

# Bank “Resilience”: The Effects of Demonetization & Covid-19 on Banks’ Non-Performing Assets in India

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## Abstract

On 8<sup>th</sup> November 2016 and 18<sup>th</sup> March 2020, the Government of India made two surprise announcements. The former came to be known as Demonetization as the government had decided that currencies of denominations 500 and 1000 would no longer be legal tender. The latter was the announcement of the COVID-19 lockdown. These events serve as liquidity and supply shocks to the economy, respectively. These shocks can potentially affect the banking system’s health, which can be measured through Non-Performing Assets (NPAs). I find that both events led to a rise in NPAs for Private Banks; Demonetization led to a rise in NPAs for Public Banks and COVID-19 to a rise in NPAs for Small Finance Banks. The main channels are through the most vulnerable sections of society, which suggests a potential drawback of financial inclusion. A number of policy changes took place at the time, making it difficult to disentangle the effects of the events.

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# I Introduction

On 8<sup>th</sup> November 2016 and 18<sup>th</sup> March 2020, in a televised broadcast, the government of India made an announcement that served as two shocks that allowed us to conduct quasi-experiments. Since the announcements were unanticipated, they serve as shocks; the former a liquidity shock and the latter a supply shock. The two events came to be known as Demonetization and the COVID-19 pandemic.

Demonetization was when the government of India announced that the currencies of denominations 500 and 1000 would cease to be legal tender, and they introduced new 500 and 2000 Rs notes. Since these were the largest denominations at the time, they accounted for 86% of the currency in circulation (Lahiri, 2020). Figure 1 displays the shock to currency in circulation. During the pandemic, there was an initial lockdown followed by a gradual ease of restrictions and opening back up of the economy. During the lockdown, many firms had shut down operations temporarily and some permanently.

Through this paper, I want to answer whether Demonetization and COVID-19 led to a rise in banks' Non-Performing Assets<sup>1</sup>, (NPAs) and if so, through which channels is this rise driven. To answer these questions, I will employ event studies to study the effects of the events on NPAs over time.

Banks serve an essential function in the economy as intermediaries of funds by accepting deposits and handing out loans. They are an integral part of the financial system and their health is of importance to regulators. As seen during the Great Recession in 2008, financial

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<sup>1</sup>A loan or advance where the interest and/or installment of principal remain overdue for a period of more than 90 days (RBI, 2001).

crises can have spillover effects and impose negative externalities on the whole economy (Acharya et al., 2017). NPAs can serve as an indicator of the banking system's health (Agarwala & Agarwala, 2019). If a bank suffers from a high level of NPAs, its profitability worsens, which could lead to the bank's failure, and if that bank is a key player in the financial system, it could lead to contagion and a financial crisis.

In order to check the channels, I divide the economy by Sectors and Priority/Non-Priority Sectors. The sectoral division divides the economy into Agriculture, Industry, Services, Retail and Other Sectors. Priority Sectors, on the other hand, are those sectors that the Government of India and Reserve Bank of India (RBI) consider important for the developing the country's basic needs. Under the Priority/Non-Priority division, the economy is split into eight priority sectors and one non-priority sector. The eight priority sectors are Agriculture, Medium & Small Enterprises (MSEs), Export Credit, Education, Housing, Social Infrastructure, Renewable Energy and Others (RBI, 2020). Within each priority sector, there are conditions that need to be met for an enterprise to be considered a priority (RBI, 2020). RBI sets priority sector lending targets for banks to meet. Failure to meet the targets results in banks having to deposit the difference into the National Bank for Agriculture and Rural Development's Rural Infrastructure Development Fund (NABRAD, 2022). Due to data constraints in this paper, I will only focus on MSEs and group all other priority sectors into one.

To motivate how these shocks can affect banks, I hypothesize that after Demonetization, consumers faced a liquidity crunch and reduced their demand, which affected the profits of firms that deal the most with cash transactions and so these firms would default on

their installment payments of their loans leading to a rise in banks' NPAs. After the COVID lockdown, firms shut down temporarily and consumers significantly reduced their demand, firms' profits would again be affected, and they would struggle to pay their loan installments, leading to a rise in NPAs. These potential chains suggest that NPAs during Demonetization would be driven by the Agriculture and Priority sector. While during COVID, the rise in NPAs would be driven by the services and retail sector.

The structure of the paper will be as follows: First, discuss the relevant literature in the area. Second, I will discuss my data sources and provide a data description. Third, I will introduce my estimation strategy. Fourth, I will provide my estimation results and robustness checks. Fifth, I will discuss the results and the policy implications. Finally, I will provide a conclusion.

## II Literature Review

There is abundant literature on the effect of Demonetization on the Indian economy (Shirley, 2017), its impact on public and market sentiment (Sinha, Sharma & Sheorey, 2022) and whether it achieved its set objectives (Lahiri, 2020).

Shirley (2017) argues that a lack of currencies jams consumption, production, employment and investment. She hypothesises that as the economy faces a liquidity crunch, consumption reduces, leading to reduced production, then employment would reduce, leading to reduced growth and finally, reduced tax revenue. This would result in the Government of India failing to achieve its desired outcome of increased tax revenue post-Demonetization. The

chain proposed by Shirley (2017) can be adapted to this paper, as lower production and employment would lead to firms and individuals defaulting on their loans.

Chodorow-Reich et al. (2020) propose and test the prediction of their model of Demonetization. They use daily district-level currency chest data to create regional variations to test their model. One interesting result from their paper is that districts that were more adversely affected by Demonetization were quicker in their uptake of alternative payment methods such as e-wallets. This suggests that pre-Demonetization, India was more cash-dependent and susceptible to a liquidity shock.

Studies regarding the effects of COVID-19 on the Indian economy have been conducted (Dev & Senagupta, 2020; Das & Patanik, 2020; Sahoo & Ashwani, 2020). However these studies are short-term in nature as long-term data on the effects of COVID-19 is only now being released. Dev & Senagupta (2020) use pre-Covid data to predict the effects of COVID-19 on the economy. They acknowledge the possibility of a rise in NPAs, especially in the banking sector, and recommend that the RBI should adequately recapitalise the banks. Sahoo & Ashwani (2020) predict the impact of the pandemic on growth, manufacturing, trade and Micro, Small & Medium Enterprises. They conclude that Micro, Small & Medium Enterprises will be severely affected. Since they are a potential channel in this paper, Sahoo & Ashwani's (2020) prediction would imply that banks' NPAs would rise from MSEs.

To the best of my knowledge, empirical literature on Demonetization's impact on banks' NPAs is sparse. Meher (2017) and Singh & Tyagi (2017) propose hypotheses on how Demonetization could have affected banks' NPAs. Tyagi & Singh (2017) hypothesise

that liquidity problems caused by Demonetization would worsen banks' NPAs as small and medium enterprises would face a loan repayment crisis. Meher (2017) considers the potential positive and negative effects on banks' NPAs. On the positive aspect, they argue that due to excess deposits, the banks would have an opportunity to set off the bad loans taken out by that depositor. In contrast, they also argue that after the increase in deposits, future NPAs would increase. As banks search for new clientele, they would do so non-optimally, as bank managers would have time pressure to get idle funds to work. This non-optimal assignment would lead to a rise in NPAs in the future. Both papers provide summary statistics to facilitate their argument but do not conduct causal analysis.

There is extensive literature studying NPAs in the context of public versus private banks (Rajaraman & Vasishtha, 2002), moral hazard (Zhang et al., 2016), the profitability of banks (Kiran & Jones, 2016) and the determinants of NPAs (Messai & Jouini, 2013; Makri, Tsagkanos & Bellas, 2014; Saba, Kousser & Azeem, 2012). Messai & Jouini (2013) use a sample of 85 European banks from 2000 to 2004, while Saba, Kousser & Azeem (2012) consider 85 US banks from 1985 to 2010 to detect the macroeconomic determinants of NPAs. Makri, Tsagkanos & Bellas (2014) identify the factors affecting NPAs in the Eurozone. Public Sector banks, in particular, have been of special interest in India due to Government control (Neelakantan & Lahiri, 2023) and historically poor performance in terms of NPAs (Rajaraman & Vaishtha, 2002). Neelakanat & Lahiri (2023) use data on bank transactions from 1998-2018 to study loan allocation and asset quality of Public Sector banks. They find that the NPA problem for Public banks is concentrated due to misallocation in sectors heavily linked to infrastructure.

### **III Data Sources & Description**

The data was collected from the RBI's Database on the Indian Economy (DBIE), Razorpays' Github and Nishusharma 1608's Github. From DBIE, I use the Variables to be Published Bank and Bank Group-wise (For Public Access). From Razorpays' Github, I use bank branch locations and from Nishusharma1608's Github, I use census population data.

There are four types of Banks in the data: Foreign Banks, Private Banks, Public Banks and Small Finance Banks. Foreign banks are the banks that have their headquarters in a different country. Private banks are privately owned banks with their headquarters in India. Public Banks are the banks in which the Government of India has majority ownership (51% or higher). Small Finance Banks are commercial banks set up with the primary objective of furthering financial inclusion. They can achieve this by providing essential banking functions to unserved and underserved sections of society and a supply of credit to small business units, small & marginal farmers, micro and small industries and other unorganised sector entities through high technology and low-cost operations (RBI, 2017). The first Small Finance Bank was set up in April 2016, so they are not present in the Demonetization case.

The frequency of bank variables is quarterly. Branch locations are as of 3<sup>rd</sup> November 2016 for the Demonetization case and 13<sup>th</sup> March 2020 for the COVID case, and the Census data is from the 2011 survey. The period of study for the Demonetization case is from 30th June 2012 (Q2 2012) to 31st December 2019 (Q4 2019), while that of the COVID

sample is from 31st December 2017 (Q4 2017) to 30th September 2023 (Q3 2023).

To account for Mergers, Exits and Entries, I combined the banks that had merged into one and removed the redundant banks. For example, if the State Bank of India (SBI) and State Bank of Bikaner & Jaipur merged in Q2 2015, then I would add all the bank variables to SBI for all quarters and remove State Bank of Bikaner & Jaipur <sup>2</sup>. I employed an 11-7 quarter rule, wherein if a bank had missing data eleven quarters prior and seven quarters after the event, I would remove the bank from the dataset. I use this rule because around 11 quarters prior to Demonetization, RBI started recording data properly, and 2016Q2 was when the first Small Finance banks showed up. To conduct robustness checks, I abandon the 11-7 rule and use two datasets, one where I do not remove any observations (The Liberal Case) and the other where I remove all observations with missing data in the period of study (The Strict Case).

After cleaning the data, I am left with 38 Foreign Banks, 19 Private Banks, 21 Public Banks and no Small Finance Banks in the Demonetization sample. In the COVID-19 sample, I have 36 Foreign Banks, 20 Private Banks, 12 Public Banks and 9 Small Finance Banks.

From the DBIE dataset, I use Major Balance Sheet Items, Asset Quality, Profitability, Major Sectoral Credit, Priority/Non-Priority Credit break-up and Infrastructure Financing Items. All gross non-performing assets (GNPA) measures are taken as a percent of total assets to account for differences in GNPAAs due to size. I use GNPA instead of net non-performing assets (NNPA) since I do not want the effects of an increase in write-offs

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<sup>2</sup>The complete list of all mergers, exits and entries is in the appendix.

to affect my non-performing asset measure. Moreover, the data on NNPAAs is limited compared to GNPAs. Major Sectoral Credit and Priority/Non-Priority Credit break-up include GNPAs from specific sectors and different priority sectors for each bank.

To control for sector credit, priority lending and infrastructure financing, I take the ratio of credit deployed to a particular segment to the total credit deployed. Then, I compute the median for each quarter. If a bank's ratio is more than the median for that quarter, then the bank is considered prevalent in that segment.

To construct regional dummies, I use branch location and state population data. First, I construct a population per branch measure, which is the population of a state divided by the number of branches a bank has in that state. Next, I compare each bank's population per branch with the median for that state. If the bank has a population per branch lower than the median for that state, then the bank is considered prevalent in that state.

## IV Estimation Strategy

To see the effects of Demonetization and COVID-19 on non-performing assets (NPAs) of different bank groups, I conducted an event study. I used 2016 quarter four as the event quarter and 2020 quarter two for COVID-19. The baseline for each event study is set at -1 quarter from the event.

The main event study regression is given by:

$$Y_{i,t} = \alpha + \sum_j \beta_j D_{i,j} + \sum_k \beta_k D_{i,k} + \delta X_{i,t} + \mathbf{S}'_{i,t} \Psi + \mathbf{P}'_{i,t} \Theta + \mathbf{I}'_{i,t} \Lambda + \mathbf{R}'_i \Gamma + \epsilon_{i,t} \quad (1)$$

where  $Y_{i,t}$  is GNPA as percent of total assets for each bank  $i$  at each quarter  $t$ , all  $D_{i,j}$  are the series of leads, all  $D_{i,k}$  are lags,  $X_{i,t}$  is the total liabilities for bank  $i$  at quarter  $t$  as controls for size,  $\mathbf{S}_{i,t}$  are sectoral controls (5 dummies),  $\mathbf{P}_{i,t}$  are priority sector controls (3 dummies),  $\mathbf{I}_{i,t}$  are infrastructure financing controls (5 dummies) and  $\mathbf{R}_{i,t}$  are regional controls (35 dummies)<sup>3</sup>. For the demonetization sample, there are 17 leads (-2 to -18) and 13 lags (0 to 12), while for the COVID-19 sample, there are 13 leads (-2 to -14) and 14 lags (0 to 13).

To analyse the channel of the rise in NPAs, I also conducted event studies with NPAs from different sectors and different priority sectors as the independent variable with size, infrastructure financing controls, regional controls and sectoral/priority controls depending on the dependent variable. The regression equation in these cases is given by:

$$Y_{i,t} = \alpha + \sum_j \beta_j D_{i,j} + \sum_k \beta_k D_{i,k} + \delta X_{i,t} + \mathbf{I}'_{i,t} \Lambda + \mathbf{R}'_{i,t} \Gamma + \mathbf{A}'_{i,t} \Xi + \epsilon_{i,t} \quad (2)$$

where now,  $Y_{i,t}$  is the GNPA percent from the segment where  $\mathbf{A}_{i,t}$  is either sectoral or priority sector controls depending on the dependent variable.

## V Results & Robustness

The results and robustness section is split into three parts. I will first discuss the results for Demonetization, then COVID-19 and finally I will present the robustness checks.

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<sup>3</sup>For complete list of dummies check appendix

## I Demonetization

Figures 2 and 3 provide the estimation results for the Demonetization sample. The baseline values of GNPA percent are 2.33% for Foreign Banks, 2.16% for Private Banks and 7.61% for Public Banks (Author's Calculations). From Figure 2, we can see that Foreign Banks were unaffected relative to the baseline. From Figure 3, it is evident that both private and public banks experienced an increase in GNPA percent after Demonetization. In the case of private banks, this increase of about 1% of total assets relative to the baseline seems to be persistent. Public banks suffer from pre-trends because of the RBI's decision to do away with regulatory forbearance regarding asset classification on restructuring of loans and advances (Patel, 2017) in April 2015. We cannot conclude that Demonetization caused the NPAs of Public Banks to rise. However, it could be the case that the event made the situation worse.

Next, we can look at the Priority/Non-Priority Sector break-up from Figures 4 to 9. Figures 4,6 and 8 for foreign banks again show no change relative to the baseline. From figures 5 and 7, we can see the same persistence for Private Banks. In Figure 7, the increase in GNPA percent from MSEs seems to be rising persistently post-Demonetization. Public banks again suffer from pre-trends, which makes causal inference difficult.

Finally, we can look at the Sectoral Channels in Tables 1 to 3; each table provides the coefficients for the first four quarters after the event<sup>4</sup>. Foreign Banks again see no change relative to the baseline. For Private banks, the Agricultural and Services Sectors

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<sup>4</sup>For complete event study graphs, see Appendix

see a persistent increase in GNPA percent of 0.09% and 0.14%, respectively, relative to the baseline. The NPAs from the Retail sector experienced an immediate increase of 0.03% relative to the baseline in quarter 2 of 2017, followed by a return to the baseline. The Industrial Sector drives the increase in GNPA for Public Banks. However, they still suffer from pre-trends.

## II COVID-19

Figures 10 and 11 provide the estimation results for the COVID-19 sample. The baseline values of GNPA percent are 1.76% for Foreign Banks, 3.37% for Private Banks, 7.52% for Public Banks and 1.15% for Small Finance Banks (Author's Calculations). Two quarters after the event, all banks experienced either no change or a reduction in GNPA percent relative to the baseline. This is due to RBI's policy change regarding asset classification during the COVID-19 moratorium period, from March 1<sup>st</sup> 2020 to August 31<sup>st</sup> 2020 (RBI, 2021). Foreign Banks' NPAs are unaffected by COVID-19. Small Finance Banks experience a significant and persistent increase in GNPA percent of 5%. Private Banks experience an increase in GNPA percent of 0.5% after the moratorium period and return to baseline a quarter later. Public Banks experience a persistent decline in their GNPA percent because of a series of mergers that took place in the Public Banking Sector<sup>5</sup>. So, we cannot attribute the decline in their GNPA ratio to COVID-19 but instead to the mergers.

Figures 12 to 17 show the Priority/Non-Priority breakdown. Foreign banks again show

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<sup>5</sup>See Appendix

no change in figures 12, 14 and 16. For Small Finance Banks, MSEs and Other Priority Sector drive the increase in GNPA percent. The one quarter increase for Private Banks is driven by MSEs while the persistent decline the GNPA ratio for Public Banks is driven by the Non-Priority Sector.

Looking at the Sectoral Channel in tables 4 to 7, we can see that Foreign Banks again are unaffected across all sectors. For Small Finance Banks, the Agricultural sector is the main driver for the persistent increase in their GNPA percent. The Industrial and Services sectors also contributed to the increase. The decrease in GNPA percent during the first two quarters is clearly shown across all sectors for Private and Public banks. Post-moratorium, Private banks experience an increase in GNPA percent from the Retail sector. Meanwhile, the Industrial sector is the main driver for the reduction in GNPA percent for Public banks.

### III Robustness

To ensure the results are robust, I abandon the 11-7 rule and create two different datasets with different data cleaning rules; in both cases, entries, exits and mergers are accounted for. The first is a liberal approach; under this approach, I do not remove any banks for missing data. The second is a strict approach; under this approach, I remove all banks with missing data.

In the Demonetization case, under the liberal approach, there are 50 Foreign Banks, 21 Private Banks and 21 Public Banks, while under the strict approach, there are 34 Foreign Banks, 17 Private Banks and 19 Public Banks.

In the COVID-19 case, under the liberal approach, there are 48 Foreign Banks, 20 Private Banks, 14 Public Banks and 12 Small Finance Banks, while under the strict approach, there are 31 Foreign Banks, 16 Private Banks, 12 Public Banks and 6 Small Finance Banks.

Figures 18 to 25 provide the robustness checks for the main results<sup>6</sup>. Figures 18 to 21 show the estimation results from the liberal and strict samples for the Demonetization case. In both cases, we can see that our results from earlier are similar. Figures 22 to 25 show the robustness results for the COVID-19 case. In both the liberal and strict cases the results are similar to the ones obtained earlier. Therefore, we can conclude that the results obtained earlier are robust.

## VI Discussion

The Discussion section is split into four subsections, as I will discuss each bank type separately.

### I Foreign Banks

Throughout the results section, Foreign Banks are unaffected by both events and across all sectors. This is due to two main reasons: the prevalence of Foreign Banks and their customer base. Foreign Banks are not as prevalent in the country; on 3<sup>rd</sup> November 2016, Foreign banks had an average of only 9.25 branches, while Private banks had an average of 1534.125 branches and Public banks had an average of 4191.381 branches (Author's

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<sup>6</sup>For robustness checks on other results, check Appendix

Calculations). On 13<sup>th</sup> March 2020, Foreign Banks had an average of 4.069 branches, Private banks had an average of 1654.782 branches, Public banks had an average of 6321.083 branches and Small Finance Banks had an average of 363.502 branches (Author's Calculations). Due to their lack of presence in the country, they would be less susceptible to shocks experienced in the country. Moreover, the expected customer base of Foreign banks is foreigners in India, Non-Resident Indians, Rich households in major cities, Multinational Corporations and Large firms. These sections of the population are among the least vulnerable, so they would be the least affected by shocks and are the least likely to default on their loans.

## II Private Banks

Private Banks post-Demonetization experience a persistent increase in GNPA percent, which appears to approach a new steady state. This could be a consequence of financial inclusion; after Demonetization, marginalised sections were forced to open bank accounts and deposit their cash in the bank. This gave them access to credit, which they acquired and some defaulted on. Some evidence pointing towards this is the rise in GNPA percent for private banks being driven by MSEs and the Agricultural Sector and a rise in the amount in farmers' savings accounts post-Demonetization, as seen in Figure 26. This would also explain why Public Banks did not experience an increase in GNPA percent from the Agricultural Sector, as one of the objectives of Public Banks is to promote financial inclusion in the country.

Post-Demonetization, we see the expected rise and then return to the baseline from the

Retail Sector. The Retail Sector relates to the sale of goods and services directly to the consumer; in India, pre-Demonetization, these transactions were conducted using currency. Hence, when faced with a liquidity crunch, consumers would reduce their demand for retail goods, leading to losses for retail firms and a rise in NPAs from them. However, as currency returns to the system, consumers return to their usual consumption habits, firms' profits return to the norm and NPAs from the sector return to baseline.

The Service Sector experiences a lagged effect post-Demonetization which is puzzling. The effects of Demonetization are expected to be immediate and short-lived. It could be the case that Demonetization caused a change in the trend of NPAs from the Service Sector; however, this needs further investigation.

During the moratorium period (from March 1<sup>st</sup> 2020 to August 31<sup>st</sup> 2020), the RBI had enforced, as a response to COVID-19, a change in asset classification. This effectively meant that the “90-day” norm for the classification of NPAs had been abandoned (RBI, 2021), and as a result, the banks were not recording the NPAs during this period. This explains the initial decline and lagged effect on banks' NPAs. Due to this change in classification, the true effect of COVID-19 on NPAs is masked; however, it is expected that COVID-19 would have led to an immediate and larger increase in NPAs for all bank types. For Private banks, we can expect it to look like an immediate and large spike followed by a gradual return to the baseline. We observe this return to the baseline in our results.

The rise in GNPA percent for Private banks post-COVID is driven primarily by the Retail Sector. This is to be expected as customers were reluctant to visit stores in person,

so the Retail Sector was one of the most affected sectors. Within the Priority Sector, Private banks' increase in GNPA percent is driven by MSEs as these are more vulnerable than the average firm and so would have taken a longer period to recover.

### III Public Banks

In response to the 2008 financial crisis, RBI introduced forbearance on asset classification on restructuring of loans and advances. This meant that certain borrowers retained their standard classification even though their payments were overdue by 90 days or more (Chari, Jain & Kulkarni, 2019). In April 2015, RBI decided to abandon forbearance on asset classification on restructuring of loans and advances (Patel, 2017). This meant that banks now had to record the overdue loans from those borrowers as NPAs too. According to the data, the withdrawal of forbearance only seems to have affected Public Banks. This suggests that Private Banks were either unable or unwilling to use the forbearance. This explains the pre-trends we observe for Public Banks in the Demonetization sample.

Given this reason for the pre-trends, it is reasonable to assume that the effects of a change in asset classification should not last for more than four quarters. Under that assumption, the effects of the asset classification change ended by April 2016 (2016 Q2). Hence, we can conclude that the rise in GNPA percent seen post-Demonetization was caused by Demonetization.

Post-COVID, Public Banks experienced a persistent decline in their GNPA percent. This was a result of improved efficiency of Public Banks after RBI enforced a series of mergers between Public banks in April 2020. However, it is not likely that the immediate

decline seen post-COVID was due to the mergers. I would expect the effects of the mergers to take effect a few quarters after the merger. The initial decline could be due to the abandonment of the “90-day” norm, or due to not all of the NPAs being accounted for, or a combination of the two.

Post-Demonetization the Industrial Sector was the main driver of the increase in GNPA percent for the Public banks. In contrast, post-COVID, the Industrial Sector is the primary driver of the decrease in GNPA percent. This contrast suggests that after the mergers, the Public banks improved efficiency in this sector in particular. This could be due to improved screening of borrowers from that sector.

## IV Small Finance Banks

Small Finance Banks experience the largest increase in GNPA percent after the moratorium period. This is because these banks were set up to promote financial inclusion and to serve the unserved and underserved. This would result in their borrowers belonging to the vulnerable sections of the population and the most susceptible to negative income shocks. Further evidence points towards this conclusion such as, the Agricultural Sector, MSEs and other priority sectors being the largest contributors to their increased GNPA percent.

Small Finance Banks also experienced increased GNPA percent from the Services Sector. This could result from a poor screening process as these banks focus primarily on the Agricultural Sector and are relatively new and inexperienced.

The existence of Small Finance banks seems to align with the reduction in NPAs from Public banks. This suggests a shift in RBI’s method of achieving financial inclusion as

Small Finance banks seem to be replacing Public banks in the role. This takes the risks away from Public banks, which are key players in the banking sector, and places the risk in smaller, less integrated banks. This overall improves the health of the banking sector. However, this also shows a cost associated with financial inclusion. Since Small Finance Banks serve the most vulnerable section of society, they are the most susceptible to failure due to shocks to the economy.

## VII Conclusion

Demonetization and COVID-19 serve as liquidity and supply shocks to the system. With 86% of the currency in circulation (Lahiri, 2020) being declared no longer legal tender and widespread pandemic restrictions being placed, effectively shutting down most of the economy temporarily. These events allow us to study the effects of such shocks on banks' NPAs and through which channels. Policymakers and regulators can use these results when making decisions surrounding monetary policy, financial inclusion and the sectors to look for during liquidity and exogenous supply shocks.

Quarterly bank-level data from RBI's DBIE allows us to examine the effects of these events on NPAs for different banks. Event studies allow us examine the effects over time and see if there is any persistence as a result of the shocks.

Foreign banks are unaffected by the shocks due to them not being as prevalent in the country. Private and Public during Demonetization experienced a rise in NPAs. The Agricultural Sector and MSEs are the primary and persistent drivers for Private banks,

which could be seen as a drawback of financial inclusion. The Industrial Sector is the main driver for Public banks, which is consistent with the literature (Neelakantan & Lahiri, 2023). However, Public banks suffer from pre-trends because of the abandonment of forbearance on asset classification. During COVID-19, RBI's policy of abandonment of the "90-day" norm during the moratorium period resulted in NPAs not being recorded during the period. So initially, banks either experience no change or reduction in recorded NPAs. However, this is followed by a non-persistent increase in Private banks and a persistent increase in Small Finance banks. Due to pandemic restrictions, the Retail Sector is the main driver of the rise in NPAs for Private banks. The Agricultural is the main source of NPAs for Small Finance Banks as that is the sector they specialise in. Public banks experience a decline in NPAs during this period as a result of improved efficiency after a series of mergers.

After Demonetization, more marginalised groups opened bank accounts with Private banks, and so Private banks experienced a persistent increase in NPAs from the Agricultural sector. It could be that as a consequence of financial inclusion, the NPAs in the banking system rose. Another piece of evidence pointing towards this is the persistent rise in NPAs for Small Finance Banks post-Covid. This shows us an additional cost to financial inclusion, and so, policymakers take the persistent rise in NPAs into account when implementing policies promoting financial inclusion. Moreover, policymakers should avoid implementing Demonetization by shocking the system like the Government of India and RBI did in 2016. Instead, they should implement Demonetization by slowly phasing out the currency as they did with the new 2000 Rs notes (Dugal, 2023).

In future research, the two events should be separated and regional variation should be used within each bank group to rigorously show causality. In the Demonetization case, regional data such as the data used by Chodorow-Reich et al. (2020), can be used if made publicly available. For the COVID case, district-level number of cases can be used. This could allow us to use a measure to determine the degree to which a bank was exposed and could add a treated and control group. The main drawback of this approach would be the lack of observations over time as there are a small number of banks within each type group.

