Net Interest Margin: Does Ownership Matter?

Rudra Sensarma and Saurabh Ghosh

Executive Summary

Net Interest Margin (NIM) or spread is the difference between interest earned and interest expended by a bank divided by its total assets. A competitive banking system is expected to foster greater efficiency which should get reflected in lower NIM. In the Indian banking industry, NIM has come down subsequent to banking sector reforms but the decline has been very slow. However, it is commonly believed that NIM in developing countries is higher than that in developed countries. The reasons could be lack of sufficient competition, higher intermediation costs, and response to changing regulations. To the extent that NIM can be considered as an indicator of bank performance and efficiency, it is very important to study what are the factors that affect NIM. On the other hand, an ongoing debate in the context of industry performance is the relation between ownership and performance. The theoretical literature suggests that private enterprises are more efficient than public enterprises. However, the empirical evidence is mixed in this regard. It is in this context that this paper studies the determinants of NIM in Indian banking and attempts to draw policy implications based on the exercise.

The authors use balance sheet data of all Scheduled Commercial Banks (excluding Regional Rural Banks) for the period 1997-98 to 2000-01 and explore, inter alia, the relationship between ownership and performance. Using econometric techniques of panel regression, viz., fixed effects model and random effects model, they find that even after accounting for bank-specific variables indicating health of banks and regulatory requirements, nature of ownership per se matters in determining NIM. Ownership is represented by dummy variables which take a value of one when a bank belongs to a particular ownership group, and zero otherwise. Statistical significance of the coefficients of the dummy variables indicates that ownership may have a significant association with NIM.

The major findings emerging from the regression analysis can be summarized as follows:

- NIM is not significantly associated with size of banks.
- Proportion of non-interest income does not have a significant impact on NIM.
- Proportion of investment in government securities adversely affects NIM.
- Proportion of advances to the priority sector positively affects NIM.
- Higher Capital Adequacy Ratio is associated with higher NIM.
- Higher Non Performing Assets are associated with lower NIM.
- Nature of ownership is a significant determinant of NIM.
- Foreign banks have the highest NIM, followed by public, private, and new private banks.

Insights emerging from such an analysis can be useful to both bank managers and policy makers. Managers can benefit from knowledge of the ways in which business decisions can affect spreads. It is also useful for the policy makers to be aware of how regulatory and supervisory decisions can affect efficiency in the banking industry, both group-wise as well as across banks.

KEY WORDS

Net Interest Margin
Scheduled Commercial Banks
Ownership
Panel Data
Net Interest Margin or NIM (also known as spread) is the difference between the interest paid out by banks on their deposits and the interest earned, taken as a ratio of total assets. This ratio serves as an indicator of performance, more specifically, efficiency of the banking industry. A competitive banking system is expected to foster efficiency which should get reflected in lower NIM. Too high NIM is reflective of lack of competition in the industry. However, too low NIM can also put a stress on the profitability of banks. To the extent that NIM is an indicator of performance of banks, it is interesting to explore its determinants. A bank’s financial health, regulatory restrictions, and ownership type are some factors which are expected to affect NIM. The central concern of this paper is to explore the determinants of NIM in the Indian banking industry. It is often argued in the literature that private entities are expected to perform more efficiently than public entities because of more effective market disciplining from shareholders and competitors. However, the empirical literature on the effect of ownership on performance has not yet reached a consensus. The Indian banking industry provides an appropriate setting for exploring the ownership-performance relationship. The nature of ownership in Indian banking industry is quite diverse with government-owned banks, private banks, and foreign banks competing among themselves. However, there have been only a few studies on the ownership-performance issue in Indian banking. Sarkar, Sarkar and Bhaumik (SSB) (1998) study the relationship between ownership and performance in Indian banking using, inter alia, NIM as a performance indicator. While the study finds an ownership effect, it does not take into account the effect of regulatory requirements on different banks as may be manifested in indicators such as the Non Performing Assets (NPAs) and the Capital to Risk-weighted Assets Ratio (CRAR).

A more recent paper by Kannan, Narain and Ghosh (KNG) (2001) studies the determinants of NIM in Indian banking industry. In this paper, the authors estimate the relationship between NIM and variables ‘indicative of the health of banks,’ including indicators of regulatory requirements such as NPAs and CRAR. However, they do not study the effect of ownership per se on NIM. In this paper, we have a modest objective, viz., to take a fresh look at the ownership-performance debate by studying the relationship between NIM and other variables, incorporating the effect of regulatory requirements as well as ownership. More specifically, we seek to find out whether ownership per se affects NIM in spite of accounting for other variables including the effect of regulatory requirements.

