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What do we know about the recent performance of Indian banks?

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Submitted to
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Abstract

This paper examines the performance of Indian banks by studying the effects of recent reforms and macroeconomic events. Indian banks went through a period of reforms in the past twenty years. The impact of these reforms and major macroeconomic events has been examined using time-series analysis. Event studies offer additional perspective on the short-run effect of the events on different types of Indian banks. Although, the event dates are not all statistically significant in the time-series regressions, the demonetization of 2016 is significant in the event study analysis. Thus, while reforms and events have immediate impact on the performance of Indian banks, the effects did not always persist over the larger time-period.

Key Words: Public Sector Banks, Private Sector Banks, Reforms, Profitability, Macroeconomic Shocks

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Introduction

The contribution of Indian banks to the country's overall GDP has increased substantially over the past two decades. In 2018, banking services alone constituted 21.67% of the country's GDP. The economic reforms launched by the Government of India over the past decade have significantly changed the landscape of various sectors of the economy (Kamath et. al., 2003). Specifically, the banking and financial sector has undergone changes in management, ownership and availability of funds since the implementation of reforms. This calls for analyzing the performance of Indian banks and their reaction to reforms imposed by the government.

India has launched a number of banking reforms since the 1990s. Although there is considerable research on the impact of 1990s reforms on banks, there has been little analysis of the overall effects of recent reforms on banks and financial institutions. These reforms include the launch of payment banks[1] in 2015 and the demonetization of Indian currency notes in 2016. Macroeconomic events like general elections and global shocks are also likely to have an impact on banks. This thesis attempts to analyze the effect of recent reforms and macroeconomic events on the Indian banking sector.

Chapter 1 begins with the history of the establishment of the banking system in India, briefly touching on the historical reforms of the 1980s. However, the primary focus of the chapter is on the performance of different types of Indian banks post-2000 time period.

[1] Payment banks provide small savings accounts, payments, and services to low income households, small businesses, and migrant labor workforce.

Chapter 2 presents an empirical study on the effects of recent reforms on stock return performance of different types of Indian banks. The overall banking index as well as the specific types of bank indices, namely the public and private bank indices, are analyzed. As such, this chapter attempts to gauge the reaction of private and public banks on the announcement of reforms. Time-series procedure and event studies have been used to understand the long-run and short-run effects of the reforms. The results of the empirical study indicate that the announcement of demonetization had an immediate, significant and positive impact on both public and private banks. The impact of demonetization was higher on public banks. However, the impact was not significant enough to reflect in the time-series procedure. The announcement of payment banks, on the other hand, did not have any impact on the banks.

Finally I conclude with the finding that the impact of a reform on banks is largely determined by the nature of the reform and its targeted group of beneficiaries. Additionally, the public sector banks (PSBs) appear to be more sensitive to reforms than do private Banks.

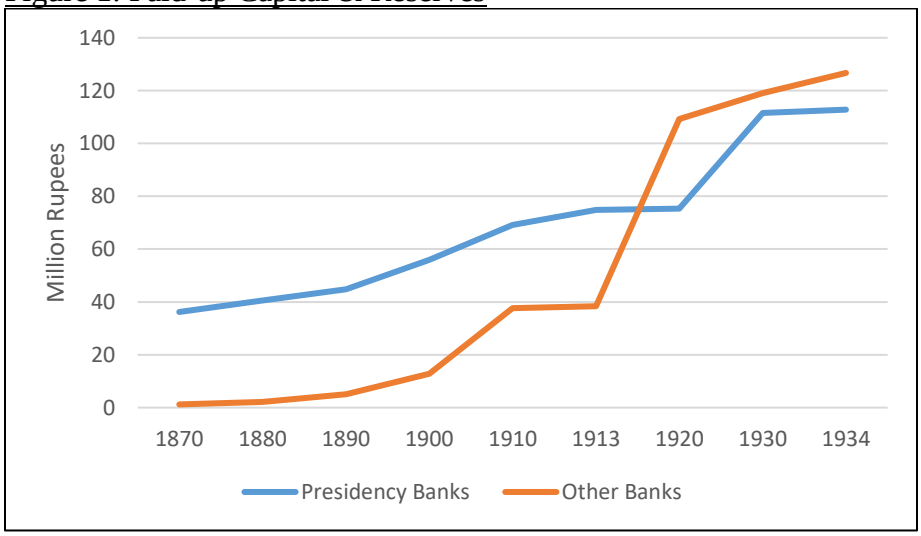
Chapter 1: Overview of Indian Banking

A. Establishment and Evolution of Banks

The early history of banks in India is closely tied to the colonial period. The British introduced formal banks to facilitate business in the country. The first bank in India, Bank of Bombay, was established in 1720, with the main purpose of issuing notes. It soon went into liquidation and closed. This was followed by a series of Presidency banks introduced by the East India Company, one of the colonial companies that

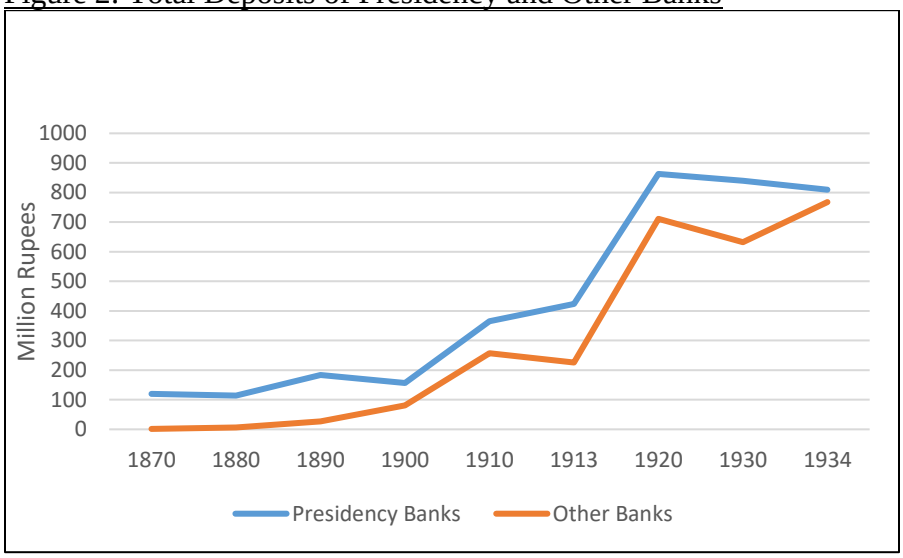
functioned as a quasi-governmental organization with its own infrastructure and army. Three banks, the Bank of Bengal, the Bank of Bombay and the Bank of Madras were established over a period of 40 years and served as Presidency Banks, which served the responsibility of modern-day central banks. These banks were mostly private as British funds and capital was used to retain control. Figures 1 and 2 show the relative importance of Presidency banks as compared to other banks during the late 1800s and early 1900s. Until 1913, the Presidency Banks had the most reserves and paid-in capital, after which other banks took over. However, in terms of deposits, Presidency Banks dominated the landscape despite the increase in the number of other commercial banks from 2 to 36 (Reserve Bank of India 2008a).

Figure 1: Paid-up Capital & Reserves



Source: The Reserve Bank of India Publication (2008a)

Figure 2: Total Deposits of Presidency and Other Banks



Source: The Reserve Bank of India Publication (2008a)

In 1921, the Presidency banks merged to form the Imperial Bank of India. The Allahabad bank, established in 1865, became the first Indian-owned. This was followed by Punjab National Bank, and Bank of India (Reserve Bank of India 2008a).

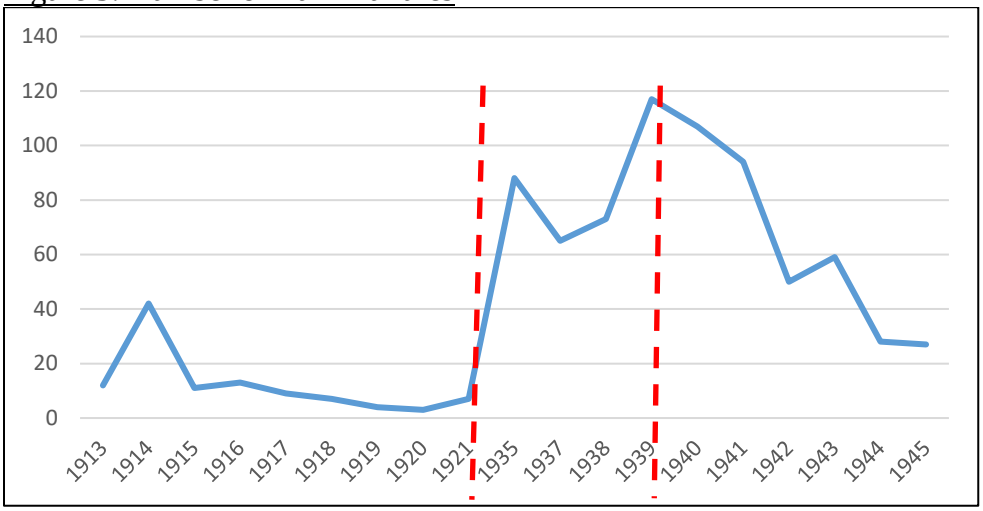
India's abandonment of the Silver Standard in 1898 was a major reform that stabilized the Indian currency. The country experienced a fall in the value of Rupee from 1871 onwards due to the depreciation in the value of silver against gold. India, then joined the Gold standard and fixed the value of rupee at exactly one shilling and four pence sterling. This move substantially reduced the costs of having a depreciating currency and enhanced the stability of the currency as all the major currencies besides China's were already tied to gold (Reuters 2010).

