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INSOLVENCY RISK OF SELECTED INDIAN COMMERCIAL BANKS: A COMPARATIVE ANALYSIS

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ABSTRACT

Financial intermediaries are going through significant changes all over the world under the impact of deregulation, technological upgradation and financial innovations. Indian banks in the new millennium are facing continuous challenges to introduce new and better products and services and provide new ideas and techniques in order to retain the existing customers and acquire new one. In this rapid changing environment banks are compelled to encounter various types of risks. This paper makes an attempt to measure the insolvency risk of selected Indian banks during the period 2000-01 to 2009-10 and also to identify key factors affecting insolvency risk. Z statistic is used to measure the insolvency risk. Findings of the study indicate that Z statistic for all the bank groups shows improvement over the years. Performance of public sector banks is quite satisfactory in this respect. Regarding the factors influencing insolvency risk, size is found to be the most significant influential factor among the variables chosen in this study that negatively associated with insolvency risk for all bank groups. Negative association is also observed between capitalization and insolvency risk for all cases.

KEYWORDS

Insolvency risk, bank specific key factors, Indian banks.

INTRODUCTION

 Sound banking system is an important indicator of an economically strong nation. The Indian banking system has played a vital role in the growth and development of the economy (Satish, Jutur and Surendar, 2005). Since independence, banking industry in India has evolved through several distinct phases. During 'Reform Phase', a series of major reformative measures has been undertaken by the Government of India and the RBI on the basis of the recommendations of the Narasimham Committee in order to make the banks economically viable and financially strong. Deregulation of interest rates, introduction of prudential norms relating to income recognition, provisioning and capital adequacy, emergence of new private sector banks, opening up of branches of foreign banks in India, increasing use of technology, continuing mergers & acquisitions, modernizing backroom operation and emphasis on customer satisfaction have changed the whole scenario of the banking functions in recent years. Indian banks in the new millennium are facing continuous challenges to introduce new and better products and services and provide new ideas and techniques in order to retain the existing customers and acquire new one. In this rapid changing environment banks are compelled to encounter various types of risks like credit risk, liquidity risk, market risk, interest rate risk etc. while carrying out their business operations. As the risks are correlated, exposure to one risk may invite another risk. Thus, handling of such risks in a proactive, efficient and integrated manner is very important for maintaining sound financial health. Failure of managing such risks efficiently will adversely affect the financial stability of a bank which in turn leads to probability of insolvency. The recent financial crisis has refocused the importance of measuring bank insolvency risk (Strobel, 2011).

In this backdrop, an attempt has been made here to measure the insolvency risk of selected Indian commercial banks during the period 2000-01 to 2009-10. The specific objectives of the study are:

1. To measure the insolvency risk of Indian public sector banks, private sector banks and foreign banks operating in India
2. To identify the bank specific key factors influencing the insolvency risk of Indian commercial banks

The rest of the paper is organized as follows:

Section II presents the review of existing literature relating to this topic. The database and methodology adopted in this study is described in section III. While section IV is devoted for analyzing and interpreting the empirical observations, concluding remarks are presented in section V.

LITERATURE REVIEW

A popular measure of a bank's insolvency is the Z statistic. The Z statistic as a measure of insolvency risk, suggested by Hannan and Hanweck (1988) and subsequently used by Liang & Savage (1990), Eisenbeis & Kwast (1991), Sinvey & Nash (1993), Naimy (2005), Rahman *et al.* (2009) and Sinha *et al.* (2010), takes into consideration banks' return on assets, volatility of return and the capital base. In spite of its simplicity, it is widely used as it can be calculated using only accounting information and thus applicable for both listed and unlisted financial institutions (Strobel, 2011).

Bichsel and Blum (2004) conducted a study on the relationship between changes in risk and changes in leverage for a panel of Swiss banks. They used market data for risk and capital over the period between 1990 and 2002. The study concluded that there was a positive correlation between changes in capital and changes in risk i.e. association between higher levels of capital and higher level of risks. But despite the positive correlation, they didn't find a significant relationship between the default probability and the capital ratio.

A study was conducted by Naimy (2005) on overall performance of the Lebanese Banks in terms of profitability and risks for the period 1993 to 2002. He used Du Pont equation to measure profitability and risk index suggested by Hannam and Hanweck (1988) to measure risk of Lebanese commercial banks.

