

CAMELS-BASED PERFORMANCE OF INDIAN PUBLIC AND PRIVATE SECTOR COMMERCIAL BANKS DURING ECONOMIC DISTRESS

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ABSTRACT

In this study, we compare the performance of public and private sector commercial banks in India from 2005 to 2016 using CAMELS measures. We find that private sector banks have been better capitalized and have lower levels of non-performing loans compared to their public sector counterparts but the two sectors don't differ significantly in other respects. We also conduct further study into non-performing loans and find that while such loans occupied a similar position in the balance sheets of both sectors during the first half of our study period, public sector banks have seen a sharp increase in the weight of non-performing loans on their balance sheets in the post-financial crisis period.

INTRODUCTION

In the aftermath of the 2008 financial crisis, there has been a significant effort in many countries to improve financial regulation. Part of this involves ascertaining the capital adequacy of banks and deriving a proper valuation of financial assets on bank balance sheets. Indian banks, in particular, have come under increasing scrutiny with the emergence of news regarding the presence of large quantities of non-performing loans on their balance sheets that were previously unrecognized. Public sector banks have also been the subject of scandals and fraudulent schemes (see, for instance, Kazmin and Mundy (2018, February 21)). In this study, we provide a brief overview of the Indian banking system and then conduct a comparison of public and private sector banks in India over a 12-year period spanning the financial crisis. Introduction is followed by a review of the literature. We then explain our research methodology, conduct an analysis based on CAMELS measurements and a further analysis of non-performing assets. We then conclude with a recommendation for further study.

Overview of the Indian Banking Sector

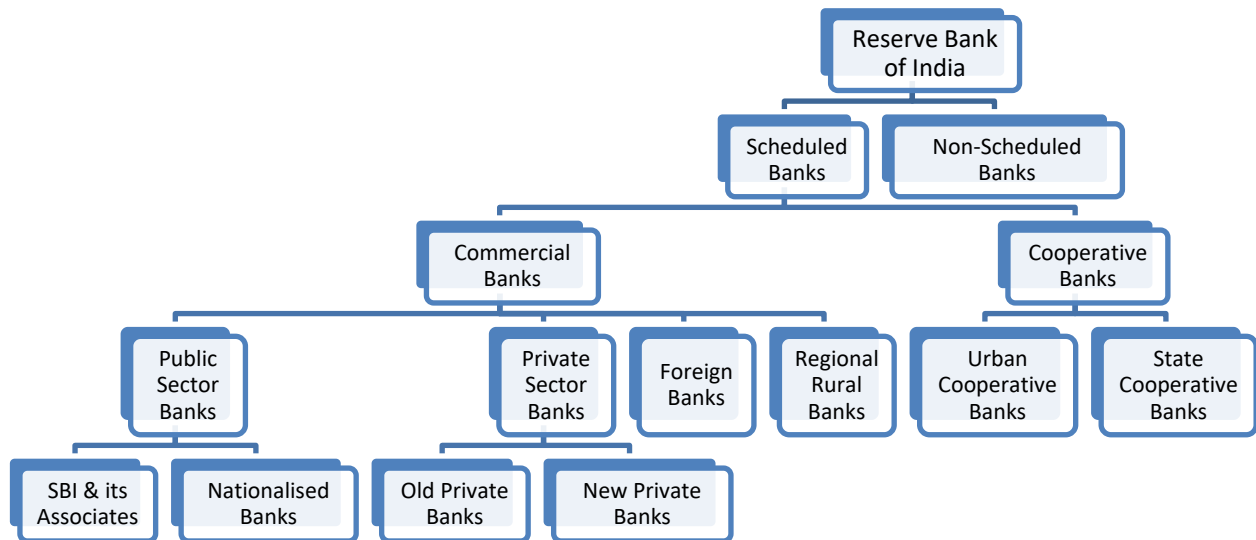
The fuel for the growth and development of an economy is finance. However, mere monetary funds would not suffice the purpose, unless it is regulated and channelized in the proper direction with proper management. This need of regulating and channelizing the flow of funds in

the economy is taken care by the banking system. A strong, resilient, and efficient banking system is essential for the economy to function smoothly and is without a doubt the backbone of any economy.

The Indian banking system has been the stimulus for the persistent growth of India's economy. The Indian financial system is dominated by the banking sector, which controls 63% of its assets, compared to Insurance companies controlling 19% and Non-banking financial institutions with 8% (see *Subbarao*). Thus, the onus of a smooth financial system operations lies with the banks. For the benefit of the economy, the banking system has been formed and different roles and responsibilities have been assigned to different types of banks to ensure the overall development of the nation.

The structure of the Indian Banking system is as follows:

Figure 1: Structure of Indian Banking System



Source - <http://stockshastra.moneyworks4me.com/economic-outlook/indian-banking-industry-indian-banks-structure-business-model/>

Reserve Bank of India - The Indian Banking system is controlled, monitored and regulated by the regulatory authority of the Banks, namely the Reserve Bank of India (RBI). RBI is the apex bank; it is the central bank of India.

Scheduled Banks - All banks which are included in the Second Schedule to the Reserve Bank of India Act, 1934, are Scheduled Banks. These banks comprise Scheduled Commercial Banks and Scheduled Co-operative Banks. Scheduled Commercial Banks in India are categorized into five different groups according to their ownership and/or nature of operation. These groups are (i) State Bank of India and its Associates, (ii) Nationalized Banks, (iii) Regional Rural Banks, (iv) Foreign Banks and (v) Other Indian Scheduled Commercial Banks (in the private sector). Scheduled Co-operative Banks consist of Scheduled State Co-operative Banks and Scheduled Urban Co-operative Banks. Scheduled banks come under the direct purview of the credit control

measures of the Reserve Bank of India. They are entitled to borrowings and rediscounting facilities from Reserve Bank of India (see also, *Evolution of Banking in India*).

Commercial Banks - The major banking segment that caters to the needs of trade, commerce, industries, agriculture, small business, transport, etc. in the Indian economy are the commercial banks. These banks carry out the basic banking business of accepting deposits and making loans and advances. Along with these, many other functions have also been vested upon by the commercial banks.