In addition to the currency standard problems, India was also affected by events that happened in the west. The Great Depression started in the early 1920s in the UK, followed by the 1929 Wall Street crash and worldwide financial panic negatively

impacted banks in India. Since India was still under British Raj, there was a contagion effect not just from the US but also from the UK.

It was not until 1935 when the central bank of India, the Reserve Bank of India (RBI) came into existence. Due to the decentralized banking system, the RBI was not powerful enough to provide stability to banks in the country. For instance, the *laisez faire* policy allowed free entry and exit of new banks in the industry without seeking permission of the RBI. Additionally, the ongoing events such as WWII and the Great Depression greatly affected the banking landscape. India's alliances with high-income countries resulted in a greater number of bank deposits. As a result, several banks took the opportunity to expand. The problem was that these banks had very low capital which increased the risk of failure: "low capital base, insufficient liquid assets and inter-connected lending were some of the major domestic factors" (Reserve Bank of India 2008). Thus, bank failures persisted despite the establishment of the RBI in 1935. The reforms of 1939 finally gave powers to the RBI, which enabled the bank to curb the number of bank failures in the country. Figure 3 shows the changes in the trend of bank failures after the implementation of the 1939 reform.

Figure 3: Number of Bank Failures



Source: The Reserve Bank of India Publication (2008)

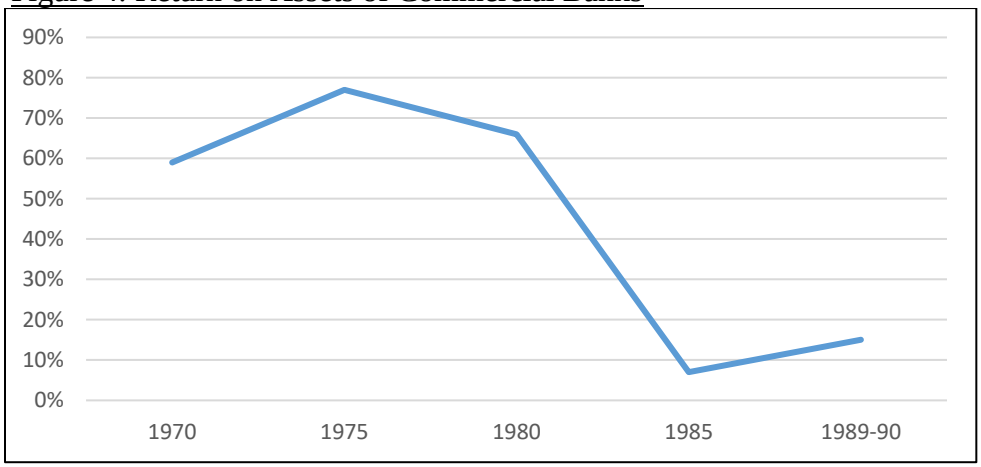
Reforms of the 1990s

The Imperial Bank of India was nationalized in 1947 and renamed the State Bank of India (SBI). At this point in time, all other banks in the country were privately owned. In the 1980s, India experienced a second wave of nationalization when six private banks were nationalized in order to give the government more control over credit delivery and other banking services. Both private and public sector commercial banks could still co-exist in the country; however, the move towards nationalization led the PSBs to eventually control 91 percent of total business in the banking industry (Sensarma 2005). RBI imposed stringent regulations on the PSBs to closely monitor the activity of the banks and demanded lending quotes. Also, the Statutory Liquidity Ratio[2] requirement was raised by 12.5 percentage points between 1970 and 1991. However, this strict regulatory environment posed a hurdle to banks, and as a result, they were rendered unprofitable, inefficient and undercapitalized (Sensarma 2005). Figure 4 shows the

[2] The Statutory Liquidity Ratio (SLR) is defined as the proportion of deposits the commercial bank is required to maintain with them in the form of liquid assets in addition to the cash reserve ration.

Return on Assets (ROA)[3] of commercial banks in the pre-reform period. Commercial banks started experiencing a downfall since 1975. Starting in 1980, the ROA plunged from 65% to 8% within just five years. This was worrisome for the banks as it meant that either the income earned was too low or the number of assets held by these banks were enormous. Both these scenarios reflect the inefficiency of commercial banks. As a result, the substantial dip in the ROA of commercial banks called for reforms in the sector.

Figure 4: Return on Assets of Commercial Banks



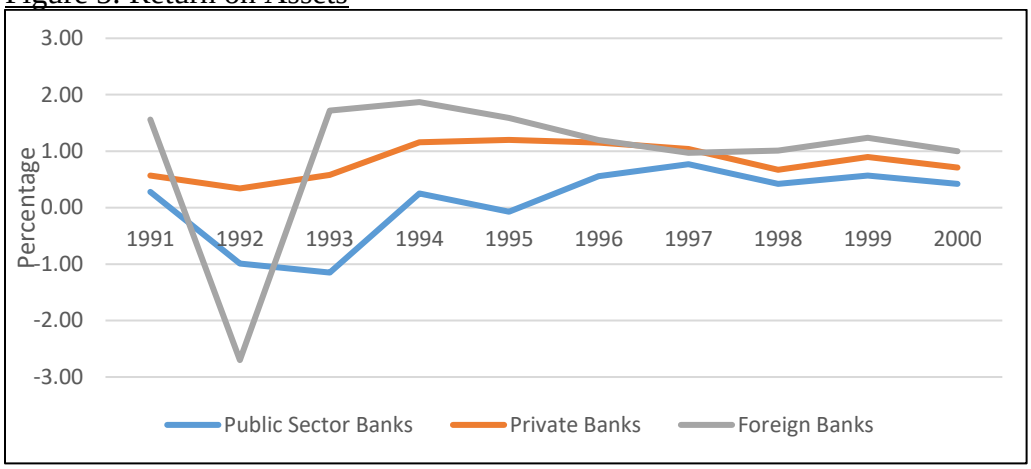
Source: The Reserve Bank of India Database

The government of India launched a series of reforms in the 1990s to improve the efficiency and profitability of banks. The Narasimhan committee was set up in 1991 to lower the cash reserve ratio and the statutory liquidity ratio. Furthermore, in 1998, interest rate deregulation was imposed on deposits and lending. The reforms focused on areas such as capital adequacy, bank mergers, and bank autonomy.

[3] ROA is the ratio of annual net income to average total assets of a business during a financial year and reflects efficiency using its assets to generate net income.

B. Pre-2000 Landscape:

Figure 5: Return on Assets



Source: The Reserve Bank of India Database

Figure 5 shows the trend of ROA for different types of Indian banks in the late 1990s. The returns on assets held by private banks were consistently higher than those held by public banks in the pre-2000 time period. While foreign banks initially struggled to have favorable returns, they ended up performing better than other banks by the early 2000s. There could be two reasons for this: 1) because the foreign banks faced less government regulations, or 2) because these banks started using their assets more efficiently. While having similar returns to private banks in 1991, the PSBs started performing poor in 1992 with plunging returns. However, by early 2000s the returns for PSBs picked up and came close to the industry average, though remaining the lowest. This suggests that the reforms likely benefitted the PSBs to some extent given that their profitability has increased over time.

C. Post-2000 Landscape:

Overall Money Supply and Bank Lending

Major changes in monetary policies typically ensue from the unfolding of macroeconomic events such as recessions. The biggest global crisis that occurred post 2000 was the 2008 financial crisis which originated in the U.S but had spillover effects in other countries. As a result, the RBI responded with changes in monetary policy. Table 1 shows the comparative monetary trend in money supply between September 2008 and August 2016. Monetary base growth exceeded 100% for all the six countries. The actual growth in money supply for China and India increased by 212.7% and 201.7% respectively. However, this was not true for other countries since they experienced a huge drop in the velocity of money (Burdekin 2018). As Islam and Rajan (2009) explain, "the reserve money growth in India was moderate, owing to the decline in net foreign assets and reduction in cash reserve ratios. Nevertheless, both broad money and commercial credit have maintained their historic growth trend. As a result, the broad money multiplier increased since September 2008."

Table 1: Growth of Money Supply between 2008 and 2016(%)

MONEY SUPPLY	**China**	**Japan**	**Eurozone**	**United Kingdom**	**United States**	**India**
Total monetary base growth	147.5	284.6	103.1	402.0	316.9	132.7
Total bank money growth	235.5	-5.9	8.9	-0.9	-6.5	220.1
Overall money supply growth	212.7	20.3	18.0	16.2	9.9	201.7

Source: Burdekin (2018); The Reserve Bank of India Database

Table 2 shows the steps taken by the RBI to expand bank lending. The measures resulted in the augmentation of liquidity of over Rs.5.85 trillion, thereby easing liquidity position and building confidence in the financial market (Mohan and Ray 2018).