Rahman, Ibranim and Meera (2009) conducted a study to investigate the impact of lending structure on the insolvency risk exposure. For this a comparative analysis between the insolvency risk behavior between the Islamic and conventional banks is made. The findings of this study was that the real estate lending is positively related to the conventional banks' risk, but inversely related to Islamic banks' risk exposure.

A study was conducted by Camara, Lepetit and Tarazi (2010) to investigate the impact of changes in Capital of European banks on their risk-taking behavior from 1992 to 2006. For this study, capital position was categorized into highly capitalized, adequately capitalized, undercapitalized, moderately undercapitalized and strongly undercapitalized. Equity, subordinated debt and hybrid capital are components of regulatory capital. They found that for highly and adequately capitalized banks as well as for strongly undercapitalized banks, an increase in equity or in subordinated debt was associated with an increase in risk. Moderately undercapitalized banks tend to invest in less risky assets when they improve their capital standards by issuing equity and there is a positive association between subordinated debt or hybrid capital and risk.

Yap, Ong, Chan & Ang (2010) identified five key factors – liquidity and interest rate factor, domestic market factor, international market factor, business operation and credit factor, that significantly contributed to banks' risk exposure in Malaysia.

In the Indian context, Sinha, Taneja and Gothi (2010) conducted a study on evaluation of riskiness of Indian Banks and Probability of Book Value Insolvency. To analyze they used a risk index known as Z score developed by Hannan and Hanweck (1988) which was successfully used to measure insolvency risk of Global Trust Bank. For this study, they randomly took sample of 15 Indian banks (Public and Private Sector) to determine the riskiness / probability of book value insolvency over the years (2006-2008) and compare relatively between public and private sector banks in India. Results obtained in the study showed that the probability of book value insolvency of Indian banks had reduced over years and the probability of book value insolvency was lower in case of public sector banks in comparison to private sector banks.

Studies relating to the determinants of bank risk exposure, specifically insolvency risk, are very limited (Rahman, *et al.*, 2009). Madura, *et al.* (1994) and Ahmad & Ariff (2004) examined the factors influencing the financial institutions' risk exposure. Rahman *et al.* identified key factors influencing the insolvency risk of Islamic and conventional banks and observed significant variation of factors affecting risk exposure of conventional and Islamic banking sector.

It is evident from the above that measurement of insolvency risk of large number of Indian commercial banks is very limited. So a study that compares the insolvency risk of different Indian commercial bank groups may be very useful to get an idea about the financial health of Indian banks.

DATA & METHODOLOGY

The present study is based on a sample of 56 Indian commercial banks, of which 26 from public sector banks (PSB), 18 from private sector banks (PrSB) and 12 from foreign banks (FB) operating in India. The relevant secondary data have been collected from 'Capitaline Plus' corporate data base, a reliable data source of Capital Market Publishers India Pvt. Ltd., for a period of 10 years from 2000-01 to 2009-10. For more details measurement of insolvency risk, public sector banks have been segregated into nationalized banks (19 banks) and SBI group (7 banks). On the other hand, private sector banks have been divided into new private sector banks (8 banks) and old private sector banks (10 banks). IDBI Bank has not been considered here for its change in character from new private sector bank to other public sector bank during the period of study. The sample size consists of all the public sector banks except one whose data were not available over the study period. Similarly, some private sector banks and foreign banks operating in India have been excluded due to non-availability of relevant data throughout the period of study. But the sample size is sufficient enough in terms of total business to represent the bank groups during the study period.

Z statistic, suggested by Hannan and Hanweck (1988) widely used by researchers, has been employed to measure the insolvency risk. Z is defined as:

$$Z = \frac{ROA + (Capital\ to\ Asset\ Ratio)}{S.D.\ of\ ROA}$$

Z statistic has been calculated for each bank during the study period considering average value of ROA and capital to asset ratio (CAR). For calculating Z statistic for each bank group during the study period, average ROA and average CAR of each bank have been considered. Similarly, year-wise Z statistic for each bank group has been computed. Higher values of Z indicate lower insolvency risk as high values of Z correspond with higher capital base and lower variability of return.

Probability of book value insolvency (P) has been computed by applying the following formula:

$$P = \frac{1}{2Z^2}$$

Probability of insolvency is inversely associated with Z statistic. The higher the Z statistic lower is the probability of insolvency and vice versa.