Based on the ownership pattern, the commercial banks can be classified as public sector banks (major holdings of the government), private sector banks (major non-government holdings), and foreign banks (having head offices located outside India). The primary difference between public and private sector banks, which are the focus of our study, is in terms of the composition of their capital. For public sector banks, the majority of their ownership (at least 51%) is under government control with the rest distributed through issuance of securities in the capital markets. Private sector banks, on the other hand, have shareholders in the form of individuals and/or institutions. These are regulated such that a public sector undertaking, including the Government of India, is not allowed to hold more than 40% of their shares (for more details of ownership limitations, see also *Reserve Bank of India. (2016, May 12)*). Because of the government control, public sector bank operations are influenced by government strategies such as welfare schemes and subsidies for the public, which are routed through these banks. Despite being commercial banks, these banks have to be thoughtful about the social benefits generated by their operations. On the other hand, private sector banks do act under the purview of regulatory authorities but are otherwise free to decide on their strategies akin to a conventional profit-seeking institution.

Research Problem

Constantly changing economic scenarios pose many challenges to the growing banking system. In the quest to fulfill its many functions, the banking system has been liberalized and additional reforms are taking place. These reforms lead to increasing opportunities as well as challenges for the banks. The entry of new private sector as well as foreign banks has led to increased competition while the role of regulatory authorities has widened and will have to contend with multiple facets of supervision.

The public sector banks' approach of social benefit is now in a drifting phase from mere social welfare to business-oriented social welfare. The major difference between public sector banks and private sector banks is narrowing and they are now competing directly with each other. Both sectors, however, have their advantages and disadvantages. The challenge lies in how both sectors cope with the dynamic circumstances of the economy. So, it is of interest to the researcher to compare the public and private sectors of the banking system. Our focus in this paper is on the performance differences between the two sectors, particularly in terms of their responses to the global financial crisis in the late 2000's.

LITERATURE REVIEW

A number of studies have conducted CAMEL-based analyses of Indian banks in various contexts. Mishra et. al. (2012) set up a ranking of twelve public and private sector banks using CAMEL ratios and found higher ranking banks to belong to the private sector. A similar study, using ten public and ten private sector banks, was conducted by Nandi (2013), who found that their selection of public sector banks scored higher. There are many more such studies that construct a CAMEL-based ranking of selected public and private sector banks, including but not limited to Prasad et. al. (2011), Devanadhen (2013), Rastogi & Saxena (2013), Sharma (2014), Palamalai & Saminathan (2016), and Rawlin et. al. (2017).

Acharya & Subramanian (2016) conducted a thorough analysis of the health of public sector banks vis-à-vis private sector banks by examining capitalization, exposure to systemic risk, and profitability. They find that while public sector banks, as of March 2014, had adequate Tier I capital, this was the result of overstated capital ratios due to regulatory forbearance provided by the Reserve Bank of India. These ratios might be subject to changes as the Basel 3 standards get adopted. The authors simulate three possible scenarios moving forward and find that, absent regulatory forbearance, all public sector banks would have Tier I capital ratios significantly lower than the mandated levels. On the other hand, all private sector banks would have Tier I capital ratios significantly higher than the mandated levels.

The Reserve Bank of India, in Financial Stability Report December 2017, found a strong negative correlation between capital adequacy and non-performing loans of -74% for all commercial banks. They also found that public sector banks recorded negative profitability ratios since March 2016 and that their gross non-performing loans were projected to increase to over 15% of total loans by September 2018. Private sector banks, on the other hand, had consistently positive profitability ratios and their gross non-performing loan ratio was projected to be at about 4%. The report also indicates a tightening of regulatory standards for public sector banks as evidenced by the following quote: "... any extension of forbearance to banks with a view to facilitating them to nurture their stressed assets should be viewed as a larger responsibility of the regulator to dovetail the interests of both the lenders and borrowers." (For further discussion of regulatory policy towards public sector banks, see also Nair (2015, March 03).)

Rather than focus on specific banks as has been done in the studies cited above and numerous other studies as well, the present study looks at the performance evolution of the entire sector of public and private sector banks with regards to how they emerged out of the 2008 global financial crisis. This particular aspect is crucial since there has been an increased emphasis on tightening financial regulation in the aftermath of that crisis. We also examine how public and private sector banks differ in terms of non-performing assets and how the difference has changed since the financial crisis.

RESEARCH METHODOLOGY

Type of Research - The research performed is analytical in nature. A detailed analysis of the Indian commercial banks has been carried out in the form of a time series analysis and in terms of performance comparison between the public and private sectors.

Research Objective - To compare the performance of Indian public sector and private sector commercial banks for the period of 2005 to 2016.

Data - The number of Scheduled Commercial Banks utilized in the study is summarized in Table 1. We note that the number of public sector banks has remained almost constant over the time horizon of our research. The number of private sector banks decreased by 25% over 2005-2011 before holding steady over the next five years. This drastic reduction is arguably due to the direct or indirect effects of the global financial crisis. We also see a 40% increase in the number of foreign banks operating in the country from 2005 to 2016. This denotes increased competition for the existing Indian banks.

Year	Foreign Banks	Private Sector Banks	Public Sector Banks		All Scheduled Commercial Banks
			Nationalized Banks	SBI & Its Associates	
2005	30	28	20	8	86
2006	29	28	20	8	85
2007	29	24	20	8	81
2008	27	23	20	8	78
2009	29	22	20	7	78
2010	31	22	20	7	80
2011	32	21	20	6	79
2012	36	20	20	6	82
2013	40	20	20	6	86
2014	42	20	20	6	88
2015	41	20	21	6	88
2016	42	21	21	6	90

Method for Data Analysis - The performance of Indian commercial banks was measured based on the CAMELS model. The CAMELS model was developed in 1970s by three banking supervisory agencies in the United States (US), namely the Federal Reserve, the Federal Deposit Insurance Corporation (FDIC), and the Office of the Comptroller of the Currency (OCC), as a part of the supervisory system for measuring the safety, soundness, and performance of a bank.

