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INDIAN INSTITUTE OF MANAGEMENT CALCUTTA

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FRTL Financial Research & Trading Laboratory

Contents

Editorial

Recent rally in the Indian stock market reminds us of pre-2007 days. Sensex climbed more than 2800 points in the past six months. Indian currency has also witnessed significant appreciation during the same period reaching below 60(to a US dollar) - a gain of 15%. There is even a prediction that Rupee can reach 45 (to a US dollar) after election (Bloomberg, March 18, 2014). Are these indications of any recovery of Indian economy or expression of sentiments? Perhaps the second statement is correct. Industry output is still depressed, policy uncertainties continue, Indian corporate sector is setting up more factories in China than in India, corruption issue is alive, and Indian bureaucracy is still under the fear of investigation by CBI or similar institutions. Such optimism in the financial markets, therefore, is a sign of change in government or governance. People have realized that present policy paralysis cannot continue and India must take advantage of moderate recovery in the global economy.

The present issue contains three articles. The first article in this issue looks at Non Performing Assets of Indian Banks. Deteriorating asset quality posed a major concern to Indian banking. The author indicates that without being alarmist, numbers in current stressed assets indicate ominous trends. The configuration of predominance of public sector banks, current fiscal situation of India, and the necessary recapitalization needs of the Indian banking sector, does not evoke very encouraging signals!

In India there is no independent body to oversea the auditors. In the second article, the author looks at publicly available data on audit and non-audit fees to understand the state of auditor independence in India. The third article deals with Monetary Policy. Monetary policy actions are undertaken by a central bank to ensure the availability of appropriate level of credit in the system. The author, in this article, created an index for mapping monetary policy with market activities in various markets.

Your magazine will add one section from the next issue- Market Score. This section will provide FII Sentiment Index (developed by the Finance Lab) and financial market broad liquidity indicators.

You may send your comments and feedback on this issue to ashok@iimcal.ac.in

Happy reading!

Ashok Banerjee

Deteriorating Bank Asset Quality in India: Ominous Trends

Partha Ray

Partha Ray, Ph.D., is Professor, Economics, Indian Institute of Management Calcutta (IIM-C). Prior to joining IIM-C, Prof. Ray, a career central banker, was the adviser to Executive Director, International Monetary Fund, Washington D.C. during 2007-2011.

The year 2013-14 has not been an exactly good year for the Indian economy. Characterized by high inflation (for most of the year), low growth, high fiscal and current account deficits, and depreciating currency, India which till very recently have been seen as part of the global growth pole is suddenly grouped under what is termed as "fragile five".[1] In this menu of bad news, the latest addition is perhaps accumulation of 'non-performing loans' (a euphemism of bad debts) of the Indian banking sector. The International Monetary Fund (IMF) in its 2014 Article IV Consultation Report for India (IMF Country Report No. 14/57), released in February 2014 commented, **"**Enhanced financial sector supervision (and) better monitoring of banks' credit quality …. will be needed as a basis for tackling rising … financial sector strains". Additionally, faced with the electoral uncertainty, thus, the question that is blowing in the wind is: Are we back to the bad old days?

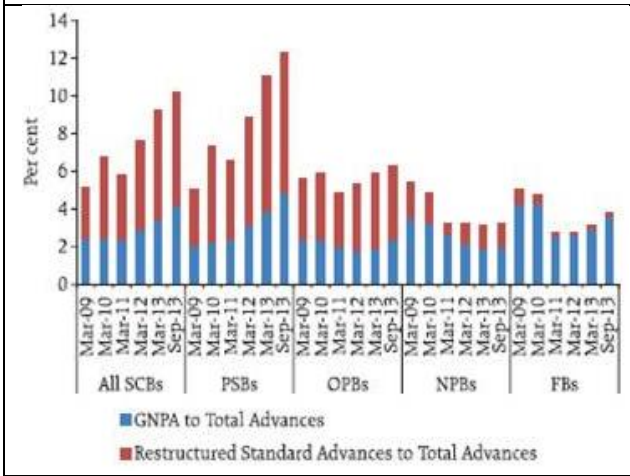
Let me start with some aggregative numbers. Deteriorating asset quality posed a major concern to Indian banking. Gross non-performing assets (GNPA) of scheduled commercial banks as a percentage of total advances rose from 3.4 per cent in March 2013 to 4.2 per cent in September 2013. What went wrong? It may be recalled that in the wake of the global financial crisis, the RBI made a number of relaxations in asset classification for restructured advances and consequently there was a sharp increase in growth rate of restructured advances in 2008-09.[2] This trend continued and the restructured standard advances also increased to 6.0 per cent of total advances as at end September 2013 from 5.8 per cent of March 2013 and "Overall the stressed advances rose significantly to 10.2 per cent of total advances as at end September 2013 from 9.2 per cent of March 2013" (RBI, *Financial Stability Report*, December 2013). Among the bank-groups, the public sector banks continued to have higher stressed advances at 12.3 per cent of total advances, of which restructured standard advances were around 7.4 per cent (Chart 1a).

[1] The term "fragile five" owed its origin in an internal note of the global Investment Bank, Morgan Staley and included the following countries: India, Indonesia, Brazil, South Africa and Turkey.