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## Tables & Figures

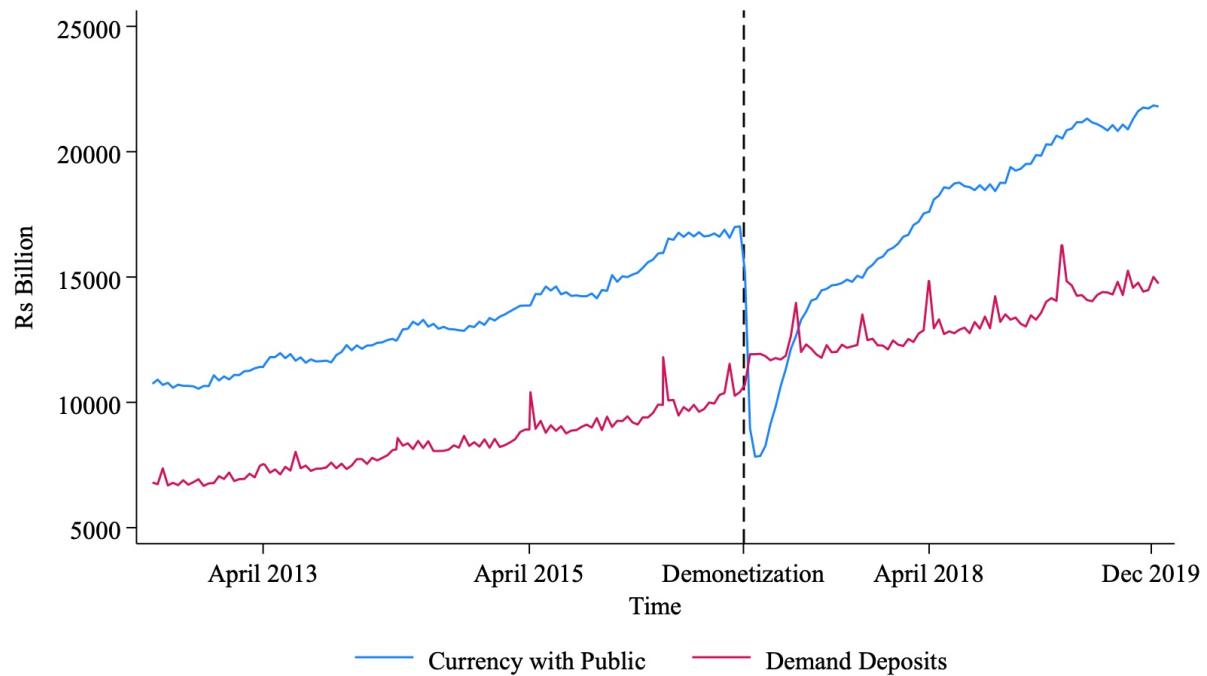


Figure 1: Money Stock Time Series.  
Source: DBIE, Money Stock and Components

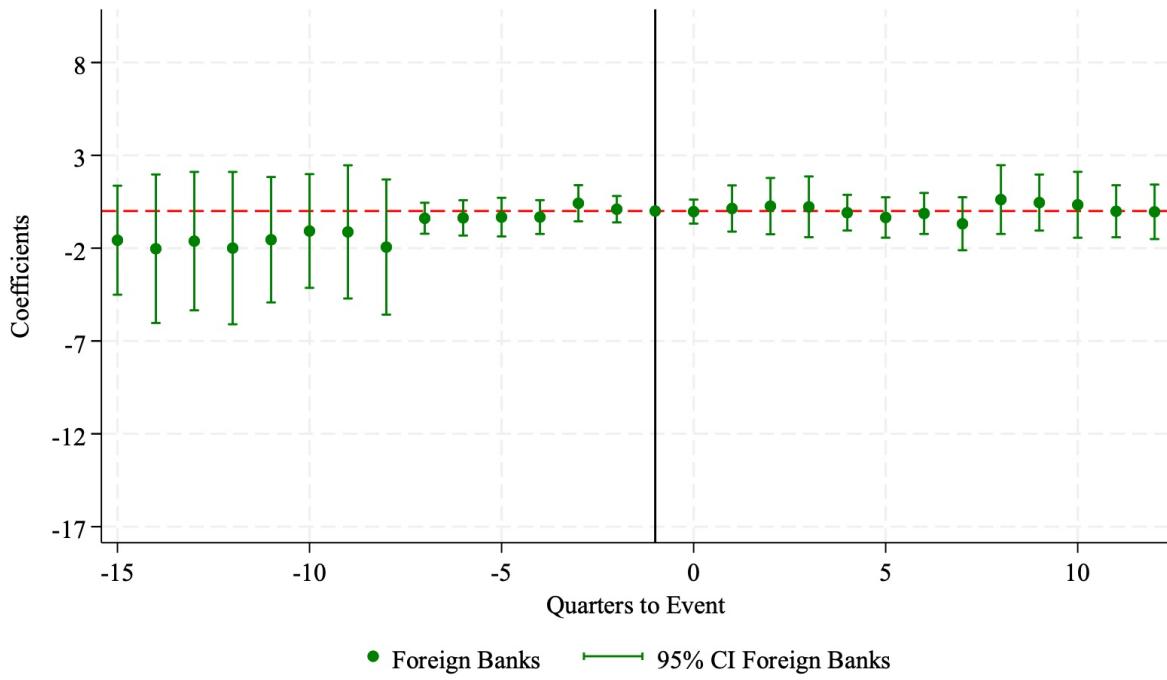


Figure 2: Demonetization GNPA Percent with all Controls

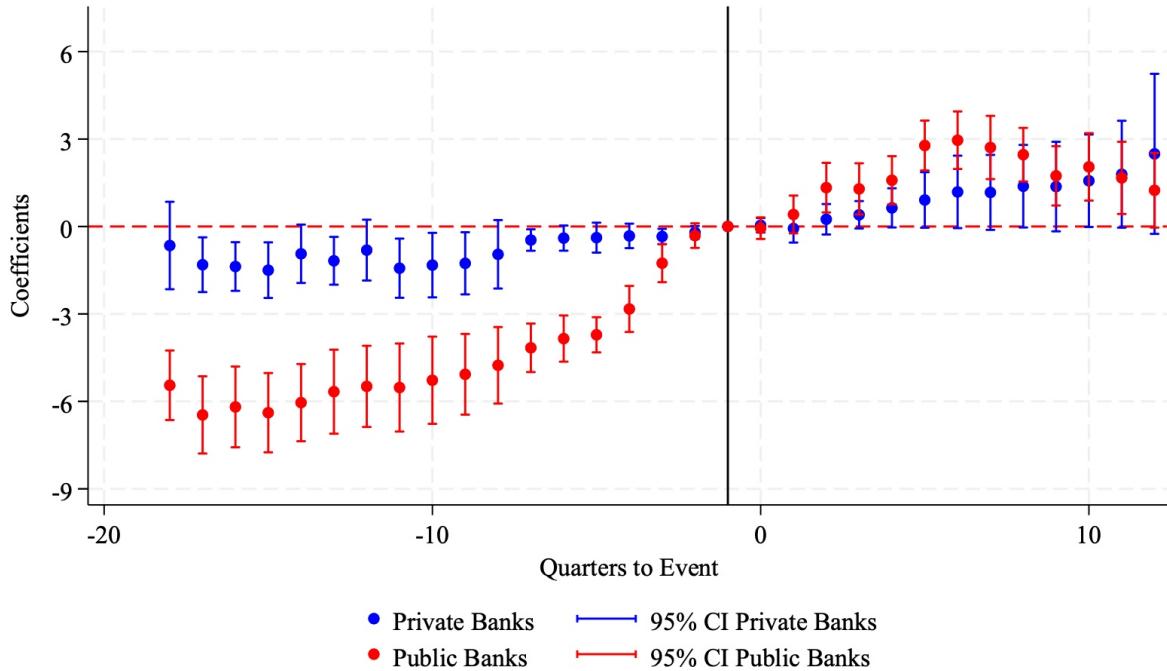


Figure 3: Demonetization GNPA Percent with all Controls

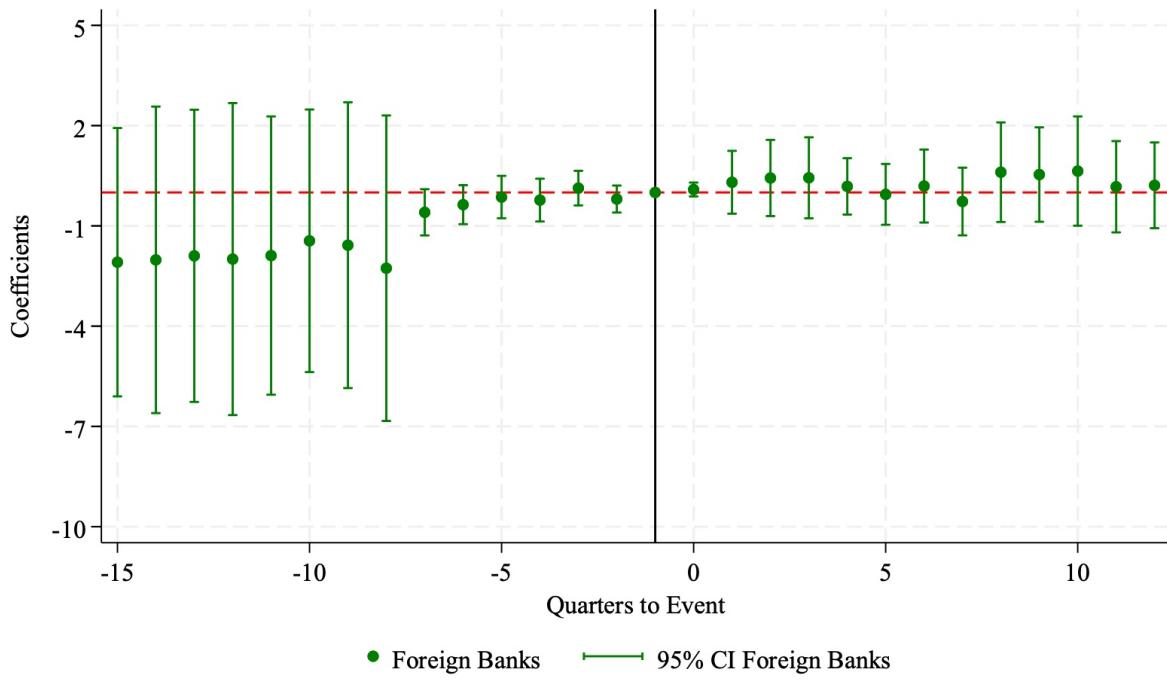


Figure 4: Demonetization GNPA Percent from Non-Priority Sector

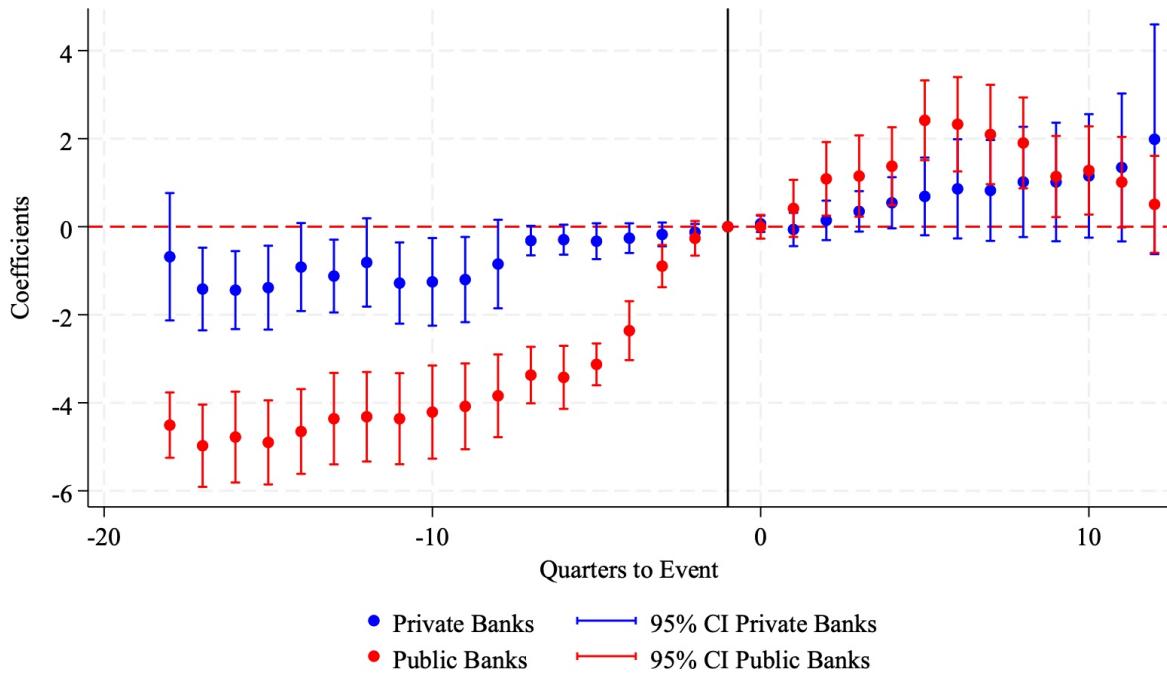


Figure 5: Demonetization GNPA Percent from Non-Priority Sector

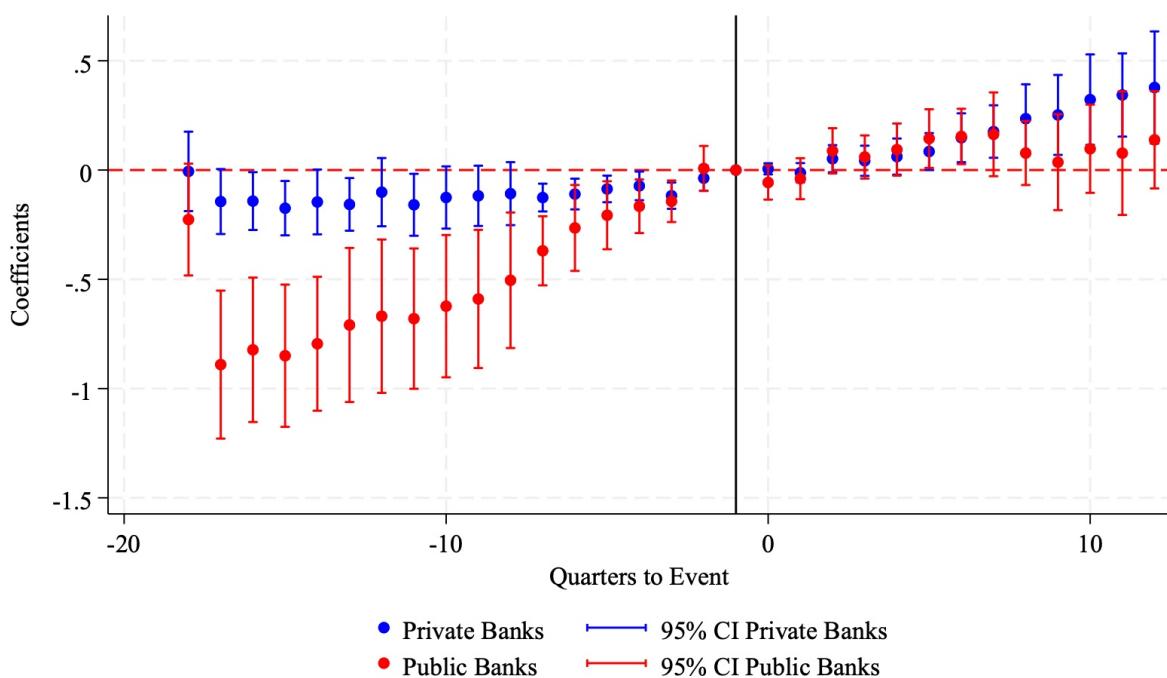
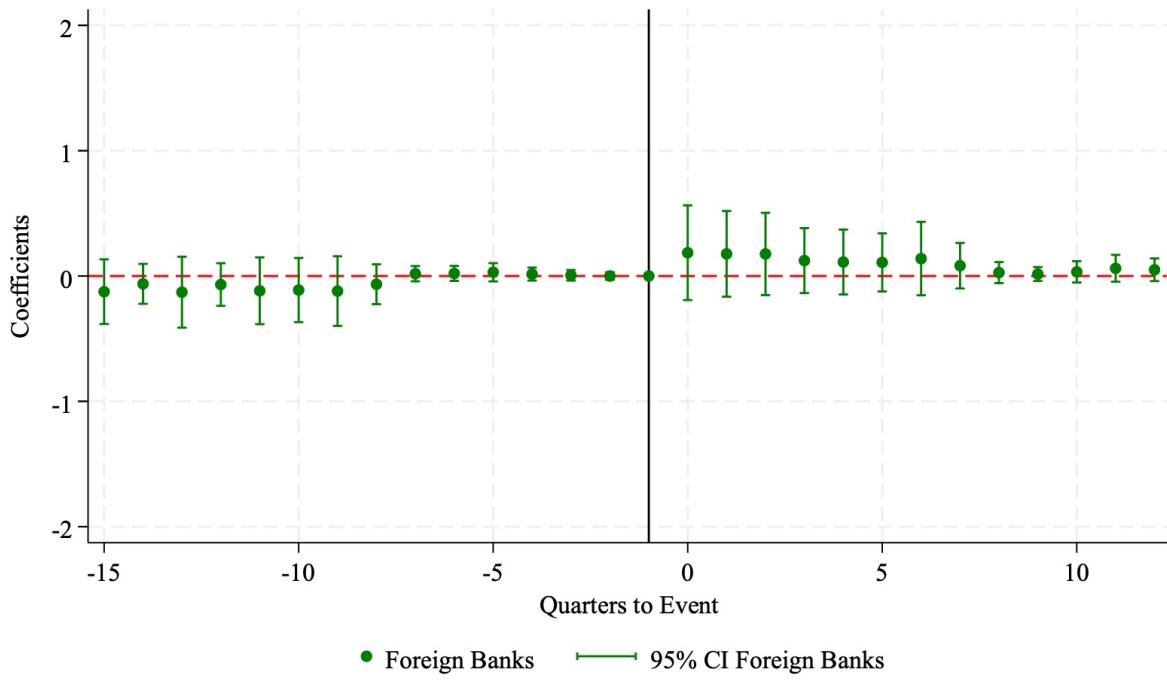


Figure 7: Demonetization GNPA Percent from Medium & Small Enterprises

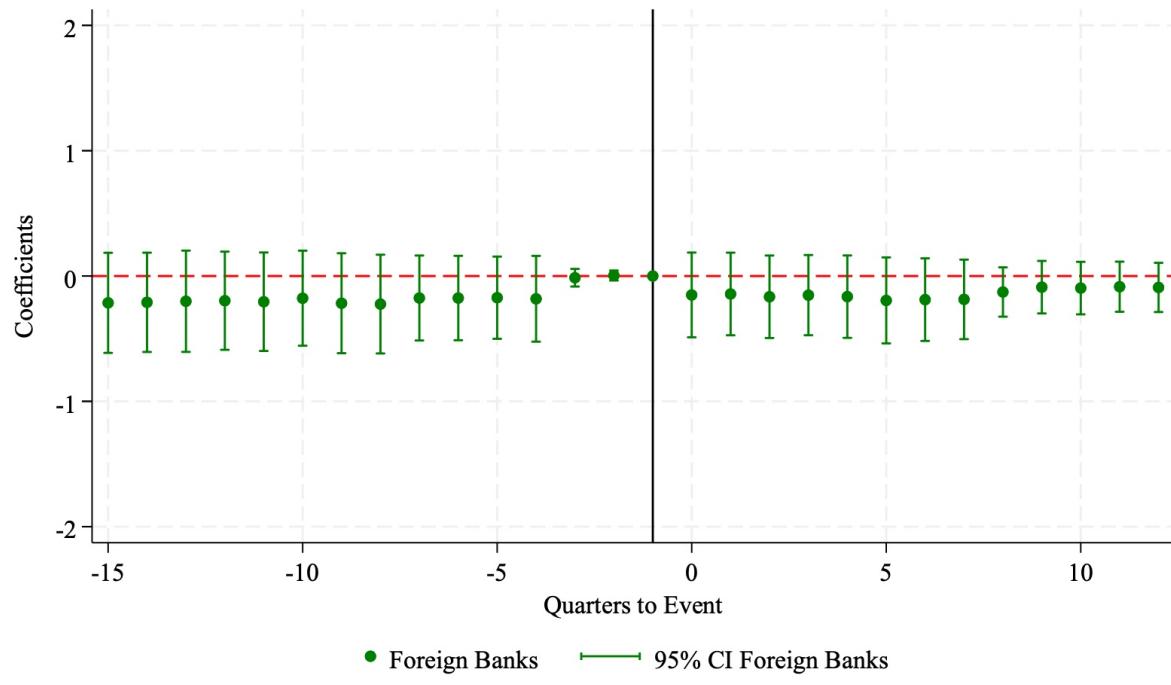


Figure 8: Demonetization GNPA Percent from Other Priority Sector

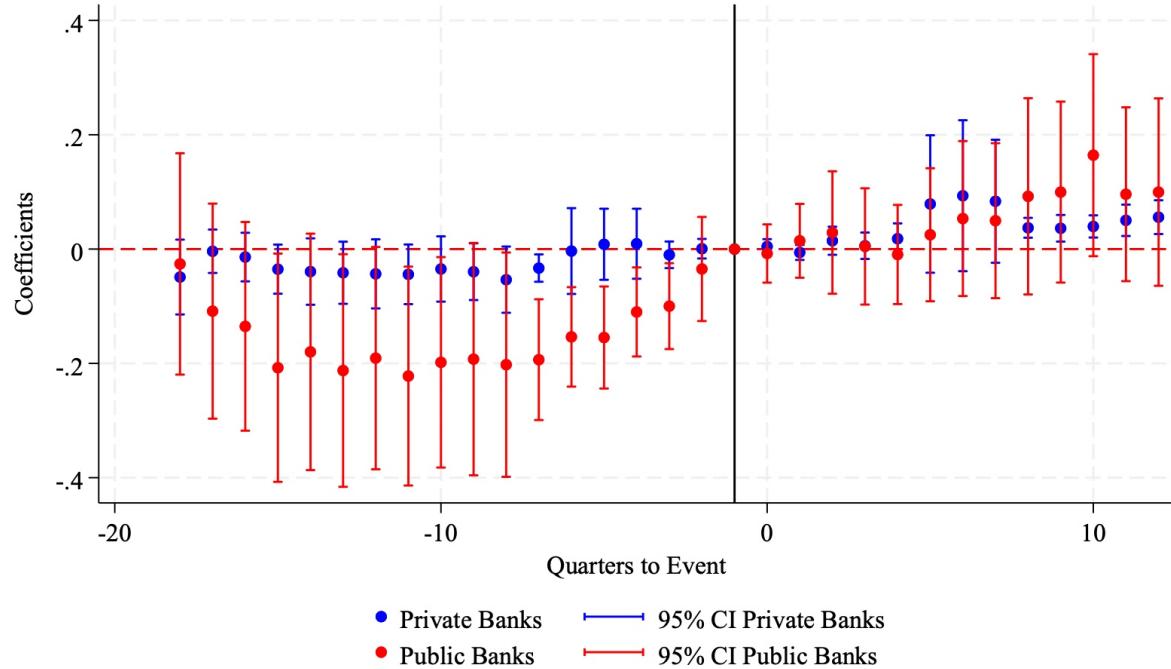


Figure 9: Demonetization GNPA Percent from Other Priority Sector

	Foreign Banks GNPA Percent				
	Agriculture	Industry	Services	Retail	Other
Quarter	(I)	(II)	(III)	(IV)	(V)
2017Q1	.0001 (.0008)	.1414 (.4971)	-.0989 (.1101)	.0192 (.0161)	.0005 (.0014)
2017Q2	-.0002 (.0018)	.4466 (.6781)	-.1289 (.1167)	.0182 (.0184)	-.0001 (.0012)
2017Q3	.0009 (.0018)	.4155 (.7942)	-.1358 (.1383)	.0216 (.0164)	-.0002 (.0012)
2017Q4	.0004 (.0025)	.0686 (.4219)	-.1241 (.1097)	.0319 (.0234)	-.0005 (.0015)
<b>No. Obs</b>	189	472	397	508	158
<b>Size Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Priority Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Infrastructure Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Region Controls</b>	Yes	Yes	Yes	Yes	Yes

Table 1: Coefficients for the 4 quarters after Demonetization

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

	Private Banks GNPA Percent				
	Agriculture	Industry	Services	Retail	Other
Quarter	(I)	(II)	(III)	(IV)	(V)
2017Q1	.0327 (.0217)	.0529 (.1653)	.0175 (.054)	-.0047 (.0138)	-.0387 (.0601)
2017Q2	.0687** (.0279)	.1593 (.1841)	.0869 (.0722)	.0372** (.0135)	-.0265 (.0608)
2017Q3	.0901** (.0316)	.3609 (.2286)	.1329* (.0733)	.0177 (.0193)	.0278 (.1298)
2017Q4	.0912** (.0333)	.5131** (.231)	.1574** (.0683)	.0122 (.0236)	.0676 (.1313)
<b>No. Obs</b>	330	330	330	495	209
<b>Size Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Priority Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Infrastructure Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Region Controls</b>	Yes	Yes	Yes	Yes	Yes

Table 2: Coefficients for the 4 quarters after Demonetization

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

	Public Banks GNPA Percent				
	Agriculture	Industry	Services	Retail	Other
Quarter	(I)	(II)	(III)	(IV)	(V)
2017Q1	-.005 (.0593)	.6424** (.2658)	-.1239 (.1133)	-.0044 (.0193)	-.0803 (.0676)
2017Q2	.1038 (.0638)	1.2916*** (.3909)	-.0779 (.1171)	.0281 (.0395)	-.0331 (.0385)
2017Q3	.1045 (.0605)	1.2941*** (.3697)	-.1103 (.1341)	.0161 (.0316)	-.0529 (.0348)
2017Q4	.0968 (.0788)	1.4179*** (.3626)	.0524 (.1292)	.0136 (.0388)	.0152 (.1079)
<b>No. Obs</b>	422	425	422	641	250
<b>Size Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Priority Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Infrastructure Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Region Controls</b>	Yes	Yes	Yes	Yes	Yes