Following existing literature (eg. *Poghosyan and Cihák, 2011* and *Betz et al., 2013*), we adopted the following proxies for measuring each variable in the CAMELS system:

- Capital Adequacy – We used two proxies:
 - i. Capital Adequacy Ratio: This was obtained from the table titled *Selected Ratios of Scheduled Commercial Banks* published by the Reserve Bank of India (RBI).
 - ii. Equity to Total Assets Ratio: Equity was calculated as the sum of Capital and Reserves & Surplus. Values were obtained from the table titled *Liabilities and Assets of Scheduled Commercial Banks* published by the RBI.
- Asset Quality – This was estimated using the ratio of Gross Non-Performing Assets (obtained from the table titled *Movement of Non-Performing Assets of Scheduled Commercial Banks*) to Total Assets.
- Management Quality – This was estimated using the ratio of Costs to Income with values obtained from the table titled *Earnings and Expenses of Scheduled Commercial Banks*. Cost denotes the sum of all operating expenses. Earnings refers to the sum of Net Interest Income and income from other sources.
- Earnings – We used two proxies obtained from *Selected Ratios of Scheduled Commercial Banks*:
 - i. Return on Average Assets: defined as the ratio of net profit for the year divided by the average of total assets for the current and previous year.
 - ii. Return on Average Equity: defined as the ratio of net profit for the year divided by the average value of equity for the current and previous year.
- Liquidity – This was estimated using the ratio of liquid assets to total deposits. For liquid assets, we used the sum of Cash in hand, Balances with RBI, Balances with banks in India, Money at call and short notice, Balances with banks outside India, and Indian Government securities. The conventional denominator in this ratio is the sum of total deposits and short-term funding but we weren't able to distinguish short-term from long-term funding on the banks' balance sheets and were therefore constrained to use only the former.
- Sensitivity to Market Risk – This was estimated using the ratio of income derived from market movements (sum of Net profit on sale of investments, Net profit on revaluation of investments, and Net profit on exchange transactions) to total income (sum of Net Interest Income and income from other sources).

Note: To clean up the data, we eliminated all observations with missing values of Capital Adequacy Ratio, Total Assets, Return on Average Assets, and Return on Average Equity, and observations with zero deposits. This resulted in an insignificant loss of less than 3% of observations.

Hypothesis – We test the following hypothesis for each aspect of the CAMELS measure:

- H_0 - There is no significant difference between the performance of selected public sector and private sector banks.
- H_1 - There is a significant difference between the performance of selected public sector and private sector banks.

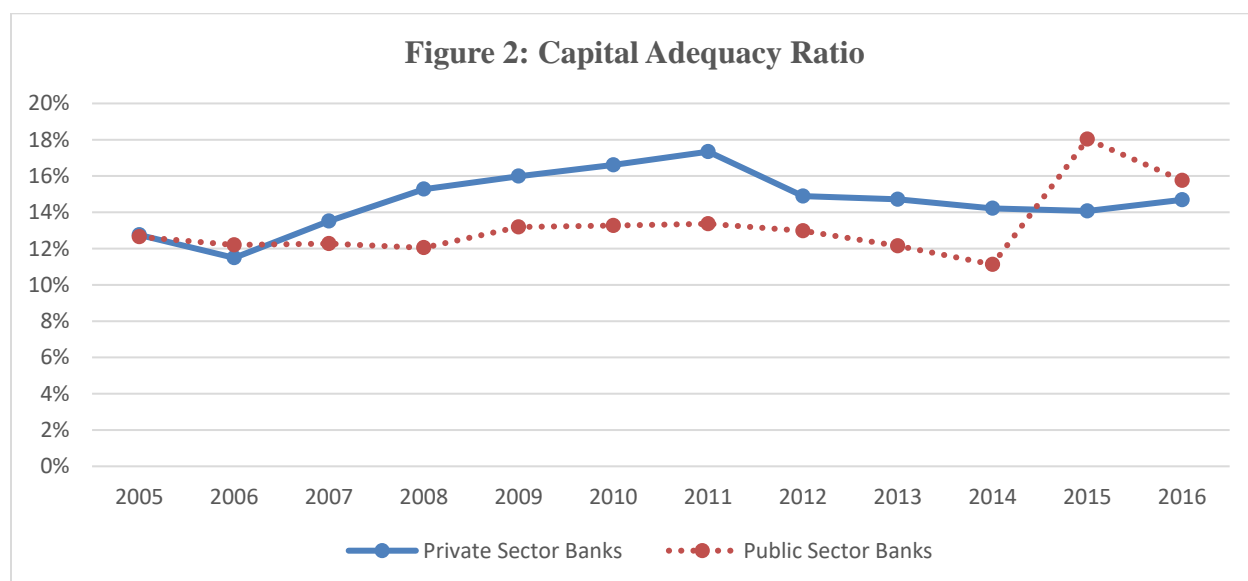
As reported earlier, a number of studies have ranked various public and private sector banks on the basis of CAMEL ratings. The results in these studies over time have been mixed with

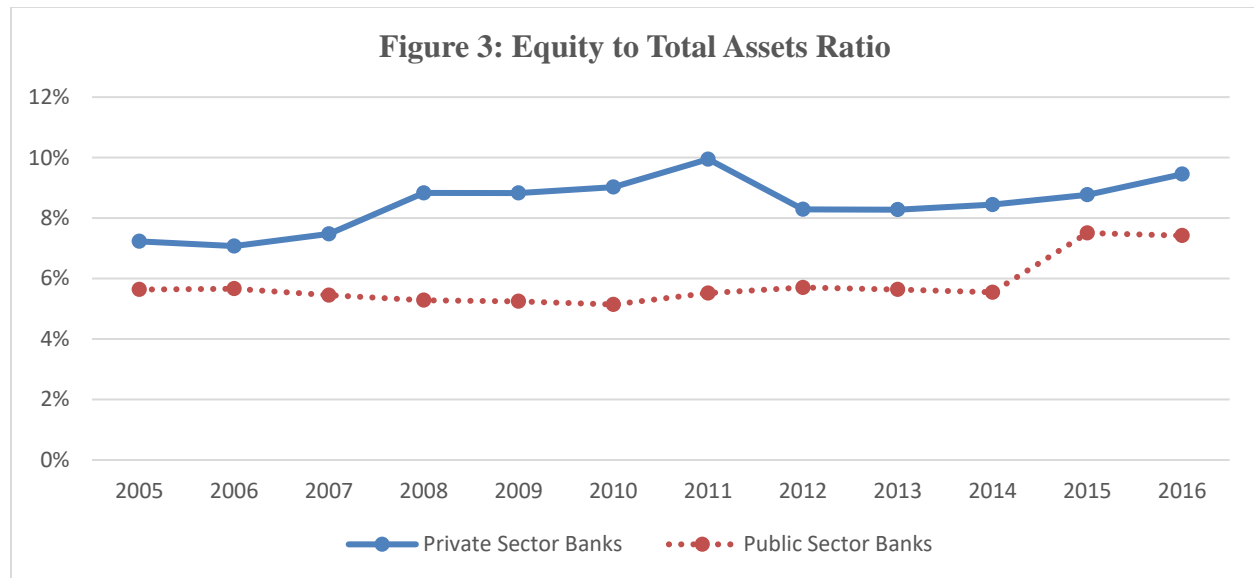
regards to which banks come out on top. As a result, while some aspects of public sector banks have been reported to be weakened in recent years, we chose to be agnostic in designing our overall alternate hypothesis and look for significant differences between public and private sector banks without being partial to a specific direction. However, given the predominant attention given to capital adequacy and non-performing assets in recent years, we are in a position to predict, based on extant evidence, that public sector banks have lower capital adequacy ratios and higher proportion of non-performing loans compared to their private sector counterparts.