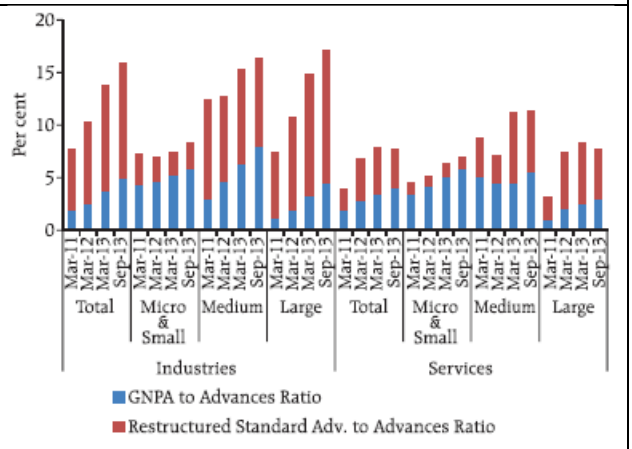
[2] As of now, these relaxations for asset classification/ provisioning would be phased out by April 1, 2015.

Chart 1: Asset Quality of Scheduled Commercial Banks (SCBs)

a) **Asset Quality of SCBs**



b) **Asset Quality at System Level: Industries' Size-wise**



Legends: PSBs: Public Sector Banks; OPBs: Old Private Sector Banks; NPBs: New Private Sector Banks; FBs: Foreign Banks.
Source: *Financial Stability Report*, December 2013, RBI.

While the deterioration in credit quality has been worse among public sector banks, sectorally it is concentrated in poorer-performing sectors such as infrastructure (especially power), aviation, agriculture, steel, and textiles. Besides, another feature of Indian banking sector's vulnerability is often lost sight of. With commercial banking sector loans to India's ten largest conglomerates accounting for almost 100 percent of banks' net worth, the concentration risk of Indian banking sector is substantial (2014 Article IV Consultation Report for India, IMF Country Report No. 14/57). While the non-performing loans of medium and large sized industries account for 16.3 and 17.1 per cent of total advances to the respective segments, for 'micro & small' sized industries stressed advances were around 8.2 per cent of the total advances to the segment (Chart 1b).

What is the capital scene of Indian banking sector? As of now, with the risk-weighted capital adequacy ratio (CAR) of scheduled commercial banks (SCBs) at 13.8 percent in March 2013, the banking system seems to be well capitalized. Also with the caps on the lending to the sensitive sector, lending to capital market, commodities and real estate is under control (Table 1). However, as we all know a chain is as good as its weakest link, there are wide variation in the adequacy of Tier I capital varies across banks.

Table 1: India's Indicators of Financial System Soundness, 2005/06-2012/13								
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Risk-weighted capital adequacy ratio (CAR)	**12.3**	**12.3**	**13.0**	**13.2**	**13.6**	**14.2**	**14.2**	**13.8**
Public sector banks	12.2	12.4	12.5	12.3	12.1	13.1	13.2	12.4
Old Private Sector Banks	11.7	12.1	14.1	14.3	13.8	14.6	14.1	13.7
New Private Sector Banks	12.6	12.0	14.4	15.1	17.3	16.9	16.7	17.5
Foreign banks	13.0	12.4	13.1	15.0	18.1	17.0	16.7	17.9
Gross nonperforming loans (% of loans)	**3.3**	**2.5**	**2.4**	**2.3**	**2.4**	**2.4**	**3.1**	**3.4**
Public sector banks	3.6	2.7	2.3	2.0	2.2	2.3	3.3	4.1
Old Private Sector Banks	4.4	3.1	2.3	2.4	2.3	2.3	1.8	1.9
New Private Sector Banks	1.7	1.9	2.9	3.1	2.9	2.6	2.2	2.0
Foreign banks	1.9	1.8	1.9	3.8	4.3	2.5	2.6	2.9
Lending to sensitive sectors (% of loans and advances)								
Real estate	17.2	18.8	18.4	17.5	16.6	16.6	15.7	15.9
Capital market	1.5	1.8	2.5	1.8	1.9	1.8	1.7	1.5
Commodities	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Source: 2014 Article IV Consultation Report for India (IMF Country Report No. 14/57)								

This is not to mean all is well in the bank capital front. As per the data released by the Reserve Bank of India (RBI) in its *Financial Stability Report* of December 30, 2013, the estimated aggregate expected loss (EL) of SCBs increased to 2.5 per cent of total advances as at end September 2013 from 2.1 per cent as at end March 2013 and it is expected to rise further to 2.8 per cent by September 2014 under the baseline scenario. However, under a severe stress scenario, the expected shortfall could be as high as nearly 11 percent of total advances (Table 2). Interestingly, the Tier I capital to total advances ratio of 12.5 per cent maintained by commercial banks as at the end of September 2013 is sufficient to cover the unexpected loss as well as the expected shortfall even under severe stress.

Table 2: Estimated Losses of Scheduled Commercial Banks (Per cent to Total Advances)									
End-Quarter	**Expected Loss**			**Unexpected Loss**			**Expected Shortfall**		
	Baseline	Medium Stress	Severe Stress	Baseline	Medium Stress	Severe Stress	Baseline	Medium Stress	Severe Stress
Sept 2013*	2.5	..	..	7.4	..	..	7.5	..	..
Mar 2014	2.5	2.8	3.2	7.4	8.1	8.9	7.5	8.2	9.0
Sept 2014	2.8	3.5	4.3	7.6	8.8	10.0	7.8	8.9	10.2
Mar 2015	2.6	3.7	4.9	7.5	9.0	10.6	7.6	9.1	10.8
* Estimation of losses for the quarter ended September 2013 is based on the observed numbers. Source: Financial Stability Report, December 2013, RBI.									