Table 3: Coefficients for the 4 quarters after Demonetization

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

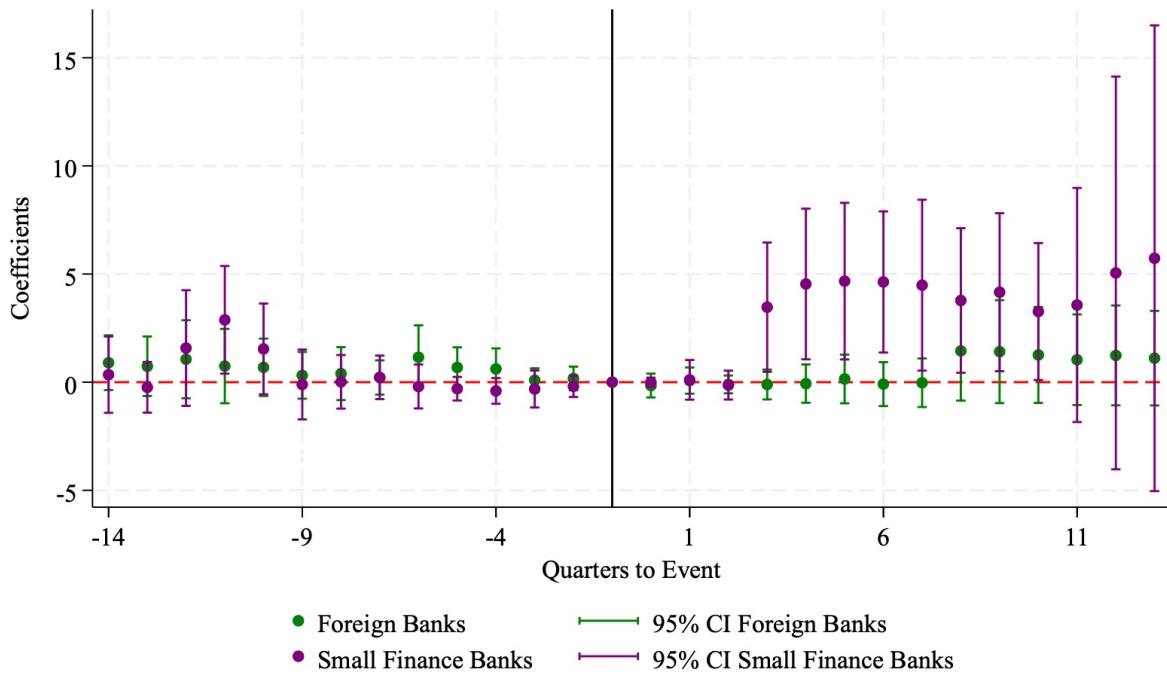


Figure 10: COVID-19 GNPA Percent with all Controls

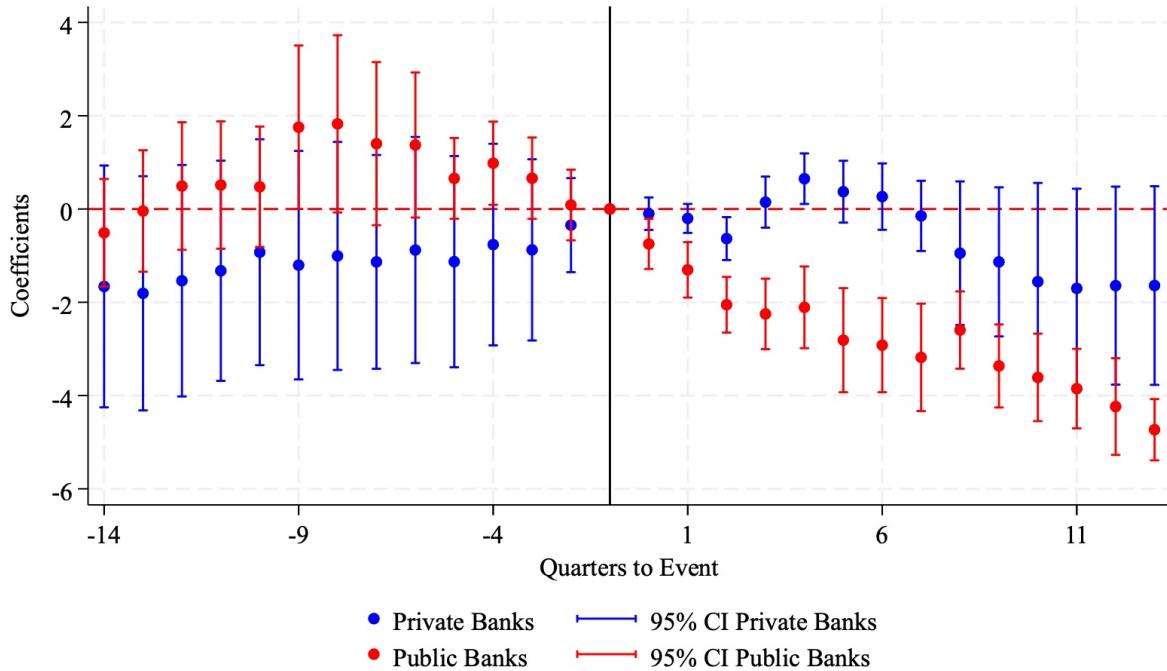


Figure 11: COVID-19 GNPA Percent with all Controls

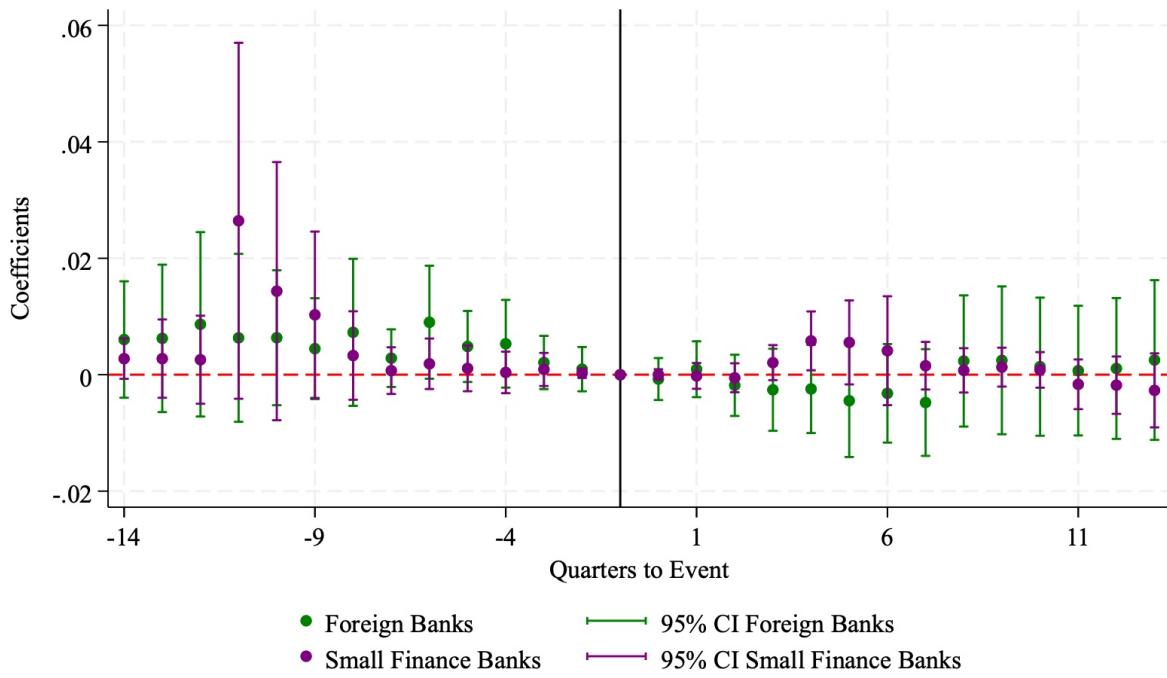


Figure 12: COVID-19 GNPA Percent from Non-Priority Sector

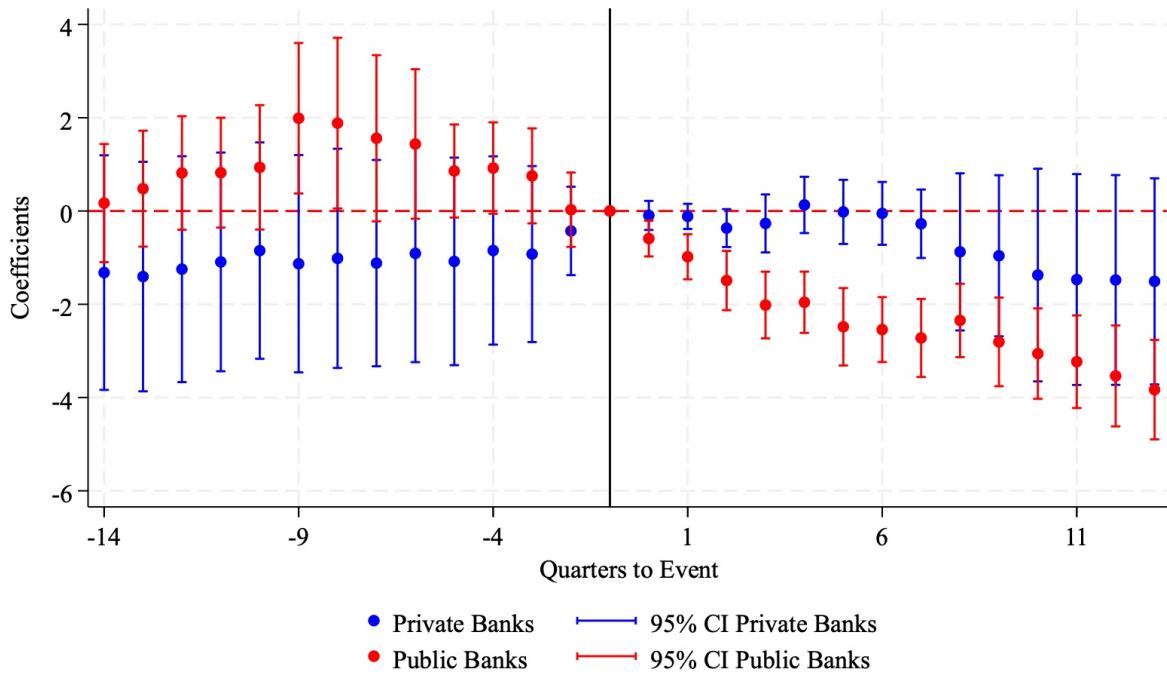


Figure 13: COVID-19 GNPA Percent from Non-Priority Sector

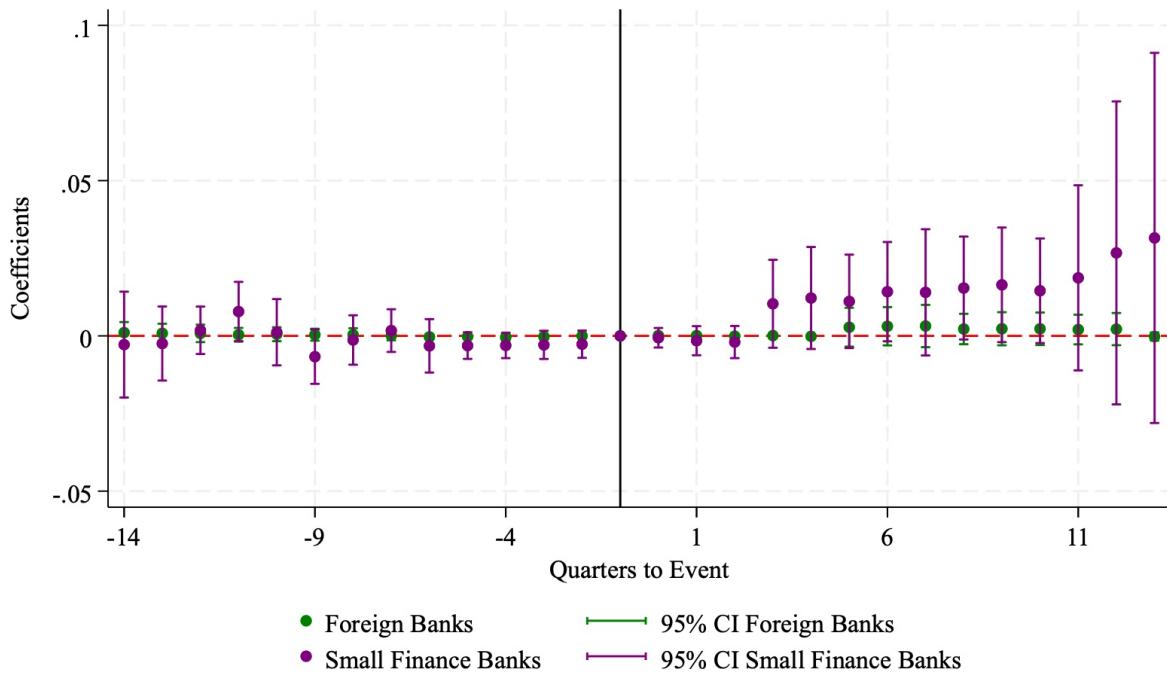


Figure 14: COVID-19 GNPA Percent from Medium & Small Enterprises

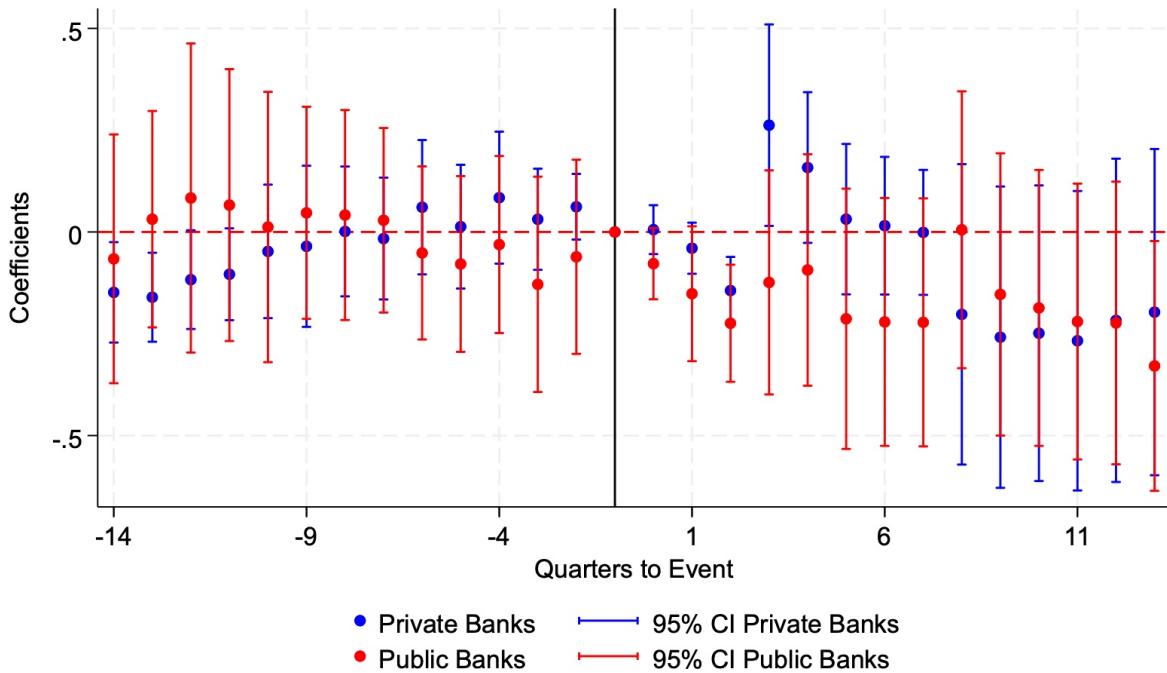


Figure 15: COVID-19 GNPA Percent from Medium & Small Enterprises

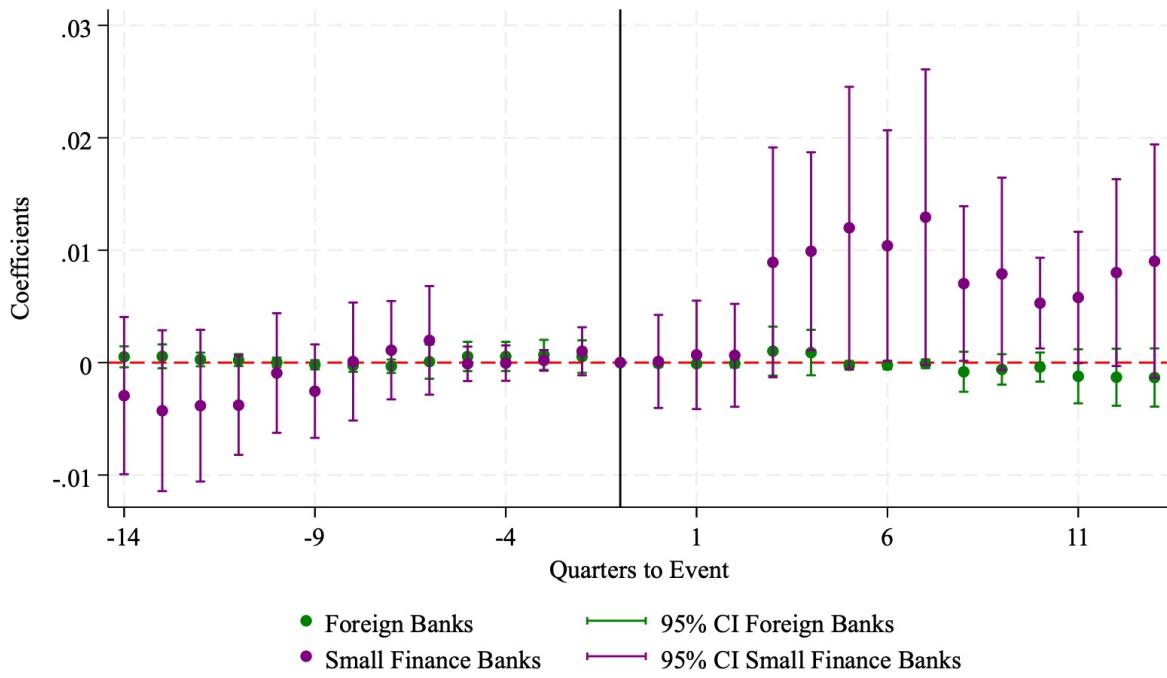


Figure 16: COVID-19 GNPA Percent from Other Priority Sector

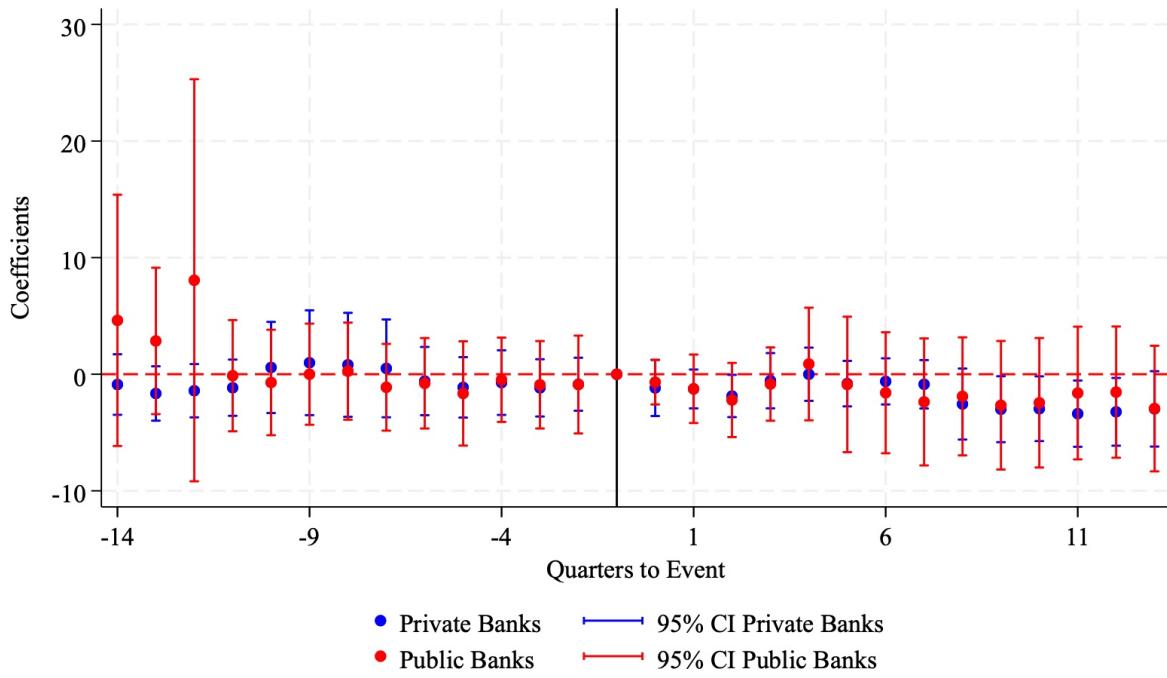


Figure 17: COVID-19 GNPA Percent from Other Priority Sector

	Foreign Banks GNPA Percent				
	Agriculture	Industry	Services	Retail	Other
Quarter	(I)	(II)	(III)	(IV)	(V)
2020Q3	.0029 (.0031)	-.0769 (.203)	.1329 (.1706)	.0323 (.1253)	.0000 (.0002)
2020Q4	-.0061 (.0061)	-.2526 (.1986)	.1449 (.1301)	.0097 (.138)	.0001 (.0002)
2021Q1	.0059 (.0081)	-.3469 (.2414)	.3219 (.3119)	.0118 (.1607)	.0004 (.0003)
2021Q2	.0089 (.0081)	-.4461 (.4023)	.2741 (.2556)	-.1274 (.2405)	-.0000 (.0004)
<b>No. Obs</b>	385	699	614	435	361
<b>Size Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Priority Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Infrastructure Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Region Controls</b>	Yes	Yes	Yes	Yes	Yes

Table 4: Coefficients for the 4 quarters after COVID-19

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

	Small Finance Banks GNPA Percent				
	Agriculture	Industry	Services	Retail	Other
Quarter	(I)	(II)	(III)	(IV)	(V)
2020Q3	.1589 (.1989)	.0306 (.0499)	.0368 (.1466)	-.0584 (.0561)	-.2154 (.4824)
2020Q4	.0591 (.1212)	.0291 (.0422)	-.0603 (.1062)	-.0533 (.0679)	-.3349 (.3384)
2021Q1	1.4171** (.5634)	.2517* (.1214)	1.319** (.6258)	.4248 (.3021)	-.4322 (.4165)
2021Q2	1.7579** (.6591)	.2922 (.1674)	1.2174 (.7313)	1.001 (.5979)	-.3814 (.5245)
<b>No. Obs</b>	200	182	203	204	107
<b>Size Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Priority Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Infrastructure Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Region Controls</b>	Yes	Yes	Yes	Yes	Yes

Table 5: Coefficients for the 4 quarters after COVID-19

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Quarter	Private Banks GNPA Percent				
	Agriculture (I)	Industry (II)	Services (III)	Retail (IV)	Other (V)
2020Q3	-.0345 (.0257)	-.1056 (.1336)	-.1219 (.0865)	-.0408** (.0167)	-.0015 (.0111)
2020Q4	-.0665** (.0243)	-.3055** (.1389)	-.2636** (.1015)	-.076*** (.0224)	-.0222 (.0209)
2021Q1	.1145 (.0715)	-.3475* (.1944)	.0714 (.1177)	.2773*** (.05801)	-.0196 (.0431)
2021Q2	.2051* (.1049)	-.2227 (.1305)	.2105 (.1232)	.4057*** (.0751)	-.0292 (.0363)
<b>No. Obs</b>	530	530	530	530	401
<b>Size Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Priority Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Infrastructure Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Region Controls</b>	Yes	Yes	Yes	Yes	Yes

Table 6: Coefficients for the 4 quarters after COVID-19

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Quarter	Public Banks GNPA Percent				
	Agriculture (I)	Industry (II)	Services (III)	Retail (IV)	Other (V)
2020Q3	-.1021** (.0403)	-.7615*** (.1515)	-.2369** (.0997)	-.0339* (.0167)	-.1628** (.0739)
2020Q4	-.2071*** (.0498)	-.1.2589*** (.2061)	-.2799 (.2085)	-.1017*** (.0212)	-.0732 (.1205)
2021Q1	-.0967 (.0538)	-.1.6728*** (.2289)	-.3413** (.1231)	.0104 (.0377)	.0088 (.1047)
2022Q2	-.0822 (.0825)	-.1.6308*** (.1914)	-.3797** (.1456)	.0523 (.0481)	-.0526 (.0874)
<b>No. Obs</b>	230	336	336	336	270
<b>Size Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Priority Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Infrastructure Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Region Controls</b>	Yes	Yes	Yes	Yes	Yes