ANALYSIS

	Private Sector Banks	Public Sector Banks	t-statistic (p-value) for difference in means
Capital Adequacy Ratio	14.51%	13.25%	1.68 (0.094)
Equity to Total Assets Ratio	8.40%	5.81%	8.30 (< 0.001)

Table 2 shows that private sector banks were better capitalized than public sector banks. The difference in terms of the Capital Adequacy Ratio may appear small. However, this ratio is based on risk-weighted assets whose definition might appear arbitrary. Furthermore, in the timeframe of our analysis, the commonly accepted criteria for this ratio moved from the Basel II to the Basel III standard. Thus, we use the Equity to Total Assets Ratio as an alternative proxy to measure capital adequacy. In this case, the difference between private and public sector banks is much larger and highly statistically significant. We reject the null hypothesis for capital adequacy and confirm that our finding matches our expectation.





Figures 2 & 3 clearly show that private sector banks were consistently better capitalized than their public sector counterparts over time.

Table 3: Asset Quality			
	Private Sector Banks	Public Sector Banks	t-statistic (p-value) for difference in means
Non-Performing Loans to Total Assets Ratio	0.73%	1.13%	-5.66 (< 0.001)

Table 3 indicates that private sector banks had a lower fraction of their assets tied up in non-performing loans, indicating that the former has been more judicious in their lending practices. We reject the null hypothesis for asset quality.

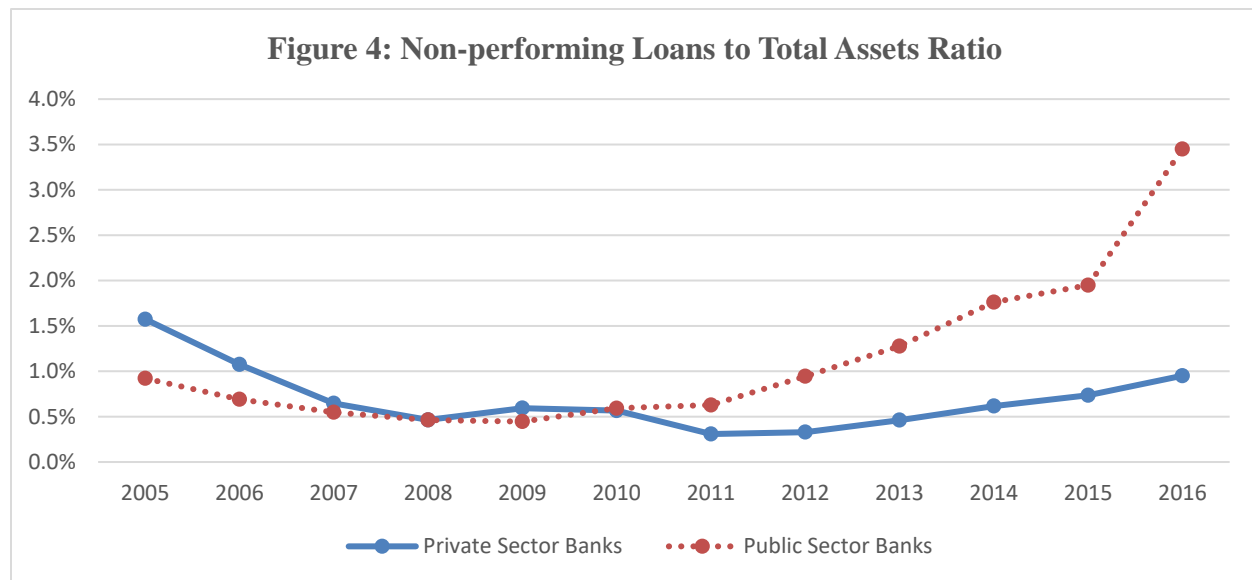


Figure 4 portrays a very interesting difference between the two sectors during the chosen time period. Early in the study private banks have a larger percentage of non-performing loans. For both sectors the steady decrease in the ratio during the global recession and the increase in the aftermath conforms with the pro-cyclical nature of risk-taking by banks. However, public sector banks appear to have been much more aggressive in their lending practices. This factor has also been widely reported elsewhere (for instance in the Financial Stability Report December 2017 published by the Reserve Bank of India) and thus confirms with our expectation. We explore this further in the next section.

Table 4: Management Quality			
	Private Sector Banks	Public Sector Banks	t-statistic (p-value) for difference in means
Cost to Income Ratio	56.46%	48.72%	5.86 (< 0.001)

Table 4 shows that public sector banks were more cost efficient than the private sector banks, providing a useful indicator of management quality in terms of cost efficiency. We thus reject the null hypothesis for management quality. However, we also see from Figure 5 that most of this difference arises from the early years of our analysis and that in recent years the two sectors have been slowly converging in this regard.