**LITERATURE REVIEW**

While the determinants of NIM have received considerable attention in the international literature (Demirgüç-Kunt and Huizinga, 1999; Bajaras, Steiner and Salazar 1999), not much work has been done on the determinants of NIM or on the relationship between ownership and performance in Indian banking. We briefly discuss here some of the papers pertaining to the Indian evidence. The SSB study (1998) uses data for public sector, private, and foreign banks for the years 1993-1994 and 19994-1995 to study the relationship between ownership and performance by using a host of performance indicators including NIM. However they do not include new private banks which started operating when entry was liberalized. They find ownership effect manifested through significant ownership dummies. More specifically, foreign banks appear to have higher NIM than private banks and public sector banks in that order. Among other variables, proportion of investment in government securities and total assets negatively affect NIM. The paper tries to capture regulatory requirements through proportion of investment in government securities, proportion of lending to the priority sector, and the proportion of rural and semi-urban branches. However, these are only imperfect proxies and the paper does not explicitly look into the implications of regulatory requirements as manifested in the levels of NPAs and CRAR. Without considering such factors, what gets manifested as ownership effect could actually be the effect of regulatory requirements and not the true effect of ownership per se.

The study by Bhaumik and Dimova (2003) uses data from 1995-96 through 1997-98 for all Scheduled Commercial Banks (SCBs) excluding Regional Rural Banks (RRBs). Using Return on Assets as the performance indicator and the variables from the SSB study as explanatory variables, they find an ownership effect as well as a convergence of performance among bank groups over time. In both these papers, regulatory requirements are ignored. This is, however, taken care of in the KNB study. The KNB study uses data on all SCBs, excluding RRBs, for the period 1995-1996 to 1999-2000, to estimate the determinants of NIM. They find that variables positively
affecting NIM are market power, index of banking service provided and CRAR. Variables that negatively affect NIM are size (proxied by log of total assets), proportion of non-interest income in total assets, and NPAs. However, the paper does not study any ownership effect on NIM. The empirical model is estimated for all banks and also estimated separately for each ownership group, but ownership effect is not explicitly built into the model.

In this paper, we try to integrate the above studies by considering the effect of ownership on NIM while controlling for, *inter alia*, the effect of regulatory requirements. We use data for all SCBs, excluding RRBs, including the new private banks. The results enable us to identify the determinants of NIM in Indian banking. More importantly, we intend to contribute to the performance-ownership debate by exploring whether ownership *per se* has a role to play in performance in terms of NIM, even after controlling for the impact of regulatory requirements.

**OVERVIEW OF INDIAN BANKING**

Indian banking has witnessed a series of reforms in the past decade. Recommendations of the first and second Narasimham Committees led to measures like interest rate deregulation, entry deregulation, branch delicensing, and increased functional autonomy given to public sector banks, reduction in statutory requirements, imposition of a minimum CRAR and stringent provisioning, and income recognition norms. One immediate impact of the reforms has been increased competition in the industry. Compared to 74 SCBs in the industry (excluding RRBs) in 1991-92, currently there are 93 banks in the industry. Classified by ownership, there are 27 public sector banks, 21 domestic (old) private, 36 foreign, and nine new private banks in the industry. Increased competition is expected to have improved efficiency in the industry. This in turn should get reflected in lower NIM across bank groups.

Do facts match the expectation? Figure 1 shows the spreads in Indian banking from 1996-97 to 2000-01 by bank group. Clearly, spreads have fallen for all bank groups which is a sign of increased efficiency of the industry. However, there seems to be a distinct difference in the behaviour across bank groups. Spreads of foreign banks have been the highest, followed by public, private and new private, banks in that order. This difference in spreads could be due to difference in health indicators and differential impact of regulatory requirements on bank groups as studied by KNG. Our attempt here is to explore whether purely an institutional factor like ownership (as explored by SSB) can account for this difference in performance over and above the difference in health indicators and regulatory requirements.