Table 7: Coefficients for the 4 quarters after COVID-19

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

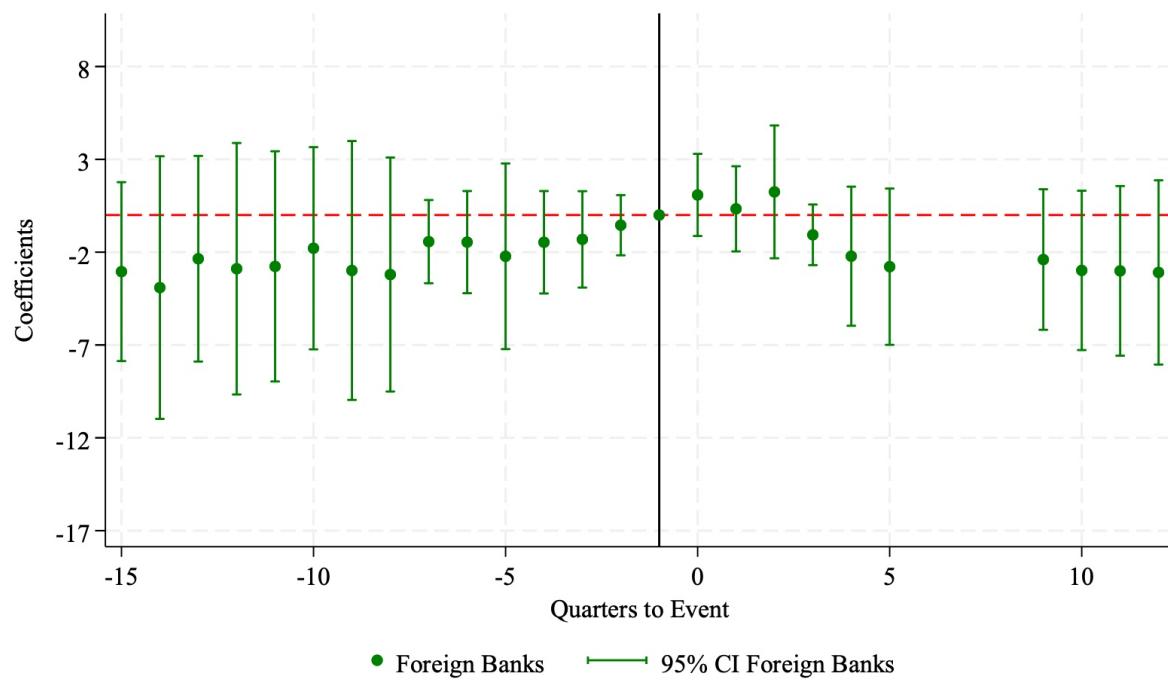


Figure 18: Demonetization GNPA percent Liberal Sample

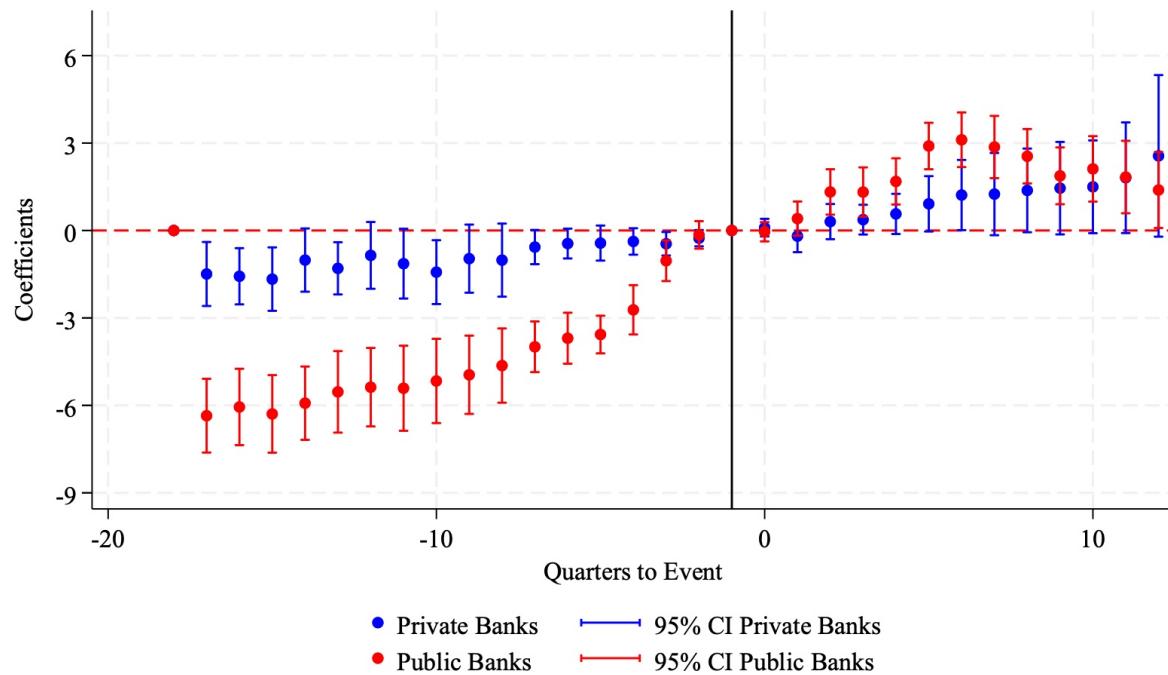


Figure 19: Demonetization GNPA percent Liberal Sample

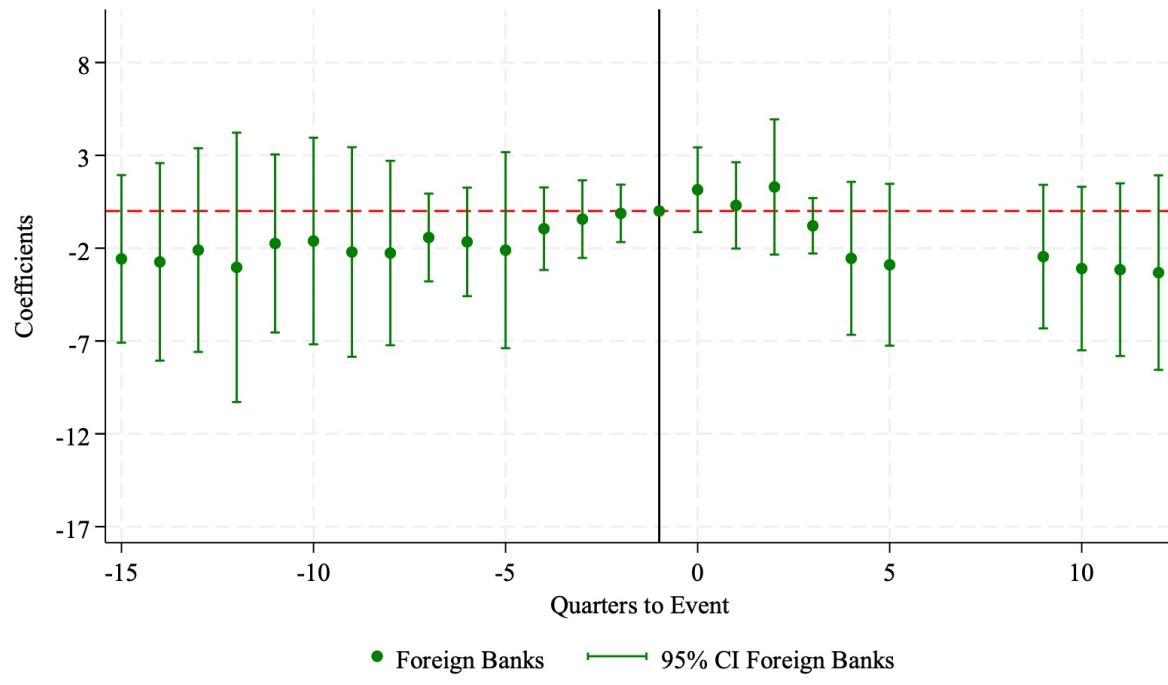


Figure 20: Demonetization GNPA percent Strict Sample

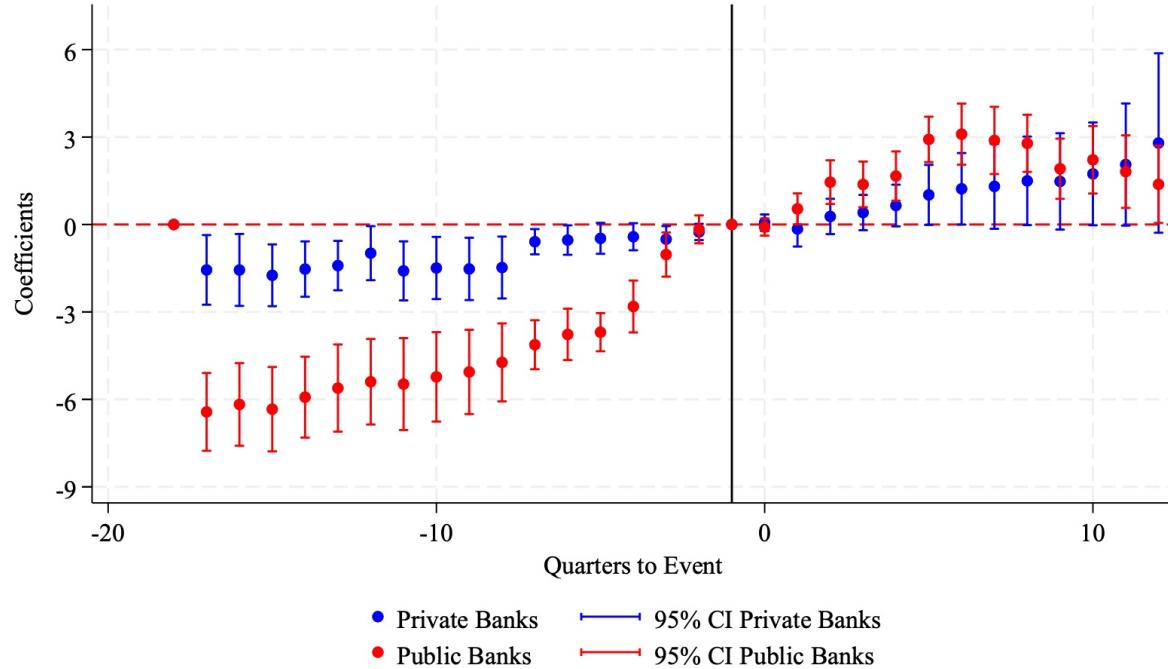


Figure 21: Demonetization GNPA percent Strict Sample

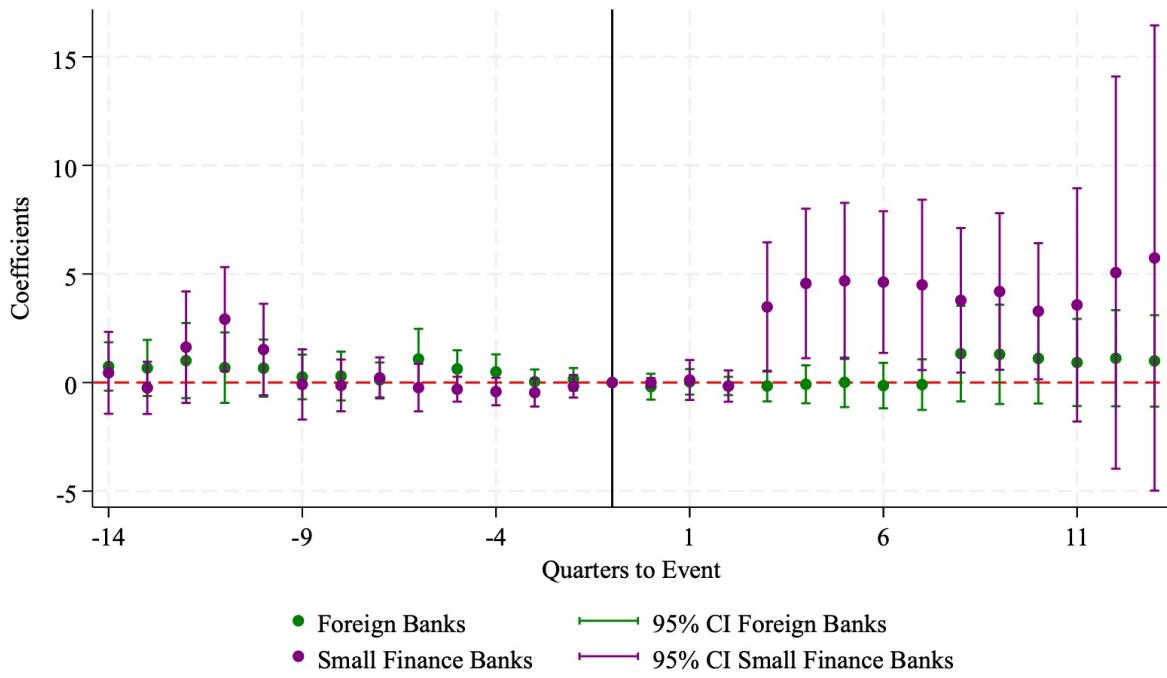


Figure 22: COVID-19 GNPA percent Liberal Sample

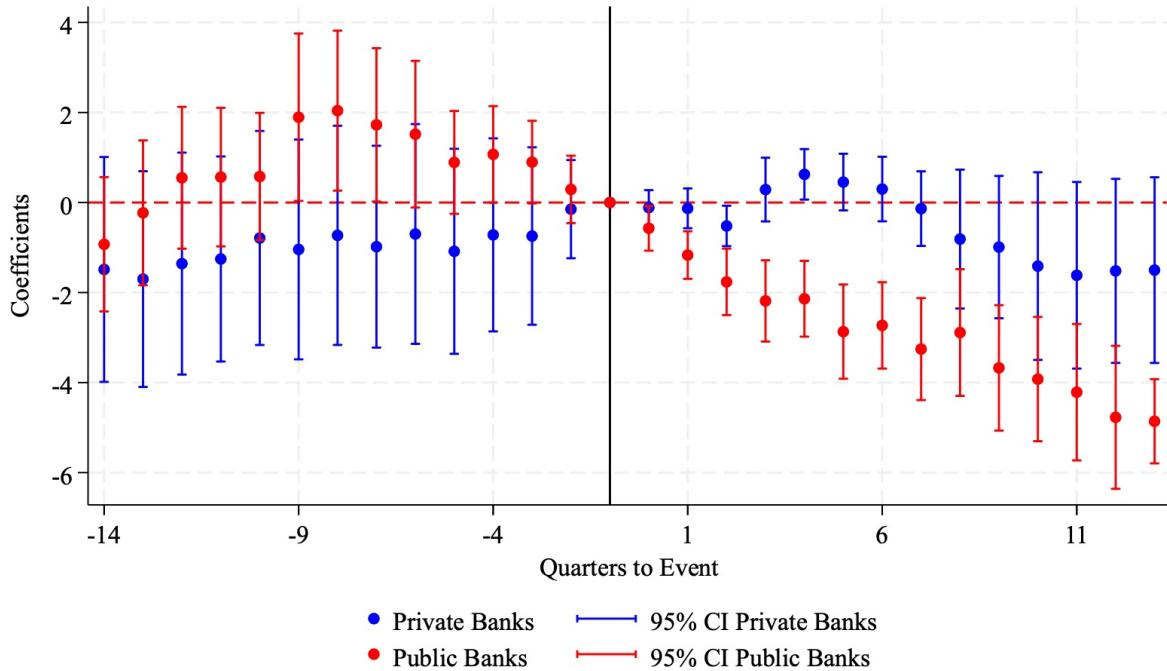
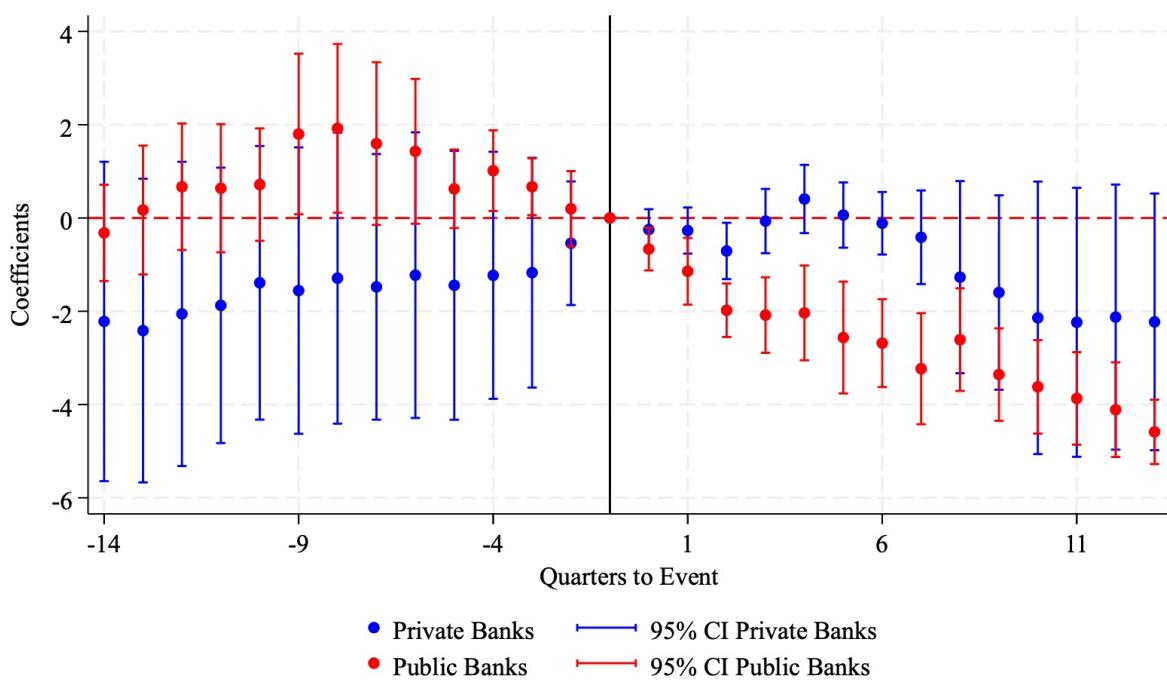
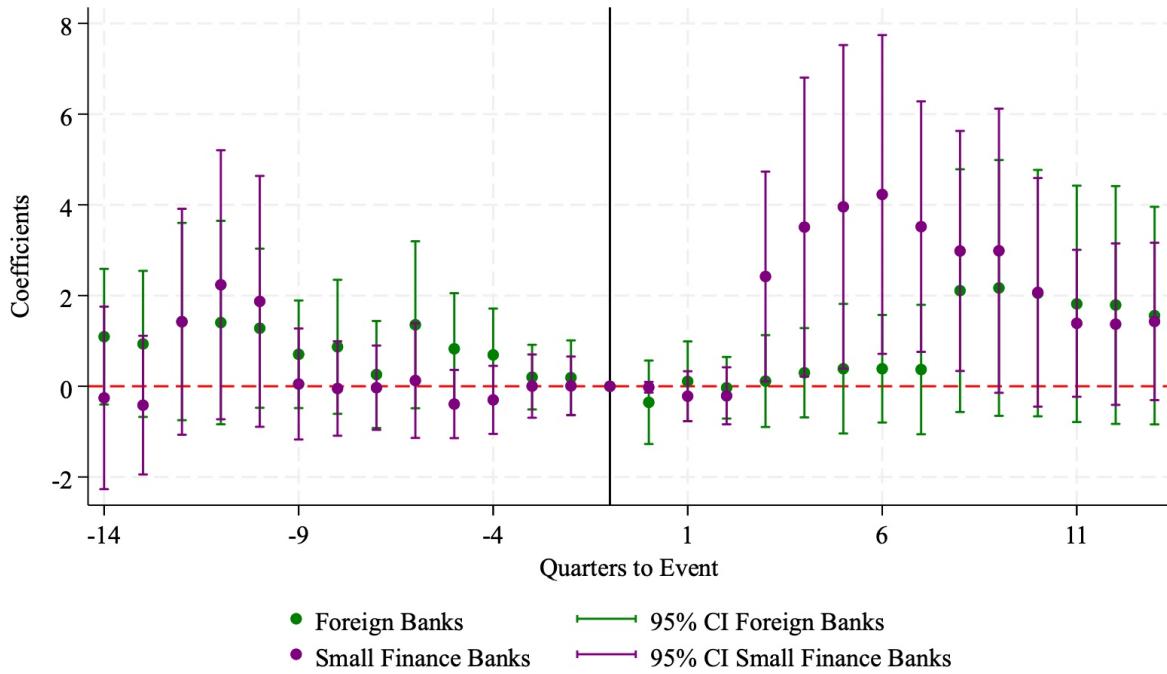


Figure 23: COVID-19 GNPA percent Liberal Sample



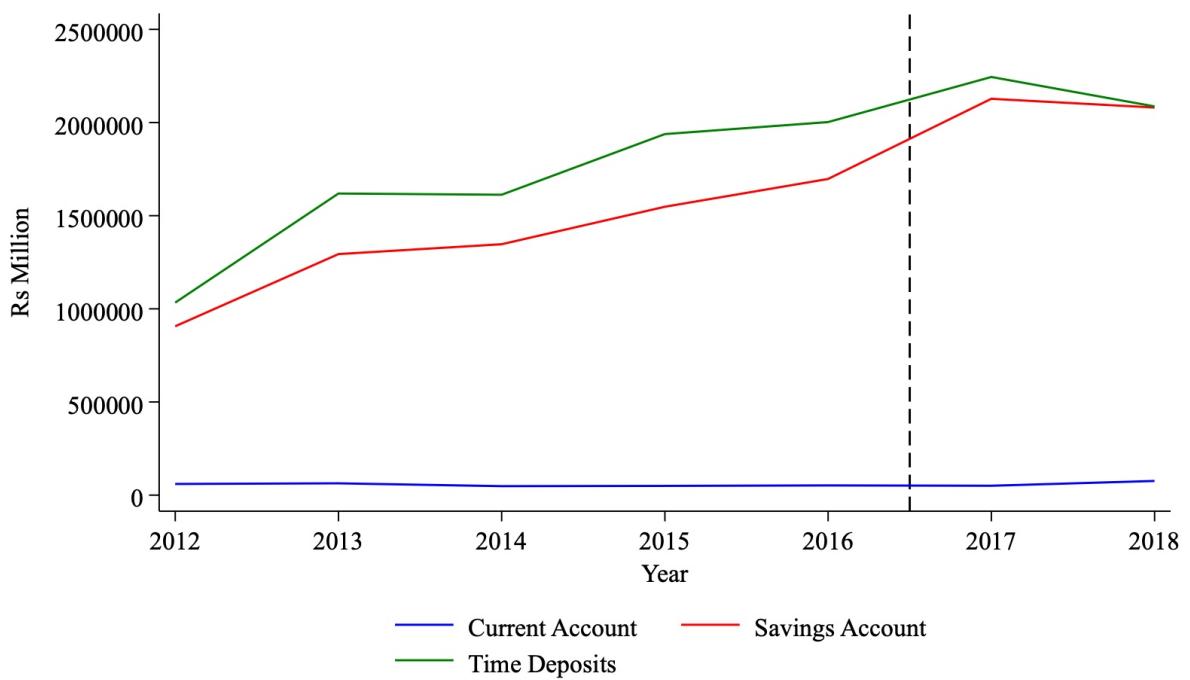


Figure 26: Deposits of Farmers with Banks.

Source: DBIE, Ownership of Deposits with Scheduled Commercial Banks

# **Appendix**

## **I List of Mergers, Entries and Exits**

1. Ing Vyasa Bank merged into Kotak Mahindra Bank in November 2014.
2. Keb Hana Bank entered India in February 2015.
3. Bandhan Bank commences operations in August 2015.
4. IDFC First Bank became a commercial bank in October 2015.
5. First Abu Dhabi Bank entered India in 2015.
6. UBS AG, RBI declared cessation of it as a Bank in January 2016.
7. KBC Bank, RBI declared cessation of it as a Bank in June 2016.
8. Commonwealth Bank of Australia exited India in August 2016.
9. Bhartiya Mahila Bank, State Bank of Bikaner & Jaipur, State Bank of Hyderabad, State Bank of Mysore, State Bank of Patiala and State Bank of Travencore merged into the State Bank of India in April 2017.
10. Emirates NBD Bank entered India in November 2017.
11. Koomin Bank entered India in February 2019
12. Dena Bank and Vijaya Bank merged into Bank of Baroda in April 2019.
13. Bank of China commenced operations in India in June 2019.

14. National Australia Bank, RBI declared cessation of it as a bank in June 2019
15. Abu Dhabi Commercial Bank sold its Indian operations to DCB Bank in September 2019.
16. Allahabad Bank merged into Indian Bank in April 2020.
17. Andhra Bank and Corporation Bank merged into Union Bank in April 2020.
18. Oriental Bank of Commerce and United Bank of India merged into Punjab National Bank in April 2020.
19. Synadcite Bank merged into Canara Bank in April 2020.
20. Westpac Banking Corporation, RBI declared cessation of it as a bank in July 2020.
21. Lakshmi Vilas Bank merged into DBS Bank in November 2020
22. HSBC Bank Oman merged into Sohar Bank in November 2022 and exited India.
23. Krung Thai Bank currently in the process of deregistering in India.

## **II Break Down of Dummy Variables**

1. Sectoral: Food Credit, Agricultural Sector, Industrial Sector, Services Sector, Retail Sector and Other Sectors.
2. Priority Sector: Non-Priority Sector, Medium & Small Enterprises and Other Priority Sector.

3. Infrastructure Financing: Transportation, Energy, Water, Communication and Social Communication.
4. Regions: Dummies for 28 states and 7 union territories. Does not include the splitting of Andhra Pradesh into two states and the splitting of Jammu & Kashmir.

### III Complete Event Studies For Sectors

#### Demonetization

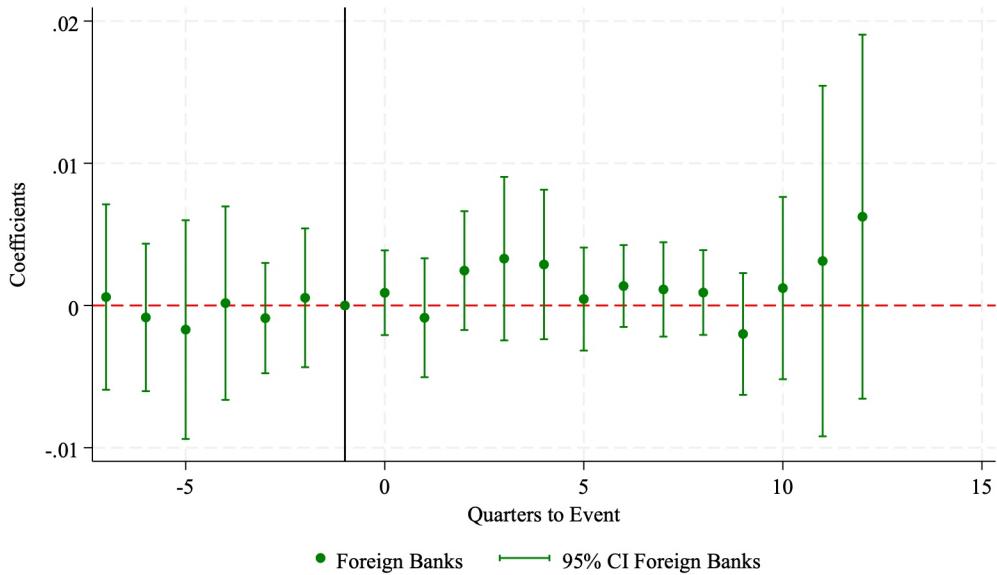


Figure 27: Demonetization GNPA percent from Agricultural Sector

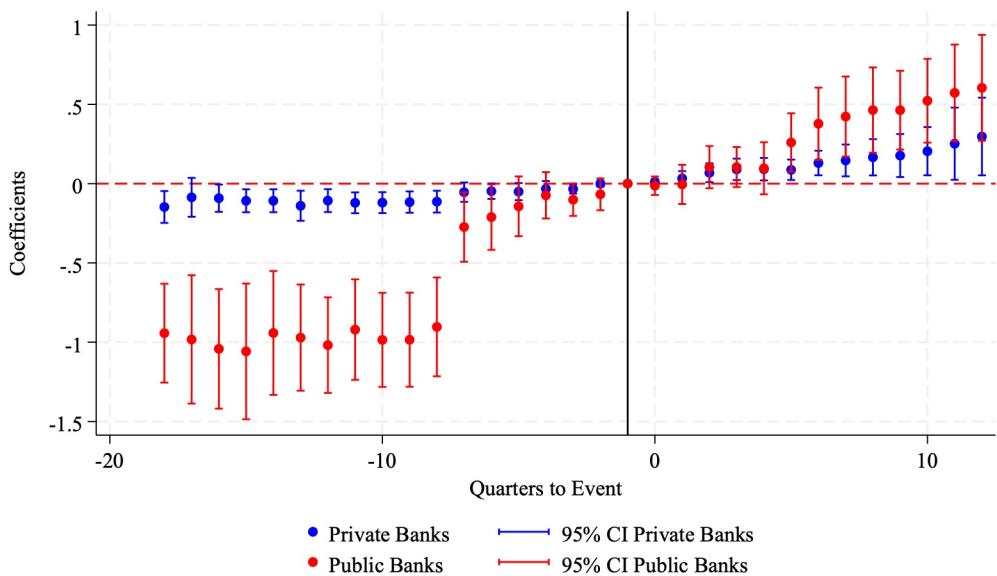


Figure 28: Demonetization GNPA percent from Agricultural Sector

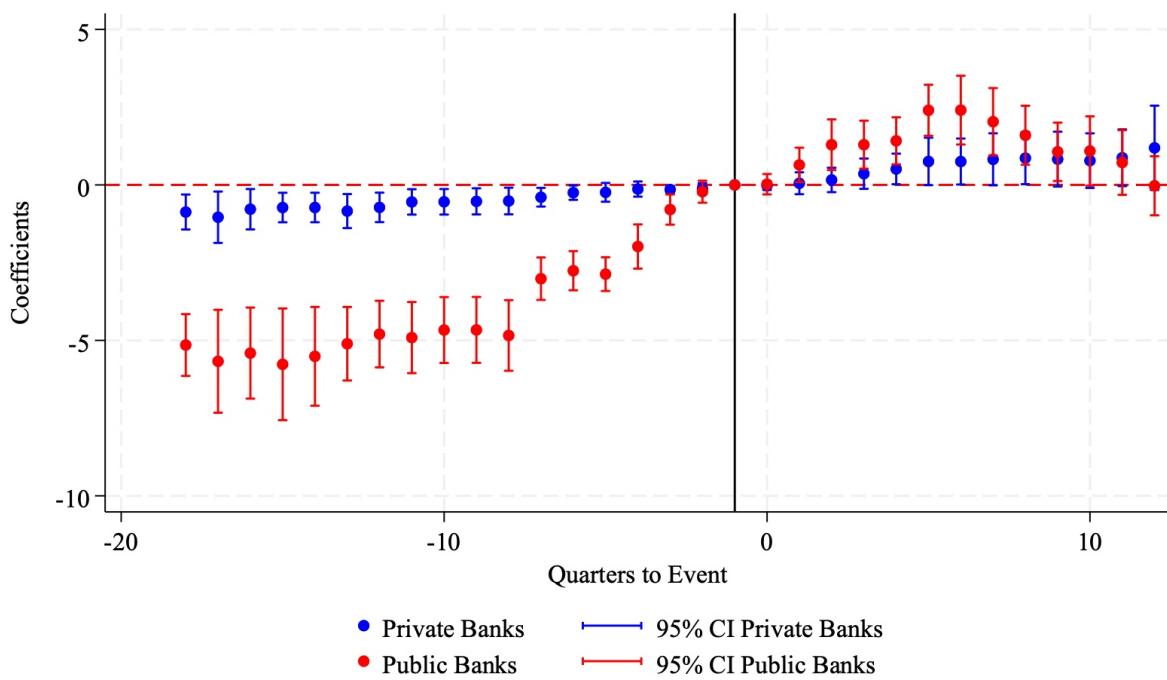
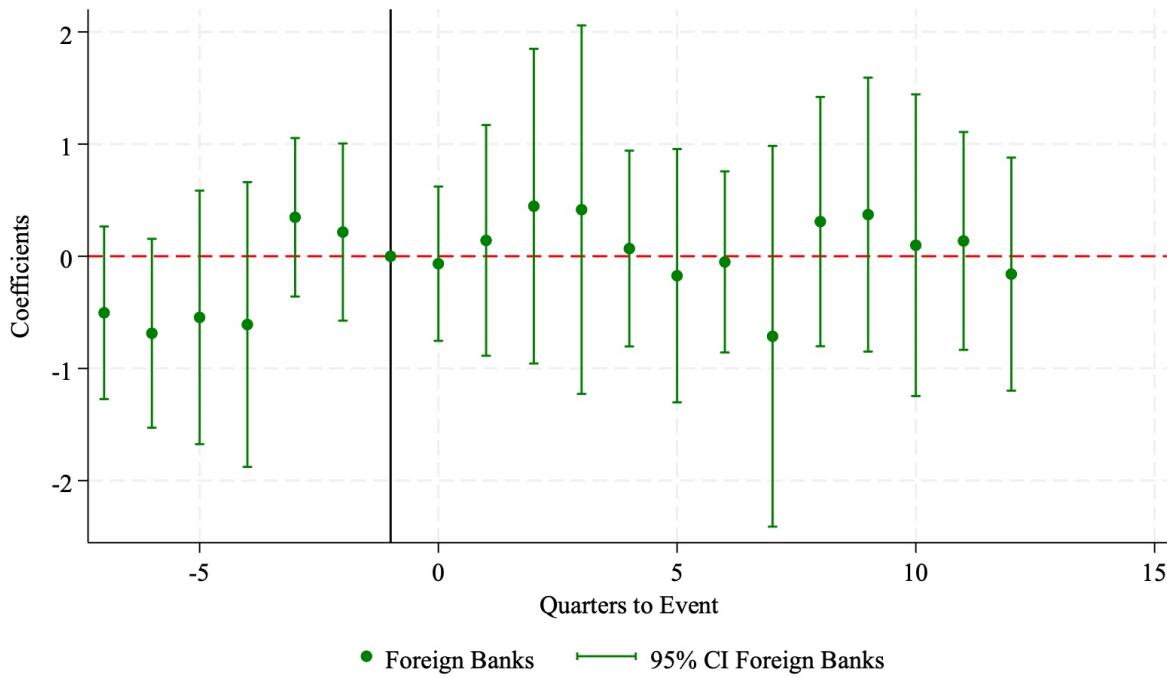
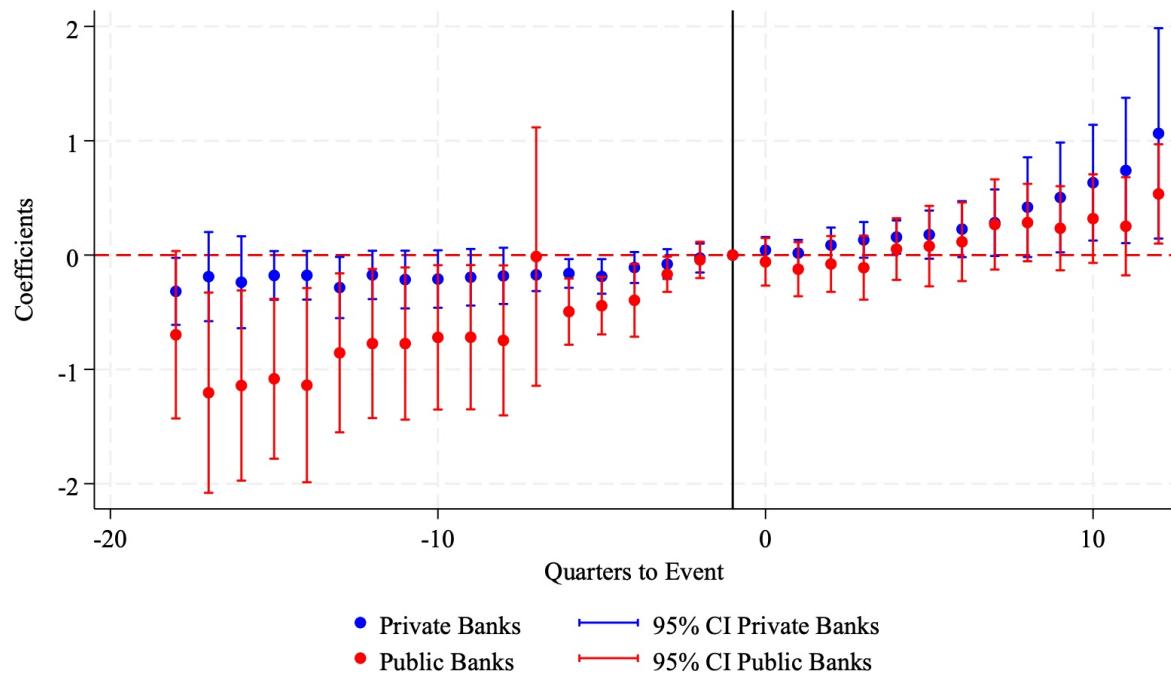
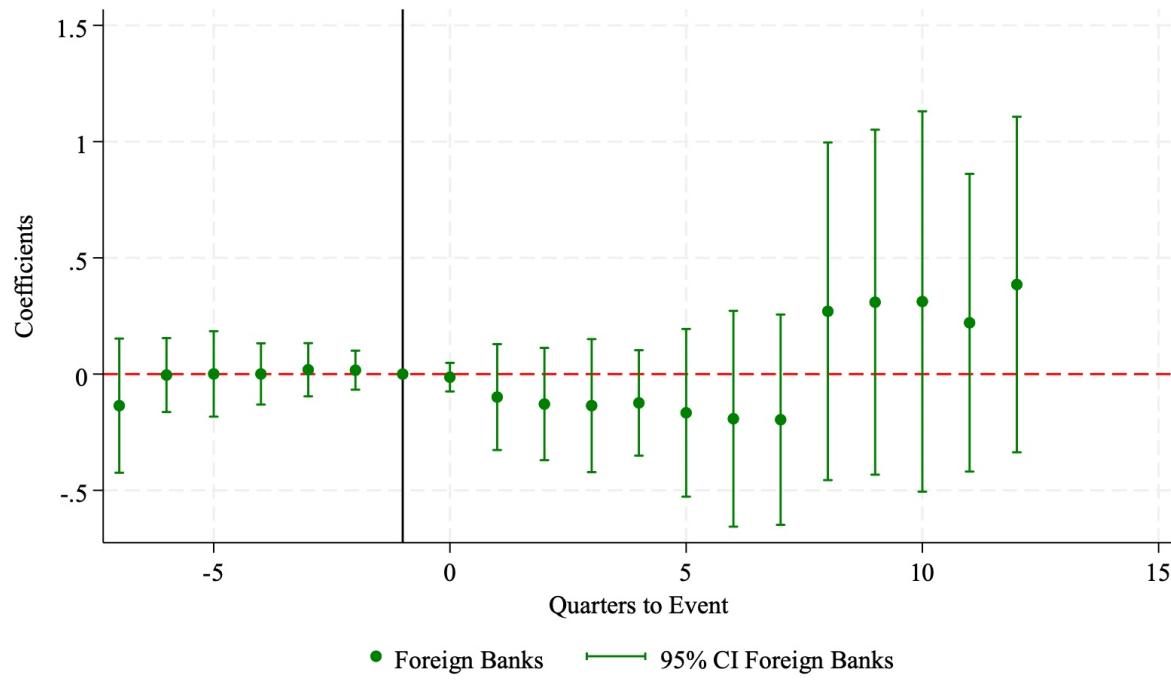