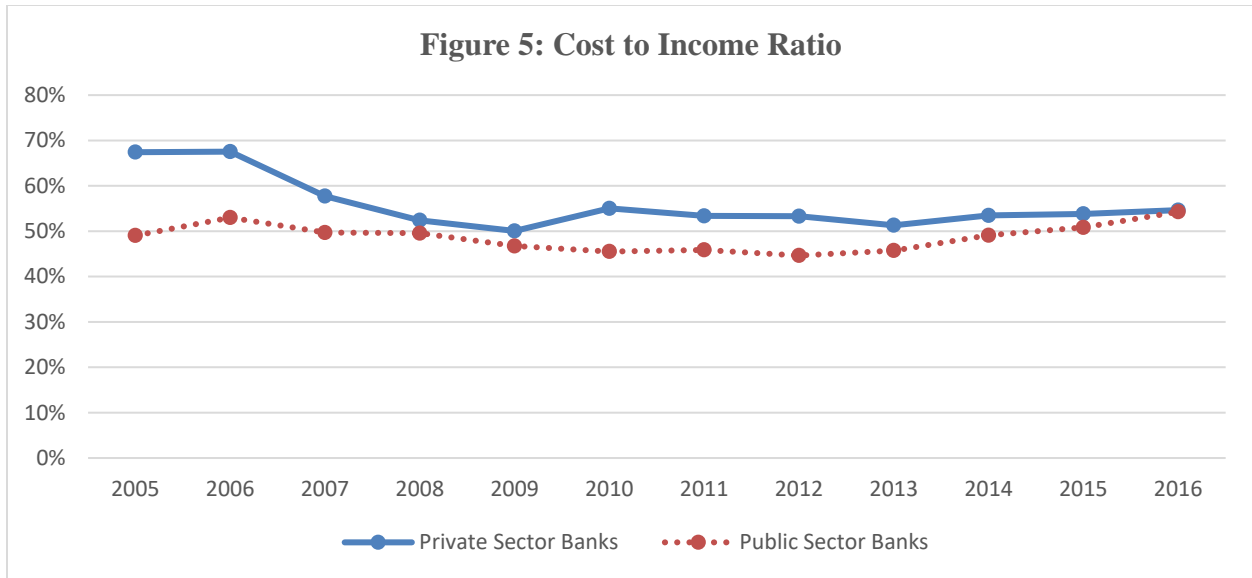
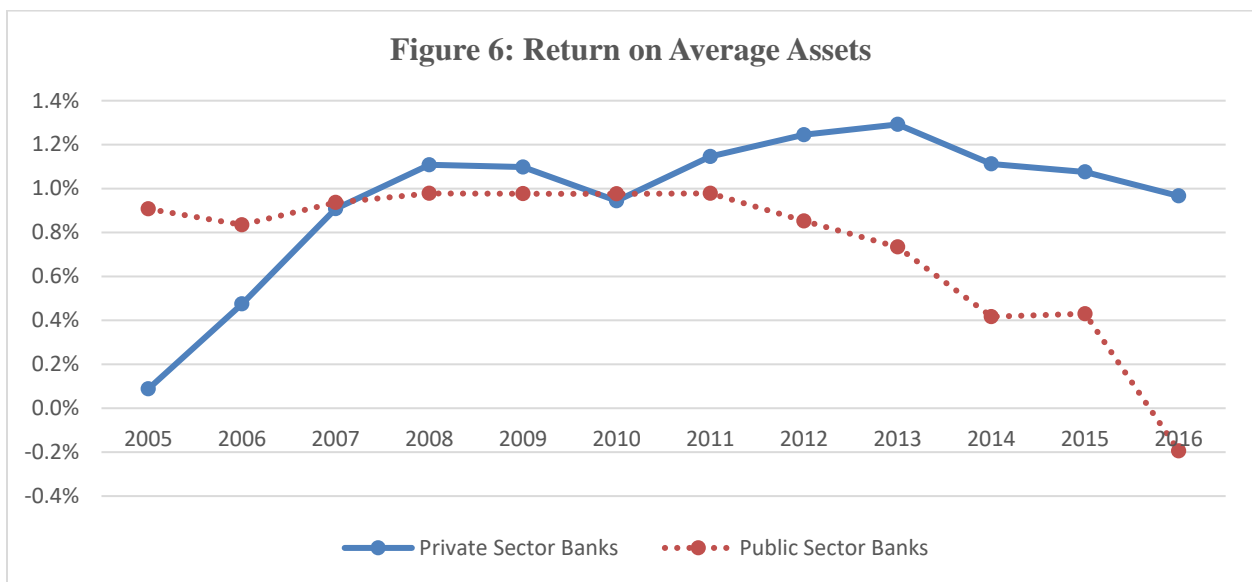
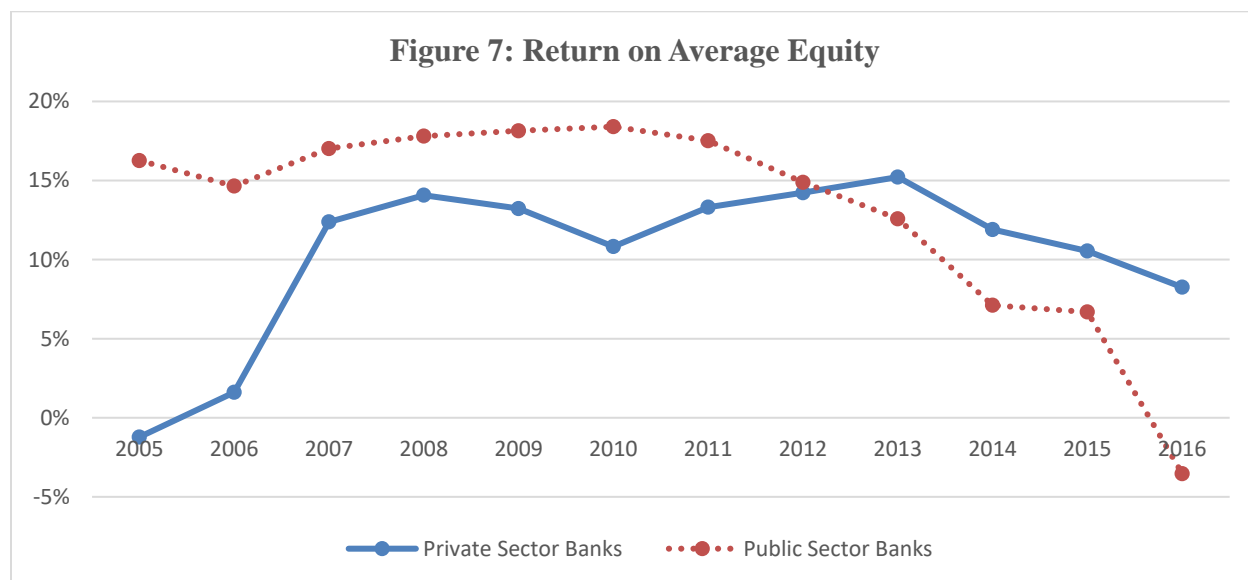