Table 2: Measures Taken to forestall liquidity pressures

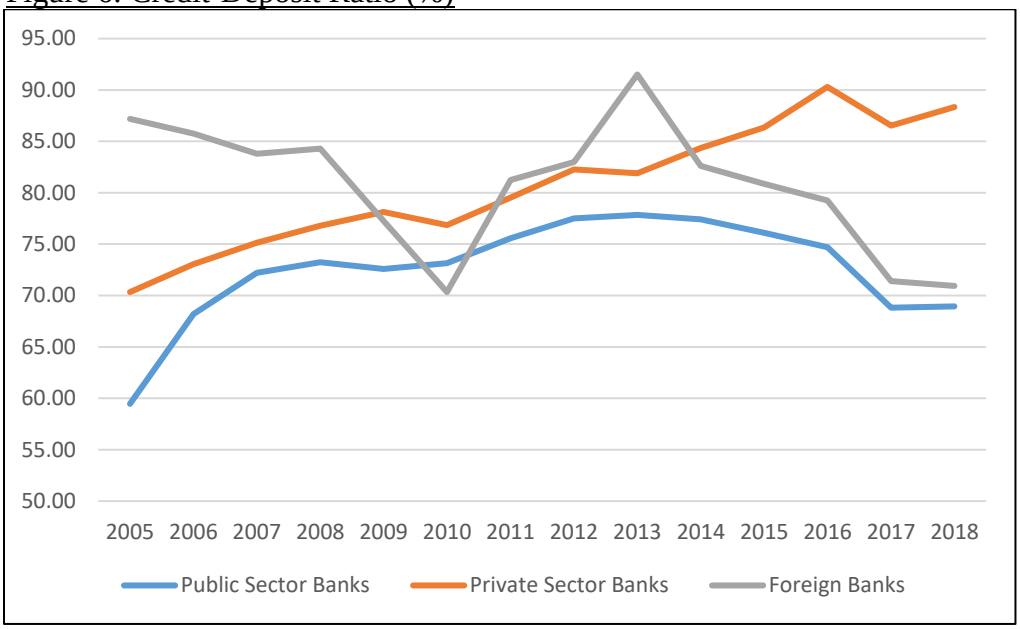
Repo Rate Reduced	9% (August 2008) to 4.75% (August 2009)
Reverse Repo Rate Reduced	6% (August 2008) to 3.25% (April 2009)
Cash Reserve Ratio	9% (August 2008) to 4.75% (April 2009)
Special Repo Window introduced under the liquidity adjustment facility for banks for on-lending to mutual funds	
Special Purpose Vehicle (SPV) instituted	- to provide liquidity support to non-banking financial companies
Special refinance facility introduced	-to provide access to banks without any collateral
NBHCs allowed access to foreign borrowing	-Corporates allowed to buy back foreign currency convertible bonds
Rupee-Dollar swap facility instituted for banks with overseas branches	

Source: Reserve Bank of India

According to Bajpai (2011), "the RBI responded to the emergent situation by facilitating monetary expansion through decreases in the CRR, RR and R-RR rates, and the SLR." The subsequent increase in the Indian bank lending involved funds going to commercial banks and individuals. However, this decision of increasing bank lending was not instituted in the West, where lending stagnated. According to Hanke, this is primarily due to the tightening of bank regulation and supervision (Hanke 2016). India is more like China's case, where high lending rates were also maintained.

As expected, the credit to deposit (CDR)[4] ratio increased for both public and private sector banks in 2008. Bajpai (2011) attributes this increase to the expansion in net RBI credit to the central government in the second-half of 2008. Figure 6 illustrates the trend of CDR for different bank groups in the country. After the 2008 crisis, the CDR continued to increase for the private sector banks, reaching roughly 90% in 2018. On the other hand, the CDR figures for PSBs and foreign banks continue to remain volatile, reducing roughly to 70% in 2018—much lower than the value during the financial crisis. This suggests that unlike other banks, private banks have a solid hold over their current liquidity positions.

Figure 6: Credit-Deposit Ratio (%)



Source: Reserve Bank of India

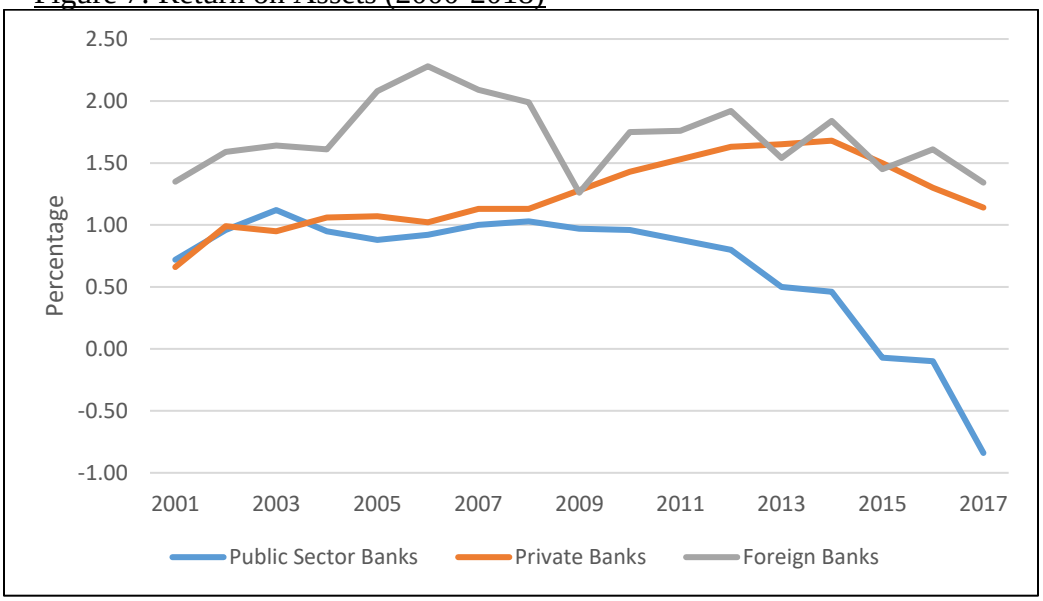
Profitability Measure

While similar trends in profitability measures prevailed in the 1990s for different bank groups, the post-2000 time period provides a different picture. Figures 7 and 8

[4] The CDR is a ratio of bank's total loans to total deposits and is used to assess a bank's liquidity.

illustrate the trend in ROA and Return on Equity (ROE)[5] for the public sector, private sector and foreign banks. While, the private sector banks experienced an increase in the returns after the 2008 financial crisis, reflecting efficient performances, the returns plunged in 2014. Foreign banks followed similar patters but with greater volatility, owing to external events. Overall, the PSBs performed the worst over the past decade with negative ROA and ROE in 2018, a significant difference from the private and foreign bank figures.

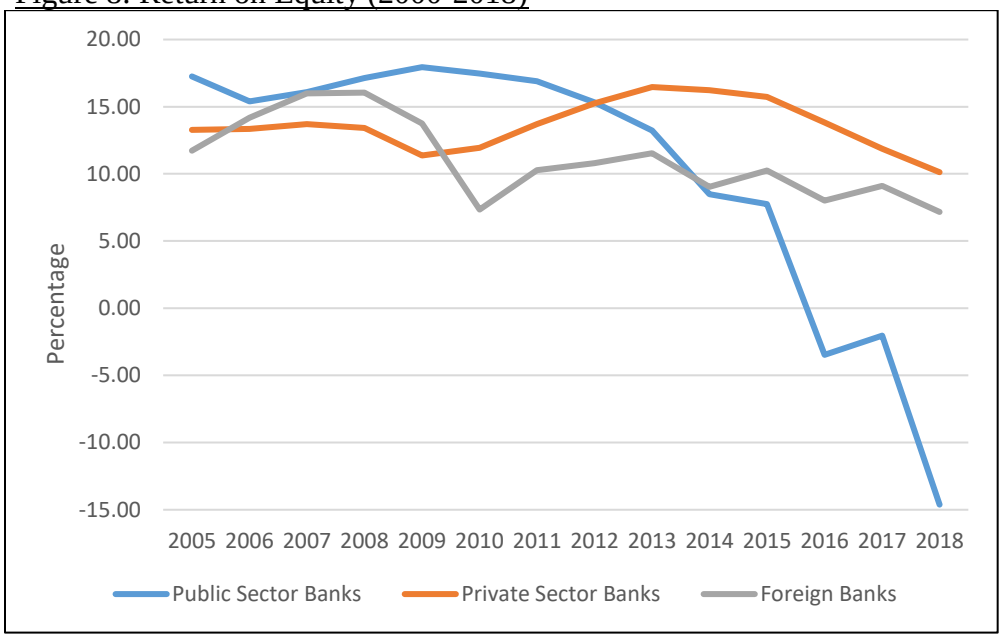
Figure 7: Return on Assets (2000-2018)



Source: Reserve Bank of India Database

[5] The ROE ratio is another measure of profitability of banks. It is a measure of financial performance of a bank. There is a direct relation between the ROA and the ROE.

Figure 8: Return on Equity (2000-2018)

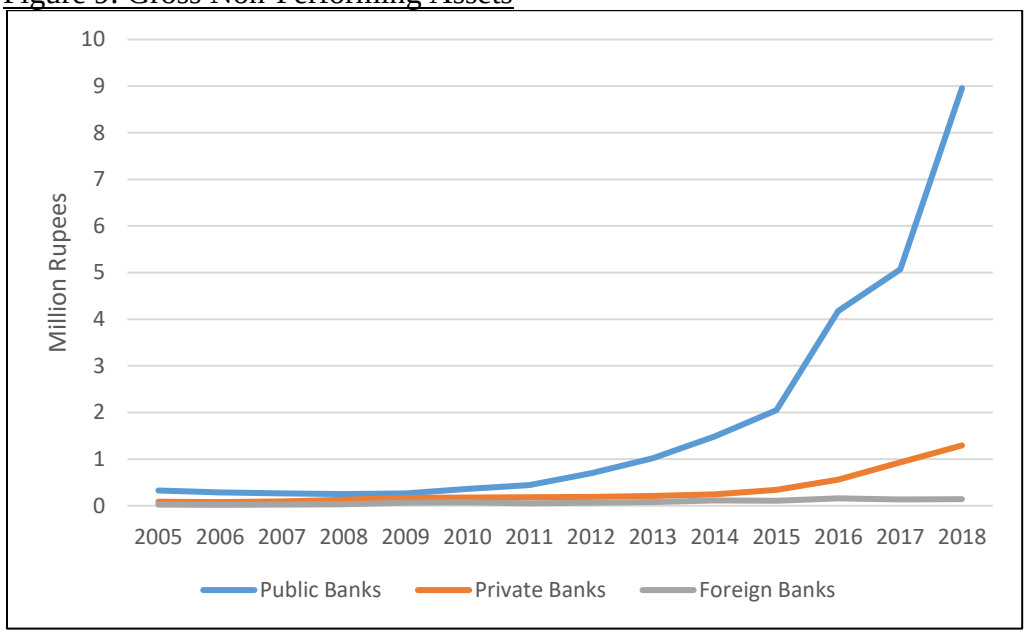


Source: Reserve Bank of India Database

Figure 9 shows the recent trend in the Non-Performing Assets (NPAs)[6] of Indian banks. The NPA of the PSBs is the highest of all brank groups in the country. These bank returns deteriorated sharply in the last few years as NPAs increased. Public banks like the Punjab National bank, Union bank, and Allahabad bank reported significant losses in 2017-18 with NPAs worth 80-120% of their net worth (Merwin 2018). Private Banks, on the other hand, performed consistently, with relatively low NPA and high ROA figures. According to an article in the Business Standard (2014), "Public Sector banks, with a 70% market share, were worst hit…Private Banks, cautious in expanding their balance sheets, fared well."