Figure 30: Demonetization GNPA percent from Industrial Sector



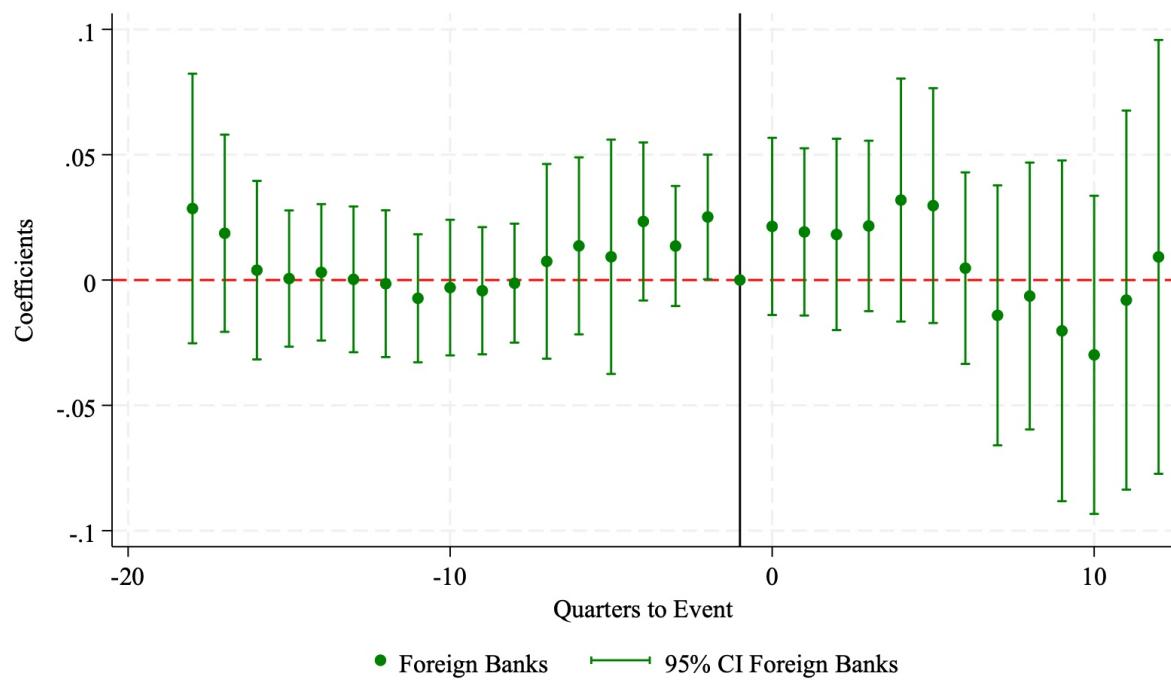


Figure 33: Demonetization GNPA percent from Retail Sector

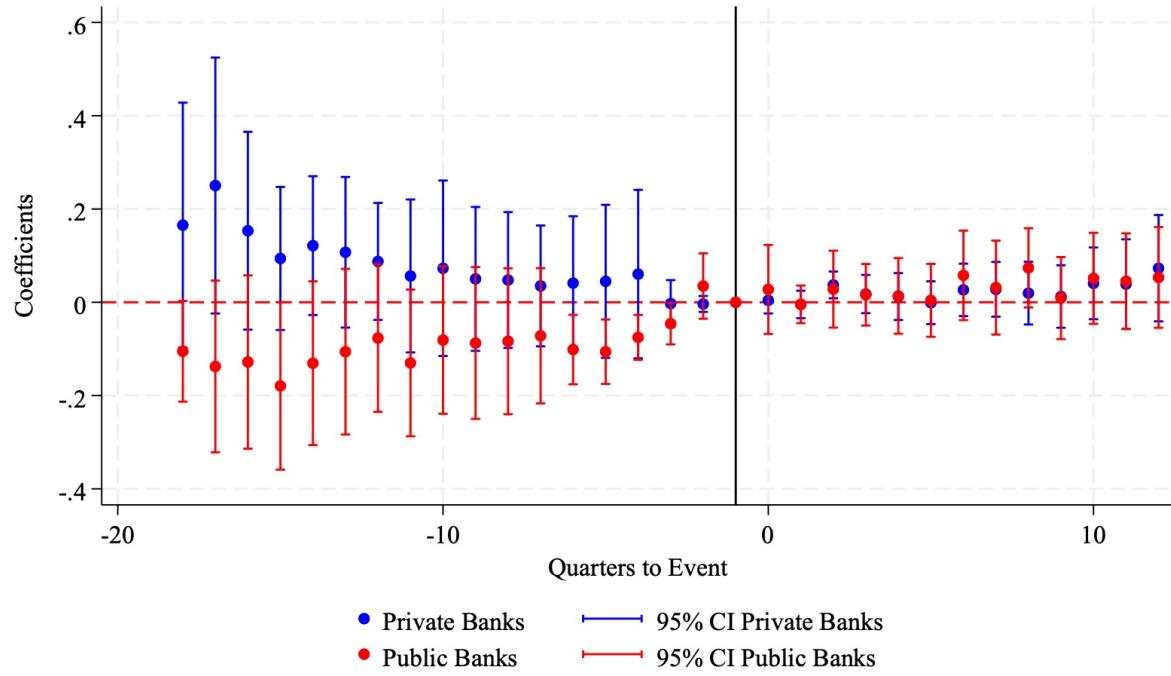


Figure 34: Demonetization GNPA percent from Retail Sector

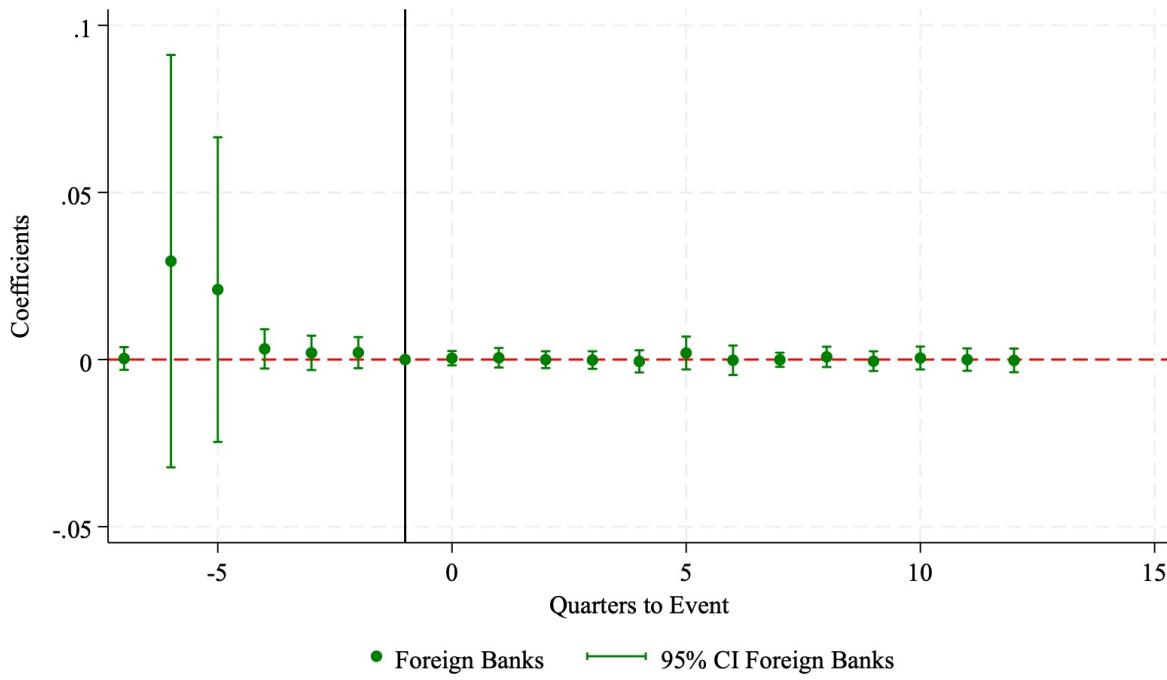


Figure 35: Demonetization GNPA percent from Retail Sector

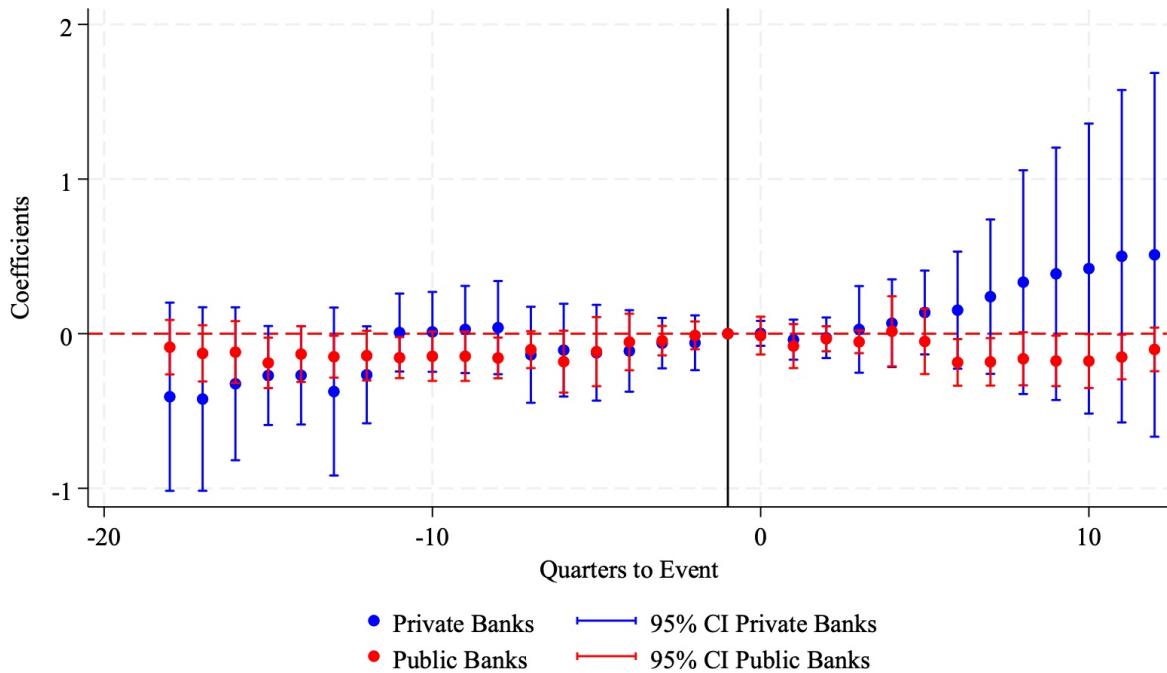


Figure 36: Demonetization GNPA percent from Retail Sector

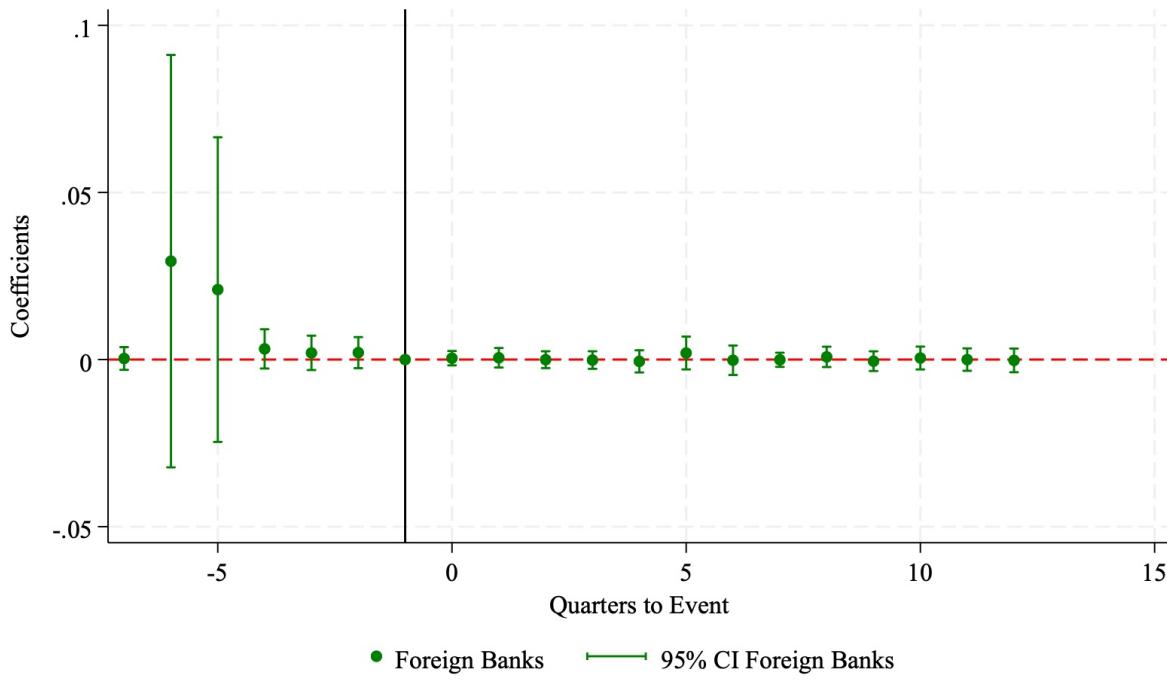


Figure 37: Demonetization GNPA percent from Other Sectors

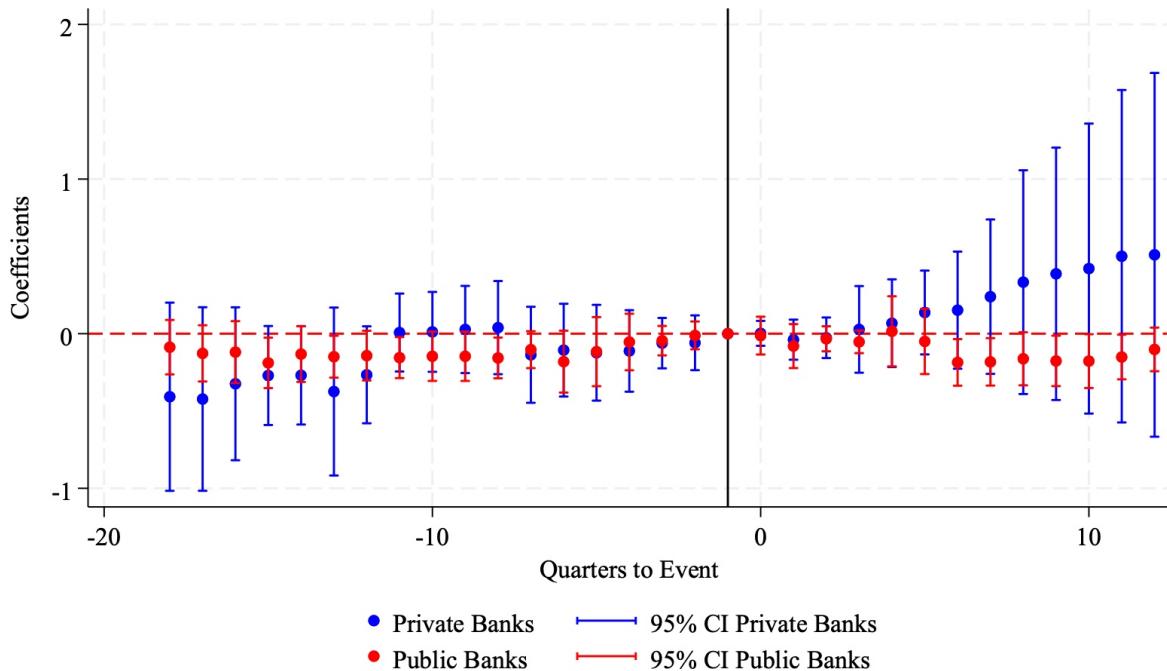


Figure 38: Demonetization GNPA percent from Other Sectors

## COVID-19

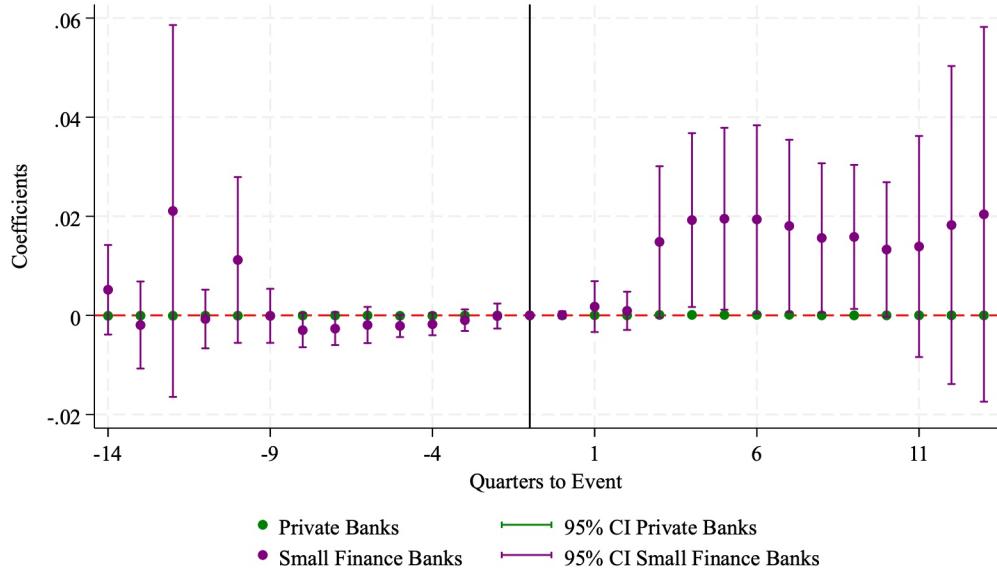
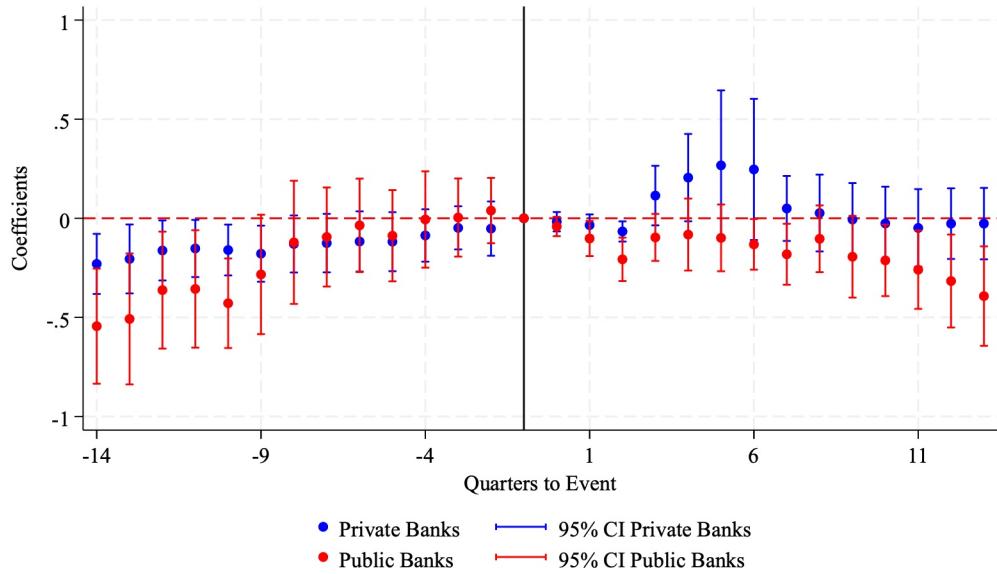
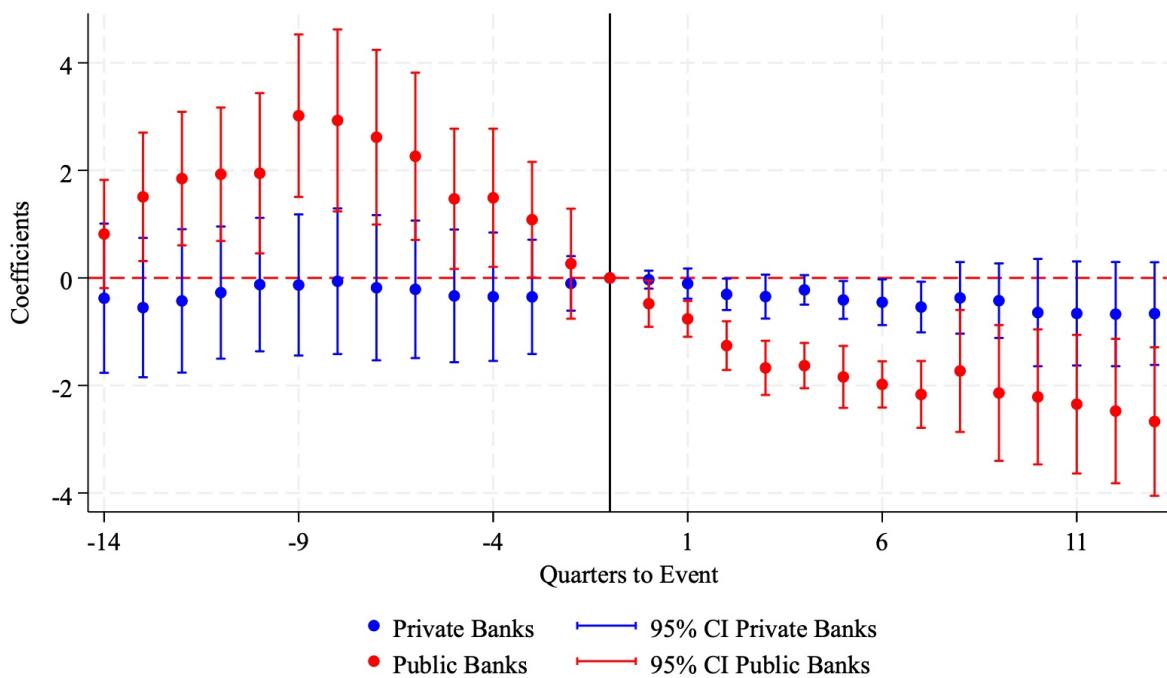
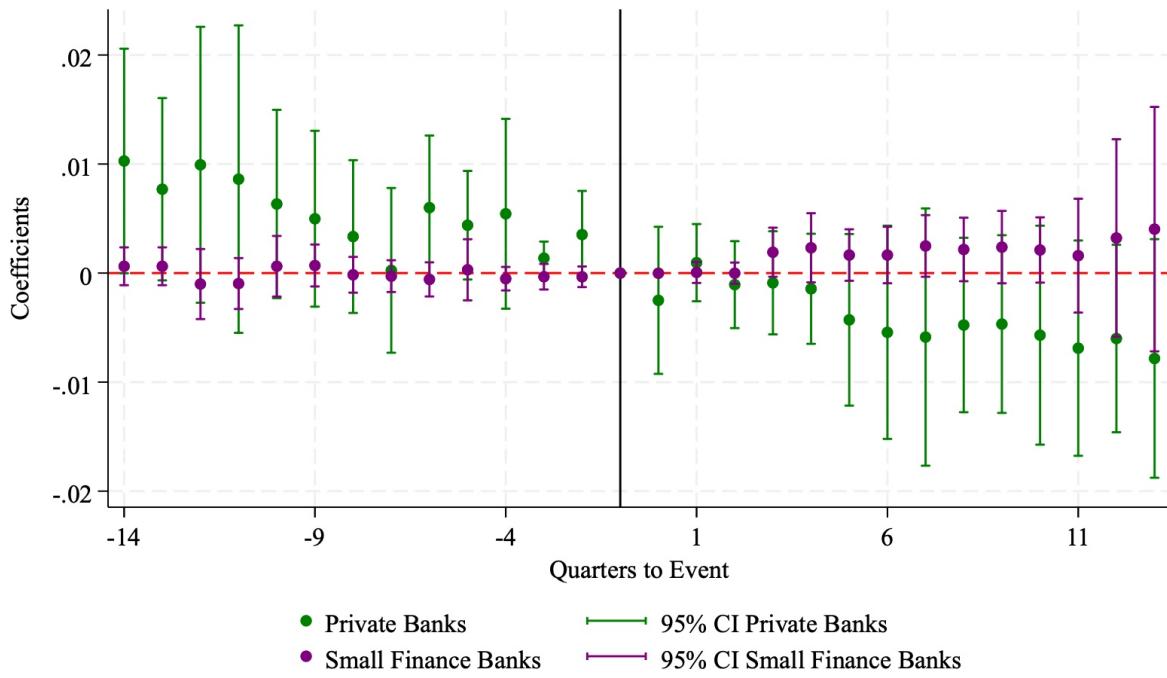