The results of IMF's stress testing seem to be is less optimistic. The IMF in its February 2014 country report on India had indicated, "Although manageable, India's banks are likely to require significant new capital injections over the next few years, based on the challenging operating environment, combined with the new Basel III capital requirements". IMF's stress test of banks' balance sheets found the Public sector banks in particular vulnerable to a change in classification on a significant share of restructured loans to NPAs. In a severe situation under the assumptions of, (a) "both the PSBs' NPAs and their restructured loans double"; and (b) under a 7 percent Tier 1 target capital ratio for all PSBs,, three alternative provisioning ratio scenarios were considered: (1) restructured loans provisioned at 50 percent; (2) both restructured loans and the existing NPAs at 75 percent; (3) both restructured loans and the existing NPAs at 100 percent, and under a 7 percent Tier 1 target capital ratio for all PSBs. Alarmingly, in the most severe case, the government's share of the recapitalization cost could amount to 5 percent of 2012–13 GDP (Table 3). Given the current fiscal situation of the government, such tail risks could indeed pose serious challenges to India's financial stability.

Table 3: Cost of Recapitalization of Public Sector Banks under Severe Stress: IMF's Calculations

(% of 2012–13 GDP)

	Scenario 1	Scenario 2	Scenario 3
Public Sector Share	2.1	3.5	5.0
Total	3.3	5.5	7.9

Source: 2014 Article IV Consultation Report for India (IMF Country Report No. 14/57)

But what really went wrong? A few key factors seem to stand out. First, as already indicated, the process of restructuring has been taken to an illogical extreme by the Indian corporates. Second, government interference in commercial decision of public sector banks is too well-known. A case in point is the process of arm-twisted negotiation between an Indian airline company and leading public sector commercial banks. Third, as an institution the credit information bureaus (CIBs) have completely failed in India. Currently, there are four CIBs in India, viz, Credit Information Bureau (India) Ltd, Experian India, High Mark Credit Information Services and Equifax Credit Information Services Private Ltd and as Deputy Governor of the RBI has recently mentioned in a speech, "The credit information bureaus .... have not received the level of success they would have expected, even after a decade of their existence".[3] Fourth, in general, global and domestic slowdown could have adversely affected the loan loss scene.

[3] Chakrabarty, K.C. (2014): "Transforming Credit Information into Action: Issues and Challenges", Keynote address by Deputy Governor, Reserve Bank of India at the Sixth Annual Credit Information Conference organized by CIBIL in Mumbai on March 20, 2014.

RBI has published a Discussion Paper on, "Early Recognition of Financial Distress, Prompt Steps for Resolution and Fair Recovery for Lenders: Framework for Revitalising Distressed Assets in the Economy" on December 17, 2013, wherein some accelerated provisioning has been proposed (Table 4). The paper has highlighted number of actions such as, early formation of a lenders' committee with timelines to agree to a plan for resolution; making improvement in current restructuring process; more expensive future borrowing for borrowers who do not co-operate with lenders in resolution; and more liberal regulatory treatment of asset sales.

Table 4: Proposed Accelerated Provisioning in respect of Non Performing Accounts

Asset Classification	Period as NPA	Current provisioning (percentage)	Proposed accelerated provisioning (percentage)
Sub- standard (secured)	Up to 6 months	15	No change
	6 months to 1 year	15	30
Sub-standard (unsecured ab-initio)	Up to 6 months	25 (other than infrastructure loans)	25
		20 (infrastructure loans)	
	6 months to 1 year	25 (other than infrastructure loans)	50
		20 (infrastructure loans)	
Doubtful I	2nd year	25 (secured portion)	50 (secured portion)
		100 (unsecured portion)	100 (unsecured portion)
Doubtful II	3rd & 4th year	40 (secured portion)	100 for both secured and unsecured portions
		100 (unsecured portion)	
Doubtful III	5th year onwards	100	100

This is not exactly very good times for the Indian economy. In such times it is easy to fall into a trap of pessimism. Without being alarmist, numbers in current stressed assets indicate ominous trends. The configuration of predominance of public sector banks, current fiscal situation of India, and the necessary recapitalization needs of the Indian banking sector, does not evoke very encouraging signals!

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A Simple Analysis of the State of Auditor Independence in India

Kaustav Sen

Kaustav Sen received his B.Tech from IIT, Kharagpur and PhD from Rutgers University, New Jersey. He is a faculty member at Pace University, New York. He researches how accounting information and corporate governance affect behavior of the capital markets and teaches financial statement analysis and valuation. He has visited and taught at other institutions, including IIM Calcutta, Hong Kong Poly, Rutgers and Montclair State. He has also been a consultant to Prudential Financial, GE Capital, JP Morgan Chase and New York Life.

Introduction

In February 2013, the Competition Commission of the UK completed its market investigation into the supply of statutory audit services to large companies and concluded that this market is not serving shareholders. It went on to say that auditors were rather catering to the needs of the senior management who are key decision makers on whether to retain their services.