In this tough competitive environment banks are facing various types of risk. Inefficient management of different risks leads to risk of insolvency. Various internal and external factors affect the insolvency risk of a bank. But in the present study only internal factors are taken into consideration. Z statistic is used to measure the insolvency risk and following factors are considered as the determinants of insolvency risk:

Capitalization (CAP): In India, RBI advised all banks to maintain adequate capital base for long term stability. High capitalization is safe from the view point of a bank and consequently lower is the risk of insolvency. Capitalization is used as the determinant of insolvency risk and it is calculated as the ratio of equity to total assets (percent). As high Z statistic indicates lower insolvency risk, a positive association between Z statistic and capitalization is expected.

Credit Risk (CR): Credit risk mainly arises from the non-recovery of loans and advances and hence the ratio of net non-performing loans to net loans and advances is widely used to measure the credit risk. Ratio of total loans to total assets and ratio of provision for loans to total assets are also used by researchers, but in this study the ratio of net non-performing loans to net loans is used as a measure of credit risk. Higher the proportion of non-performing loans in net loans, higher is the credit risk and consequently insolvency risk will also be high. So, theoretically an inverse association between credit risk and Z statistic is expected.

Size (LnTA): Size of a bank may be another determinant of insolvency risk. Generally, higher the size of a bank higher is the risk taking ability [Saunders *et al.* (1990) and Hassan (1993)] and lower is the insolvency risk. Size is measured by the natural log of total assets (LnTA).

Liquidity (LQ): In general, high liquid ratio can be interpreted as having a positive influence on stability. But excess investment on liquid assets may adversely affect the profitability. So, a trade of between liquidity and profitability is desirable. Liquidity is measured by the ratio of liquid assets to total assets. Cash and bank balance, money at call & short notice and short term investment are included in the definition of liquid assets following the classical concept of liquid assets in the bank management literature (Alger and Alger, 1999).

Efficiency (EF): Net interest margin (difference between interest earned interest expended) as a percentage of total assets is often used a proxy for the efficiency of banks and the same is used here as a determinant of insolvency risk as increase in efficiency of the management reduces the bank risk exposure (Angbazo, 1997).

In order to examine the impact of above factors on the insolvency risk of selected bank groups during the study period flowing OLS model is used:

$$Z_i = \alpha + \beta_1 CAP_i + \beta_2 CR_i + \beta_3 LnTA_i + \beta_4 LQ_i + \beta_5 EF_i + \varepsilon$$

In order to measure the dependability of the regression results, Durbin – Watson test method is used. According to this method, a rule of thumb is that for a spurious regression R^2 would be greater than the calculated D-W statistic. Another rule of thumb is that the observed D-W statistic should be about 2 for the dependability of the regression result and the absence of first order serial correlation (Gujarati, 1995, p.423).

In order to test multicollinearity, Variance Inflation Factor (VIF) method is used. As a general rule of thumb, if the VIF of a variable exceeds 10 or TOL is equal to zero, that variable is said to be highly collinear with other regressor(s). If the VIF is below 10, multicollinearity will not cause a serious problem.

EMPIRICAL OBSERVATIONS

INSOLVENCY RISK AND PROBABILITY OF BOOK VALUE INSOLVENCY

Table 1 shows the Z statistic and probability of book value insolvency (P) of public sector banks, private sector banks and foreign banks during the period 2000-01 and 2009-10. It is evident from the table that average ROA of both public sector banks (0.00858) and private sector banks (0.00862) is almost equal, but it is

considerably higher in case of foreign banks (0.01257). In case of CAR, significant higher value is observed for foreign banks (0.17125) as compared to private sector banks (0.07296) and public sector banks (0.04452). But Z statistic of public sector banks (28.99985) is much greater than that of other two bank groups – private sector banks (15.16687) and foreign banks (15.28193). The reason is due to the difference in the variability of ROA as measured by the standard deviation. While S.D of ROA is only 0.00187 in case of public sector banks, it is very high of 0.01203 for foreign banks. It is also higher in case of private sector banks (0.00538) as compared to public sector banks. This significant difference in the variability of ROA leads to lower Z statistic despite higher ROA and CAR of foreign banks and private sector banks. Thus, the observed Z statistics indicate that the public sector banks are safer as in comparison to private sector and foreign banks. The probability of book value insolvency as shown in the table also depicts the same. It can be mentioned here that the findings of the present study support the findings of Sinha, Taneja and Gothi (2010).