Table 5: Earnings

	Private Sector Banks	Public Sector Banks	t-statistic (p-value) for difference in means
Return on Average Assets	0.92%	0.74%	2.93 (0.0036)
Return on Average Equity	9.86%	13.17%	-3.28 (0.0011)

Table 5 shows a significant difference in earnings between private and public sector banks but the direction of the difference depends on the proxy we use to measure earnings. In terms of ROA, private sector banks outperform banks in the public sector but the opposite is true if we use ROE as the measure. We are thus unable to reject the null hypothesis for earnings. The time-series analysis in this case turns out to be very revealing.





We can make a couple of significant observations from figures 6 & 7. In terms of both ROA and ROE, each ratio shows private sector banks were consistent in the years 2007-2016. On the other hand, public sector banks had steadily diminishing returns in terms of both measures from 2011 onward. This trend matches the increase in non-performing loans for public sector banks in the same time period. Our findings here are in line with those reported in Financial Stability Report December 2017, and Acharya & Subramanian (2016).

We also notice that the ROA values for both classes of banks were similar during the first half while the ROE for public sector banks was higher. This apparent discrepancy can be understood in light of the lower equity levels of public sector banks as seen in Figure 3, since all else equal, lower equity values result in higher values of ROE. We test this assertion by estimating the correlation between Equity to Total Assets ratio and ROE for each of the two classes. For public sector banks, we found a correlation of -12.4% with a p-value 0.025, confirming our conjecture. On the other hand, for private sector banks, we found a positive correlation of 12.3% with a p-value of 0.044, showing that the negative correlation between the equity ratio and ROE only exists for public sector banks.

Table 6: Liquidity			
	Private Sector Banks	Public Sector Banks	t-statistic (p-value) for difference in means
Liquid Assets to Deposits Ratio	40.26%	38.46%	1.82 (0.069)

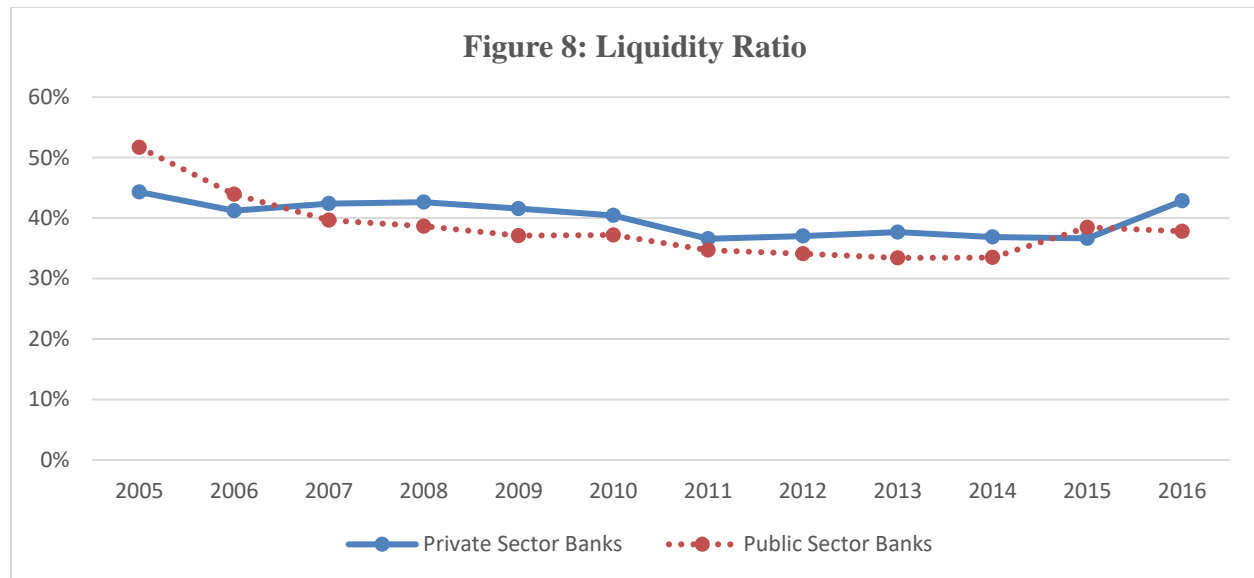
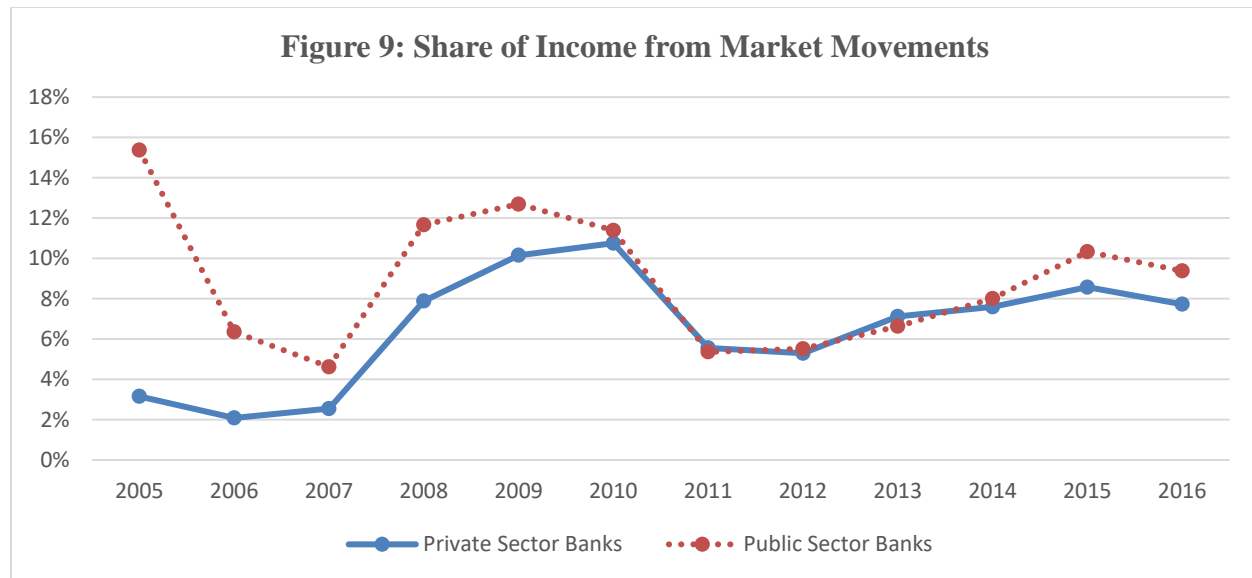