6 The RBI defines NPAs as loans or advances for which the principal or interest payments remain overdue for 90 days. NPAs are closely related to Non-Performing Loans (NPLs).

Figure 9: Gross Non-Performing Assets



Source: Reserve Bank of India Database

Due to the significant differences in the performance of public and private banks over the past few years, it is crucial to examine the impact of reforms and macroeconomic shocks on these banks separately. The two most recent reforms in India, the announcement of Payment Banks and Demonetization in 2015 and 2016 respectively are focus event dates for this thesis. According to a Business Today article (2015), "Payment Banks will be a new category of banks…the current lot of universal banks can do these transactions too…but now with payment banks, they [commercial banks] are likely to feel threatened." Former Governor of India, Raghuram Rajan, believes that "they [payment banks] could act like feeder banks and make the larger banks more competitive" (Merchant 2015). This serves as a motivation to study the impact of the announcement of payment banks on the banking landscape of the country. Additionally, the Prime Minister's sudden announcement of demonetization created banking havoc in

the country, with the RBI being underprepared to meet the demand of new currency notes. This is reason enough to examine this specific event.

Existing literature provides analyses of the short-run effects of the two reform events. Jain's (2017) study suggests that demonetization affected private and public sector banks differently. Specifically, Jain demonstrates that "the public sector witnessed an immediate positive effect on the returns whereas the private sector recorded a lagged negative impact". However, no long-term analysis has been conducted to examine the full effects of these reforms. The purpose of this thesis is to provide a comprehensive analysis of major events that have impacted the banking industry. While the focus is both on the short-term and long-term effects of payment banks and demonetization on Indian banks, other events have been included for a comprehensive understanding.

Chapter 2: Empirical Study

For this thesis, data have been collected from the Bloomberg Terminal and the Reserve Bank of India database. Two types of empirical studies are conducted to analyze the stock return performance of bank indices, 1) time-series procedure, and 2) event study procedure.

A. Time Series Analysis

Data and Methodology:

As per the efficient market hypothesis, all players in the stock market have equal access to knowledge and therefore the stocks should be priced perfectly, including all known prior information. This perhaps suggests that the stock returns adequately reflect

the impact of reforms and shocks on banks. Thus, stock returns will be used for the time-series analysis.

Variables:

Weekly and monthly periodic return data are collected from 2000 onwards from Bloomberg. Since the purpose of the thesis is to examine the impact of events on different types of banks, separate regressions are run with overall Nifty Bank Index, Public Sector Bank Index and Private Sector Bank index as the dependent variables. Lags of the appropriate Bank Index, Nifty 50 Index, S&P 500 Index, and percentage change in the Rupee/US dollar exchange rate are the independent variables.

The Nifty Bank Index has data ranging from 2000-2019, the Nifty Public Sector Bank has data ranging from 2004-2019, and the Nifty Private Sector Bank Index has data ranging from 2005-2019. Lags are used to determine the extent to which previous returns explain current returns of the bank index. Lags control for inertia in the market in determining the present value of the dependent variable (Wilkins 2017). Returns and percentage changes present non-stationarity in the data. Nifty 50, a market index, covers the biggest companies in the country including major banks. The S&P500 Index is used to incorporate the effects of the U.S market. Finally, the exchange rates variable is the percentage change in the INR-USD exchange rates. It is used to control for the effects of exchange rate changes in making Indian assets more, or less, valuable abroad.

The Akaike Information Criterion (AIC) and the Shwarz Bayesian information criterion (BIC) are the most frequently used approaches in the time-series literature to determine an optimal lag length, with BIC being the more parsimonious approach

(Gonzalo and Pitarakis, 2002). Table 3 shows that the optimal lag length for the dependent variable is estimated using BIC and is found to be 4 for the Nifty Bank Index.

Table 3: Optimal Lag Length Determination

VAR Lag Order Selection Criteria
Endogenous variables: NIFTYBANK
Exogenous variables: C NIFTY SNP500
Date: 02/28/19 Time: 16:48
Sample: 1/01/2000 12/28/2019
Included observations: 988

Lag	LogL	LR	FPE	AIC	SC	HQ
0	2269.310	NA	0.000596	-4.587672	-4.572807*	-4.582019
1	2271.453	4.268733	0.000594	-4.589986	-4.570166	-4.582449*
2	2272.498	2.078913	0.000594	-4.590077	-4.565301	-4.580655
3	2272.733	0.466207	0.000595	-4.588527	-4.558796	-4.577221
4	2274.506	3.522829	0.000594*	-4.590094*	-4.555408	-4.576903
5	2274.670	0.323545	0.000595	-4.588400	-4.548759	-4.573325
6	2274.880	0.417819	0.000596	-4.586802	-4.542206	-4.569843
7	2275.160	0.553028	0.000597	-4.585344	-4.535792	-4.566500
8	2275.393	0.460636	0.000598	-4.583791	-4.529284	-4.563062
9	2275.729	0.665342	0.000599	-4.582448	-4.522987	-4.559835
10	2277.680	3.849340*	0.000598	-4.584372	-4.519955	-4.559875

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Choice of Events:

In addition to demonetization and the announcement of payment banks, it is crucial to study other events that might have affected the banking landscape after 2000. The Bai-Perron procedure allows for the estimation of multiple structural breaks in a data set at the same time (Bai 1997). According to Burdekin and Siklos, multiple breaks might exist in the trends of economic time series (1995). Hence, in order to make comprehensive statistical inferences from a time-series procedure, identification of unknown break points is crucial. The following dates are identified using the Bai-Perron test:

1) Global Financial Crisis (10/24/2008)
2) General Elections (05/16/2009)

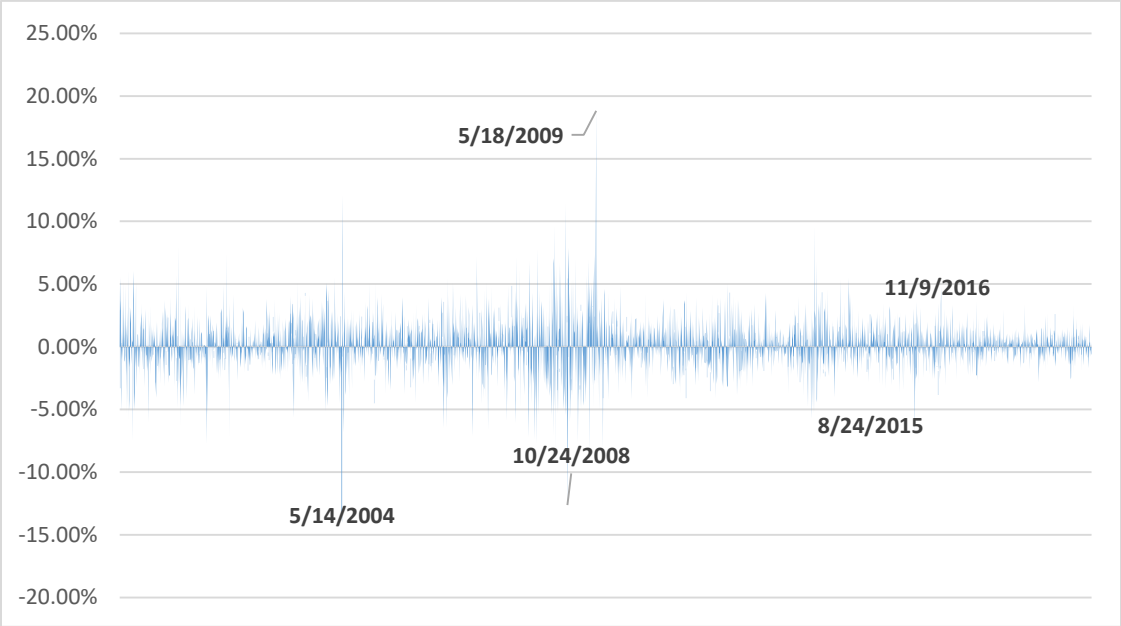
3) Payment Banks Announcement(8/19/2015)

4) China's Economy Slowdown (8/24/2015)

5) Demonetization (11/10/2016)

Figure 10 appears to confirm the impact of the above-mentioned events on the Nifty bank stock returns. Hence, these event dates are used for the time-series analysis.