Figure 39: COVID-19 GNPA percent from Agricultural Sector





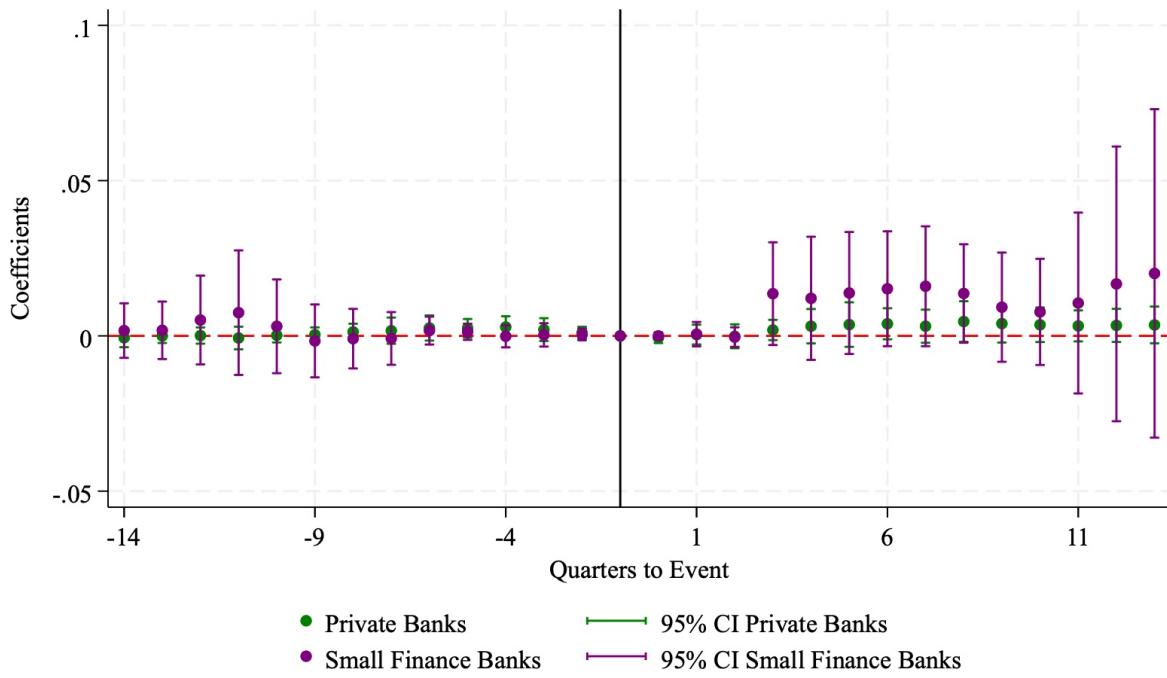


Figure 43: COVID-19 GNPA percent from Services Sector

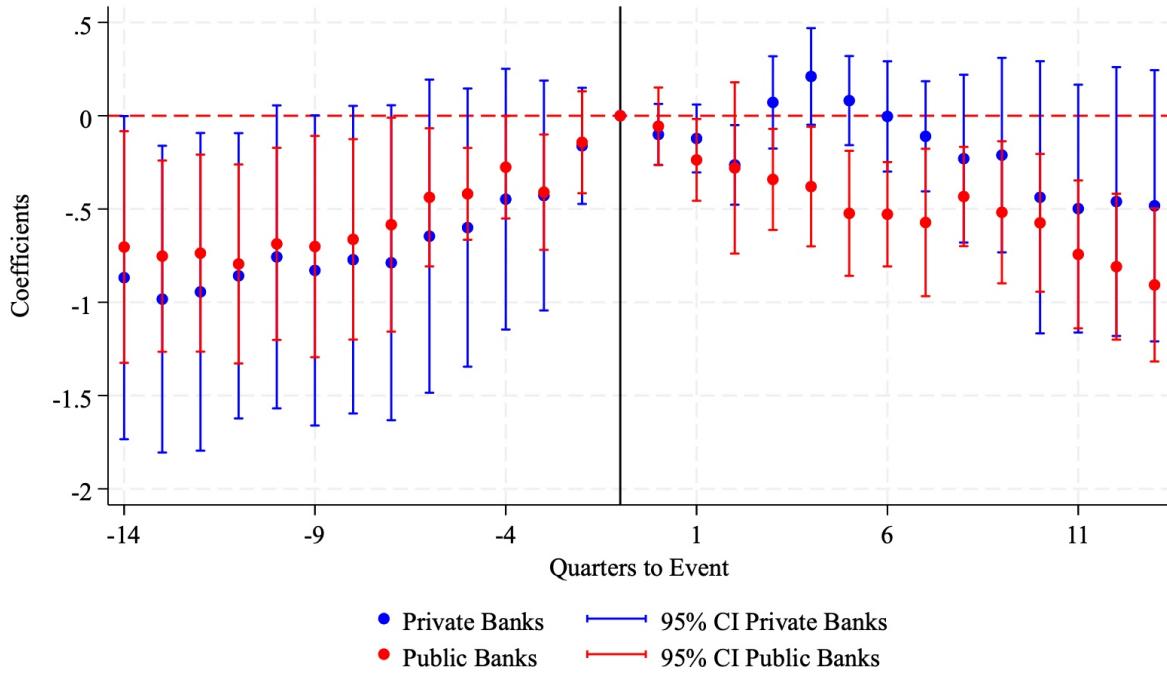


Figure 44: COVID-19 GNPA percent from Services Sector

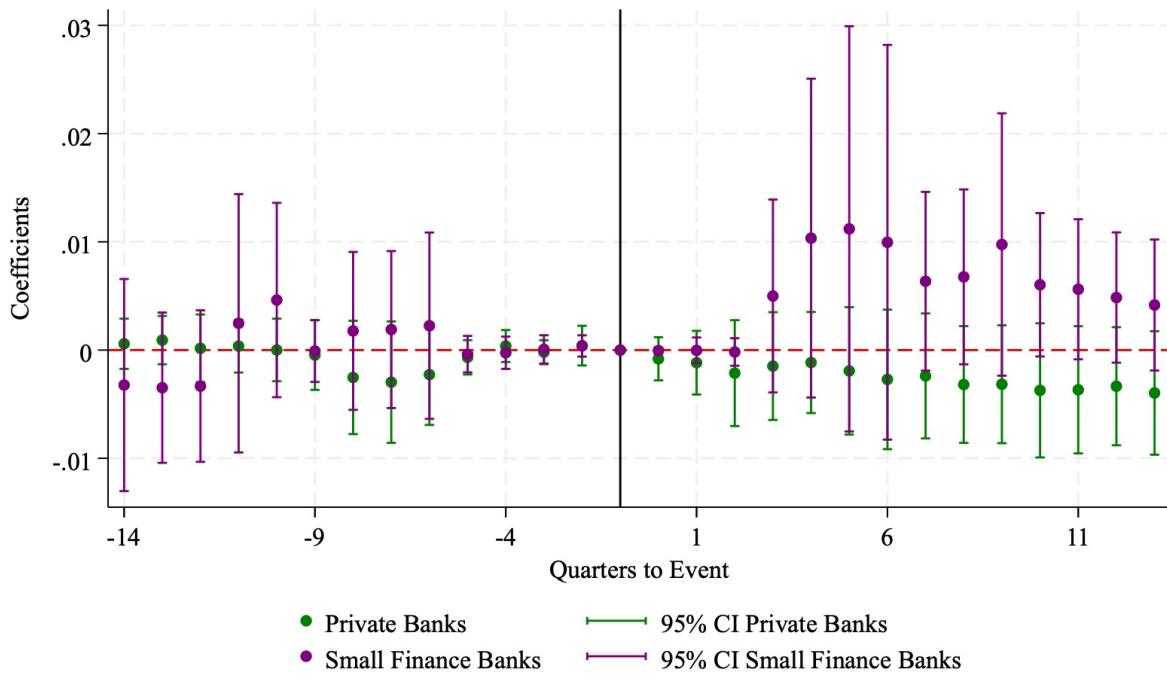


Figure 45: COVID-19 GNPA percent from Retail Sector

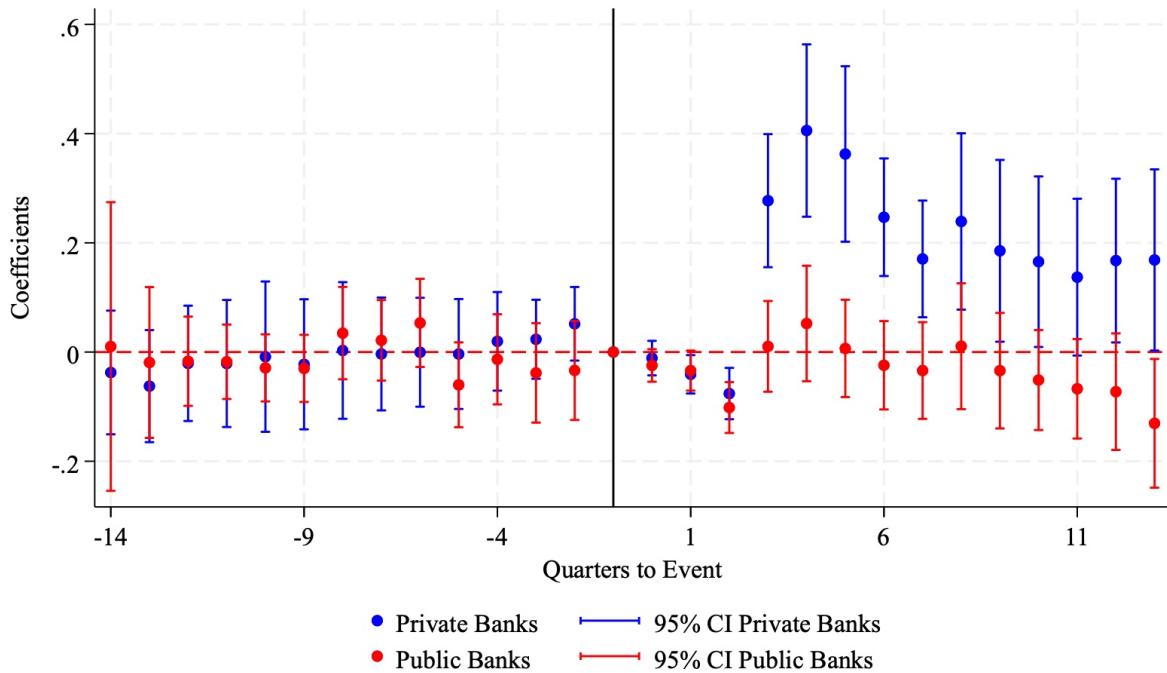


Figure 46: COVID-19 GNPA percent from Retail Sector

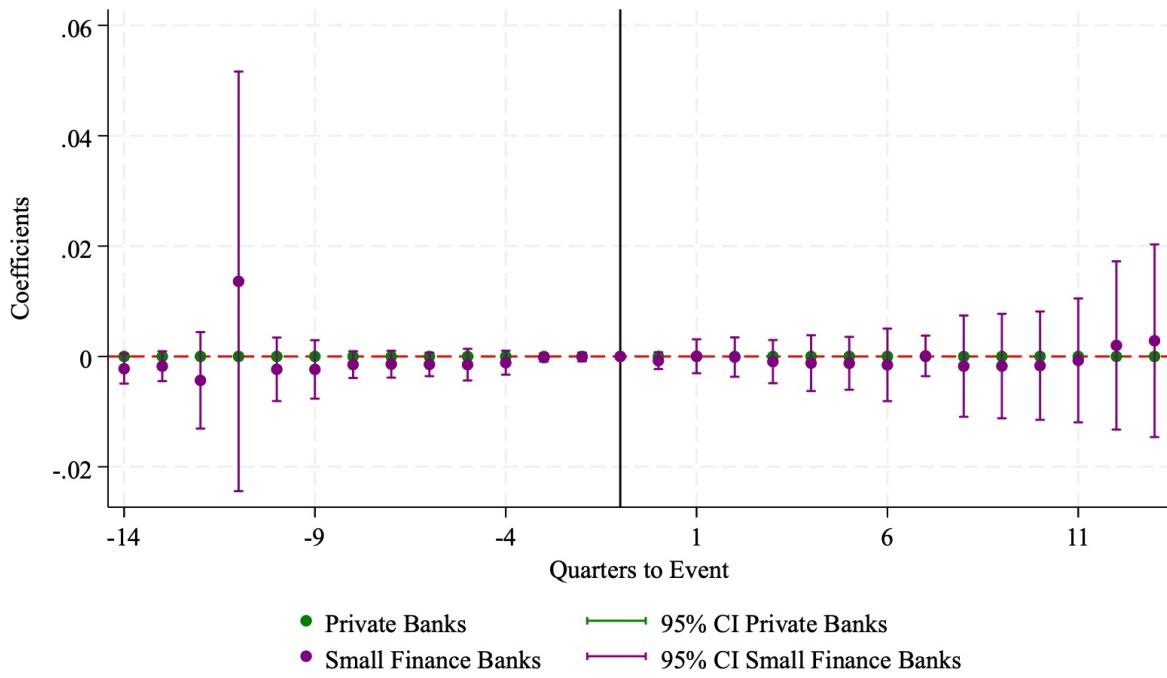


Figure 47: COVID-19 GNPA percent from Other Sectors

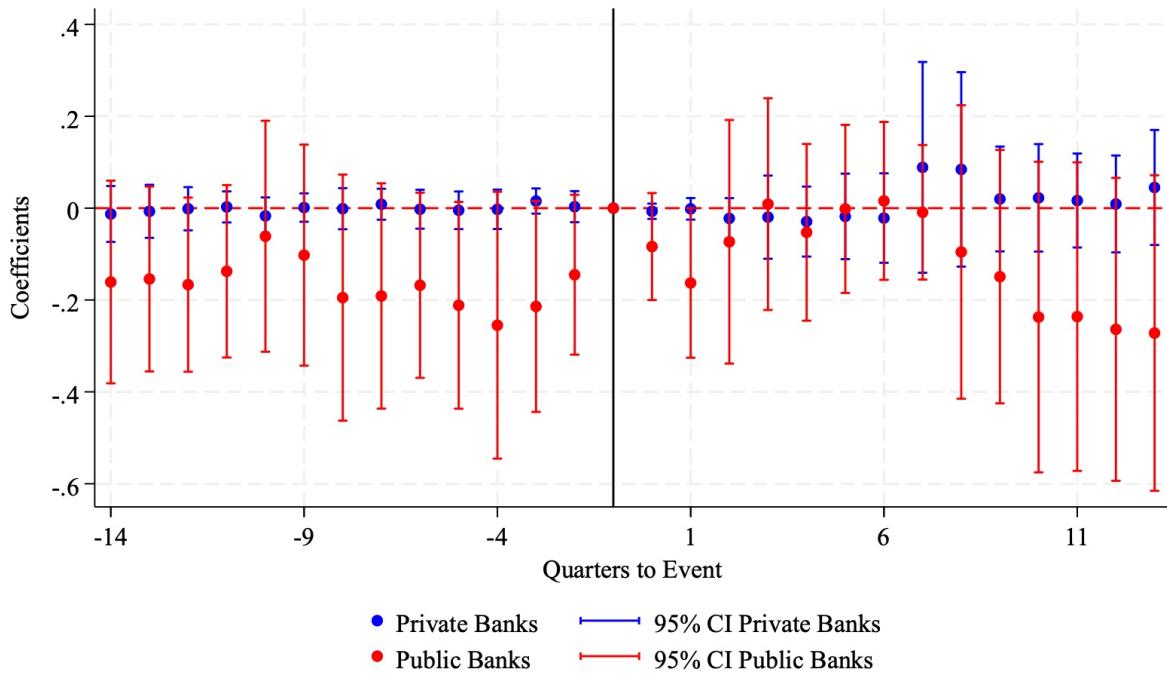


Figure 48: COVID-19 GNPA percent from Other Sectors

## IV Robustness of Other Results

### Demonetization Liberal

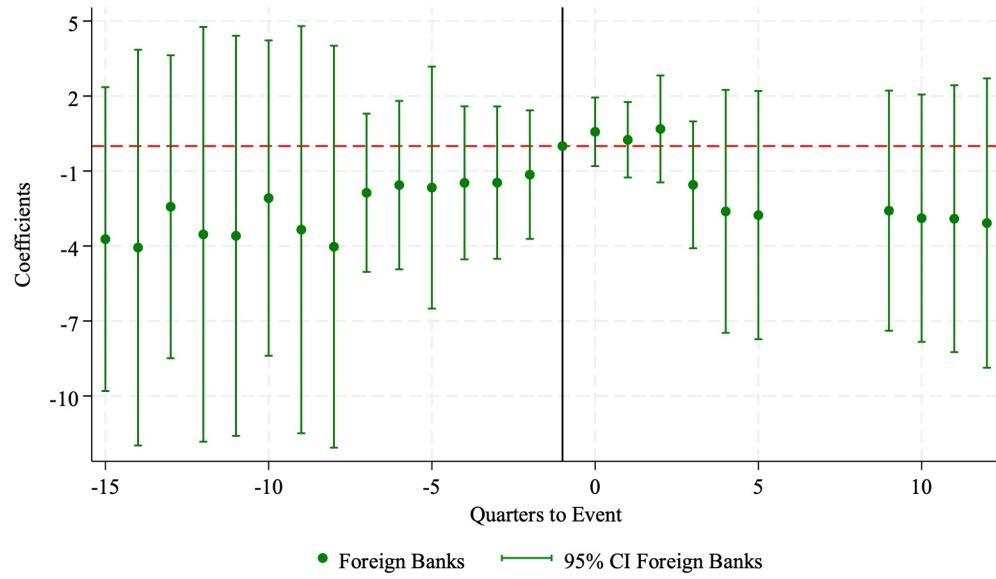


Figure 49: Demonetization GNPA percent from Non-Priority Sector Liberal Sample

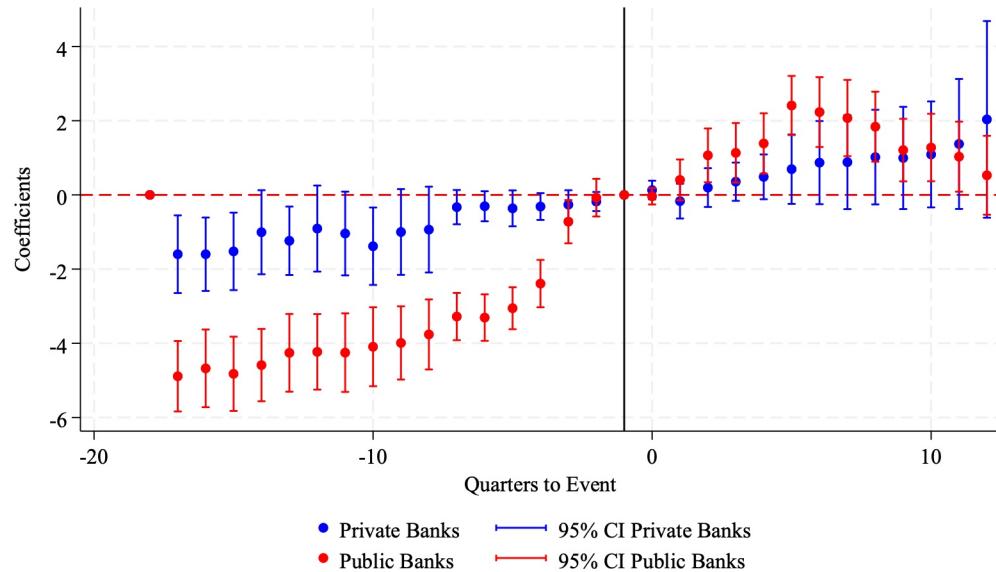
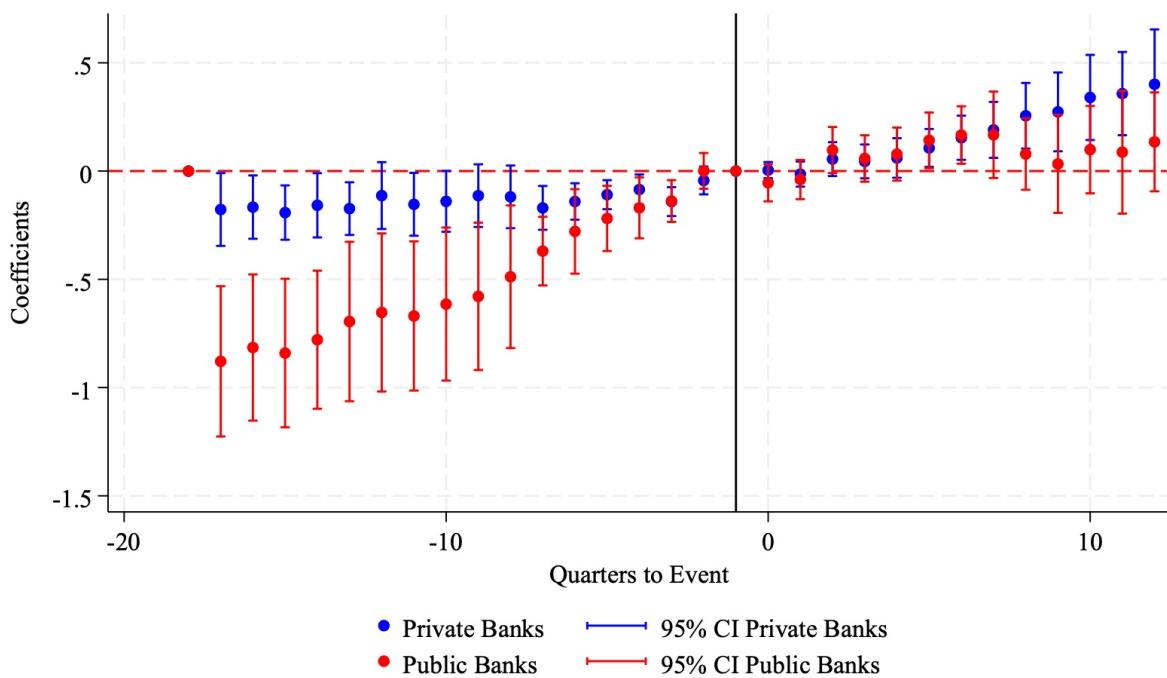
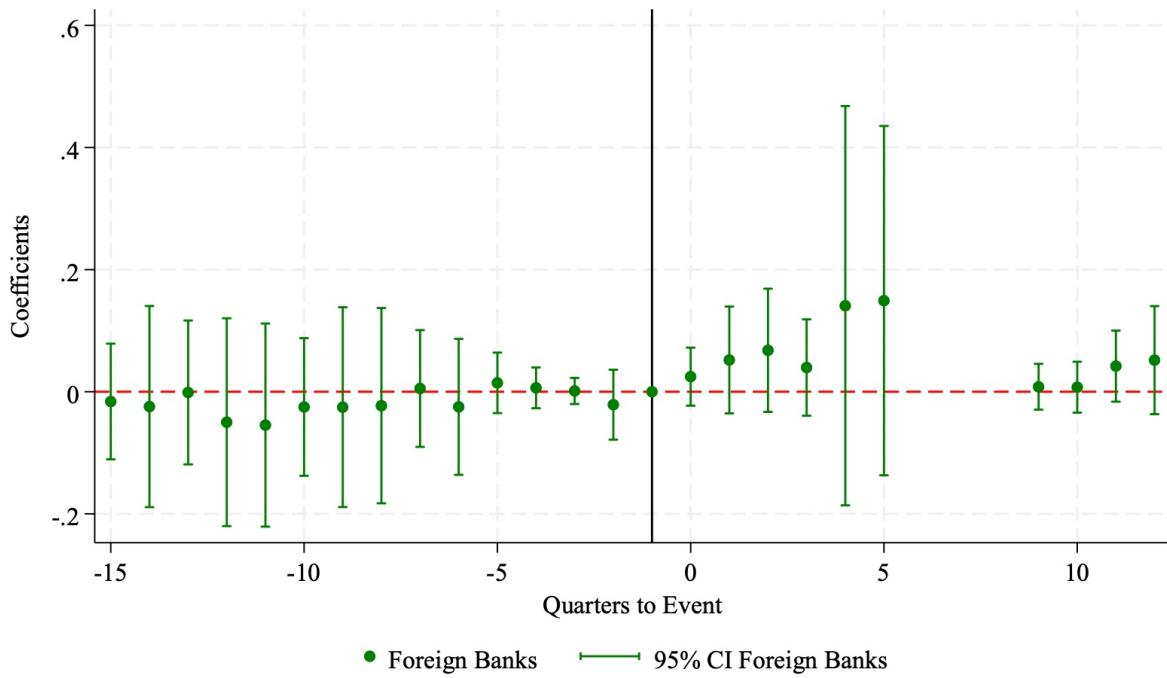


Figure 50: Demonetization GNPA percent from Non-Priority Sector Liberal Sample



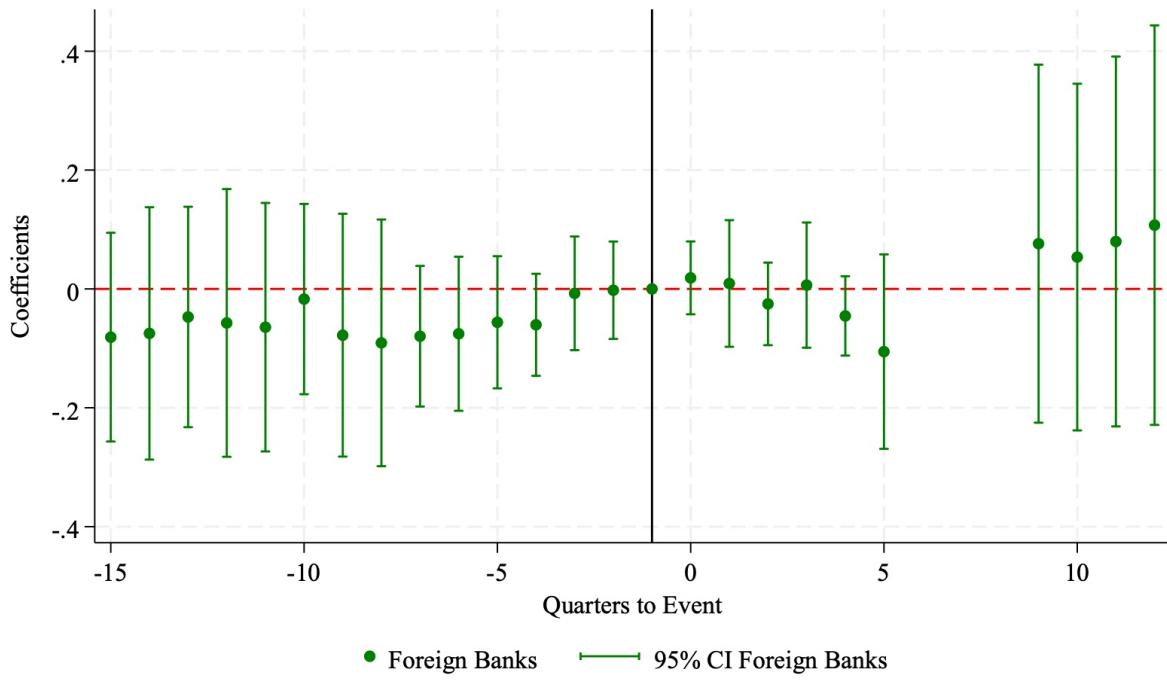


Figure 53: Demonetization GNPA percent from Other Priority Sector Liberal Sample

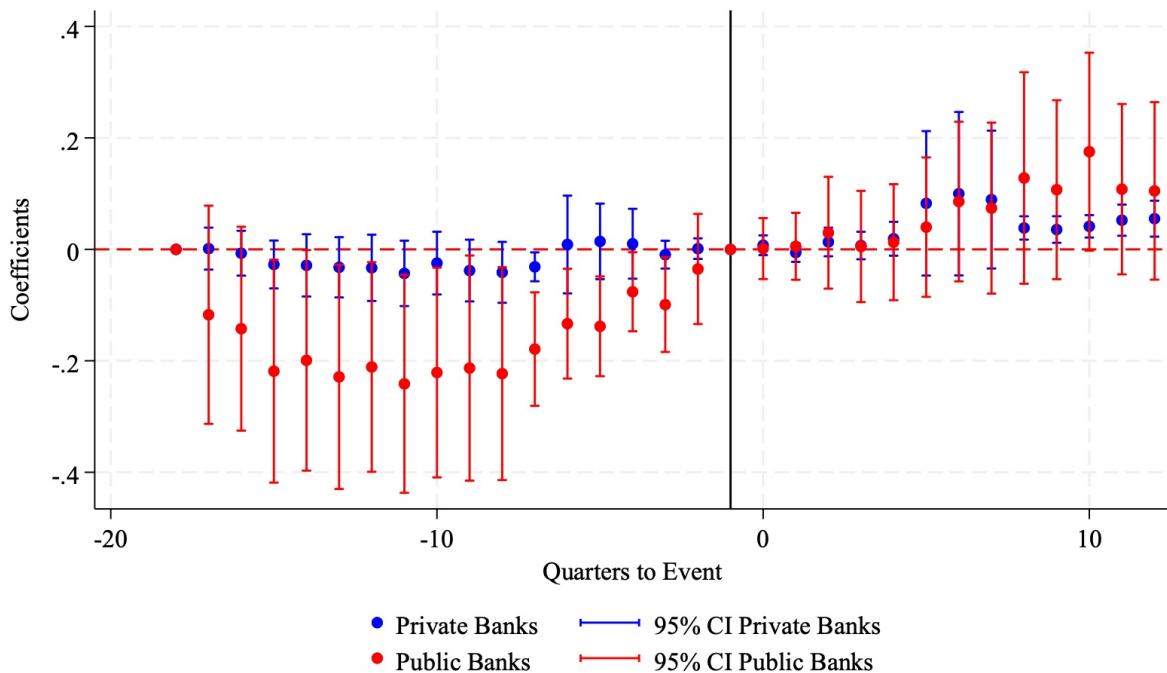


Figure 54: Demonetization GNPA percent from Other Priority Sector Liberal Sample

	Liberal Sample: Foreign Banks GNPA Percent				
	Agriculture	Industry	Services	Retail	Other
Quarter	(I)	(II)	(III)	(IV)	(V)
2017Q1	-.0002 (.0014)	.7478 (1.448)	-.0022 (.0818)	.0327 (.0315)	.0000 (.0000)
2017Q2	.0004 (.0018)	1.5991 (2.0332)	-.0351 (.0481)	.0336 (.0346)	.0000 (.0000)
2017Q3	.0004 (.0027)	-.6555 (.9201)	-.0081 (.1096)	.0358 (.0331)	.0000 (.0000)
2017Q4	.0029 (.0047)	-1.9972 (1.7466)	-.0936 (.0805)	.0487 (.0443)	.0000 (.0000)
<b>No. Obs</b>	107	195	166	272	87
<b>Size Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Priority Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Infrastructure Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Region Controls</b>	Yes	Yes	Yes	Yes	Yes

Table 8: Coefficients for the 4 quarters after Demonetization

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

	Liberal Sample: Private Banks GNPA Percent				
	Agriculture	Industry	Services	Retail	Other
Quarter	(I)	(II)	(III)	(IV)	(V)
2017Q1	.0373 (.0223)	.0274 (.1721)	.0208 (.0621)	-.0053 (.0178)	-.0351 (.0502)
2017Q2	.0767** (.0289)	.1802 (.1994)	.0951 (.0765)	.0355** (.0134)	-.0216 (.0596)
2017Q3	.0881*** (.0292)	.3483 (.2447)	.1121 (.0664)	.013 (.0168)	-.0201 (.1281)
2017Q4	.0931** (.034)	.5318* (.2516)	.1508** (.0694)	.0082 (.0234)	.0404 (.1245)
<b>No. Obs</b>	302	302	302	452	200
<b>Size Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Priority Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Infrastructure Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Region Controls</b>	Yes	Yes	Yes	Yes	Yes

Table 9: Coefficients for the 4 quarters after Demonetization

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

	Liberal Sample: Public Banks GNPA Percent				
	Agriculture	Industry	Services	Retail	Other
Quarter	(I)	(II)	(III)	(IV)	(V)
2017Q1	-.0289 (.0584)	.652** (.2543)	-.1315 (.1113)	-.0127 (.0179)	-.0803 (.0676)
2017Q2	.0786 (.0568)	1.3183*** (.3493)	-.0391 (.1226)	.015 (.0404)	-.0331 (.0385)
2017Q3	.0775 (.0538)	1.3502*** (.3669)	-.0996 (.1588)	.0028 (.0314)	-.0529 (.0348)
2017Q4	.0823 (.0718)	1.4867*** (.3557)	.0225 (.1554)	.0118 (.0371)	.0152 (.1079)
<b>No. Obs</b>	412	415	412	612	250
<b>Size Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Priority Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Infrastructure Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Region Controls</b>	Yes	Yes	Yes	Yes	Yes