Table 6 shows that private sector banks were slightly more liquid than public sector banks. However, neither the magnitude nor the statistical significance of the difference is very high. We are unable to reject the null hypothesis for liquidity. This is confirmed in Figure 8, where we see both types of banks follow a similar trend while staying close to each other.

	Private Sector Banks	Public Sector Banks	t-statistic (p-value) for difference in means
Share of income from investments & exchange transactions	6.32%	8.98%	-4.58 (< 0.001)

Table 7 shows that private sector banks had a lower share of their income from sale and revaluation of investments and exchange transactions, implying a lower sensitivity to market movements. We thus reject the null hypotheses for sensitivity to market risk. Once again, the time-series analysis provides a clearer picture.



We see from Figure 9 that most of the difference between the two sectors occurs in the earlier years of our study, from 2005-2009. Subsequent to that, the two sectors are identical in terms of sensitivity to market risk, which is a possible indication of improving risk-management practices at public sector banks.

FURTHER ANALYSIS OF NON-PERFORMING ASSETS

Our analysis in the previous section indicates that a further investigation of non-performing assets is warranted. Specifically, we check whether the high non-performing assets ratio for public sector banks is caused by the existence of a few outliers or whether this was a sector-wide trend. To accomplish this, we compare the distributions of the relevant ratio between public and private sectors banks for each year and see if the distributions are statistically different.

Figure 10 shows the histograms for the years 2005 – 2010. We see that with the exception of a few outliers, the distributions of the private and public sector banks' NPL ratios lie in the same range. For instance, in 2006, almost all the banks in the public sector had less than 1.5% of their assets tied up in non-performing loans. This was also true of most private sector banks. While the precise limits vary from one year to the next, both types of banks had similar spreads.

Figure 10: Histograms for Non-Performing Loans to Total Assets (2005 – 2010)