Figure 11: Periodic Return of NIFTY Bank Index



Global Financial Criteria

It is not a surprise that the Global Financial Crisis of 2008 shook markets across the world. Global stock markets plunged drastically on October 24, 2008 due to the ongoing credit crisis, sluggish profit forecasts, and falling commodity prices in the West (Twin 2008). As such, the daily stock return of the Indian bank index fell by 12.63% on October 24, 2008, its biggest decline in ten years. In response to the crisis, the RBI implemented the monetary easing and liquidity enhancements measures described in the previous section. The RBI reduced the CRR and provided a facility to swap dollars for

Indian banks. Additional measures were implemented to encourage flow of credit to sectors experiencing financial pressure: these include reduction of risk weights on banks' exposure to certain sectors and reduction of lending rates. Meanwhile, the government launched two fiscal packages to boost aggregate demand (Reuters 2009). The sudden dip in the stock market coupled with the aggressive response by the RBI and the Indian government makes it crucial to understand the impact of the crisis on Indian banks. Thus, it seems appropriate to analyze the overall effect of the 2008 financial crisis event on the Indian bank indices.

General Elections

In the current global landscape, political news significantly impacts the performance stock markets. News surrounding election results affect the stock market due to changes in investor sentiment. The 2004 and 2009 general election events are of importance due to the surprising results of the elections. With the Bharatiya Janata Party (BJP) landing in a surprise victory, the Indian stock market plunged and fell by 12.93% on May 14, 2004, the day after the results were announced. However, the stock market had a completely opposite reaction to the 2009 General election results, with the daily Nifty Bank index return increasing by 18% on May 18, 2009. On May 16, 2008 India's ruling party, the Congress, achieved an unexpectedly decisive victory. Defying exit polls and analysts' predictions, the party won more than 70% of the vote with more than 250 seats, while the opposition party, the Bharatiya Janata Party (BJP), took 160 seats (Gentleman 2009). The difference in the effects of these general elections on the stock market is perhaps due to the investor sentiment on the two political parties: The Congress party, led by Dr. Manmohan Singh, an economist, had an edge over the BJP in its ability

to implement economic reforms in the country. While Dr. Singh was perceived as being capable of instituting economic and sound banking reforms, BJP lacked economists who could improve the overall economy of the country (Gentleman 2009). To gauge the impact of general elections on the banking landscape, the 2009 election has been studied because, (1) it had a larger absolute effect than the 2004 election on the Nifty bank index, (2) it is the more recent of the two general elections, and (3) it was significant in the Bai-Perron testing.

Payment Banks Announcement

In recent years, the effects of digitalization have seeped through emerging economies. Consequently, the growth in the mobile subscriber base of rural Indians has allowed for their greater financial inclusion in the economy. For instance, Kenya and Brazil have been successful in transforming the rural population's payment systems with the use of mobile payment networks (Reddy 2018). Hence, India made a proposal in November 2014 to launch payment banks and the RBI approved 11 applicants on 19 August 2015. According to Reddy (2018), payment banks posed a serious challenge to existing commercial banks in the payment services line of business and deposit mobilization because payment banks targeted a large number of unbanked customers who are not covered by traditional banks. Reddy finds that the anticipation of the announcement negatively impacted the stock prices of commercial banks. While literature exists on the immediate impact of this reform on the stock market, there is no analysis of its overall impact on the profitability of the commercial banks.

China's Economy Slowdown

China's substantial slowdown in 2015 was a concern for countries that had strong linkages to it. While India is relatively protected due to its limited direct trade links with China, a reduction in Chinese commodity prices indirectly affected India as it posed a risk to investments made by firms in metals, mining and oil exploration sectors. A study conducted by IMF suggests that global financial markets were vulnerable to China's problems and China's slowdown impacted many developing countries (Mishra 2015). Thus, including this event in the study is appropriate.

Demonetization

In 2016, Prime Minister, Narendra Modi, highlighted that "the magnitude of cash in circulation is directly linked to the level of corruption" (Beyes and Bhattacharya 2017). He then made a surprise announcement on the evening of 8 November 2016 to demonetize the country's two largest-denomination notes, worth 500 and 1000 rupees, to mitigate the problem of corruption in the country. India had experienced demonetization for the first time in 1946 when Rs 1000, 5000, and 10,000 notes were discontinued. Almaqtari et al (2018) assess the determinants of profitability of Indian banks using demonetization as one of the macroeconomic factors in their panel data analysis. The authors show that reform was statistically significant in affecting the profitability of banks.

<u>Theoretical Model:</u>

OLS is used to examine the significance of events and other explanatory variables in explaining a bank index's return performance.

$$Periodic\ Return_i = \beta_0 + \beta_{1j}\ Periodic\ Return\ Lags + \beta_2\ Nifty\ Market\ Index +$$

$$\beta_3\ S\&P500\ Market\ Index + \beta_4\ \%\ Change\ in\ INR/USD\ Rate + \beta_5\ Event\ Dummy_k$$

Where i= Nifty Bank Index, Public Sector Banks Index, Private Sector Bank Index, $j \in [1,4]$ and k= Global Financial Crisis, General Elections, Payment Banks Announcement, China's Economy Slowdown, Demonetization

Results:

Table 4 presents the results of the multiple linear regression model for the weekly series over the 2000-2019 time period for Nifty Bank Index. It suggests that the 1st and 2nd lags of the Nifty Bank Index variable significantly explain the movements in the present value of the Nifty Bank Index, at a 95% confidence level. Additionally, the U.S stock market lag is significant at the 10% level. These results persist upon including the event dummies. While none of the events are significant in the weekly series, China's slowdown event is significant at the 95% level in the monthly series. The coefficient sign is negative suggesting that the effect was slowing the Indian bank performance. This speaks to the potential influence of China over the Indian banks, despite the two countries having only indirect relations and a few significant ties. Additionally, the exchange rate lag variable is statistically significant at the 95% confidence level in both the weekly and monthly series. The coefficient sign is negative suggesting that the weakening of the Indian Rupee lowers bank returns. This could well reflect the selling of Indian bank stocks by foreign investors who own roughly 20% of PSB stocks and at least 49% of private bank stocks, and who would lower dollar valuations of their holdings as the rupee weakens (Reserve Bank of India 2010).

Table 4: Nifty Bank Index Regressions

	WEEKLY		MONTHLY	
	(1)	(2)	(3)	(4)
VARIABLES	Model 1	Model 2	Model 3	Model 4
Constant	0.0041	0.0040	0.0243	0.0247
	[0.0013]	[0.0019]	[0.0067]	[0.0094]
Nifty Bank (-1)	**-0.1093****	**-0.1141****	-0.0689	-0.0883
	[0.0531]	[0.0532]	[0.1286]	[0.1292]
Nifty Bank (-2)	**0.0826*****	**0.0779****	-0.1064	-0.1098
	[0.0318]	[0.0318]	[0.0670]	[0.0673]
Nifty Bank (-3)	-0.0437	-0.0471	0.0052	0.0032
	[0.0316]	[0.0316]	[0.0671]	[0.0674]
Nifty Bank (-4)	0.0499	0.0465	-0.0303	-0.0229
	[0.0314]	[0.0315]	[0.0672]	[0.0681]
Nifty 50 (-1)	0.0797	0.0774	-0.0158	-0.0265
	[0.0751]	[0.0752]	[0.1803]	[0.1808]
S&P500 (-1)	**0.1124***	**0.1133***	0.2162	0.2587
	[0.0607]	[0.0609]	[0.1774]	[0.1857]
Exchange Rate(-1)	**-0.2648****	**-0.2697****	**-0.7153****	**-0.7248****
	[0.1351]	[0.1376]	[0.3494]	[0.3526]
Financial Crisis		0.0098		0.0372
		[0.0071]		[0.0321]
General Elections		0.0003		0.0014
		[0.0029]		[0.0140]
China Slowdown		-0.0131		**-0.0622***
		[0.0086]		[0.0376]
Payment Banks		0.0004		0.0004
		[0.0041]		[0.0189]
Demonetization		-0.0101		-0.0559
		[0.0149]		[0.0657]
Observations	994	994	224	224
R-squared	0.02	0.03	0.04	0.07

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Weekly Periodic Return of Public and Private Banks

VARIABLES	Public Banks (1)	Private Banks (2)
Constant	0.0031	0.0040
	[0.0032]	[0.0031]
Bank Index (-1)	-0.0725	**-0.1686****
	[0.0527]	[0.0752]
Bank Index (-2)	0.0531	**0.1239*****
	[0.0358]	[0.0378]
Bank Index (-3)	-0.0244	-0.0612
	[0.0356]	[0.0372]
Bank Index (-4)	**0.0596***	0.0444
	[0.0357]]	[0.0371]
Nifty 50 (-1)	-0.0123	0.1027
	[0.1049]	[0.1122]
S&P500 (-1)	**0.1656***	**0.2119*****
	[0.0926]	[0.0778]
Exchange Rate(-1)	-0.5741	-0.1718
	[0.2270]	[0.1943]
Financial Crisis	**0.0076*****	**0.0132***
	[0.0025]	[0.0075]
General Elections	-1.03E-06	0.0006
	[0.0042]	[0.0038]
China Slowdown	**-0.0199***	-0.0101
	[0.011]	[0.0089]
Payment Banks	-0.0002	-0.0003
	[0.0050]	[0.0041]
Demonetization	-0.0011	-0.0177
	[0.0183]	[0.0161]
Observations	786	719
R-squared	0.03	0.05

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5 presents results of the weekly periodic returns of private and public banks. Both private and public banks follow the same trend as the overall bank index. The 1st and 2nd lags of the private (public) bank index as well as the S&P500 index are highly significant. The Great Recession significantly affected the returns of public and private banks, with a 99% significance level for public banks and a 90% significance

level for private banks. The crisis event increased private banks' weekly return by 1.32% points. This is likely due to the numerous aggressive stimulus packages implemented by the RBI at the onset of the crisis. Since public banks are subject to more regulations, the stimulus packages had a direct positive impact on these banks, which is more than the implied effect on private banks. This explains the positive sign on the Financial Crisis coefficient. The 2015 Chinese crisis dummy was significant at the 90% confidence level in impacting PSBs periodic returns. The crisis shook foreign investor confidence in Asian markets, thereby negatively affecting Indian banks, despite the country's weak links with China. Foreign Institutional Investors (FII), accounting 20% of the PSBs' shareholding, reduced investments in Indian bank equities by 81% in the 2015 fiscal year (Oberoi 2018).