Table 10: Coefficients for the 4 quarters after Demonetization

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## Demonetization Strict

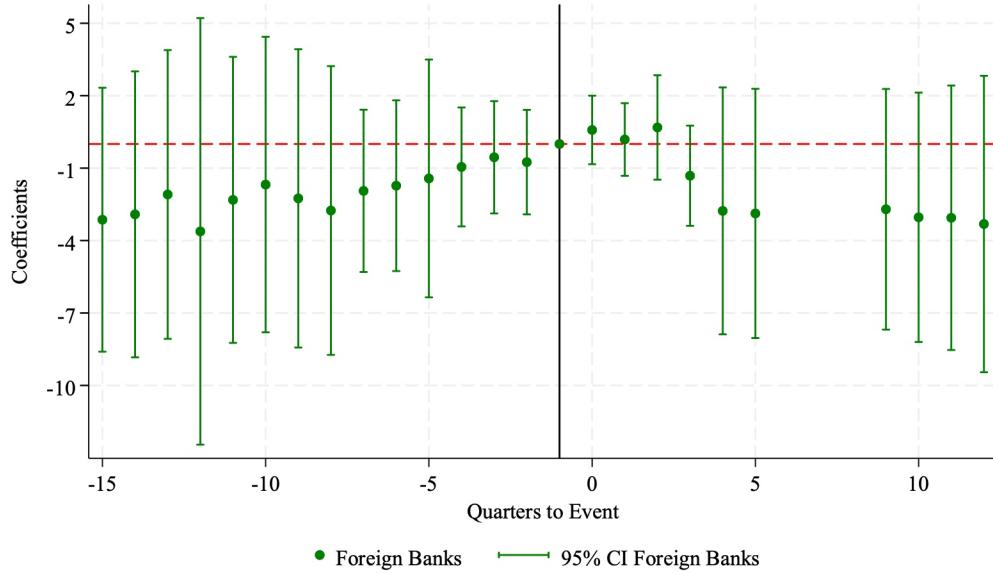


Figure 55: Demonetization GNPA percent from Non-Priority Sector Strict Sample

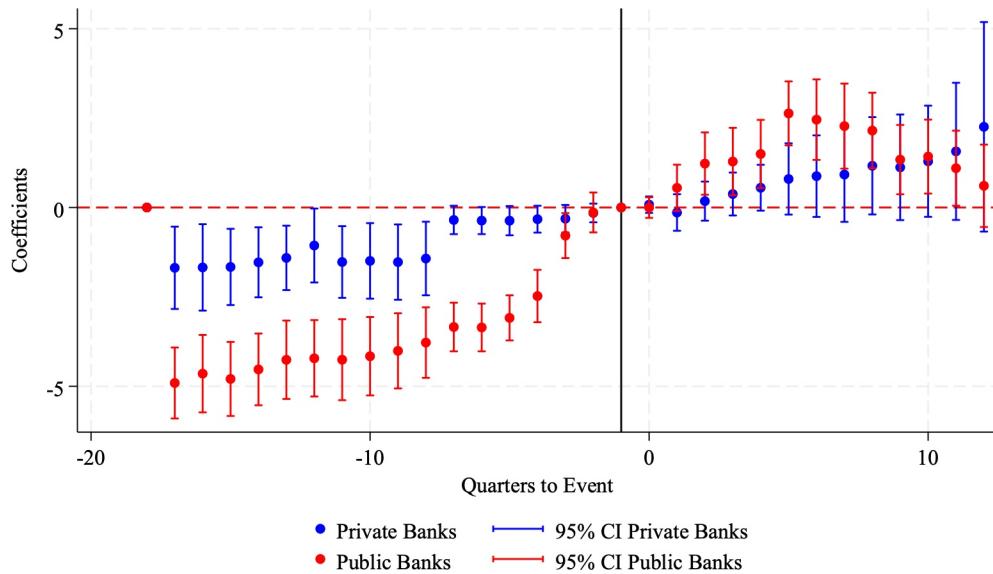


Figure 56: Demonetization GNPA percent from Non-Priority Sector Strict Sample

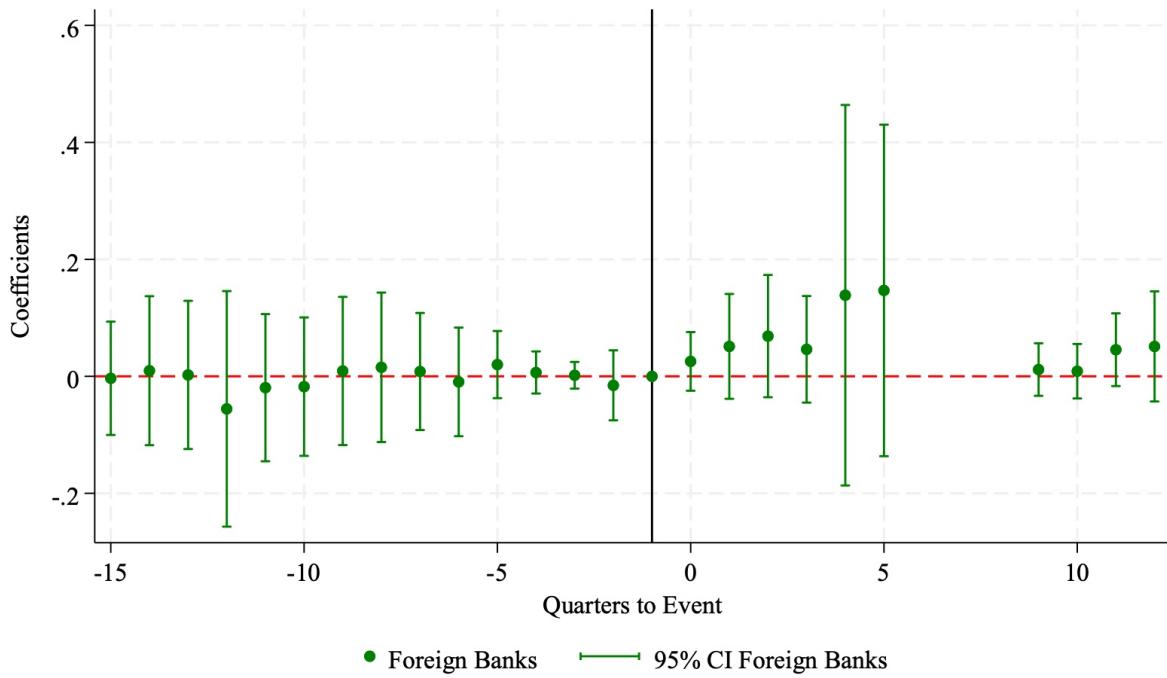


Figure 57: Demonetization GNPA percent from MSEs Strict Sample

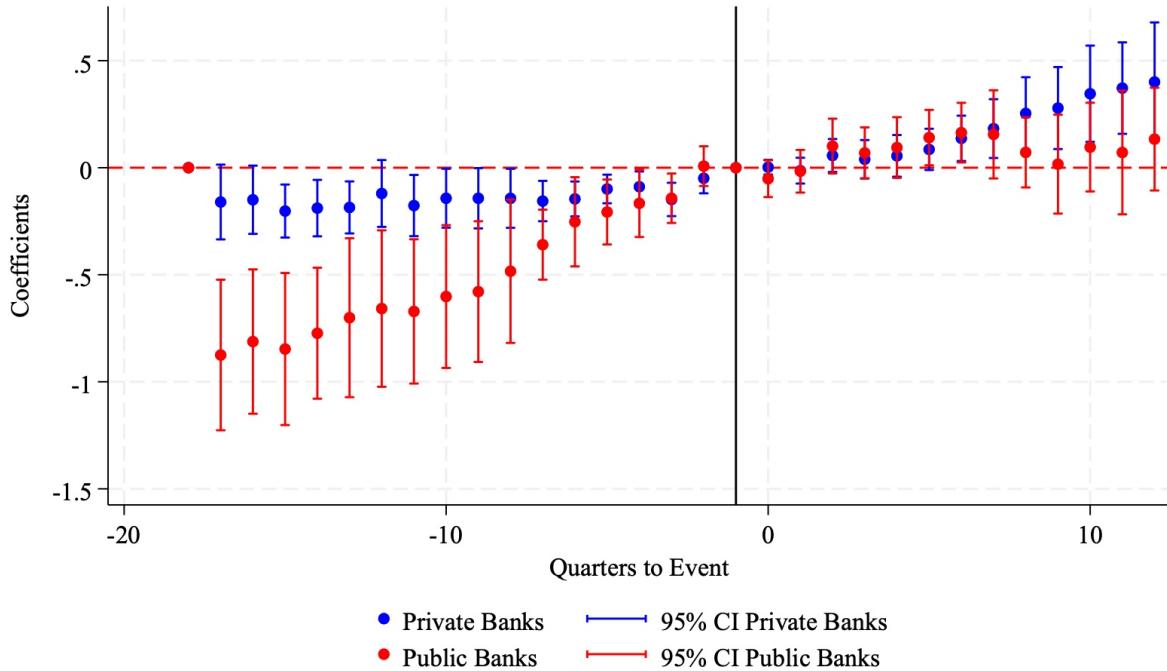


Figure 58: Demonetization GNPA percent from MSEs Strict Sample

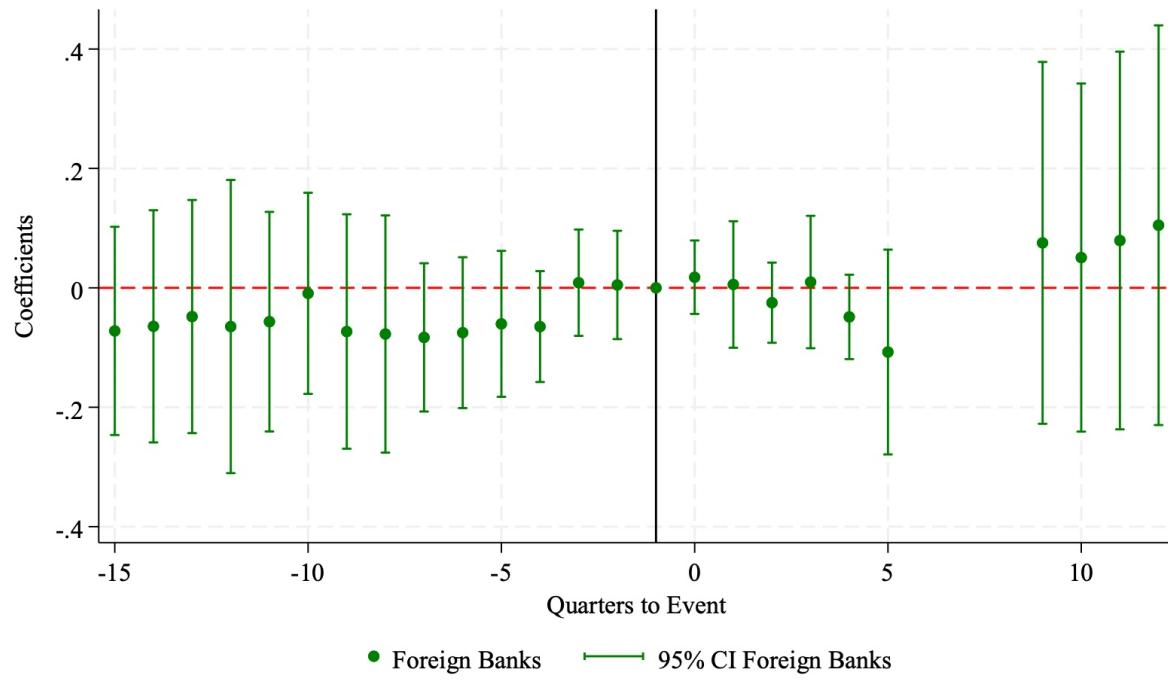


Figure 59: Demonetization GNPA percent from Other Priority Sector Strict Sample

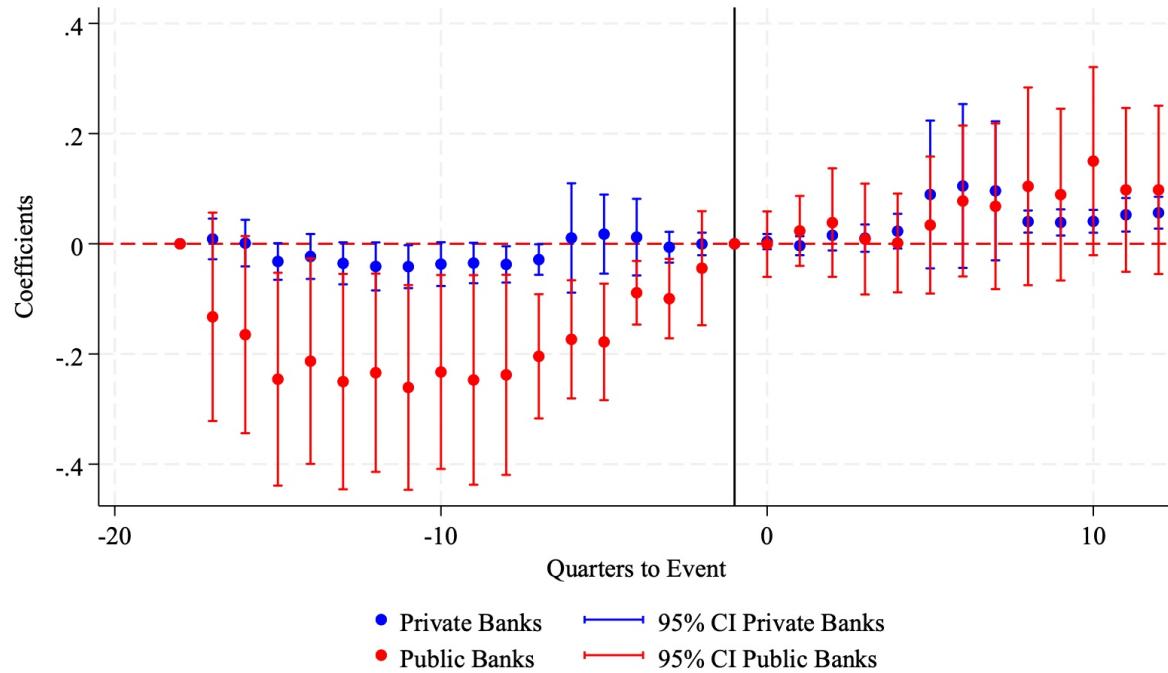


Figure 60: Demonetization GNPA percent from Other Priority Sector Strict Sample

	Strict Sample: Foreign Banks GNPA Percent				
	Agriculture	Industry	Services	Retail	Other
Quarter	(I)	(II)	(III)	(IV)	(V)
2017Q1	.0008 (.0017)	.8752 (1.5229)	-.0034 (.0859)	.0328 (.0319)	.0000 (.0000)
2017Q2	.0012 (.0017)	1.7442 (2.1154)	-.0354 (.0546)	.0331 (.035)	.0000 (.0000)
2017Q3	.0021 (.0035)	-.526 (.9319)	-.0059 (.1053)	.0392 (.0323)	.0000 (.0000)
2017Q4	.0047 (.0059)	-2.2127 (1.8554)	-.1546 (.0988)	.0422 (.0427)	.0000 (.0000)
<b>No. Obs</b>	105	187	162	266	87
<b>Size Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Priority Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Infrastructure Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Region Controls</b>	Yes	Yes	Yes	Yes	Yes

Table 11: Coefficients for the 4 quarters after Demonetization

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

	Strict Sample: Private Banks GNPA Percent				
	Agriculture	Industry	Services	Retail	Other
Quarter	(I)	(II)	(III)	(IV)	(V)
2017Q1	.0413*	.0266	.0087	-.0087	-.063
	(.0221)	(.1844)	(.0569)	(.0165)	(.0769)
2017Q2	.0808**	.1822	.0942	.0396**	-.0229
	(.0287)	(.2133)	(.0737)	(.0154)	(.0734)
2017Q3	.1084**	.4033	.1397	.019	.0733
	(.0374)	(.2698)	(.0873)	(.0204)	(.1858)
2017Q4	.1052**	.6052**	.1773**	.0107	.0846
	(.0378)	(.2508)	(.0761)	(.0265)	(.1697)
<b>No. Obs</b>	271	271	271	421	169
<b>Size Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Priority Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Infrastructure Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Region Controls</b>	Yes	Yes	Yes	Yes	Yes

Table 12: Coefficients for the 4 quarters after Demonetization

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

	Strict Sample: Public Banks GNPA Percent				
	Agriculture	Industry	Services	Retail	Other
Quarter	(I)	(II)	(III)	(IV)	(V)
2017Q1	-.0344	.6646***	-.1583	.0038	-.0308
	(.0664)	(.2104)	(.1268)	(.0171)	(.0469)
2017Q2	.0969	1.3343***	-.0977	.0322	-.0389
	(.0674)	(.3514)	(.1361)	(.044)	(.0358)
2017Q3	.0934	1.2951***	-.1478	.0181	-.0369
	(.0627)	(.3212)	(.1656)	(.0372)	(.0298)
2017Q4	.0961	1.415***	-.0029	.0199	-.0458
	(.0809)	(.337)	(.1609)	(.0431)	(.0329)
<b>No. Obs</b>	379	382	379	559	216
<b>Size Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Priority Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Infrastructure Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Region Controls</b>	Yes	Yes	Yes	Yes	Yes

Table 13: Coefficients for the 4 quarters after Demonetization

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## COVID-19 Liberal

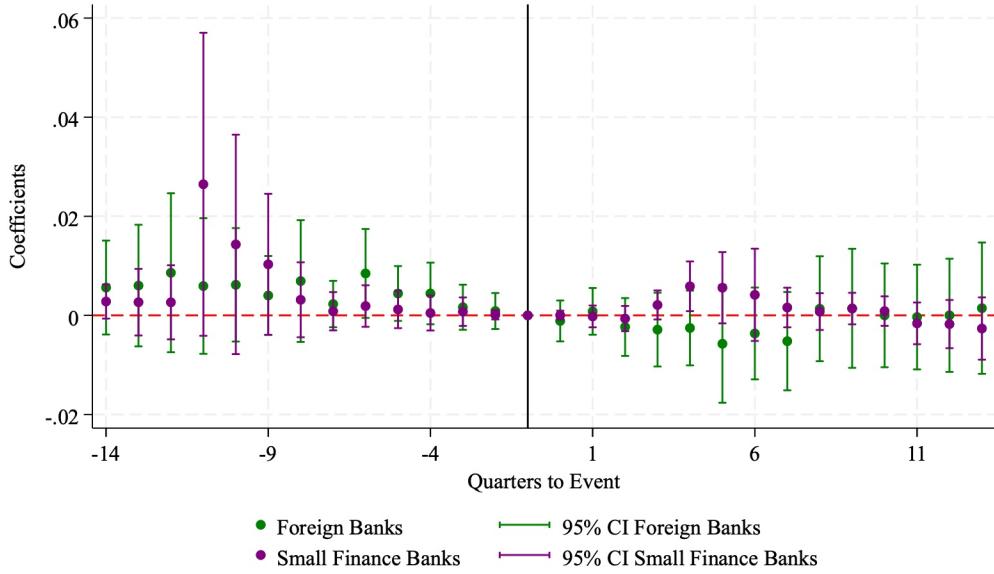


Figure 61: COVID-19 GNPA percent from Non-Priority Sector Liberal Sample

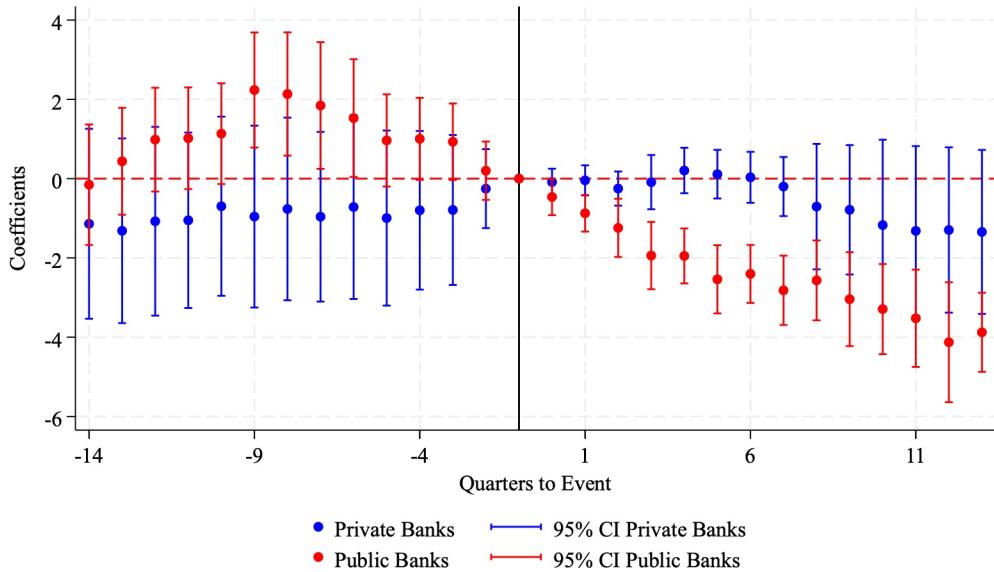


Figure 62: COVID-19 GNPA percent from Non-Priority Sector Liberal Sample

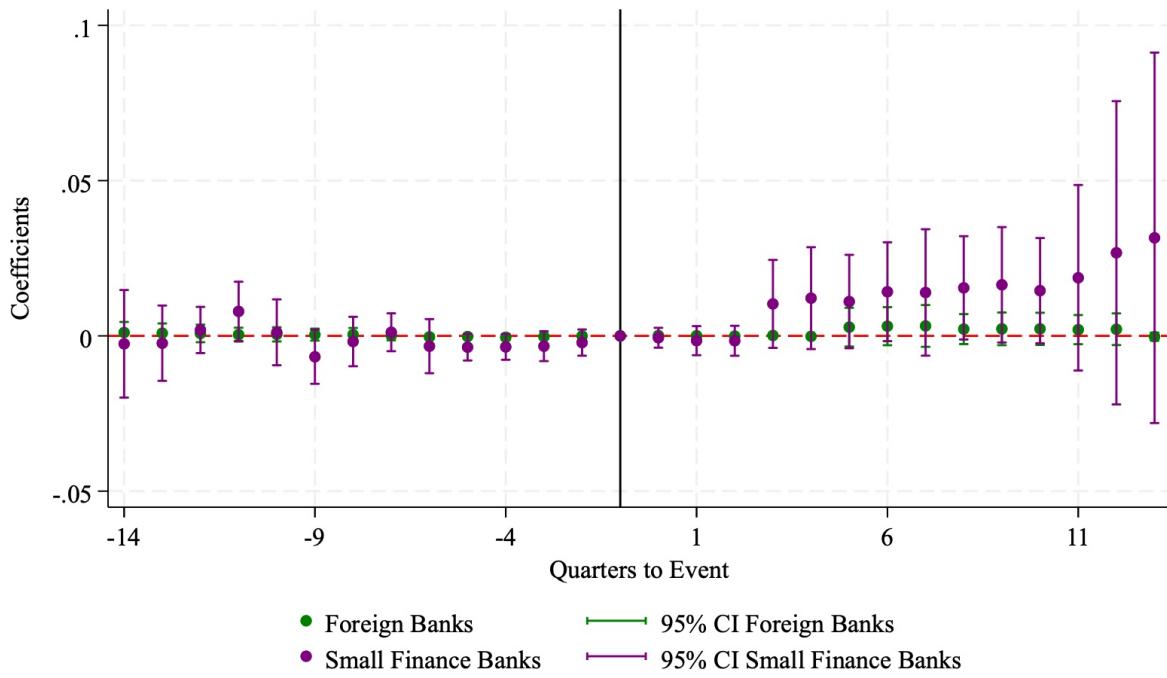


Figure 63: COVID-19 GNPA percent from MSEs Liberal Sample

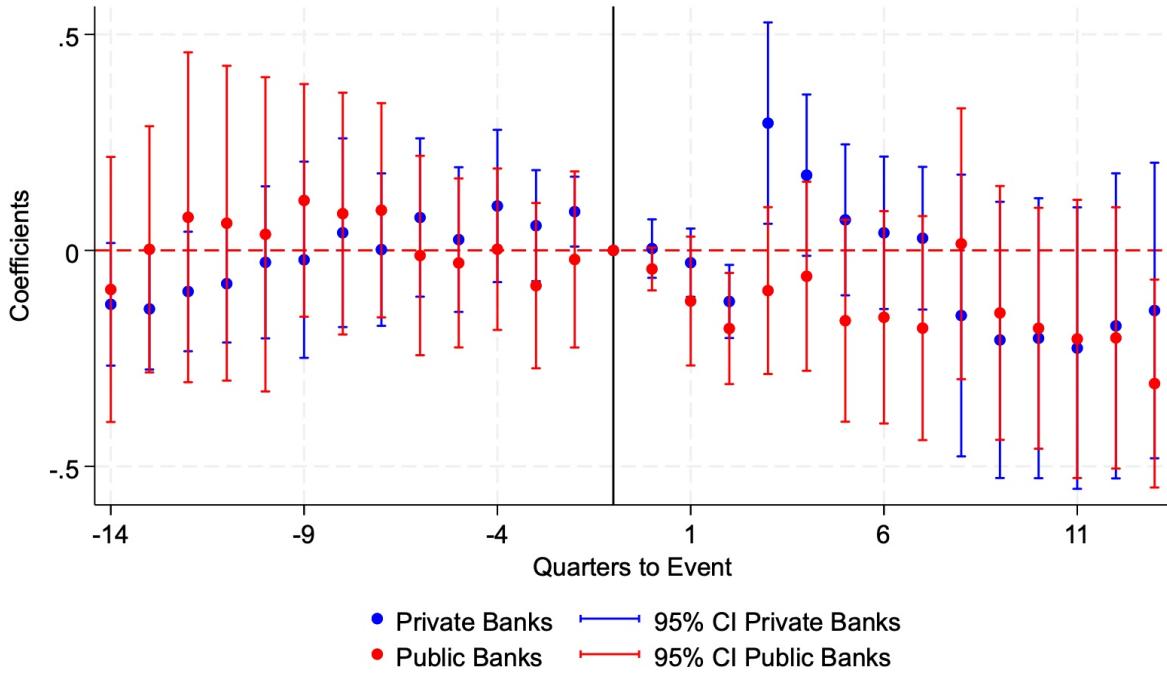


Figure 64: COVID-19 GNPA percent from MSEs Liberal Sample

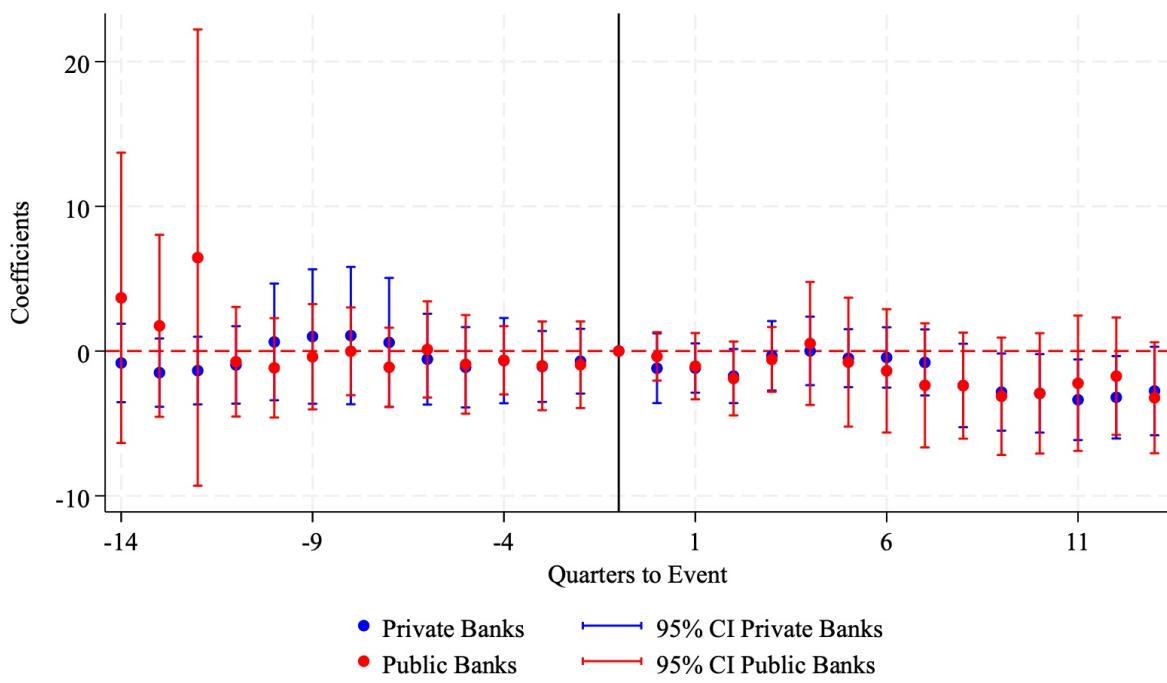
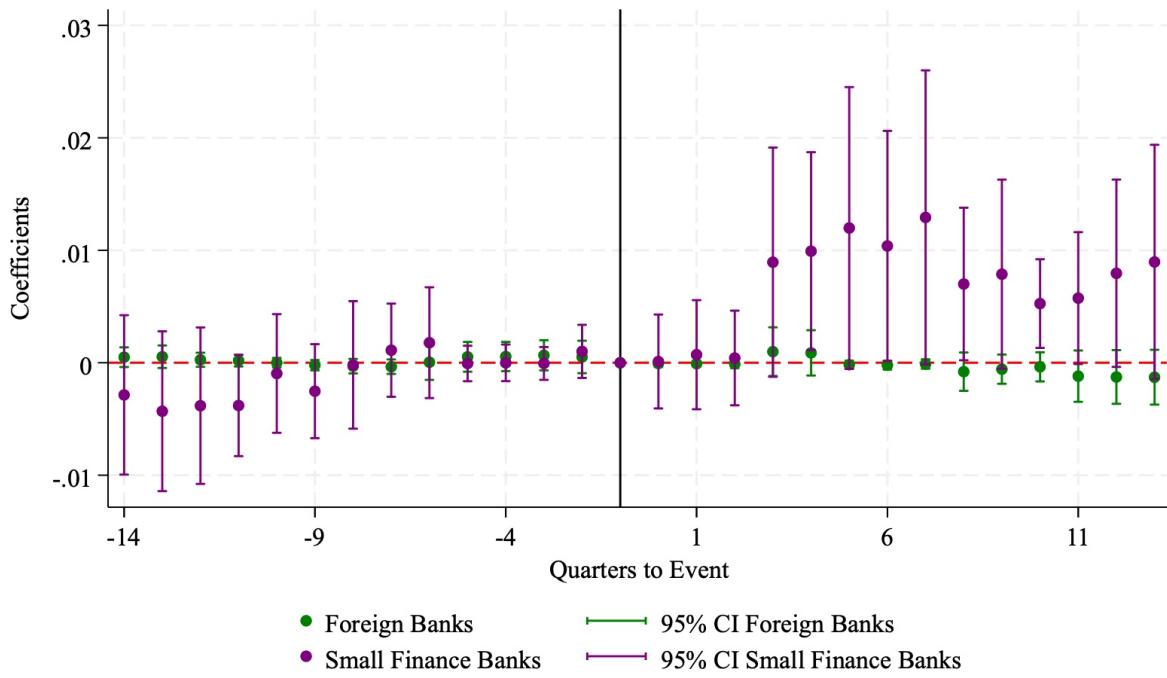


Figure 66: COVID-19 GNPA percent from Other Priority Sector Liberal Sample

	Liberal Sample: Foreign Banks GNPA Percent				
	Agriculture	Industry	Services	Retail	Other
Quarter	(I)	(II)	(III)	(IV)	(V)
2020Q3	.0029 (.0031)	-.0784 (.1911)	.1141 (.1706)	.0264 (.1122)	-.0000 (.0002)
2020Q4	-.006 (.0061)	-.2657 (.1896)	.1449 (.1301)	.0044 (.1338)	.0001 (.0002)
2021Q1	.0059 (.0081)	-.372 (.2447)	.3219 (.3119)	-.0004 (.1574)	.0004 (.0003)
2021Q2	.009 (.0081)	-.4557 (.4006)	.2741 (.2556)	-.1315 (.2404)	-.0000 (.0004)
<b>No. Obs</b>	385	699	614	435	361
<b>Size Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Priority Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Infrastructure Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Region Controls</b>	Yes	Yes	Yes	Yes	Yes

Table 14: Coefficients for the 4 quarters after COVID-19

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

	Liberal Sample: Small Finance Banks GNPA Percent				
	Agriculture	Industry	Services	Retail	Other
Quarter	(I)	(II)	(III)	(IV)	(V)
2020Q3	.1588 (.1987)	.0305 (.0497)	.0368 (.1465)	-.0585 (.0562)	-.2189 (.4751)
2020Q4	.0286 (.1369)	.0254 (.0435)	-.0541 (.0971)	-.0679 (.0639)	-.3231 (.3477)
2021Q1	1.416** (.5635)	.2514* (.1213)	1.3189** (.625)	.4242 (.3019)	-.4308 (.4173)
2021Q2	1.7568** (.6592)	.2921 (.1673)	1.2174 (.7306)	1.001 (.5977)	-.3806 (.5277)
<b>No. Obs</b>	200	182	203	204	107
<b>Size Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Priority Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Infrastructure Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Region Controls</b>	Yes	Yes	Yes	Yes	Yes

Table 15: Coefficients for the 4 quarters after COVID-19

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Quarter	Liberal Sample: Private Banks GNPA Percent				
	Agriculture (I)	Industry (II)	Services (III)	Retail (IV)	Other (V)
2020Q3	-.0318 (.0234)	-.1027 (.1268)	-.1234 (.0847)	-.0397** (.0145)	-.002 (.0122)
2020Q4	-.0707*** (.0205)	-.3477** (.1349)	-.3149*** (.1048)	-.0719*** (.0212)	-.0226 (.0252)
2021Q1	.1119 (.0742)	-.3854* (.2047)	.0444 (.1253)	.2745*** (.0597)	-.0239 (.0433)
2021Q2	.1968* (.1041)	-.2752* (.1251)	.1849 (.1232)	.4011*** (.0778)	-.0376 (.0336)
<b>No. Obs</b>	530	530	530	530	401
<b>Size Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Priority Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Infrastructure Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Region Controls</b>	Yes	Yes	Yes	Yes	Yes