Among other assertions, Laura Carstensen, Chairman of the Audit Investigation Group at UK's Competition Commission said: "… Shareholders play very little role in appointing auditors compared to executive management—and despite the presence of audit committees and other safeguards—audit firms naturally focus more on meeting management interests. The result is a rather static market in which too often audits don't fulfil their intended purpose and thus fail to meet the needs of shareholders. …" (http://www.competition-commission.org.uk/media-centre/latest-news/2013/feb/audit-market-not-serving-shareholders)

After the passage of the Sarbanes-Oxley Act (SOX) in the wake of the Enron and other scandals, the US formed an independent body to oversee the auditors: Public Company Accounting Oversight Board (PCOAB). While India adopted provisions in the spirit of SOX in the new Companies Act of 2013 restricting the consulting work that auditors can do, it didn't feel a need to form an independent body and left it to the professional organization of chartered accountants, ICAI to perform this function. In this article, I look at publicly available data on audit and non-audit fees to understand the state of auditor independence in India.

Background

Auditors of publicly listed companies typically referred to as public accountants, have one primary responsibility: to objectively assess if the financial statements prepared by their clients are reliable. To make this assessment, auditors examine if the client has followed the appropriate accounting standards, implemented adequate internal control procedures and have made reasonable assumptions in calculating various accrual accounting numbers. While part of this assessment process is quite objective, there is a significant subjective component as well, especially in arriving at accrual estimates and recording of special transactions for which the accounting standards are not clear.

While the attestation function is indeed the primary responsibility of the public accountants, it is certainly not the most profitable activity that they perform as the rates for attestation services are very competitive. Attesting the veracity of the financial statements allows the auditor to establish a relationship with the client; providing consulting and advisory services such as setting up accounting systems, tax planning and filing, advising on merger and acquisition decisions are the more profitable activities performed by public accountants. It is the lure of high margin advisory services business that very often blurs the objectivity of public accountant in performing the attestation function, leading to a lack of audit independence.

In order to understand audit independence in the Indian context, I explore how as the ratio of audit fees to total fees (sum of audit and non-audit fees) behaves for all BSE listed firms (A & B groups) during 2001-2010. While this ratio has been used extensively in the academic literature to proxy for audit quality or independence, practitioners may object to it arguing that the relationship between the audit and non-audit fees do not represent whether an auditor performs the attestation function in an objective manner. Such a criticism has some merit and an ideal audit independence measure should address the incentives to the auditor. The ratio of bonus to non-audit revenues generated by audit partners can be such an ideal measure, but unfortunately that information is not available publicly.

Analyses

Using a set of simple bar charts, I examine the behavior of the ratio of audit-to-total fees to understand whether differences exist across various groups of firms. The full sample consists of all BSE (groups A & B) listed firms downloaded from Prowess on September 1, 2011. There are 21,638 firm-year observations over the ten year period, 2001-2010. Of these, there are 18,895 firm-year observations with non-missing audit fee data. So for the purposes of this study, full sample consists of the 18,895 firm-year observations. There are several questions I ask and try to answer using these charts.

Question 1: Is the audit-to-total fee ratio similar for large and small audit firms?

The 'Big 10' sample consists of ten largest audit firms in terms of the market share, where market share is the combined rank by share of fees and share of clients in a financial year. In figure 1, the bars are plotted for 'all' firms and the Big 10 firms. Two observations are quite evident from figure 1: (a) audit-to-total fee ratio has gone down from 2001 to 2002, but this drop is steeper for the Big 10 firms (b) the Big10 audit firms have a lower fraction of revenues from audit fees as compared to the smaller firms, so it appears that they have incentives to be less independent. This may appear counterintuitive at first. While it is true that large audit firms are retained because of their 'reputation', it is also true that there are several instances of high profile audit failures among these large firms e.g. Enron in the US and Satyam in India, not to name many others in the US and other parts of the world. While the 'reputation' angle may indeed be valid during the initial years of an audit engagement, over time, it may be marred by the flow of consulting revenues from the client.