Among the public sector banks, average performance of state bank group is better than the nationalized banks in terms of maintaining sound financial health. While Z statistic for state bank group is found to be 34.25338, it is 23.12279 for nationalized banks during the study period. By maintaining almost same capital base, SBG could improve its Z statistic by increasing μ (ROA) and lowering variability of ROA. Among the private sector banks, none of the bank groups performed well. Though the probability of book value insolvency is lower for new private sector banks than the old private sector banks, but it is considerably higher than the state bank group. The reason is same. Both new and old private sector banks could not maintain a steady return on assets over the years.

In this context a study conducted by Jordan (1998) may be considered. He found that a failed bank had an average individual Z score of 21.22 and for survivor it was 37.62. In case of bank groups, it was 8.71 for failed banks and 13.33 for non-failed bank. Though the socio-economic conditions, customer expectations, use of technology etc. are not same in case of India and hence the Z score may be different to classify a bank / bank group as failed or non-failed. But for analytical purpose if use the findings of Jordon (1998) as yardstick, then it is evident that none of the bank groups operating in India may be considered as failed bank group.

TABLE 1: Z STATISTIC & PROBABILITY OF BOOK VALUE INSOLVENCY FOR INDIAN BANKS DURING 2000-01 TO 2009-10

Banks	μ (ROA)	μ (CAR)	σ (ROA)	Z stat.	P
Public Sector Banks (PSB)	0.00858	0.04452	0.00187	28.99985	0.00059
Private Sector Banks (PrSB)	0.00862	0.07296	0.00538	15.16687	0.00217
Foreign Banks (FB)	0.01257	0.17125	0.01203	15.28193	0.00214
Nationalized Banks (NB)	0.00826	0.04457	0.00228	23.12279	0.00094
State Bank Group(SBG)	0.00943	0.04809	0.00168	34.25338	0.00043
Old Pvt. Sector Banks(OPrSB)	0.00807	0.06937	0.00555	13.95387	0.00257
New Pvt. Sector Banks (NPrSB)	0.00940	0.08613	0.00554	17.23332	0.00168

A look into the top five banks (Table 2) in respect of Z score out of the selected 56 banks for this study reveals that HDFC Bank occupied first position with a very high Z score of 162.58210. Out of the top five banks, three banks are private sector banks, more specifically new generation private sector banks. On the other hand, State Bank of India and Syndicate Bank are public sector banks. From the earlier discussion, it is evident that average Z score of new private sector banks was much lower than that of SBG or NB. This indicates that some of the new private sector banks performed extremely well in the matter of managing sound financial health while others could not. This is also justified from the Table 3 that shows the list of five banks having lowest Z score. Out of five banks, Z statistic of Centurion Bank of Punjab and Development Credit Bank is very low, 3.33793 and 3.84337 respectively. Among the other three banks, Oman International Bank, foreign bank operating in India, obtained the lowest Z score (0.76924). Performance of Dena Bank and Indian Bank, public sector banks in India, was very poor in the matter of financial health.

It is also evident from the table 2 that very high Z score of HDFC Bank is due to lower variability of return [σ (ROA)]. Average ROA of City Union Bank (0.01355) is greater than that of HDFC Bank (0.01253), but the S.D. of ROA of the former bank is considerably higher than the later. Similarly, State Bank of India and Syndicate Bank occupied 3rd and 4th position respectively by maintaining a steady return on assets over the years. Because the average ROA and average CAR of the banks are lower than other three top banks. Table 3 also depicts the same. Out of five banks having lowest Z score, three have negative average ROA and the variability of ROA is also very high.

TABLE 2: LIST OF FIVE BANKS HAVING HIGHEST Z STATISTIC DURING 2000-01 TO 2009-10 (DESCENDING ORDER)

Sl. No	Bank	μ (ROA)	μ (CAR)	σ (ROA)	Z stat.
1	HDFC Bank Ltd.	0.01253	0.07725	0.00055	162.58210
2	City Union Bank Ltd.	0.01355	0.06812	0.00164	49.87134
3	State Bank of India	0.00831	0.05356	0.00136	45.38774
4	Syndicate Bank	0.00807	0.03759	0.00114	39.93682
5	AXIS Bank Ltd.	0.01022	0.05702	0.00181	37.23054