**DATA AND METHODOLOGY**

The data sources for this study are various issues of *Report on Trend and Progress of Banking in India* and *Statistical Tables Relating to Banks in India* (Reserve Bank of India, 1998-99; 1999-2000; 2000-01). The detailed descriptions of the variables are as follows:

- NIM = Net interest margin (or spread) normalized by total assets
- TA = Total assets (taken in logs)
NINTINC = Non interest income normalized by total assets
CRAR = Capital to risk-weighted assets ratio
NPA = Net non performing assets normalized by total assets
GSEC = Total investment in government securities (in India and abroad) normalized by total assets
PRIO = Priority sector advances normalized by total advances

We do not include the proportion of rural and semi-urban branches as done by the SSB study since it would be highly correlated with the proportion of lending to priority sector and result in the problem of multicollinearity. Data on the above variables were collected from the above-mentioned publications for the years 1997-98 to 2000-01. As mentioned earlier, the banks were classified into four broad groups (public, old private, new private, and foreign) according to their ownership type and a dummy variable for each group was created. The summary statistics of the data are reported in Table 1. Clearly, behaviour of banks across ownership groups is quite different for most of the variables. For instance, NIM for the new private banks appears to be the lowest as also NPAs. On the other hand, public banks are the largest group in terms of assets and also have the largest investment in government securities and priority sector loans.

However, it needs to be noted that foreign banks are a highly heterogeneous group, as depicted by the high standard deviation especially in CRAR and NPAs. Nevertheless, we feel that even while taking cognizance of the heterogeneity of foreign banks, one needs to study the implications of group behaviour after including foreign banks. This is all the more important since foreign banks are popularly perceived to be more efficient than other groups in India while Figure 1 reveals that their NIM is the highest. Moreover, a large number of foreign banks are new entrants who entered the industry after deregulation. In this respect, studying the foreign banks would help us to gain insight into the role of entry vis-à-vis ownership in affecting efficiency. Indeed, most Indian studies (KNG, 2001; SSB, 1998) that include foreign banks in their sample face the problem of high variance in the variables for this group and we are no different in this respect.

It is evident from the data structure introduced above that the data are in the form of a panel and have two dimensions, viz., the ownership group effect that can be captured by an index ‘k’ and the time-specific effect that can be captured by an index ‘t.’ Such models are popular in the literature as two-factor (individual and time-specific) models and could be of fixed effects or random effects types. The former pre-suppose that the differences across units (ownership group and time) could be captured in differences in the intercept term while the latter assumes that both the effects are randomly distributed and captured in the error term (Greene, 2000). The model specified above takes the following forms under these two alternative specifications:

\[
Y_{it} = a(k) + \lambda(t) + \beta X_{it} + \mu(i,t)
\]

\[
Y_{it} = a + \beta X_{it} + \epsilon(i) + \delta(t) + \mu(i,t)
\]

Here \(Y_{it}\) is the dependent variable (NIM in the present case) and \(X_{it}\) is the set of independent variables (TA, NINTINC, CRAR, NPA, GSEC, and PRIO). The terms \(a(k)\) and \(\lambda(t)\) capture the ownership group-specific effects and time-specific effects. Note that can be rewritten as \(\mu + \overline{a(k)}\), where \(\mu\) is the average group effect and \(\overline{a(k)}\) is the deviation from the average with the restriction \(\sum \overline{a(k)} =0\). Following Greene (2000), we report our results of the fixed effects model using this specification. The error structure for the fixed effects model follows properties of OLS regression and that for the random effects model is specified as follows:

### Table 1: Summary Statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Public</td>
<td>Private</td>
</tr>
<tr>
<td>NIM</td>
<td>2.90 (Old) 2.44 (New) 3.81 (Foreign)</td>
<td>0.320 (Old) 0.520 (New) 0.460 (Foreign)</td>
</tr>
<tr>
<td>TA</td>
<td>14.52 (Old) 12.15 (New) 13.18 (Foreign)</td>
<td>0.650 (Old) 1.080 (New) 0.390 (Foreign)</td>
</tr>
<tr>
<td>NINTINC</td>
<td>0.01 (Old) 0.01 (New) 0.02 (Foreign)</td>
<td>Negligible (Old) Negligible (New) Negligible (Foreign)</td>
</tr>
<tr>
<td>CRAR</td>
<td>11.29 (Old) 12.32 (New) 12.92 (Foreign)</td>
<td>3.720 (Old) 22.760 (New) 8.460 (Foreign)</td>
</tr>
<tr>
<td>NPA</td>
<td>3.27 (Old) 3.75 (New) 1.26 (Foreign)</td>
<td>1.890 (Old) 4.130 (New) 0.940 (Foreign)</td>
</tr>
<tr>
<td>GSEC</td>
<td>0.27 (Old) 0.22 (New) 0.21 (Foreign)</td>
<td>0.002 (Old) 0.001 (New) 0.001 (Foreign)</td>
</tr>
<tr>
<td>PRIO</td>
<td>0.34 (Old) 0.33 (New) 0.17 (Foreign)</td>
<td>0.003 (Old) 0.008 (New) 0.004 (Foreign)</td>
</tr>
</tbody>
</table>

