencies for evaluation of their ratings. Second, the ratings of all the concerned banks are clustered at the upper end of the rating scale, with no bank having a rating signifying inadequate safety or high risk of default (Table 4). Third, over the entire period, several banks witnessed a change in both their long-term rating as well as short/medium term rating.

Table 4: Rating of public sector banks by domestic agencies 1997:1 to 2002:4

No. of banks	No. of banks to whom rating was assigned		Category of rating					
	Long-term	Short-/medium term	Long-term			Short/ medium term		
			H	Hi	M	H	Hi	M
27	12	19	7	3	2	15	2	2

H: Highest safety; Hi: High safety; M: medium safety

In the light of the foregoing discussion, we define the long-term rating variable RATELO as:

RATELO = 0; if the rating reflects moderate safety within the category ;

= 1; if the rating reflects high safety within the category, and ;

= 2; if the rating reflects highest safety within the category :

Similarly, we define a short-term/medium-term rating variable RATESH as:

RATESH = 0; if the rating reflects moderate safety within the category

= 1; if the rating reflects high safety within the category

= 2; if the rating reflects moderate safety within the category :

The choice of explanatory variables is conditioned by the CAMEL (Capital Adequacy, Asset Quality, Management, Earnings and Liquidity) approach. Therefore, the following variables were initially identified as potential determinants of ratings: non-performing loans to total loans (NPL), net interest income (NIIRWA), fee income (FIRWA), bank deposits (BDRWA), off-balance sheet activities (OBSRWA), profits (PFRWA), provisions (PVRWA) and the hundred-per cent risk-weighted assets (HRRWA), with all the variables (except NPL) being scaled by total risk-weighted assets. A specification search was undertaken to eliminate insignificant terms, starting from a very general specification containing a large number of candidate explanatory variables. The risk of omitted variable bias, and the presence of multi-collinearity suggested that variables on the border of insignificance should not be omitted. However, the dependent variable contain a preponderance of "ones", that is, the proportion of non-unity terms is low. The danger existed that particular right-hand side variables serve only to "explain" one or two episodes, and results will not be robust. Hence, it was important to be parsimonious.

The final specification of the regression equations was determined so as to balance these considerations. The rationale behind the choice of the independent variables is explained below. The relationship between rating and asset quality is captured by the variable NPL. Intuitively, the higher the non-performing loans, the more a bank will be inclined to "gamble for resurrection" in an attempt to shore up its ratings, implying a negative relationship between these two variables.

Net interest income (NIIRWA) is a measure of intermediation profitability before credit losses. It is calculated as net interest income (NIM) i.e. the difference between total interest income and total interest expenses and can be taken to be a proxy for earnings. Banks with low NIM would attempt to increase fee income by selling derivative products, whereas banks with high NIMs

would be inclined to lock-in their spreads by not using hedging instruments. A high NIIRWA value would translate into a lower rating for the bank, being interpreted as evidence of absence of diversification of banking operations.

Fee income (FIRWA) is reflective of diversification of banking business. It can also be taken to be a proxy for earnings. Higher fee income implies that the bank is better equipped to maintain an income stream in the face of an adverse impact on its traditional banking business, which, *ceteris paribus*, would possibly translate into a higher credit rating.

Bank deposits (BDRWA), essentially a proxy for liquidity, reflect vulnerability to a run on deposits and can be considered as a proxy for resources. Higher deposits, especially short-term deposits can, in the face of a contingency, translate into a run on the bank and to that extent, ratings are expected to be lower for banks with extremely high levels of deposits (Ediz *et al.* 1998).

Loan loss provisions (PVRWA) is indicative of the financial health of the bank. Provisions reflect the cushion available to banks in the face of credit risks. Therefore, *in the short-run*, in particular, higher provisions, to the extent that they represent greater safety, would tend to be associated with favourable ratings. *In the long-run*, however, banks are expected to have fully provided for any contingency, and therefore, higher provisions would tend to impinge unfavorably on the rating.

Finally, the hundred per cent risk weighted assets variable (HRRWA) is reflective of the riskiness of bank operations. While a modicum of risk is embedded in the very business of banking, a significant degree of risk might be reflective of poor credit lending decisions, which might adversely impinge on rating and therefore the relationship of this variable to rating can be expected to be negative. Standard descriptive statistics relating to the explanatory variables are presented in Table 5.