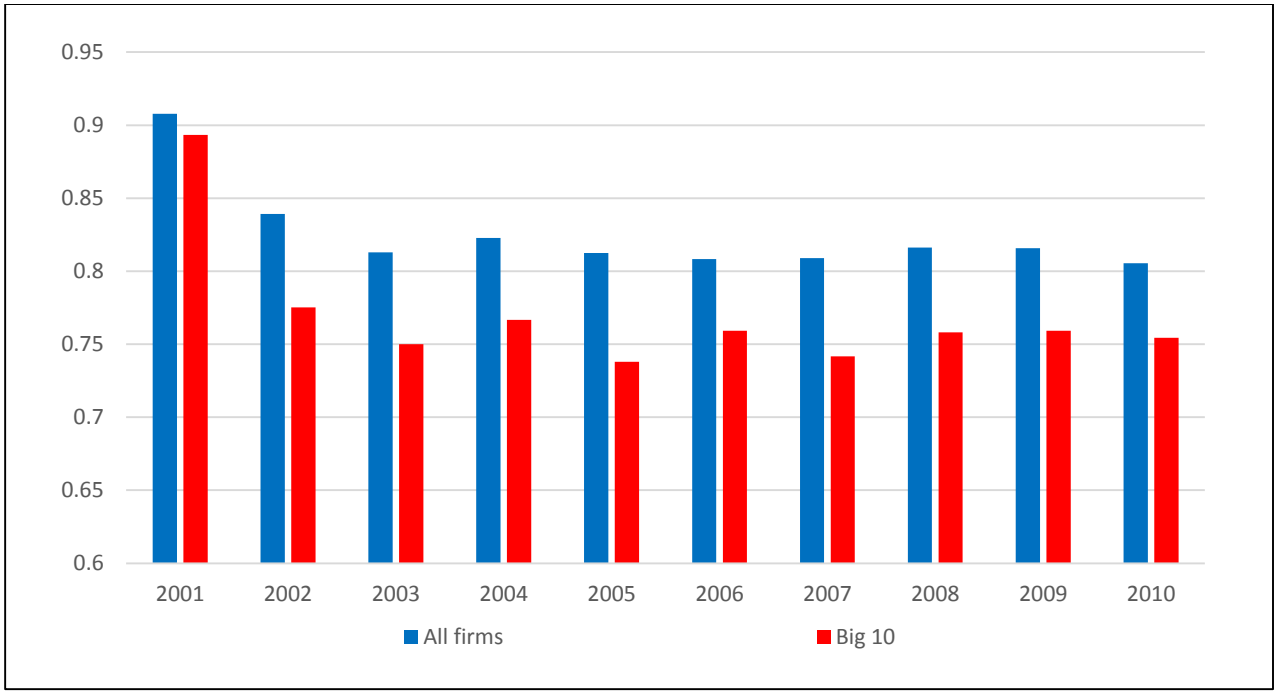

Figure 1: Audit fee to total fee ratio of full sample and Big 10 auditor sample.

Question 2: Is the audit-to-total fee ratio similar across the Big 4 affiliated firms?

The Indian affiliates of the Big 4 international auditors show quite a bit of variation in behavior of the audit-to-total fee ratio. It should be noted that the mean (median) audit fees per engagement for DTT, EY, KPMG and PWC are 4.1 (1.8), 3.8 (2.5), 4.4 (2.4) and 3.1 (1.9) and the mean (median) total fees per engagement are 6.1 (2.5), 5.1

(3.1), 5.5 (3.1) and 4.4 (2.7) respectively, measured in millions of INR. So it appears that EY and KPMG generate more fees per engagement than DTT and PWC. However, EY had 742 and KPMG had 326 engagement-years in this sample as compared to 1172 for DTT and 1054 for PWC. The overall audit (total) fees generated over this ten year period are 4804 (7117), 2794 (3753), 1441 (1799) and 3259 (4607) million INR for DTT, EY, KPMG and PWC respectively. So in terms of size, clearly DTT is the largest, followed PWC, EY and KPMG.

Similar to what was observed in Figure 1, it appears from Figure 2 that the smaller of the Big 4 firms generate less revenues from non-audit fees. KPMG has consistently maintained the highest audit-to-total fee ratio across the years, whereas DTT is at the bottom, especially towards the later years. It should be noted that while the data does indicate KPMG to be quite distinct from DTT in generating more revenues from audit services as compared to non-audit services in India, in an international context, all of these four firms have been fined by regulators from time to time for failing to perform their professional duties. As recently as Jan 24, 2014, the *New York Times* reported that KPMG agreed to pay 8.2 million USD to settle civil charges that it violated independence rules by providing non-audit services to three of its clients; the PCAOB helped the SEC with the investigation.

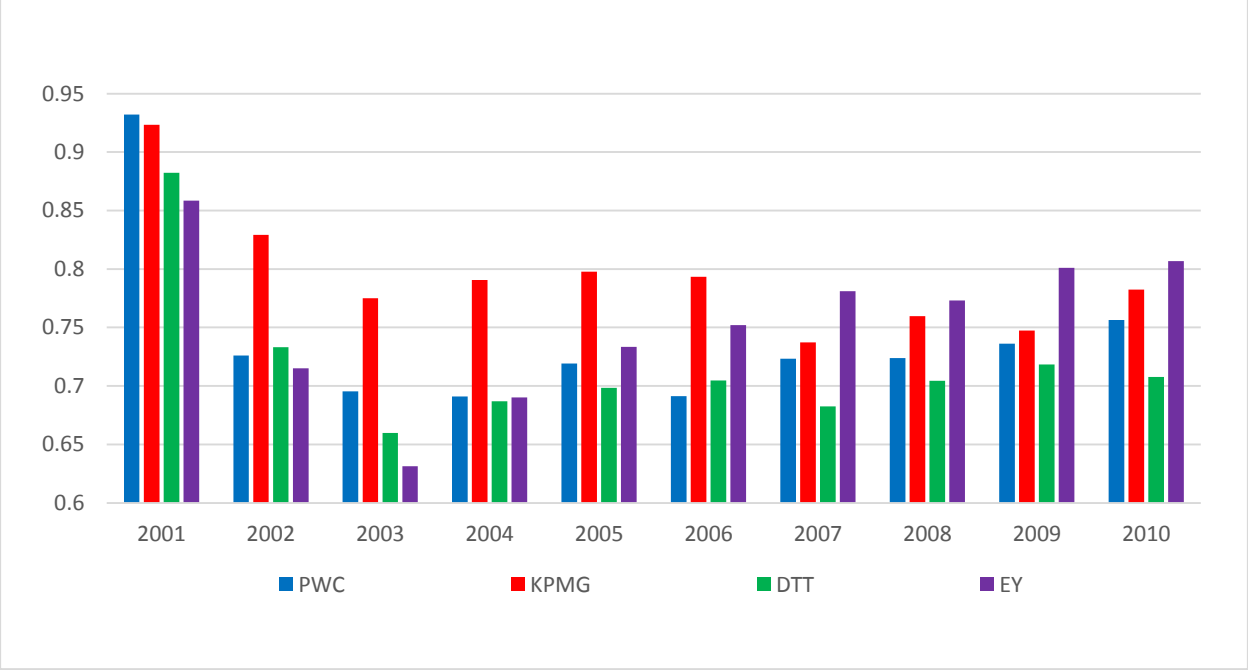

Figure 2: Audit fee to total fee ratio of Big 4 affiliated firms.