TABLE 3: LIST OF FIVE BANKS HAVING LOWEST Z STATISTIC (ASCENDING ORDER)

Sl. No	Bank	μ (ROA)	μ (CAR)	σ (ROA)	Z stat.
1	Oman International Bank	-0.01732	0.04962	0.04199	0.76924
2	Centurion Bank of Punjab Ltd.	-0.00145	0.04998	0.01454	3.33793
3	Development Credit Bank Ltd.	-0.00521	0.06356	0.01518	3.84337
4	Dena Bank	0.00404	0.03459	0.00748	5.16296
5	Indian Bank	0.00855	0.03711	0.00845	5.40434

Year-wise Z statistic and probability of book value insolvency for Indian banks as shown in Table 4 reveals that gradually Indian banks are moving towards stable financial condition. In case of selected public sector banks Z statistic increased from 6.18527 in 2000-01 to 22.33462 in 2009-10. Indeed from 2005-06 onwards the probability of book value insolvency declined over the periods. In case of foreign banks, it increased from a very low of 4.56213 to 17.56258 during the study period. In case of private sector banks, though increased from 10.23337 in 2000-01 to 13.40755 in 2009-10, shows a fluctuating trend over the years. For instance, highest Z statistic is found in the year 2007-08 (25.95713), but in the immediately preceding year it came down to 13.30720. Overall a positive trend is found for all the bank groups in recent years that indicate a good sign for Indian commercial banks.

TABLE 4: YEAR-WISE Z STATISTIC AND PROBABILITY OF BOOK VALUE INSOLVENCY FOR INDIAN BANKS

Year (End march)	Public Sector Banks		Private Sector Banks		Foreign Banks	
	Z stat.	P	Z stat.	P	Z stat.	P
2001	06.18527	0.01307	10.23337	0.00477	4.56213	0.02402
2002	13.13779	0.00289	10.49397	0.00454	9.44213	0.00561
2003	13.61288	0.00269	17.29352	0.00167	9.58754	0.00544
2004	16.88679	0.00175	12.16516	0.00338	10.71454	0.00436
2005	14.04984	0.00253	10.25357	0.00476	10.56705	0.00448
2006	17.69293	0.00159	10.89587	0.00421	13.29051	0.00283
2007	20.95470	0.00114	12.25659	0.00333	11.24521	0.00395
2008	21.08257	0.00112	25.95713	0.00074	14.25421	0.00246
2009	21.09367	0.00112	13.30720	0.00282	16.59358	0.00182
2010	22.33462	0.00100	13.40755	0.00278	17.56258	0.00162

FACTORS INFLUENCING INSOLVENCY RISK

In order to examine the impact of various internal factors on the insolvency risk, five variables (CAP, LnTA, CR, LQ and EF) have been identified initially. Using these five variables as the determinants of insolvency risk it has been observed that one variable, liquidity (LQ), is highly correlated with other variables. Moreover, insignificant association is found with very high standard error for all the runs of the regression model. To reduce the multicollinearity problem and to obtain more acceptable results, LQ is excluded from the regression model used in this study and the results are reported in table 5, 6 and 7 respectively for public sector banks, private sector banks and foreign banks. Insolvency risk is measured by Z statistic. As Z statistic is a 'safety index', a high Z statistic indicates low insolvency risk exposure. Thus, the association between independent variables and bank insolvency risk exposure is reversed from the sign the tables.

It is evident from the results that size (LnTA) is significantly associated with insolvency risk for all the bank groups. LnTA is positively associated with Z statistic and thus, it is inversely associated with insolvency risk. This implies that the higher the size of a bank lower is the risk of insolvency and vice versa. Capitalization is also negatively associated with insolvency risk for all cases. While significant association is found for both public sector banks and foreign banks, the result is not statistically significant in case of private sector banks. The negative association between capitalization and insolvency risk implies that a bank can reduce its risk of insolvency by maintaining adequate capital base. In India, as per RBI norms, minimum CAR is 9%. From the analysis of the data it has been observed that all types of commercial banks considered for this study have CAR above than the minimum CAR prescribed by the RBI throughout the study period. Very high CAR is maintained by the foreign banks operating in India over the years. This is a good sign for the Indian banks for strengthening the financial health.