Since the purpose of this thesis is to examine the overall banking landscape of the country, it is also of interest to analyze bank trends in the years prior to the occurrence of the events. Hence, time-series analysis has been conducted for the sub period 2000-2007, 2007 being the last year of no major event. Regression analysis of specific bank types has been avoided due to the lack of sufficient data for the study. Hence, only the overall Nifty Bank Index is used for the study of trends in the sub-period. Table 6 shows that none of the variables are significant in explaining the movements in the Nifty Bank Index in the sub-period regression. The S&P500 index, while highly significant in the full sample analysis, loses its significance in the early sub-period. This suggests that the effects of the U.S market on the Nifty Bank Index are substantial only in the more liberalized period post 2000. This speaks to the potential interrelatedness of the U.S markets with the

subsequent macroeconomics events in the study. In summary, the explanatory variables chosen for this study are of significance only in the entire sample period.

Table 6: Weekly Periodic Return for Nifty Bank

VARIABLES	(1)
Constant	0.0060
	[0.0022]
Nifty Bank (-1)	-0.0741
	[0.0719]
Nifty Bank (-2)	0.0336
	[0.0502]
Nifty Bank (-3)	0.0077
	[0.0502]
Nifty Bank (-4)	-0.0175
	[0.0491]
Nifty 50 (-1)	0.0661
	[0.0961]
S&P500 (-1)	0.0892
	[0.0996]
Exchange Rate(-1)	-0.2780
	[0.4893]
Observations	412
R-squared	0.01

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In summary, the results of the time series analysis indicate that the announcement of payment banks and demonetization did not have a statistically significant impact on the returns of bank indices. This, however, could be a figment of these events' being near the end of the sample. Since the two reforms happened recently, it might be that there is not enough data to properly assess the full impact. Another possible reason for the lack of long-term significance of the demonetization dummy is the eventual failure of the policy. As per the Reserve Bank of India, "99 percent of the value of the old bills that had been removed from circulation eventually found its way back into the financial system"

(Gentleman 2018). While, the final outcome of the policy was that it did not really change the existing banking landscape of the country, the policy did bring havoc to financial institutes in the short-run:

> "The immediate fallout was chaos, as the country scrambled to cope. There was a rush at banks and ATMs to exchange old notes and withdraw new currency. Queues at banks grew; many people suffered, especially the poor, who had no access to credit cards…" (Krishnan 2018)

Thus, to gauge the immediate effects of these events an event study is conducted focusing on the stock return movements around the specific event dates. An event study aims to examine the impact of specific events on the banks' stock returns (Khotari and Warner 2006).

B. Event Study

Methodology:

Using the same event dates as those tested in the procedure for time series regression, we define each event window as the number of observations before and after the event date and the estimation window is the number of observations before and after the event window. Event window of ±1 and ±2 days have been used for this thesis. Estimation windows of 15, 30 and 45 days are applied to bank stock returns to assess the immediate share price responses. Event studies have been conducted for all events to assess the share price reaction of the overall bank index. However, the event studies of public and private sector banks are limited to the announcements of payment banks and demonetization.

Results:

The tables below show the regression results of the specific Bank Index on its lags and the events. Table 7 (a) shows the results of the Nifty bank index event study with a window of ±1 days and an estimation window of 15, 30 and 45 days respectively. The financial crisis event is statistically significant in all estimation windows, with a 99% confidence level in the 45 days estimation window. The UPA general elections' result is highly significance at the 99% level across all three estimation windows. The Chinese crisis events is significant at the 99% confidence level for the 45 days estimation window. Finally, the demonetization and payment bank announcement events are not significant in any estimation windows.

Table 7(a): Daily Periodic Return for Nifty Bank Index

	Event window ±1; Estimation Window 15	Event window ±1; Estimation Window 30	Event window ±1; Estimation Window 45
Financial Crisis	**-0.079**** [0.0357]	**-0.067**** [0.0268]	**-0.069***** [0.0241]
General Elections	**0.110***** [0.0261]	**0.099***** [0.0202]	**0.092***** [0.0207]
Payment Banks Announcement	-0.003 [0.0140]	-0.009 [0.0115]	-0.009 [0.0089]
China Slowdown	**-0.029**** [0.0164]	**-0.029**** [0.0125]	**-0.030***** [0.0103]
Demonetization Announcement	0.013 [0.0089]	0.011 [0.0073]	0.010 [0.0064]

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7 (b) shows the results for the event study on the Nifty bank index with a nearest event window of ±2 days and an estimation window of 15, 30 and 45 days respectively. The financial crisis, UPA victory and China slowdown events remain statistically significant over all estimation windows. The demonetization event gains

significance at the 98% level in all three estimation windows. However, the payment bank announcement is still not significant in any estimation windows.

Table 7 (b): Daily Periodic Return for Nifty Bank Index

	Event window ±2; Estimation Window 15	Event window ±2; Estimation Window 30	Event window ±2; Estimation Window 45
Financial Crisis	**-0.059*** [0.0299]	**-0.046*** [0.2188]	**-0.046**** [0.0195]
General Elections	**0.070***** [0.0245]	**0.069***** [0.0177]	**0.048**** [0.0183]
Payment Banks Announcement	-0.003 [0.0119]	-0.009 [0.0115]	-0.008 [0.0076]
China Slowdown	**-0.025*** [0.0130]	**-0.027***** [0.0097]	**-0.028***** [0.0078]
Demonetization Announcement	**0.017**** [0.0063]	**0.015**** [0.0062]	**0.015**** [0.0062]

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Tables 8 (a) and (b) present results for daily returns of the Private Sector Bank index with event windows of ±1 and ±2 days respectively. The demonetization event is significant at 90% and 95% level in all estimation windows when the event window is ±2 days. However, it is only significant in the 15 days estimation window when the event window is ±1 day. The payment banks announcement is not significant in any case.

Table 8 (a): Daily Periodic Return of Private Sector Bank Index

	Event window ±1; Estimation Window 15	Event window ±1; Estimation Window 30	Event window ±1; Estimation Window 45
Payment Banks Announcement on 08/19/2015	-0.005 [0.0265]	-0.008 [0.0099]	-0.009 [0.0087]
Demonetization Announcement on 11/08/2016	**0.010*** [0.0061]	0.008 [0.0075]	0.008 [0.0067]

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8 (b): Daily Periodic Return of Private Sector Bank Index

	Event window ±2; Estimation Window 15	Event window ±2; Estimation Window 30	Event window ±2; Estimation Window 45
Payment Banks Announcement on 08/19/2015	-0.006 [0.0122]	-0.009 [0.0083]	-0.019 [0.0136]
Demonetization Announcement on 11/08/2016	**0.014**** [0.0065]	**0.010*** [0.0057]	**0.010*** [0.0052]

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Tables 9 (a) and (b) present the results for the daily returns of the Public Sector Bank Index with event windows of ±1 and ±2 days respectively. The demonetization event is significant at the 99% level over all estimation windows when the event window is ±2 days and significant for the 30 and 45 days estimation windows when the event window is ±1 day. This suggests that demonetization had a more significant impact on PSBs than private banks. Most of the deposits came from low-income households in rural parts of the country. The PSBs, dominating the rural space of India, benefitted the most due to swelling deposits and falling treasury yields (Acharya 2016). The payment banks event remained insignificant for the PSBs.

Table 9 (a): Daily Periodic Return of Public Sector Bank Index

	Event window ±1; Estimation Window 15	Event window ±1; Estimation Window 30	Event window ±1; Estimation Window 45
Payment Banks Announcement on 08/19/2015	-0.021 [0.0235]	-0.019 [0.0171]	-0.019 [0.0144]
Demonetization Announcement on 11/08/2016	0.031 [0.0204]	**0.026*** [0.0141]	**0.025**** [0.0123]

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9 (b): Daily Periodic Return of Public Sector Bank Index

	Event window ±2; Estimation Window 15	Event window ±2; Estimation Window 30	Event window ±2; Estimation Window 45
Payment Banks Announcement on 08/19/2015	0.008 [0.0186]	0.005 [0.0268]	0.007 [0.0454]
Demonetization Announcement on 11/08/2016	**0.040***** [0.0144]	**0.031***** [0.010]	**0.037***** [0.0111]

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

It seems that, while demonetization did not have any long-term significant effects on the banking industry in India, it had a significant short-term effect on the PSBs. The significant positive effect for the PSBs can be attributed to the extended reach of these banks in rural areas of the country. The PSBs have more than twice the number of branches in India as compared to private banks. Schemes like the Pradhan Mantri Jan Dhan Yojna that provide easy access to bank account to many rural allowed for the PSBs to witness high deposits after the announcement of demonetization (Jain 2017).

The payment banks announcement event did not significantly change the existing landscape of Indian banks, perhaps because the "main target for payment banks will be small businesses and low-income households". While provisions of financial services to these target groups does impose competition to the big commercial banks, the scope of competition is limited because financial services to low-income households are a small proportion of services offered by the commercial banks.