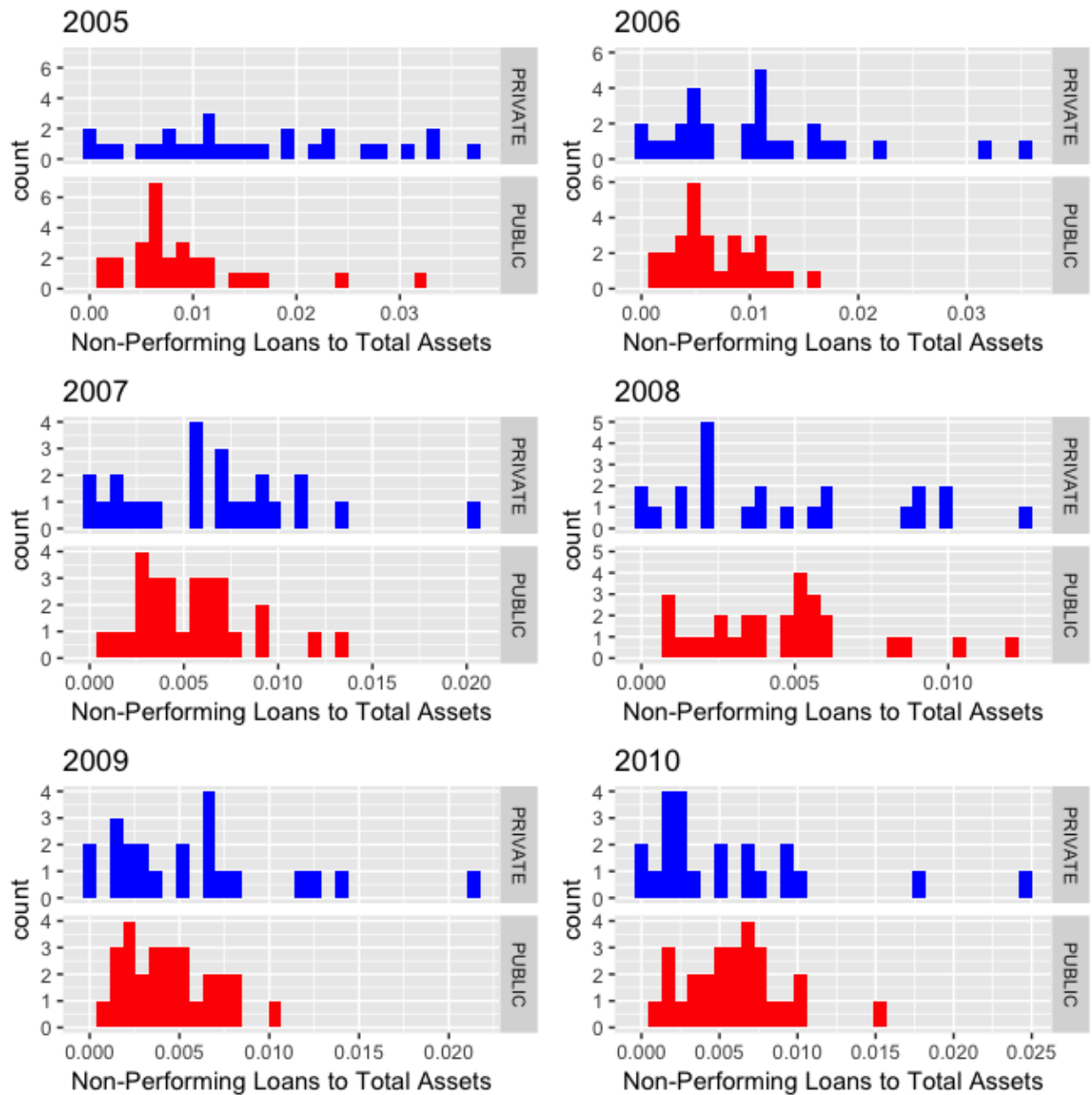
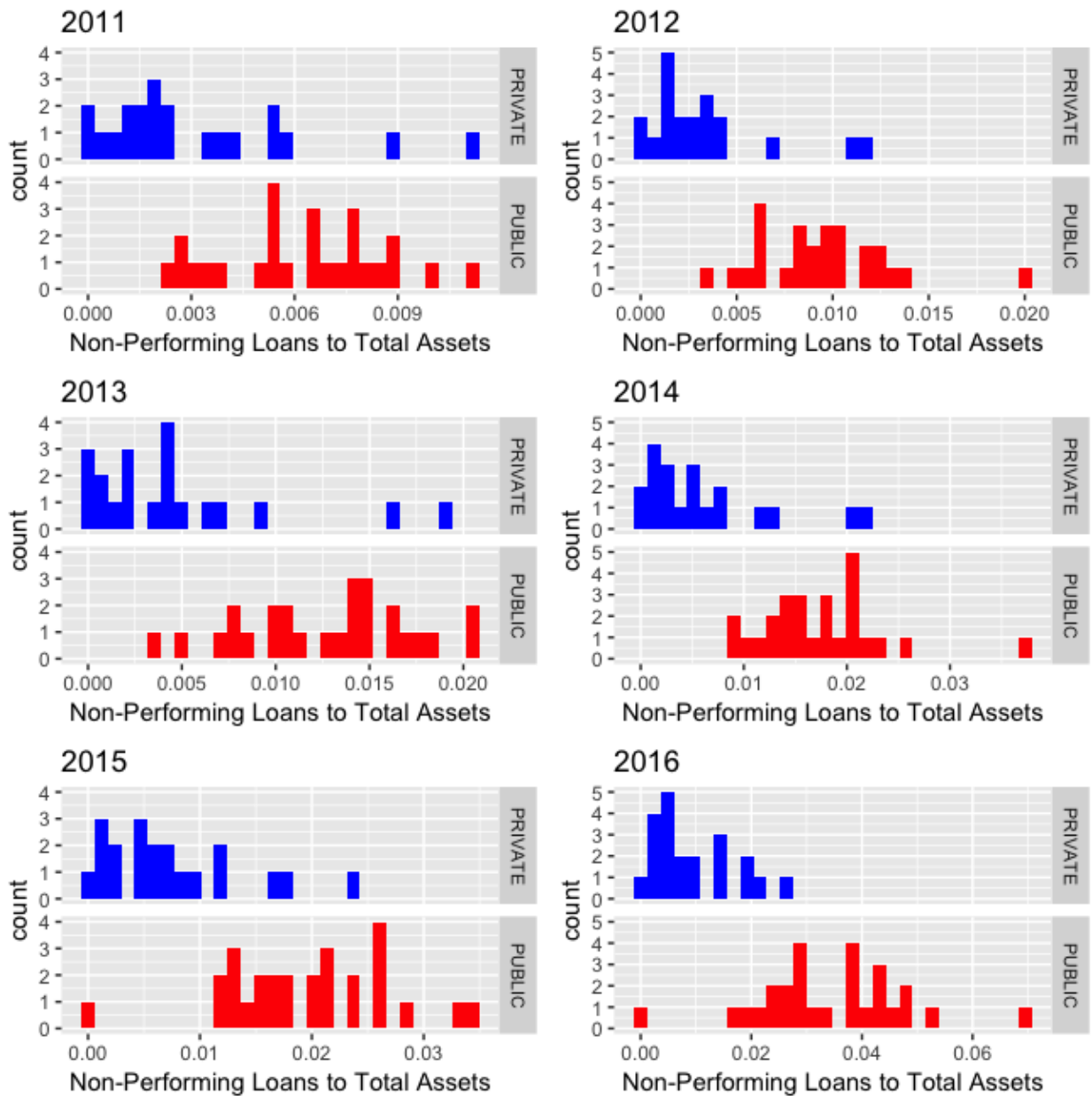


Figure 11 shows the histograms for the years 2011 – 2016. In contrast to Figure 10, we clearly see a shift to the right for the distributions of public sector banks compared to private sector banks. It is therefore not just a few outliers that cause the average ratio of non-performing loans to total assets for public sector banks to trend sharply upwards. Instead, the entire sector experienced this trend.

Figure 11: Histograms for Non-Performing Loans to Total Assets (2011 – 2016)



CONCLUSION

Based on our analysis, we find that the largest source of difference between public and private sector banks occur in the form of non-performing loans. The problem of bad loans issued by public sector banks have been well documented (see for example, *Mundy & Kazmin, 2017*). This problem has only worsened since the end of the financial crisis, likely fueled by an urge to expand lending in a booming economy. This in turn appears to have contributed to a significant drop in returns for public sector banks over the last five years. In contrast, non-performing loans for private sector banks have increased to a significantly lower extent in the same time-period and

their returns have been relatively steady. The other significant difference between the two sectors lies in their level of capitalization. Private sector banks have been better capitalized compared to public sector banks, which allows them to absorb unanticipated losses in the event of another national or international economic downturn. In terms of other factors, we do not find significant differences, especially over the later part of our analysis, strongly indicating that the increase in competition has led to a convergence in several operating characteristics of public and private sector banks.

This study provides interesting insight into the CAMELS-related performance of public and private banks in India...especially pre and post financial crisis. The authors contemplate a further comparison between the performance of banks in the Indian economy with banks located in a more established yet sluggish economy...such as the United States. This may provide insights as to how Indian banks can benefit from the experience of US banks as the Indian economy matures and slows. However, this is left to another study at a later date.

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