

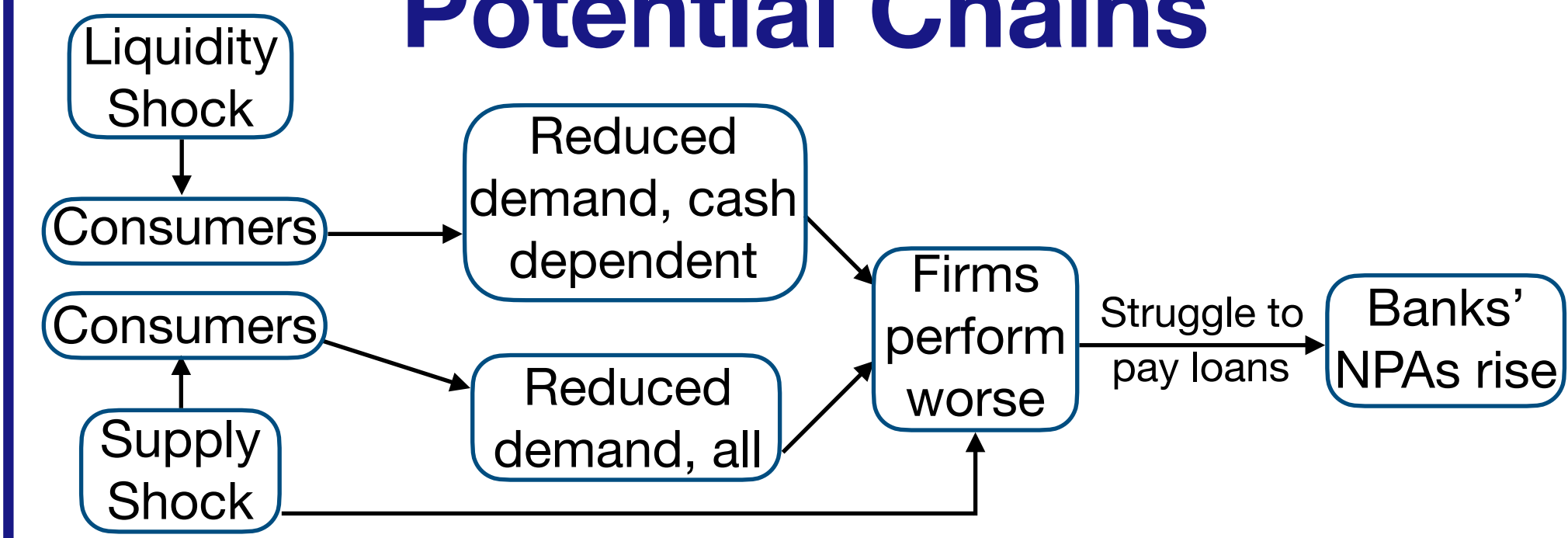
Motivation

- Banks serve an important function in the economy as deposit holders and lenders.
- The 2008 financial crisis had spillover effects and imposed negative externalities on the whole economy and spread globally (Acharya, et. al., 2017). More recent shocks like demonetization and covid-19 provide a local and global shock respectively.
- Banks are an integral part of the financial system and their health is of importance to regulators.
- Non-Performing Assets serve as a measure of the banking sector's health (Agarwala & Agarwala, 2019).
- Public Banks in particular have a history of poor NPA performance in India (Neelakantan & Lahiri, 2023).

Shocks of Interest

- Liquidity Shock (Q4 2016):** On 8th November 2016, the Government of India announced that the 2 largest denominations (Rs 500 and 1000) would no longer be legal tender. This accounted for 86% of the currency in circulation (Lahiri, 2020). This event came to be known as Demonetization and would hinder the ability of cash-dependent households and firms to repay loans.
- Supply Shock (Q2 2020):** As COVID-19 began to spread across the country, restrictions were put in place to prevent the spread of the virus. This led to many firms shutting down operations temporarily and thus, they would struggle to repay loans.

Potential Chains



Bank Terms & Types

- Non-Performing Assets:** A loan or advance where the interest or installment on principle remains overdue for more than 90 days.
- Bank Dimensions:** Banks are divided into Foreign, Private, Public and Small Finance Banks based on ownership and objective.
- Small Finance Banks:** Commercial banks that primarily undertake basic banking activities for the unserved and underserved sections.

Sectoral

- The dataset provides a priority and sectoral breakdown of GNPA for each bank.
- Priority Sectors are the sectors that the Government of India and RBI consider important for the development of the basic needs of the country.
- Medium and Small Enterprises (MSEs) are a part of the priority sector.
- The data provides a 6-sector breakdown: Food Credit, Agriculture, Industry, Services, Retail and Other sectors.
- Agriculture, services and retail were expected to be exposed to both shocks.
- These sectors were cash dependent pre-demonetization and were impacted by a lack of demand during covid.