Question 3: Is there any difference in audit-to-total fee ratio due to the level of ownership by promoters?

Many a times, promoters take a free ride with outside investors' money - the Rajus of Satyam fame being a case in point. High level of promoter ownership gives them power to exploit the minority shareholder. For this to materialize, the auditor has to be less objective in their assessment. Promoters can accomplish this by offering lucrative consulting work to the auditor. The patterns in Figure 3 confirm this behavior. In each of the ten years, firms that have more than 65% promoter ownership have lower audit-to-total fee ratio compared to firms that have less than or equal to 35% promoter ownership. Of course, the skeptics might say that promoters are not luring auditors and making them less independent, but simply spending more money on non-audit services with no strings attached. There is no way to confirm whether it is true. In addition to the "big auditor implies more consulting" effect, the variation among the Big 4 is also driven by the fact that some of them spun off their consulting business, while others did not at various points during this ten year period.

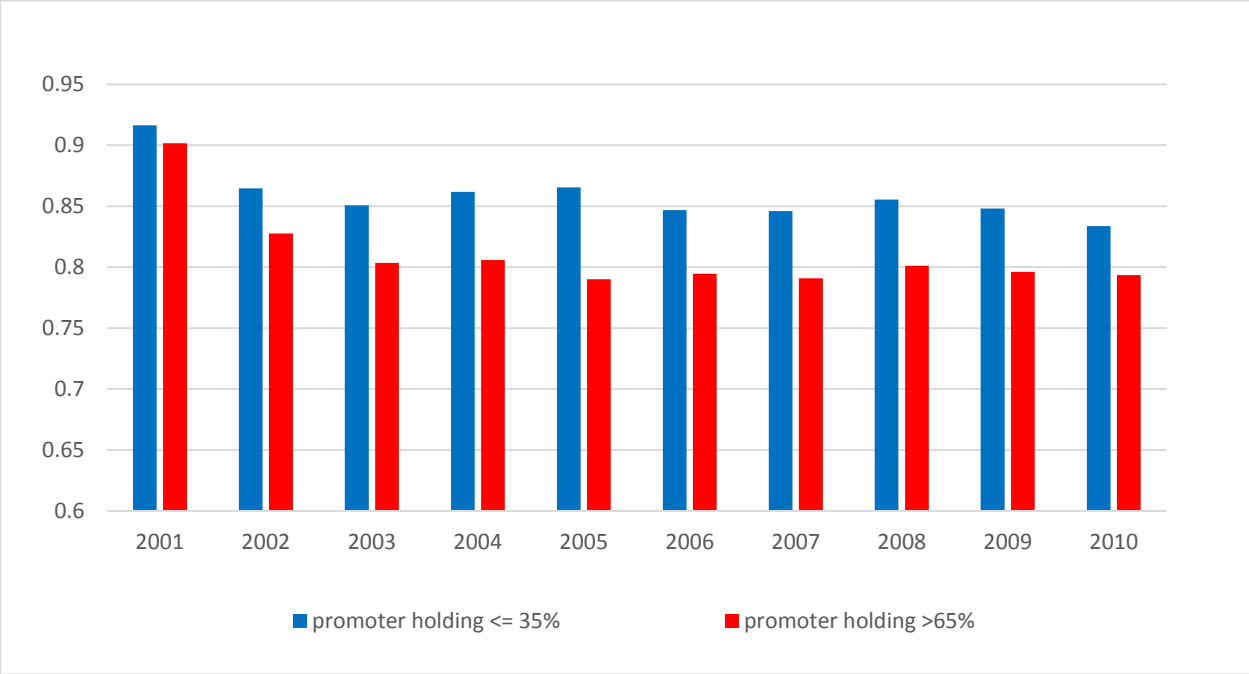

Figure 3: Audit fee to total fee ratio of low and high promoter owned firms.

Question 4: Is there any difference in audit-to-total fee ratio between business group affiliated and standalone firms?

Business groups have been around in India and many other countries for a long time, and the academic literature has offered arguments both in favor and against their

existence. One positive feature often mentioned about business groups is the management expertise and talent pool that they have, whereas the most common negative trait we hear about is the prevalence of inter-company funds transfer to the detriment of outside shareholders, commonly called propping and tunneling. Figure 4 shows that business group affiliated firms offer their auditor more non-audit work as compared to the standalone firms. Once again, this may be interpreted as auditors having less objective focus when the client is a business group affiliated firm. An alternative explanation may be that business groups invest more in systems related projects, with no strings attached for the auditor to be less objective in attesting the firm's financial reports.