In view of the recent trend towards divestment in several SOBs, we also include a proxy for management as defined by the variable GOVT, identifying those banks that have raised capital from the market and therefore, have divested their shareholding to the public at large. In other words, if a bank has accessed the capital market in a particular quarter, we insert a value of 1 for

this variable in respect of the bank for that and all subsequent quarters: otherwise, the variable is assigned the value zero.15

Table 5: Standard descriptive statistics of major explanatory variables

Variable	Mean	Std. deviation	Minimum	Maximum
CAR	11.79	2.46	1.88	18.28
NIIRWA	1.86	0.52	0.61	3.31
FIRWA	0.53	0.31	0.06	1.72
BDRWA	6.21	3.66	0.56	18.27
PVRWA	0.52	0.70	-2.05	3.29
PFRWA	1.68	1.02	0.21	5.56
HRRWA	89.46	9.06	64.59	108.19
NPL	15.29	4.96	5.66	32.10

The statistics pertain to 19 state-owned banks over the sample period

7. Interpretation of Results

The estimation results for the specification given by (5) are summarized in Table 6. At the outset, it ought to be clarified that our exercise is not designed to make an *ex-post facto* analysis of the impact of the new Accord on the Indian banking system. Such an analysis is precluded by the simple fact of the Accord not having yet been operationalised. The task is the less ambitious one of gauging the behavioral relationship underpinning bank ratings and, in particular, the impact of bank capitalization on such ratings. It is to be hoped that any insights gained on this aspect would serve as indications for the adjustments that the Indian banking system may have to undergo in the wake of the new Capital Accord with its strong emphasis on the ratings philosophy.

There are two sets of results presented in Table 6, the short-term model being based on 19 banks and the long-term model based on a sample of 12 banks. Initially both models were estimated with the profitability variable (PFRWA) included but the coefficients on this variable yielded counter-intuitive signs, probably reflective of the fact that profits are not as overwhelming a concern as other aspects of bank safety in a Government dominated banking system. This variable (PFRWA) was correspondingly dropped in the final version of the model. The salient features brought out by Table 8 are the following.

Higher net interest income (NIIRWA) seems to worsen bank ratings, possibly being interpreted as the inability of the bank to diversify into non-fund operations. However, the variable is significant only in the long-term and that too, for the rating indicating highest safety (Rating 2).

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The importance of diversification in the assessment made by domestic credit rating agencies is reinforced by the uniform positive sign on fee incomes (FIRWA).

The bank deposits variable (BDRWA) reflects a vulnerability to "runs", so that deposit expansion beyond a threshold can translate into adverse ratings. The consistently negative sign (also significant in 3 out of 4 cases) bears out this contention.

Table 6: Estimation results for the multinominal logit model

Variable	Dependent variable : RATELO		Dependent variable : RATESH	
	Rating = 2	Rating = 1	Rating = 2	Rating = 1
Constant	11.39 (4.33)*	14.43 (2.04)*	7.87 (6.48)	11.51 (4.17)**
Capital (-1)	0.62 (0.13)*	0.67 (0.26)**	0.45 (0.17)**	0.23 (0.18)
NIIRWA	-2.53 (1.03)*	-0.37 (1.40)	-2.32 (1.30)	-1.69 (1.43)
FIRWA	1.84 (0.81)*	5.96 (2.39)*	6.51 (3.47)**	0.66 (3.41)
BDRWA	-0.29 (0.18)	-0.49 (0.19)**	-0.55 (0.19)*	-2.35 (0.69)**
PVRWA	-0.44 (0.40)	-0.39 (0.63)	0.09 (0.36)	-0.06 (0.49)
HRRWA	-0.12 (0.04)*	-0.28 (0.10)**	0.02 (0.04)	0.08 (0.11)
NPL	-0.28 (0.07)*	-0.38 (0.12)*	-0.51 (0.22)**	-0.47 (0.21)**
GOVT	-0.001 (0.88)	-4.61 (2.19)**	-0.31 (0.09)*	-0.53 (0.24)**
No. of Obs	288		288	
Log likelihood	-72.21		-67.52	
R-squared	0.57		0.69	

Figures in brackets are standard errors
*, ** and *** denote statistical significance at 1, 5 and 10%, respectively

The provisioning variable (PVRWA) represents the cushion available to banks in the face of credit risks. It is insignificant throughout in the analysis; the explanation, however, is weakened due to the negative signs of the long-term coefficients. One is inclined to believe that a higher long-term provisioning factor may signal a persistent bad loans problem and faulty lending policies, thus impacting bank ratings adversely. The hundred-per cent risk-weighted assets (HRRWA) variable is an additional dimension of a bank's riskiness of operations. The long-term sign in our results seems to be correct, but the short-term sign is perverse, although it is insignificant at conventional levels. In both panels of Table 6, non-performing loans is associated with a higher probability of a low rating and, moreover, all coefficients are statistically significant. This confirms the fact that asset quality is a significant factor that impinges critically on a bank's rating.