One important reason for financial sector reforms in India was to reduce the overdue on loans and advances. For this 'prudential norms' were introduced for all the banks operating in India. Since high level of non-performing loans adversely affect the liquidity, profitability and solvency position of a bank, management of NPAs has got paramount importance for all after the financial sector reforms. It is evident from the result that credit risk, measured by the percentage of net non-performing loans to net advances, is positively associated with insolvency risk for both private sector and private sector banks. But in case of foreign banks operating in India, significant negative association between credit risk and risk of insolvency is found. The reason is that the quantum of net non-performing loans for most of the foreign banks was found to be either nil or very negligible over the study period. But in case of public sector banks and private sector banks the quantum of non-performing loans was not negligible, though significant improvement is noticed. Another explanatory variable, efficiency (measured by difference between interest earned and interest expended) is negatively associated with insolvency risk in case of public sector banks (significant association) and private sector banks. But for foreign banks significant positive association is found. Interest margin in case of foreign banks is found to be low as compared to other two bank groups included in this study.

The observed F statistics are highly significant and R²s are also quite satisfactory for all runs of the regression model. The observed R² and F statistics may, thus, be sufficient to speak in favour of the goodness of the regression model to fit into the present task of identifying the factors influencing the insolvency risk. The observed D-W statistics also strongly advocate in favour of the dependability of the results. Multicollinearity problem was measured by Variance Inflation Factor (VIF), which is the inverse of tolerance value. Low degree of multicollinearity is reflected in higher tolerance value and lower VIF value. As a general rule of thumb, if VIF value is more than ten, there is a multicollinearity problem (Hair, Money, and Samouel, 2007). Based on the value of VIF in Tables, there is very low multicollinearity among the variables.

TABLE 5: RESULTS OF DETERMINANTS OF INSOLVENCY RISK: PUBLIC SECTOR BANKS

Variable	Coefficient	t-statistic	R ²	F-statistic	D-W stat.	VIF
CAP	4.807	3.426*	0.618	10.701*	1.943	1.430
LnTA	4.084	2.054**				1.212
CR	-1.048	-1.900***				1.237
EF	0.489	0.204				1.023
Constant	-44.972	-1.772***				

*, **, *** imply significant at 1%, 5% and 10% respectively

TABLE 6: RESULTS OF DETERMINANTS OF INSOLVENCY RISK: PRIVATE SECTOR BANKS

Variable	Coefficient	t-statistic	R ²	F-statistic	D-W stat.	VIF
CAP	2.870	1.036	0.797	11.792*	2.156	2.035
LnTA	15.316	4.326*				1.425
CR	-4.034	-0.895				1.930
EF	9.915	2.486**				1.432
Constant	-138.232	-2.876**				

*, **, *** imply significant at 1%, 5% and 10% respectively

TABLE 7: RESULTS OF DETERMINANTS OF INSOLVENCY RISK: FOREIGN BANKS

Variable	Coefficient	t-statistic	R ²	F-statistic	D-W stat.	VIF
CAP	0.865	3.502*	0.854	10.240*	1.915	5.361
LnTA	7.356	4.618*				5.415
CR	0.245	1.862***				3.957
EF	-0.077	-3.380**				1.963
Constant	-60.826	-3.333*				

*, **, *** imply significant at 1%, 5% and 10% respectively

CONCLUSION

An attempt is made in the present study to measure the insolvency risk of selected Indian commercial banks during 2000-01 to 2009-10 and also to identify key factors influencing the insolvency risk. For this 56 commercial banks from public sector, private sector and foreign bank operating in India have been selected. Z statistic has been used to measure the insolvency risk. It is observed from the analysis of insolvency risk that public sector banks are less risky as compared to other two bank groups. Among the public sector banks, average performance of state bank group is found better than the nationalized banks in terms of maintaining sound financial health. But an upward trend of Z statistic is found for all the bank groups over the years. If the private sector banks and foreign banks can reduce the variability of ROA, their performance in terms of maintaining sound financial health can be improved significantly. Regarding the factors influencing insolvency risk, size is found to be the most significant influential factor among the variables chosen in this study that negatively associated with insolvency risk for all bank groups. Negative association is also observed between capitalization and insolvency risk for all cases. But in case of credit risk contradictory result is found for foreign banks. However, it may be concluded that Indian banks are gradually improving their financial health. If the banks can reduce the non-performing loans to a very negligible level and can maintain a steady ROA, insolvency risk will not be a matter of serious concern for the selected banks.

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