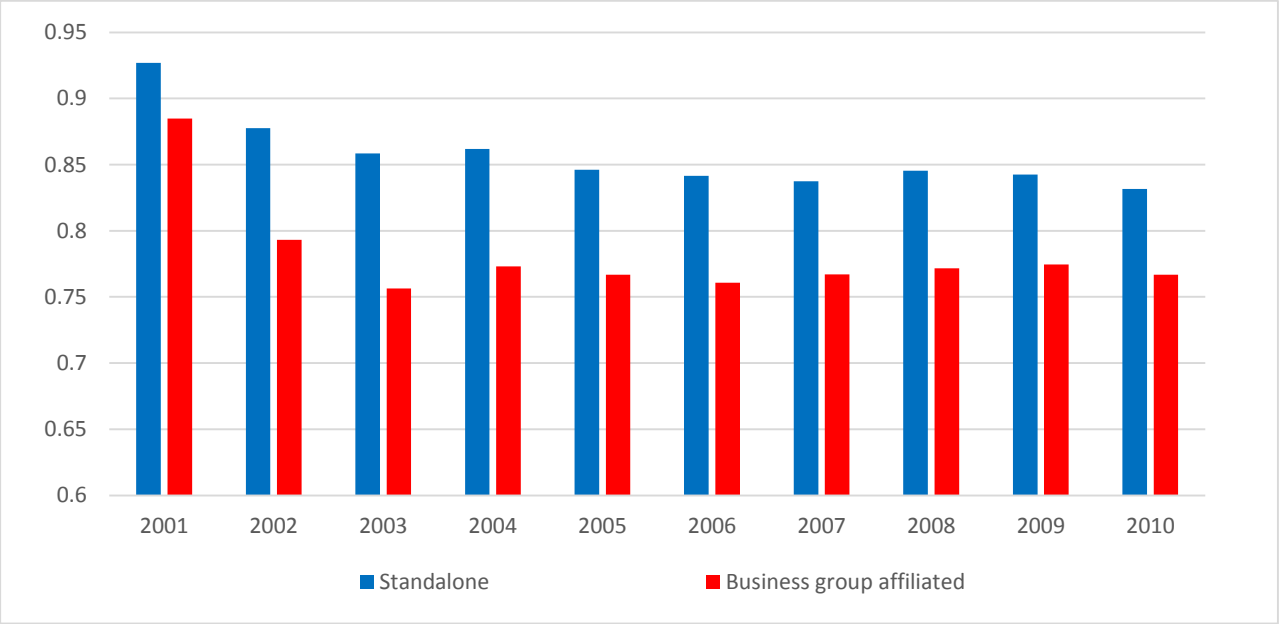

Figure 4: Audit fee to total fee ratio of standalone and business group affiliated firms.

Conclusion

There are two ways of interpreting the evidence that has been presented above. A high audit-to-total fee ratio may either mean that the auditor is more independent or may mean that the client has a small non-audit service budget. If there is any merit to the first interpretation, which a large academic literature ascribes to, then it goes to show that large audit firms are less objective in their assessment of a company's financials. Further, firms having higher promoter ownership or affiliated to business groups have auditors that are less independent. It should be pointed out that these conclusions are based on one ratio, which at best is a noisy proxy of auditor independence. While the results presented here does get one thinking, corroborating using other measures is essential to making the argument watertight. Pinning down lack of auditor independence is not a simple task. My objective here was to use a simple measure to throw some light into it.

Monetary Policy and Other Macro Parameters

Golaka C Nath*

Dr. Golaka C Nath is a Senior Vice President at the Clearing Corporation of India Ltd. (CCIL). He has over 21 years of experience in the banking and financial sector, having previously worked with the National Stock Exchange of India Ltd. and Vijaya Bank. In the past, he has worked on a World Bank Project on "Developing Bond Market in South Asia". He has also provided secretarial service to the High Powered Committee on "Corporate Bonds and Securitization" appointed by the Ministry of Finance, Government of India.

Monetary policy function of a central bank involves aggregate demand management by moderating money supply in the economy through directional interest rate structure. A central bank typically may define monetary policy as the collective actions undertaken to influence the availability and cost of money and credit to ensure price stability and inclusive growth through employment generation. A broader definition of monetary policy includes the directives, policies, statements, and other actions by the central bank.

A central bank typically uses few instruments to manage monetary policy – (a) Operating Open Market Operations – the central banks typically buys securities from institutions like banks and primary dealers to infuse liquidity to ensure appropriate availability of funds to lend; (b) Changing Reserve requirements – controlling a portion of deposits that banks must hold in cash (Cash Reserve Ratio) and securities (Statutory Liquidity Ratio) which affects the available liquidity within the market; (c) Activating Repo window - permits certain institutions like Banks and primary dealers to borrow from it directly on a temporary basis.[4]

Monetary policy actions are undertaken by a central bank to ensure the availability of appropriate level of credit in the system and policy rates give an indication of cost of money in the system. Inflation expectations are inbuilt in the policy rate as price stability is an important part of the monetary policy framework. Monetary policy stance (whether the stance is expansionary, contractionary, or neutral) can be judged by looking at the cost of money and credit as measured by the rate of interest relative to inflation and inflationary expectations and the growth of money and credit itself.

**** Personal views of the author only and not the views of his organization***

[4] In India, Reserve Bank of India conducts daily Repo under Liquidity Adjustment Facility (LAF) to moderate liquidity supply in the system and maintains an interest rate corridor.

Policy Index

In India, Reserve Bank of India (RBI) uses multiple rates for managing policy stance – Cash Reserve Ratio (CRR), Statutory Reserve Ratio (SLR), Bank Rate, Marginal Standing Facility (MSF) Rate, Repo Rate and Reverse Repo Rate. Recently, RBI shifted to using one policy Repo rate and other two related rates - Reverse Repo Rate and MSF/Bank Rate are being set within the interest rate corridor parameterized by RBI (currently +/-100bps Repo rate). Initially, all these policy rates as well as CRR and SLR were used independently by RBI for policy stance management. Typically, policy rates are changed by multiples of 25bps as and when RBI decides to change the rates. Only on two occasions between 2001 and 2013, the changes were not in multiples of 25bps. Typically policy rate changes are announced during monetary policy reviews which happened every quarter. However, there are cases when the policy rate changes were announced in between two policy review dates depending on the economic situation. Currently RBI is moving towards a bi-monthly review system. Table -1 gives the number of changes (all policy instruments) effected by RBI during 2001 to 2013 along with the volatility persisted during the period.