NET INTEREST MARGIN: DOES OWNERSHIP MATTER?
\[ E(\varepsilon) = E(u_i) = E(\delta) = 0 \]
\[ E(\varepsilon_i, \varepsilon_j) = O^\varepsilon^2 \quad \forall \quad i = j, \text{ and } 0 \text{ otherwise,} \]
\[ E(\delta_i, \delta_j) = O^\delta^2 \quad t = s, \text{ and } 0 \text{ otherwise} \]
\[ E(u_{it}, u_{js}) = O^{u^2} \quad \forall \quad i = j, \quad t = s, \quad \text{ and } 0 \text{ otherwise} \]

The errors are uncorrelated with each other and with the explanatory variables. Such error structure gives rise to a variance term given by \( \text{Var}(Y_{it}) = O^\varepsilon^2 + O^\delta^2 + O^{u^2} \). Hence, this model is also known as the error components or variance components model and is estimated using Generalized Least Square (GLS) procedure. The null hypothesis of random effects model being as good as the fixed effects model can be tested on the basis of Hausman’s test.

**RESULTS AND DISCUSSION**

The results of the estimation are summarized in Table 2. Hausman’s test did not reject the null hypothesis which is why we report both the alternative specifications of fixed effects and random effects models. The coefficient of total assets is insignificant in both specifications indicating that size does not seem to matter in determining NIM. The proportion of non-interest income to total assets captures fee-based activities of banks. Higher income from such activities is expected to allow the banks to tolerate lower levels of spread.

Although we find the expected negative sign on the coefficient of the non-interest income variable, it is statistically insignificant at conventional levels of significance. Proportion of investment in government securities in total investment has a negative and significant impact on NIM. Proportion of lending to priority sector appears to positively affect NIM. This result is apparently surprising. However, this may be because of the fact that, subsequent to removal of interest rate subsidy on priority sector loans, it may now be a viable business option for banks to lend to the priority sector (SSB) or park the shortfall in RIDF (Rural Infrastructure Development Fund) of NABARD (which is the stipulated norm) to meet priority sector lending targets.

Moving to the variables indicative of regulatory requirements, CRAR is expected to positively affect NIM (KNG, 2001). This is because banks with higher CRAR would seek more interest income in order to maintain their high levels of capital. This in turn gets reflected in higher NIM. In our case, we find the expected relationship as suggested by the coefficient of CRAR which is positive and significant. Banks with high NPAs are expected to have shifted their loan portfolio away from risky activities which would have otherwise adversely affected their spreads. The less risky activities where these banks would have moved into would bring them lower returns. This is supported by the coefficient of NPA being negative and significant. In order to study the effect of current NPAs on the next period’s NIM, we re-estimated the model using lagged NPA instead of current NPA. We found that all the above results remain unchanged both in sign and statistical significance.*

Thus, lagged NPA adversely affects current NIM. In other words, low NIM may not only characterize a bank with high levels of current NPAs but also may be the effect of high NPAs of the bank in the past.

After accounting for all the health variables and regulatory requirements, is their any ownership effect left? This can be answered in terms of the coefficients of the ownership dummies. The ownership dummies represent deviation of each group from the mean industry behaviour. We find that three out of the four ownership dummies, with the exception of the public dummy, are statistically significant. The foreign dummy has a positive (and significant) coefficient. This shows that NIM of foreign banks is higher than the industry average. The public dummy has a positive (but insignificant) coefficient which is lower than that of the foreign dummy. This shows that NIM of public banks

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* We do not report the results here due to lack of space, but they are available on request.
is second to foreign banks in magnitude although it is not significantly different from the industry average. The old private dummy has a negative (and significant) coefficient. Thus, the NIM of old private banks is lower than the industry average and also lower than that of public banks. Finally, the new private dummy has a negative (and significant) coefficient with the least value. This suggests that NIM of new private banks is the lowest in the industry.