Table 16: Coefficients for the 4 quarters after COVID-19

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Quarter	Liberal Sample: Public Banks GNPA Percent				
	Agriculture (I)	Industry (II)	Services (III)	Retail (IV)	Other (V)
2020Q3	-.1029** (.0386)	-.8407*** (.1348)	-.1826* (.0941)	-.0261 (.0153)	-.1146 (.0693)
2020Q4	-.2116*** (.0398)	-.1344*** (.2024)	-.2094 (.1996)	-.0901*** (.0236)	-.0513 (.1011)
2021Q1	-.1062** (.0431)	-.18354*** (.2359)	-.2767** (.1156)	.0151 (.0386)	.0077 (.0935)
2022Q2	-.0678 (.0617)	-.1789*** (.2451)	-.3358** (.1218)	.0643 (.0465)	-.0338 (.0761)
<b>No. Obs</b>	368	368	336	368	302
<b>Size Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Priority Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Infrastructure Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Region Controls</b>	Yes	Yes	Yes	Yes	Yes

Table 17: Coefficients for the 4 quarters after COVID-19

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## COVID-19 Strict

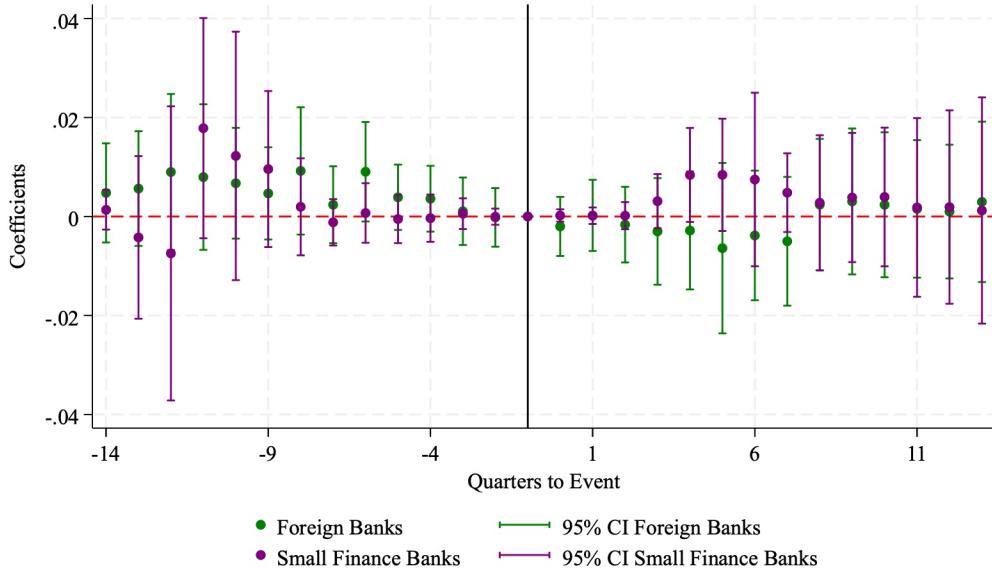


Figure 67: COVID-19 GNPA percent from Non-Priority Sector Strict Sample

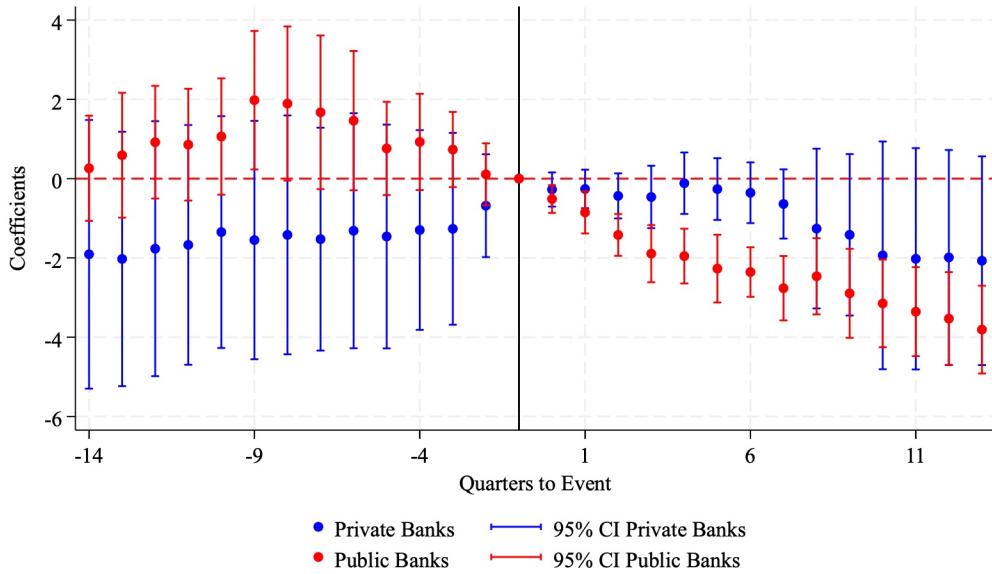
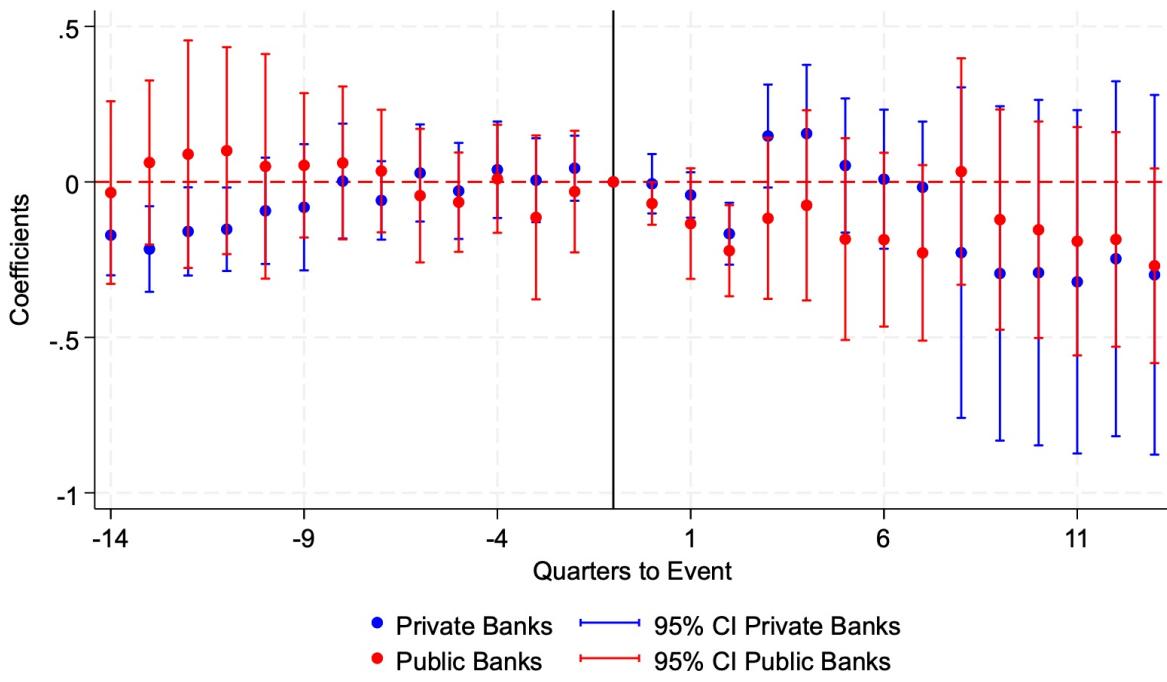
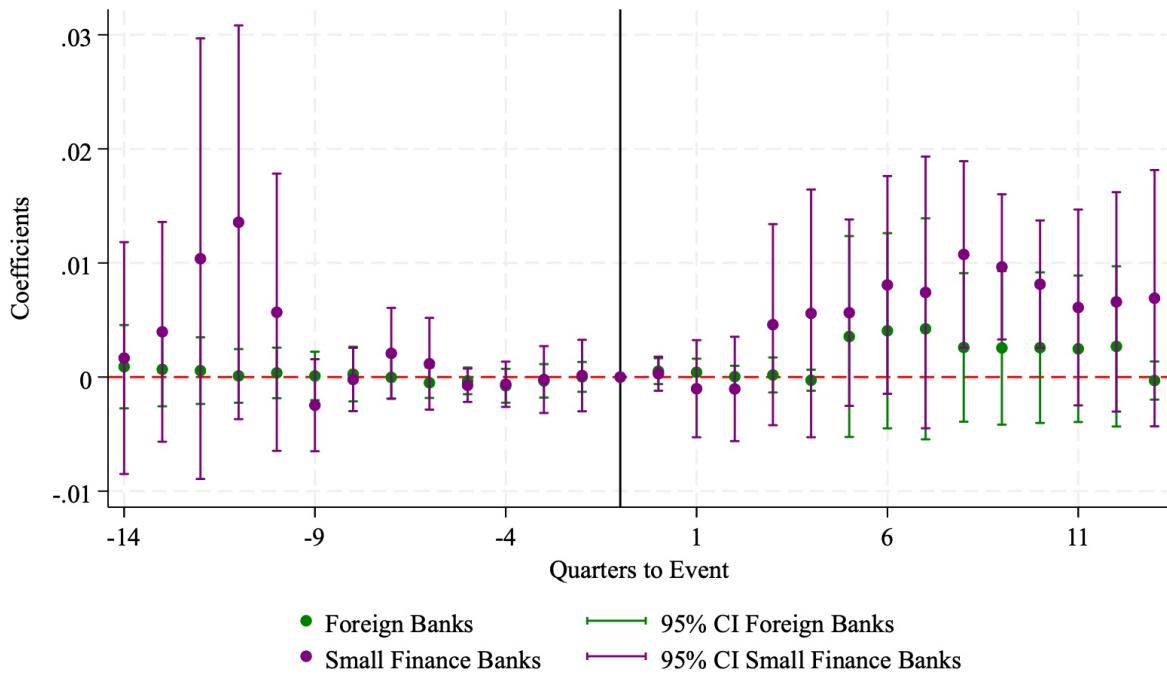


Figure 68: COVID-19 GNPA percent from Non-Priority Sector Strict Sample



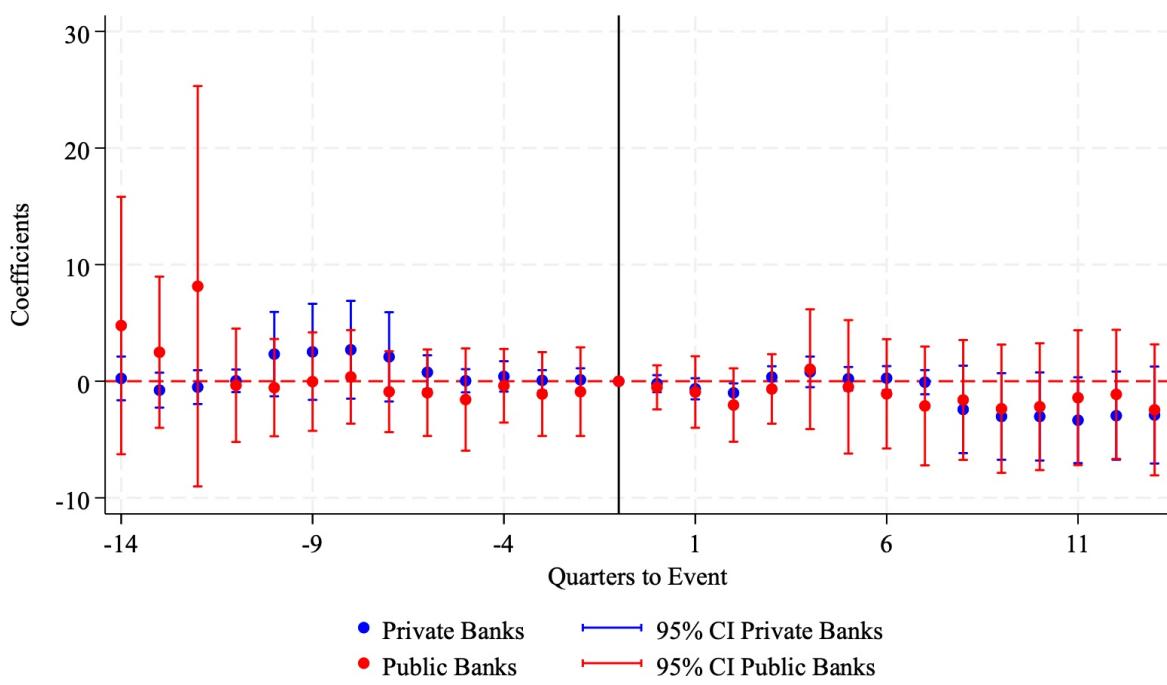
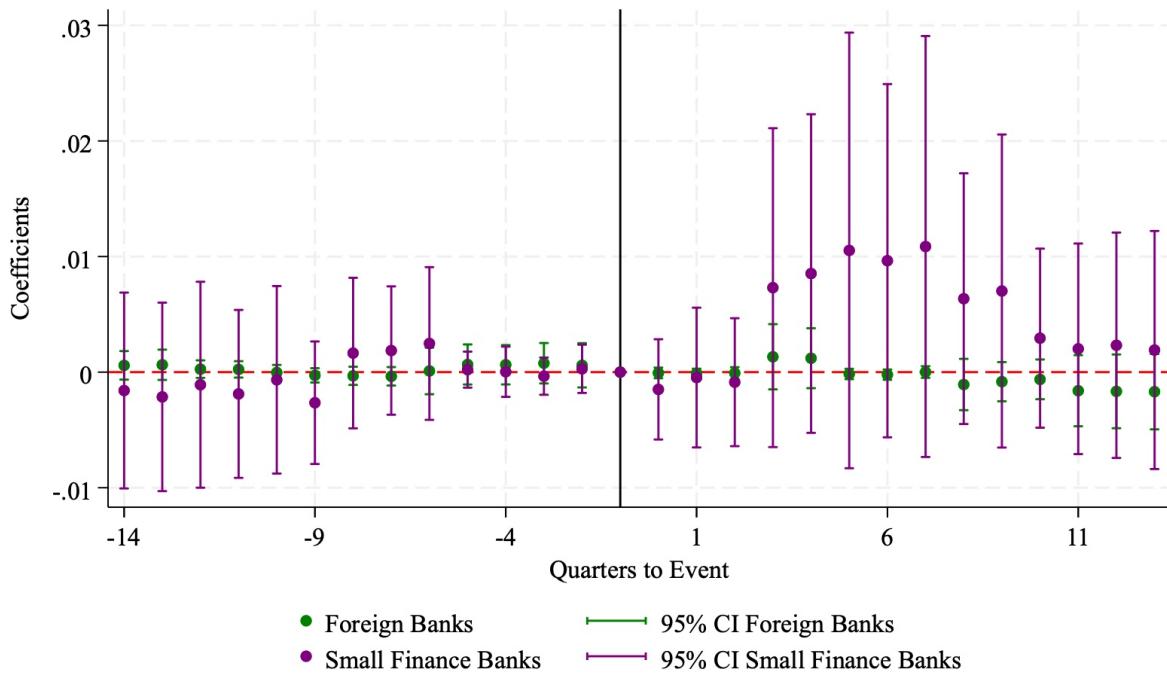


Figure 72: COVID-19 GNPA percent from Other Priority Sector Strict Sample

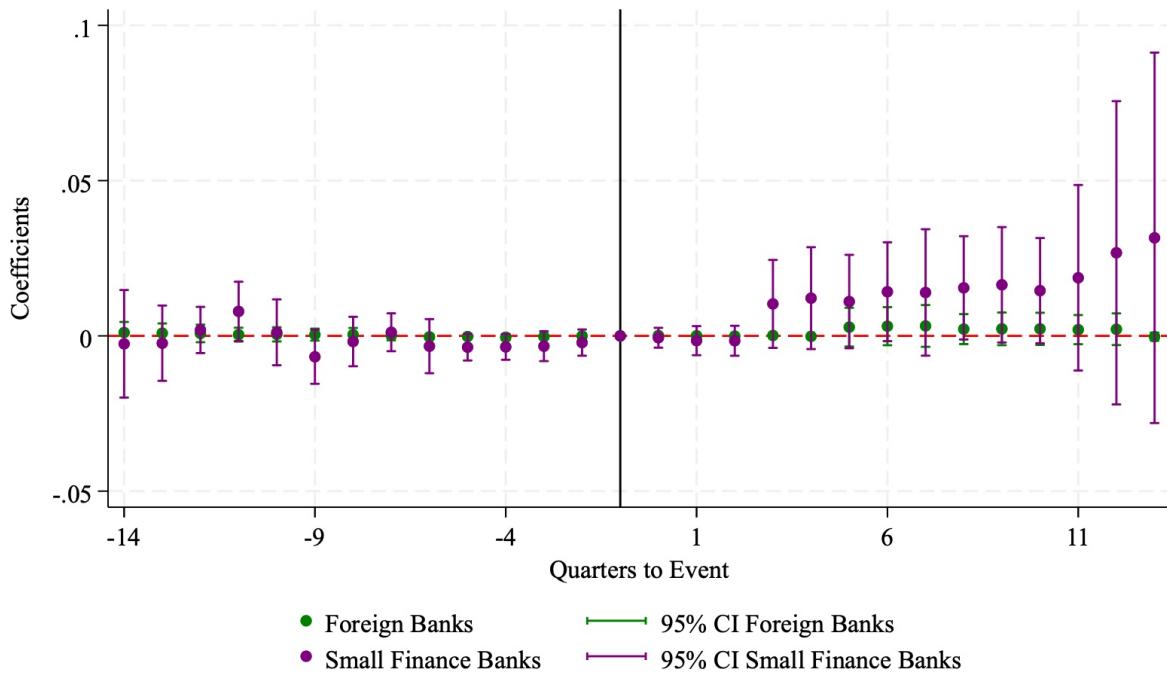


Figure 73: COVID-19 GNPA percent from MSEs Liberal Sample

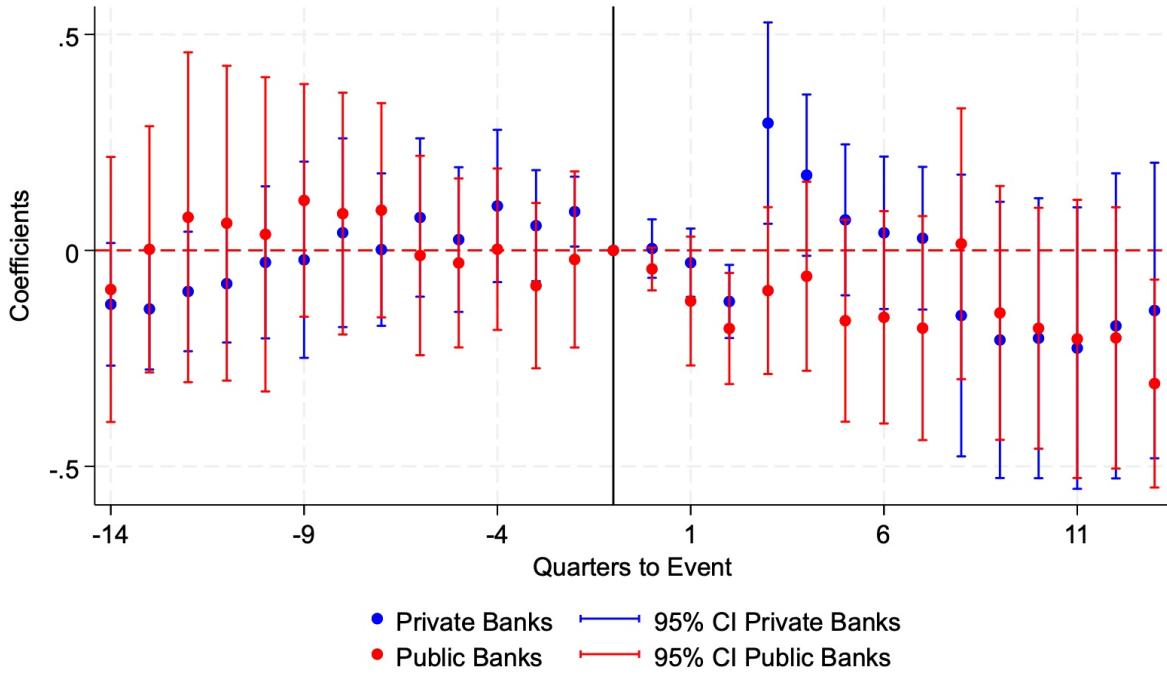


Figure 74: COVID-19 GNPA percent from MSEs Liberal Sample

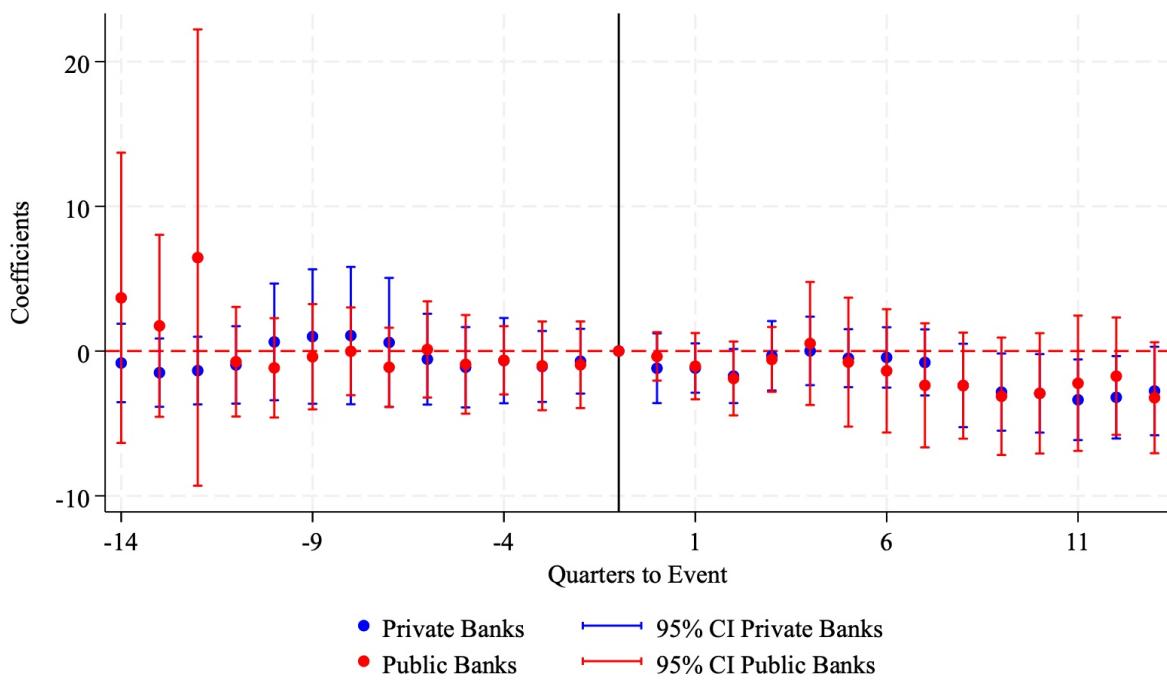
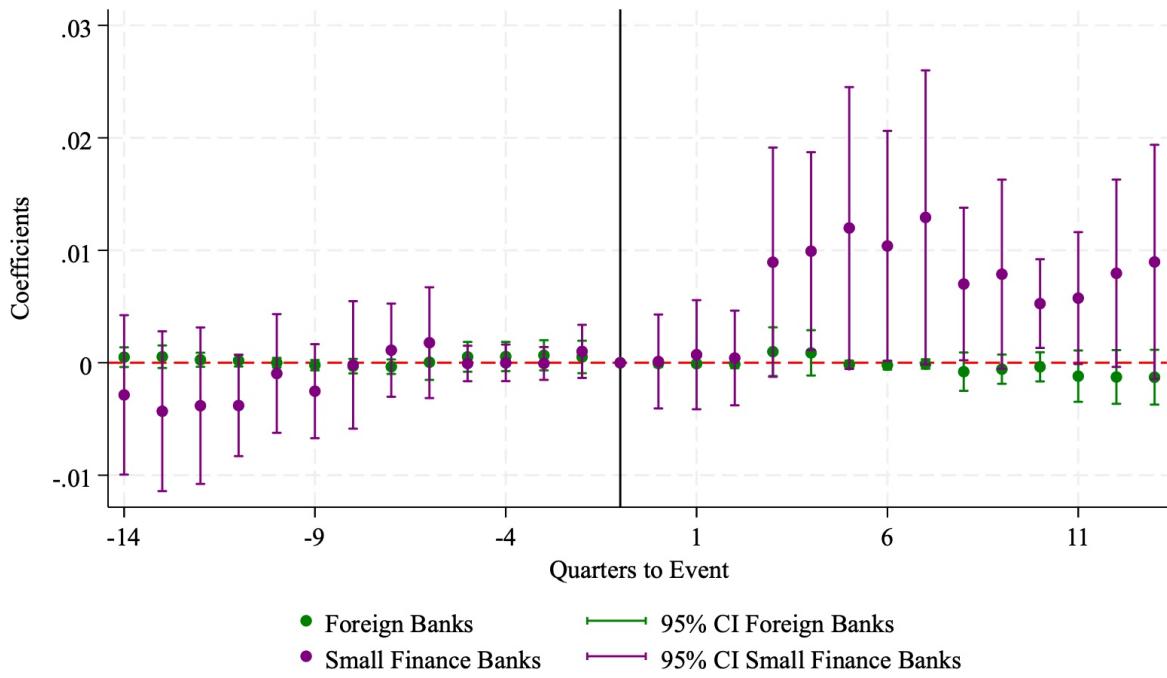


Figure 76: COVID-19 GNPA percent from Other Priority Sector Liberal Sample

	Strict Sample: Foreign Banks GNPA Percent				
	Agriculture	Industry	Services	Retail	Other
Quarter	(I)	(II)	(III)	(IV)	(V)
2020Q3	.0017 (.0038)	-.0358 (.2656)	.2779 (.2824)	.0389 (.1435)	.00001 (.0002)
2020Q4	-.0069 (.0072)	-.2315 (.3093)	.2499 (.2043)	.0151 (.1654)	.0002 (.0003)
2021Q1	.0048 (.0071)	-.2197 (.3416)	.5963 (.5021)	.0279 (.1926)	.0005 (.0003)
2021Q2	.0103 (.0082)	-.1961 (.3974)	.5021 (.4109)	-.1051 (.248)	-.0001 (.0004)
<b>No. Obs</b>	344	566	501	386	334
<b>Size Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Priority Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Infrastructure Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Region Controls</b>	Yes	Yes	Yes	Yes	Yes

Table 18: Coefficients for the 4 quarters after COVID-19

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

	Strict Sample: Small Finance Banks GNPA Percent				
	Agriculture	Industry	Services	Retail	Other
Quarter	(I)	(II)	(III)	(IV)	(V)
2020Q3	-.0172 (.0863)	-.0035 (.0496)	-.0927 (.0542)	-.058 (.0789)	-.3309 (.3916)
2020Q4	-.0185 (.072)	.0019 (.0455)	-.0714 (.1566)	-.0562 (.1313)	-.2977 (.4296)
2021Q1	1.099** (.3901)	.1795 (.1614)	.7289* (.3155)	.5354 (.471)	-.1732 (.5036)
2021Q2	1.4555** (.5271)	.2301 (.2348)	.5041 (.4349)	1.2969 (.8352)	.2946** (.0874)
<b>No. Obs</b>	153	134	157	157	76
<b>Size Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Priority Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Infrastructure Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Region Controls</b>	Yes	Yes	Yes	Yes	Yes

Table 19: Coefficients for the 4 quarters after COVID-19

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

	Strict Sample: Private Banks GNPA Percent				
	Agriculture	Industry	Services	Retail	Other
Quarter	(I)	(II)	(III)	(IV)	(V)
2020Q3	-.0256*	-.1292	-.0886	-.0319*	-.0067
	(.0124)	(.1532)	(.1006)	(.0152)	(.0165)
2020Q4	-.0569***	-.3768*	-.2742*	-.0585***	-.0268
	(.0173)	(.1874)	(.1395)	(.0174)	(.0304)
2021Q1	.0574	-.3895	.0773	.2573***	-.0201
	(.0402)	(.2246)	(.1247)	(.0511)	(.0502)
2021Q2	.1096**	-.2771*	.2814	.4007***	-.0196
	(.0495)	(.1528)	(.1682)	(.0743)	(.0447)
<b>No. Obs</b>	447	447	447	447	336
<b>Size Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Priority Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Infrastructure Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Region Controls</b>	Yes	Yes	Yes	Yes	Yes

Table 20: Coefficients for the 4 quarters after COVID-19

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

	Strict Sample: Public Banks GNPA Percent				
	Agriculture	Industry	Services	Retail	Other
Quarter	(I)	(II)	(III)	(IV)	(V)
2020Q3	-.0959**	-.7487***	-.2175*	-.0319*	-.1654*
	(.0392)	(.1531)	(.1188)	(.0153)	(.0758)
2020Q4	-.2009***	-1.2542***	-.2647	-.1005***	-.0746
	(.0491)	(.1918)	(.211)	(.0215)	(.1208)
2021Q1	-.0699	-1.6777***	-.3887**	.0135	.0093
	(.0596)	(.2303)	(.1407)	(.0445)	(.1101)
2022Q2	-.0575	-1.589***	-.3833**	.061	-.0556
	(.0725)	(.1816)	(.1338)	(.0483)	(.0851)
<b>No. Obs</b>	336	336	336	336	270
<b>Size Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Priority Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Infrastructure Controls</b>	Yes	Yes	Yes	Yes	Yes
<b>Region Controls</b>	Yes	Yes	Yes	Yes	Yes

Table 21: Coefficients for the 4 quarters after COVID-19

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$