Conclusion

The Indian banking landscape experienced significant changes after 2000. While performing similarly before 2000, PSBs and private sector banks demonstrated a change in their relative performance in the early 2000 as seen through the profitability trends for both the sectors. By the late 2000s, the PSBs had negative asset and equity returns which were primarily caused by a high volume of NPAs. The Gross NPA figures for public banks differed by roughly 90% from the private and foreign banks' NPAs in 2018. Therefore, it seemed crucial to estimate the impact of recent reforms and macroeconomic shocks separately for these banks. A time series procedure for 2000-2019 time period did not yield any statistically significant results for the 2015 and 2016 policy moves. However, demonetization and other events except for payment banks were statistically significant in the event study analysis. Demonetization was significant for both private and public banks, but it had a higher impact on the stock returns of PSBs. Since public banks dominate the banking landscape in India, the sensitivity of public banks to reforms is unsurprising.

The heterogeneity analysis on different bank groups suggest that PSBs are both the worst performing banks, and are the most responsive to reforms. Thus, it is necessary for the RBI to institute new reforms that have a lasting and positive impact on these banks. Consequently, the Banks Board Bureau (BBB) has made suggestions to professionalize the boards for PSBs by bringing in experts on risk managements, information technology and human resource management (Economic Times 2019). Furthermore, the BBB and the central government are currently developing an objective framework for performance evaluation which should improve focus on transparency,

accountability and skills. These proposed suggestions aim to provide the PSBs with resources to curb their high rates of loan delinquency, among others. Thus, the institution of new reforms should augment and strengthen the performance of the banking landscape in the country. In order to understand the implications of these new reforms on the banking landscape, further studies can be conducted using findings from this thesis.