Therefore, while three out of the four ownership dummies are statistically significant, in terms of magnitude, coefficient of the dummy variable for foreign banks is the highest, followed by public banks, old private, and new private banks in that order. Thus, our results support the ownership-performance hypothesis discussed earlier. In other words, even after accounting for all other possible explanatory factors drawn from the literature, there appears to be a clear association of ownership with performance in terms of NIM. Foreign banks have the highest NIM, followed by public, private, and new private banks in that order. Lastly, we found the time period dummies to be insignificant suggesting that there might not have been any significant change in NIM for the entire industry in any particular year.

We also carried out a robustness check by re-estimating the above model for a reduced sample that excluded any bank with CRAR greater than 20. The main purpose of this exercise is to see whether our original results are distorted in any way by the heterogeneity of foreign banks. We noticed in Table 1 that foreign banks had very high standard deviation for almost all variables and the highest for CRAR. Accordingly, removing those banks with CRAR higher than 20 gave us a more homogeneous sample which did not include extreme observations.* Interestingly, we obtained the same results as in the case of the full sample. All the signs of the coefficients of the health indicators, regulatory variables as well as dummy variables and their significance as obtained in the full sample estimation carried over to the reduced sample estimation as well.** This shows that our earlier results based on the full sample are consistent even for the sub-sample and therefore were not influenced by heterogeneity of foreign banks.

* While 20 is an arbitrarily chosen cut-off, similar results were obtained for a number of other values as well.

** We do not report the results here due to lack of space, but they are available on request.

POLICY IMPLICATIONS

NIM being an indicator of performance of banks, it is very important to identify which factors affect NIM. Such an analysis has implications for both bank managers as well as policy makers. For the manager, while formulating business strategies of the bank, it is useful to know how different decisions are likely to affect NIM. For example, the analysis suggests that a decision to reduce investment in government securities need not necessarily reduce NIM since there may be other investment avenues that yield higher returns. A decision to increase priority sector advances may actually be income enhancing due to the removal of subsidy element in priority sector lending.

Similarly, for the policy maker, it is of interest to know how performance of banks and efficiency of the banking industry in particular is associated with regulatory requirements as well as health indicators and governance structures. This helps the policy maker to understand the industry behaviour better and to assess the implications of current and prospective regulations. For example, the present analysis reveals that banks with higher CRAR tend to generate higher income in order to maintain their high capital levels. Further, high NPAs impinge upon the spread of banks and are thereby associated with low NIM. Foreign banks appear to have the highest NIM followed by public, private, and new private banks. These insights may be useful for the policy maker while taking supervisory or regulatory decisions for specific bank groups or for the entire industry.

CONCLUSION

In this paper, we attempt to explore the role played by ownership factors in the various determinants of NIM or spreads in Indian banking. We find that other than the proportion of investment in government securities, proportion of lending to priority sector, CRAR, and NPAs, ownership per se has a significant impact on spreads. While we focus only on one efficiency indicator, viz., NIM, it can be extended to encompass many other indicators as well. One alternative to NIM could be to use a measure of ‘narrow spreads,’ which is the difference between the ratio of interest earned on advances to advances and the ratio of interest paid on deposits to deposits (Ramaiah and Ghosh, 2003). The advantage of this measure is that it focuses only on core banking activity unlike the traditional NIM used in this paper.
Credit risk could be alternatively proxied by gross NPAs or provisions and contingencies, instead of net NPAs as done in this paper. Macro-economic factors, although accounted for through the time dummies in our paper, can be explicitly introduced through variables like gross domestic product and interest rates. We intend to take up such issues in our future research.

REFERENCES


Note • The views expressed in this paper belong to the authors and not to the institution to which they belong.

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If you want truth to go round the world you must hire an express train to pull it; but if you want a lie to go round the world, it will fly: it is as light as a feather, and a breath will carry it. It is well said in the old proverb, ‘a lie will go round the world while truth is pulling its boots on.’

C H Spurgeon