The GOVT variable emerges with a negative sign in all cases (only one of the 4 coefficients is insignificant, the remaining 3 being significant). Thus lowering of Government shareholding in SOBs tends to improve credit rating, being interpreted as a harbinger of greater operational autonomy and commercial orientation. In a slightly different context, Caprio and Martinez-Peria (2000) have demonstrated that lowering of state ownership in banks is likely to lower the likelihood of banking crises and lower their fiscal costs as well.

We finally come to the central feature of the exercise viz., the role of capitalisation in influencing bank ratings. The analysis brings out clearly that in the short, as well as the long term higher capitalization improves bank ratings. Every additional unit of capital translates into greater financial strength of the bank in countering unforeseen contingencies. It is thus hardly surprising that higher capitalization implies a more favorable rating in both the long run as well as in the short/medium run. Therefore, the econometric results highlight the importance attached to capitalization by rating agencies. This is hardly to deny the important role played in the determination of bank ratings by other bank-specific factors as well as the regulatory environment and general macroeconomic conditions.

8. New capital accord: Caveats and observations

Several caveats are in order at this juncture. The Reserve Bank of India, in clarifying its position on the Accord, has expressed skepticism of the role of the rating agencies in this process. While it has rejected the role of external (international) rating agencies in sovereign rating on the basis of their past track record, it has proposed that the banks and only the larger corporates approach the domestic rating agencies for this purpose in view of their low penetration. For the rest of the borrowers, banks will be expected to strengthen their internal ratings systems. The new Accord, however, views the more sophisticated banks as being the ones who would be using their internal ratings based (IRB) systems to assign risk weights (Karacadag and Taylor, 2000). Therefore, in the near future, one might expect the BCBS to come out with a graded system of IRB approaches to fit different levels of sophistication in banks.

Thus, it is expected that banks in India would eventually use a mixture of external ratings and internal ratings. This brings to the fore the issue of the 'time horizon' over which the rating assigned to a borrower would be considered valid since a change in the rating would lead to a change in the risk weight. The existing capital regulation excludes this dimension to the extent that risk weights remain unchanged for loans to corporates, irrespective of the change in their

financial condition over time. Once risk weights are driven by ratings, then this aspect assumes importance both from the point of view of assigning capital by the bank, and its monitoring by the supervisor. In this context, the Basel Committee paper has pointed out that the ratings assigned by external agencies which are claimed to be "through the cycle" may be more stable over time than the "point in time" ratings derived from the Internal Ratings Based (IRB) approach, which could change more frequently over the business cycle and hence introduce a greater degree of volatility in the regulatory capital requirements. In either case, it can be expected that variability would be introduced into the capital regulation framework, by the use of ratings for assigning risk weights and it will be for the supervisors and banks to decide whether this should be *pro-* or *anti-cyclical*.

Yet another type of rating that can be expected to play a significant role in capital regulation is "supervisory rating". The second pillar of the new Accord expects supervisors to specify bank-specific capital add-ons based on the risk profile of individual banks, thus effectively raising the Basel minima for riskier banks. Although supervisors would use different methods to diagnose the risk profile of their banks, it can be expected that some would use the component or composite ratings of supervisory rating models (such as CAMEL), which can provide useful indicators of risk profile (Swindle, 1995). Irrespective of the manner of determining risk profile, there is no gainsaying that Indian banks could be expected to have, under the new system, a higher capital charge levied on them, in comparison with the current system average.

9. Concluding remarks

With the Accord being expected to be revised in the light of comments received by the BCBS, it is too early to gauge the full impact of the new Accord on Indian banks. Some simple conclusions, however, suggest themselves. Claims on banks would overall attract higher risk weights, irrespective of whether they continue to remain unrated or obtain ratings, internal or external, since the present ceiling of 20 per cent would then become a floor. With most corporates being unrated, there would be no major change in the overall risk weights on good quality assets, and there could even be lower risk weights for premium borrowers. However, non-performing loans would attract the 150 per cent risk weight—up from the 100 per cent at present —and hence require more capital to support them. Overall the conclusion is inescapable that the new Accord would require net additional capital for the Indian banking system as a whole.

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