Year	Number of Policy Instruments Changes (CRR/SLR/Repo/Rev Repo/MSF/BR)	Volatility (3 Month Rate)	Volatility (10 Year Rate)
2001	13	0.86	0.69
2002	8	0.46	0.45
2003	7	0.61	0.41
2004	4	0.37	0.67
2005	3	0.21	0.18
2006	8	0.34	0.37
2007	9	0.51	0.16
2008	17	0.98	0.78
2009	8	0.56	0.56
2010	16	1.22	0.11
2011	19	0.76	0.19
2012	10	0.28	0.11
2013	25	1.11	0.59
Full period	147	1.66	1.11

The changes effected to policy instruments for executing monetary policy stance varied widely during the period of study. In recent years (aftermath of financial crisis), the changes are relatively more than the pre financial crisis period. As these changes are not continuous, we needed to create an index for mapping monetary policy with market activities in various markets. Two indices were created – one with a straight line orientation while the other with a U-shaped curve. The straight line index with a base of 100 on 01-01-2001 was created by assigning 1 point for every 25bps point change (+1 for 25bps increase in any instrument and -1 for 25bps decrease in any instrument). The U-shaped index was created by adhering to a structure of exponential measure – 25bps change were subjected with 1 point for index while 50bps changes were accorded 2.25 and so on – 100bps change was accorded 5 points, etc. The quarterly simple average of the indices were created for using the same to map the activities in various markets. Chart – 1 gives the quarterly monetary policy index movement.

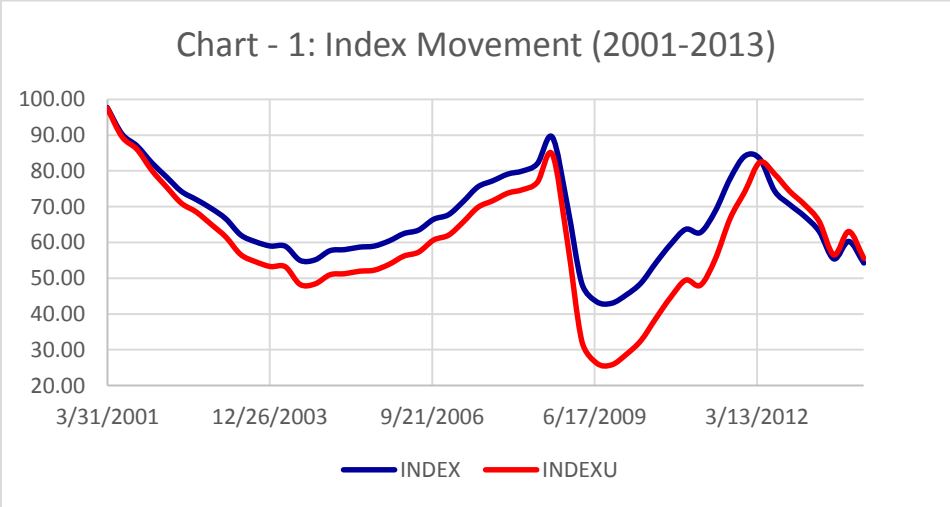

Table 2 gives the relation between changes in indices and other market activities. We have considered equity market returns (SENSEX), Exchange Rate, IIP growth, 3-month and 10 year interest rates.

Table -2: Pearson Correlation Coefficients, N = 51							
Prob > |r| under H0: Rho=0							
	SENRTN	**INDX**	**INDXU**	**EX**	**IIPG**	**Y3M**	**Y10**
SENRTN	1	0.22284	0.18742	-0.53787	0.15639	0.16625	0.23453
		0.116	0.1878	<.0001	0.2731	0.2436	0.0976
INDX	0.22284	1	0.97215	-0.16627	0.59087	0.81237	0.50819
	0.116		<.0001	0.2436	<.0001	<.0001	0.0001
INDXU	0.18742	0.97215	1	-0.14137	0.52145	0.7884	0.45194
	0.1878	<.0001		0.3224	<.0001	<.0001	0.0009
EX	-0.53787	-0.16627	-0.14137	1	-0.44749	0.00955	-0.00051
	<.0001	0.2436	0.3224		0.001	0.947	0.9972
IIPG	0.15639	0.59087	0.52145	-0.44749	1	0.35704	0.2438
	0.2731	<.0001	<.0001	0.001		0.0101	0.0847
Y3M	0.16625	0.81237	0.7884	0.00955	0.35704	1	0.56687
	0.2436	<.0001	<.0001	0.947	0.0101		<.0001
Y10	0.23453	0.50819	0.45194	-0.00051	0.2438	0.56687	1
	0.0976	0.0001	0.0009	0.9972	0.0847	<.0001	

The analysis of correlation shows that relation between equity market and currency market is significant and negative. As higher exchange rate (depreciation) results in lower FII flows to equity market, the relationship is rational. However, the equity market did not show any significant relationship with IIP growth and interest rate (both short and long term) as well as the monetary policy indices. However, the monetary policy indices have very strong relationship with interest rates (short and long term) and IIP growth but the said indices had insignificant relationship with equity and currency markets.

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