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Appendix

Figure A1: Nifty Bank Index Closing Price

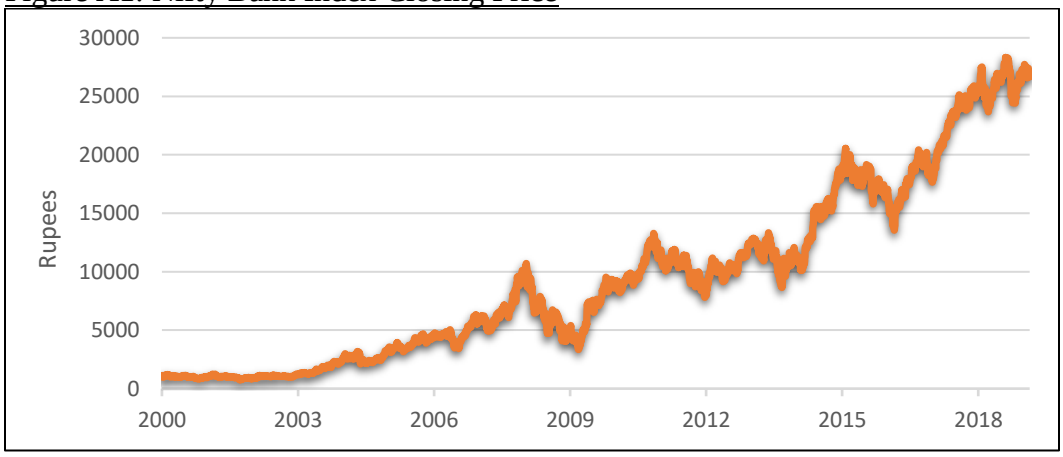

Figure A2: Nifty Public Bank Index Periodic Return

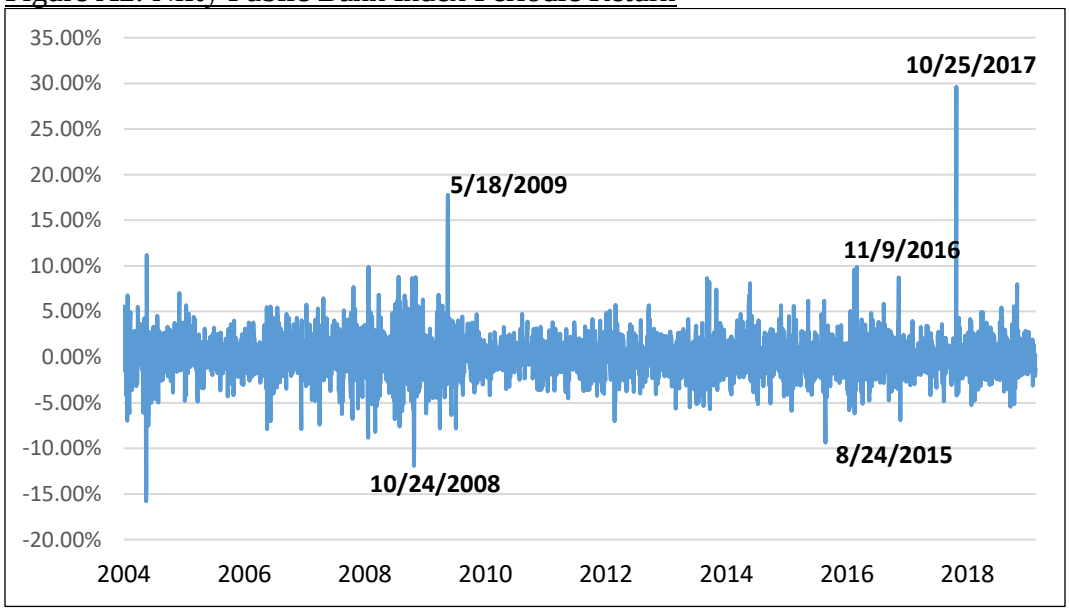

Figure A3: Nifty Public Bank Index Closing Price

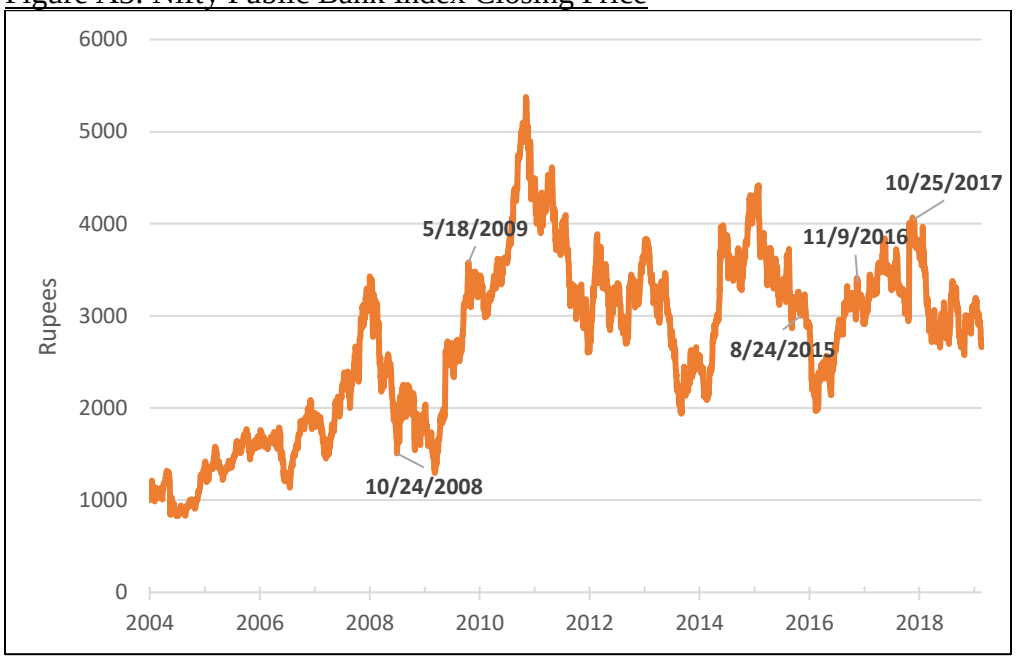

Figure A4: Nifty Private Banks Periodic Return

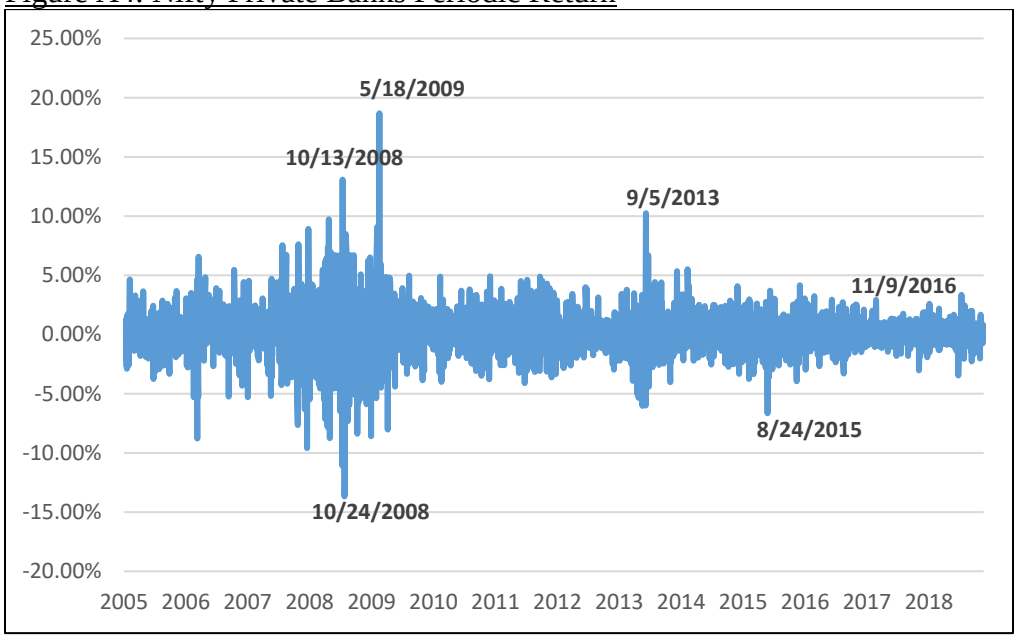

Figure A5: Nifty Private Banks Closing Price

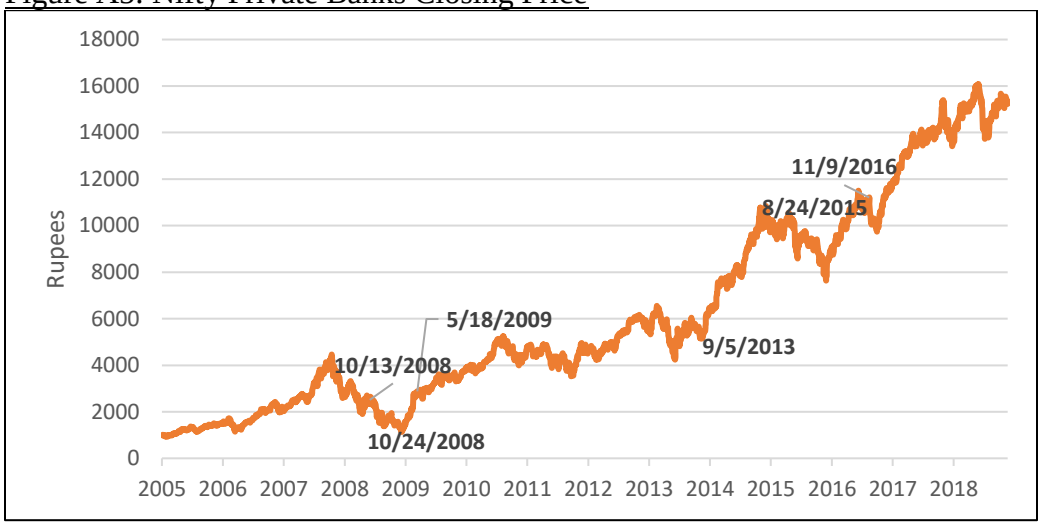

Figure A6: Nifty Bank Index and Nifty 50 Index Periodic Return Comparison

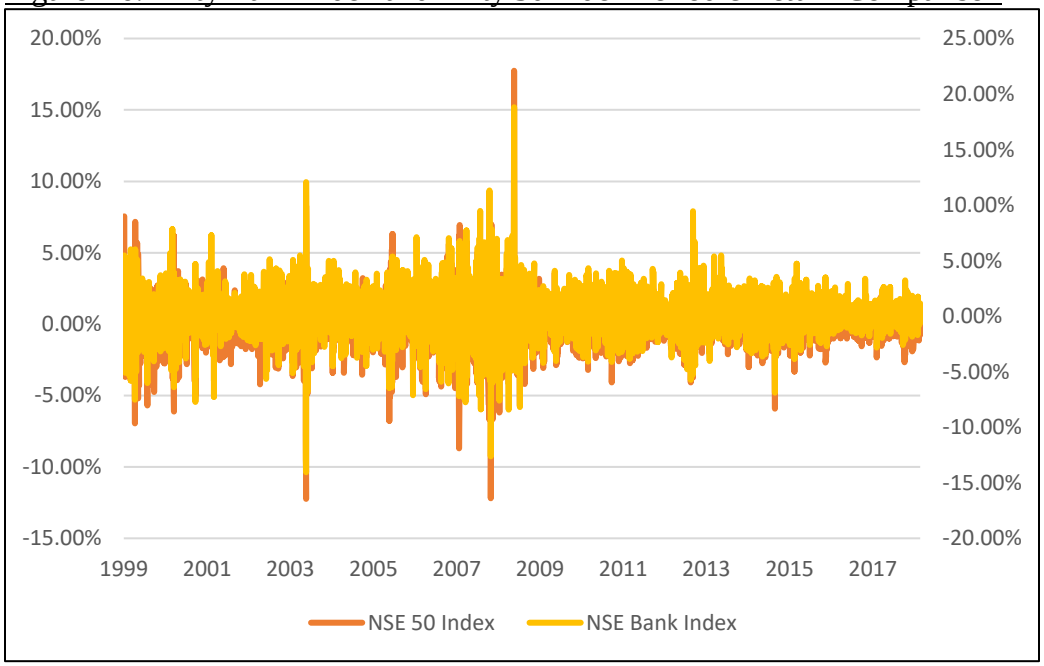

Table A1: Nifty Bank Index Weekly Series with Demonetization Event

Dependent Variable: NIFTYBANK
Method: Least Squares
Date: 03/04/19 Time: 14:00
Sample (adjusted): 2/11/2000 2/22/2019
Included observations: 994 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.004115	0.001348	3.052911	0.0023
NIFTYBANK(-1)	-0.109598	0.053169	-2.061325	0.0395
NIFTYBANK(-2)	0.082141	0.031829	2.580688	0.0100
NIFTYBANK(-3)	-0.043850	0.031614	-1.387050	0.1657
NIFTYBANK(-4)	0.049479	0.031495	1.571009	0.1165
NIFTY50(-1)	0.078362	0.075226	1.041689	0.2978
SNP500(-1)	0.114260	0.060843	1.877949	0.0607
XCHANGERATE(-1)	-0.264882	0.177932	-1.488664	0.1369
DEMONITIZATION	-0.009553	0.014612	-0.653766	0.5134

R-squared	0.024446	Mean dependent var	0.004180
Adjusted R-squared	0.016523	S.D. dependent var	0.041405
S.E. of regression	0.041061	Akaike info criterion	-3.538479
Sum squared resid	1.660755	Schwarz criterion	-3.494097
Log likelihood	1767.624	Hannan-Quinn criter.	-3.521606
F-statistic	3.085361	Durbin-Watson stat	2.017237
Prob(F-statistic)	0.001923		

Table A2: Nifty Bank Index Weekly Series with Payment Banks Event

Dependent Variable: NIFTYBANK
Method: Least Squares
Date: 03/04/19 Time: 14:01
Sample (adjusted): 2/11/2000 2/22/2019
Included observations: 994 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.004452	0.001483	3.001406	0.0028
NIFTYBANK(-1)	-0.109874	0.053173	-2.066336	0.0391
NIFTYBANK(-2)	0.082222	0.031826	2.583490	0.0099
NIFTYBANK(-3)	-0.044082	0.031618	-1.394182	0.1636
NIFTYBANK(-4)	0.049533	0.031492	1.572854	0.1161
NIFTY50(-1)	0.079486	0.075200	1.057002	0.2908
SNP500(-1)	0.113360	0.060794	1.864644	0.0625
XCHANGERATE(-1)	-0.265390	0.177933	-1.491522	0.1361
PAYMENT_BANKS	-0.002236	0.003357	-0.665987	0.5056

R-squared	0.024462	Mean dependent var	0.004180
Adjusted R-squared	0.016539	S.D. dependent var	0.041405
S.E. of regression	0.041061	Akaike info criterion	-3.538496
Sum squared resid	1.660728	Schwarz criterion	-3.494114
Log likelihood	1767.632	Hannan-Quinn criter.	-3.521622
F-statistic	3.087427	Durbin-Watson stat	2.016624
Prob(F-statistic)	0.001911		

Table A3: Nifty Bank Index Monthly Series with Demonetization Event

Dependent Variable: NIFTYBANK
Method: Least Squares
Date: 03/04/19 Time: 14:10
Sample (adjusted): 2000M06 2019M01
Included observations: 224 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.024724	0.006803	3.634216	0.0003
NIFTYBANK(-1)	-0.066562	0.128712	-0.517138	0.6056
NIFTYBANK(-2)	-0.107517	0.067084	-1.602727	0.1105
NIFTYBANK(-3)	0.004172	0.067230	0.062063	0.9506
NIFTYBANK(-4)	-0.028206	0.067353	-0.418778	0.6758
NIFTY50(-1)	-0.023151	0.180676	-0.128134	0.8982
SNP500(-1)	0.223734	0.177783	1.258466	0.2096
XCHANGERATE(-1)	-0.703673	0.349980	-2.010610	0.0456
DEMONETIZATION	-0.053432	0.064254	-0.831570	0.4066

R-squared	0.047753	Mean dependent var	0.019632
Adjusted R-squared	0.012321	S.D. dependent var	0.090651
S.E. of regression	0.090090	Akaike info criterion	-1.936655
Sum squared resid	1.745003	Schwarz criterion	-1.799580
Log likelihood	225.9054	Hannan-Quinn criter.	-1.881325
F-statistic	1.347727	Durbin-Watson stat	1.981427
Prob(F-statistic)	0.221363		

Table A4: Nifty Bank Index Monthly Series with Payment Banks Event

Dependent Variable: NIFTYBANK
Method: Least Squares
Date: 03/04/19 Time: 14:08
Sample (adjusted): 2000M06 2019M01
Included observations: 224 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.027023	0.007487	3.609494	0.0004
NIFTYBANK(-1)	-0.072796	0.128738	-0.565461	0.5723
NIFTYBANK(-2)	-0.108991	0.067125	-1.623688	0.1059
NIFTYBANK(-3)	0.002511	0.067279	0.037324	0.9703
NIFTYBANK(-4)	-0.033314	0.067381	-0.494409	0.6215
NIFTY50(-1)	-0.017628	0.180445	-0.097692	0.9223
SNP500(-1)	0.223231	0.177711	1.256150	0.2104
XCHANGERATE(-1)	-0.721918	0.349735	-2.064186	0.0402
PAYMENT_BANKS	-0.013473	0.015508	-0.868736	0.3860

R-squared	0.048032	Mean dependent var	0.019632
Adjusted R-squared	0.012610	S.D. dependent var	0.090651
S.E. of regression	0.090077	Akaike info criterion	-1.936948
Sum squared resid	1.744492	Schwarz criterion	-1.799873
Log likelihood	225.9382	Hannan-Quinn criter.	-1.881618
F-statistic	1.355996	Durbin-Watson stat	1.983638
Prob(F-statistic)	0.217492		