Data

- Bank data was collected from the Reserve Bank of India (RBI), branch location data from Razorpay's GitHub and population data from Nishusharma1608's GitHub.
- A bank i at quarter t is the unit of observation.
- The demonetization sample uses data from 2012Q2 to 2019Q4 and the Covid sample uses data from 2016Q4 to 2023Q2
- Only banks with data 11 quarters prior and 7 quarters after the events were retained.
- Entries, exits and mergers are accounted for.
- In the demonetization sample, there are 38 Foreign, 19 Private, 21 Public and 0 Small Finance Banks.
- In the Covid sample, there are 36 Foreign, 20 Private, 12 Public and 9 Small Finance Banks.

Bank "Resilience": The Effects of Demonetization and Covid-19 on Bank's Non-Performing Assets in India

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Research Questions

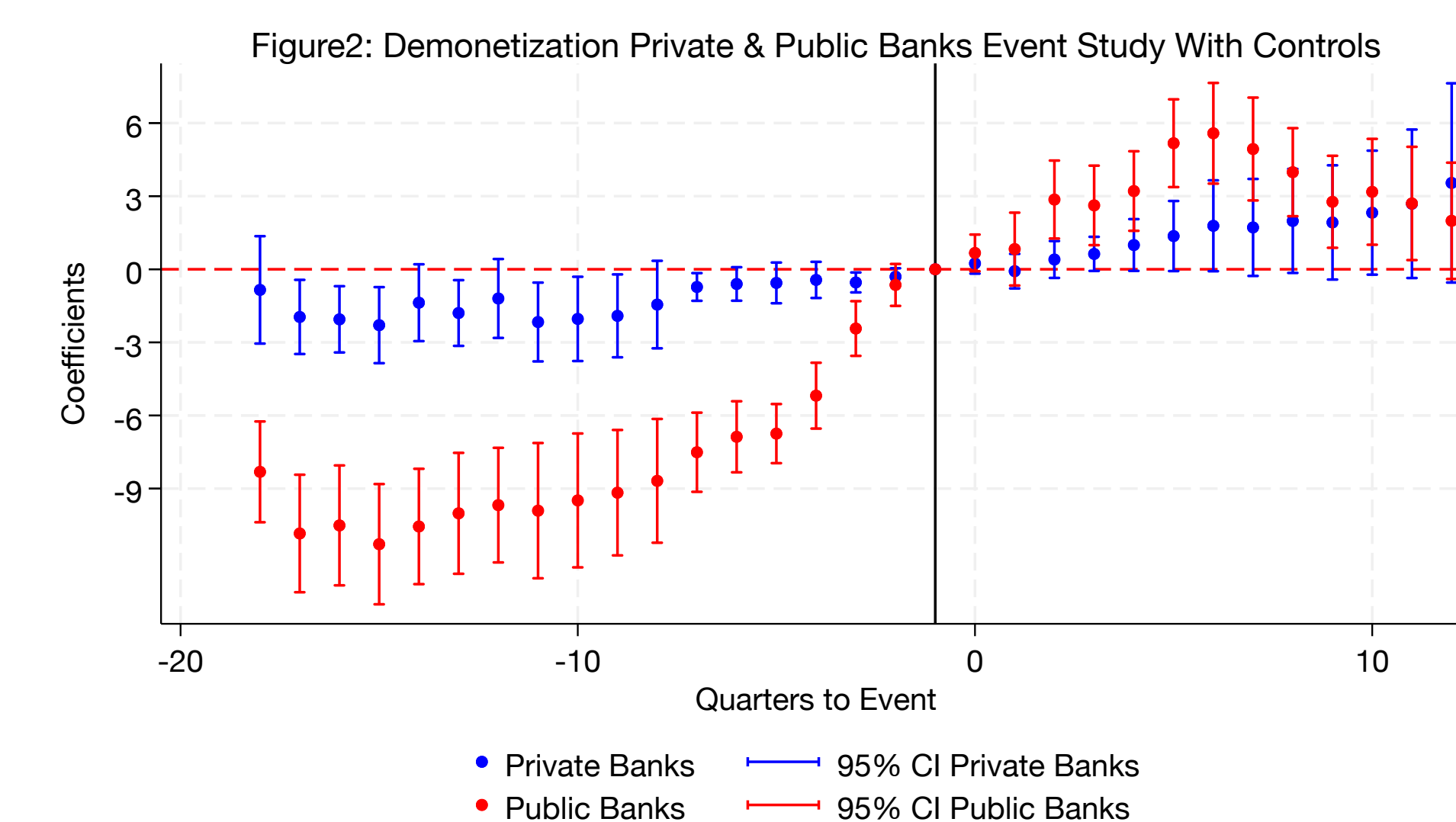
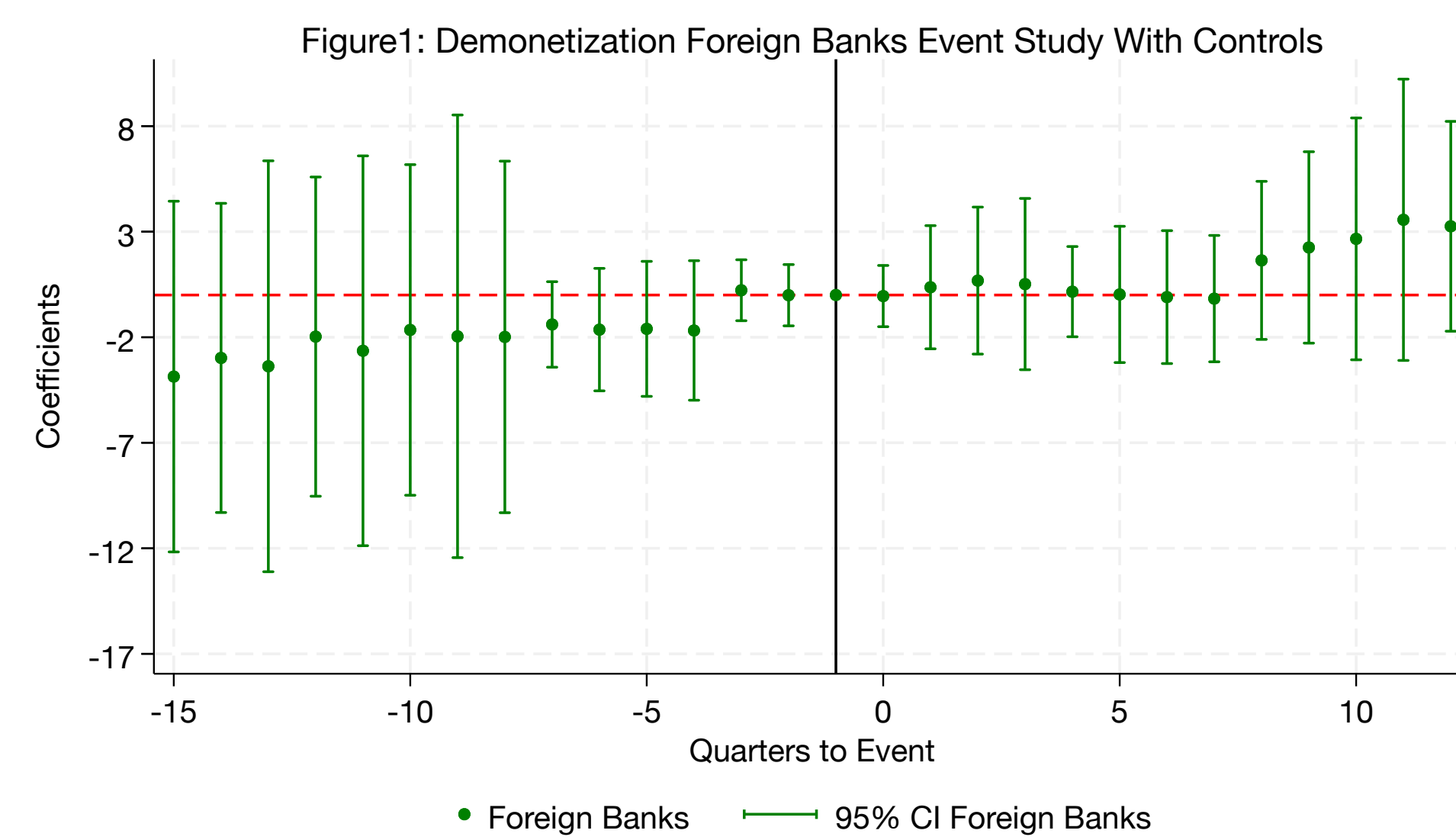
- Did the demonetization or COVID-19 lead to a rise in the Non-Performing Assets (NPAs) of Banks?
- Did NPAs rise from any particular sector of the economy or Medium & Small Enterprises?

Key Findings

Bank Type	Demonetization	COVID-19
Foreign Banks	No Effect	No Effect
Private Banks	Increase in GNPA through: MSEs & Agriculture	Increase in GNPA through: Services & Retail
Public Banks	Increase in GNPA through: Industry	Decrease in GNPA through: Industry
Small Finance Banks	-	Increase in GNPA through: MSEs & Agriculture

Results: Demonetization

- Foreign banks are unaffected by demonetization. This is potentially driven by the fact that they are not as prevalent as other local banks.
- Private banks experience a rise in GNPA post-demonetization relative to the baseline period; the effects are also persistent.
- Public Banks perform worse than Private Banks, however due to pre-trends it is hard to isolate the effects of demonetization.



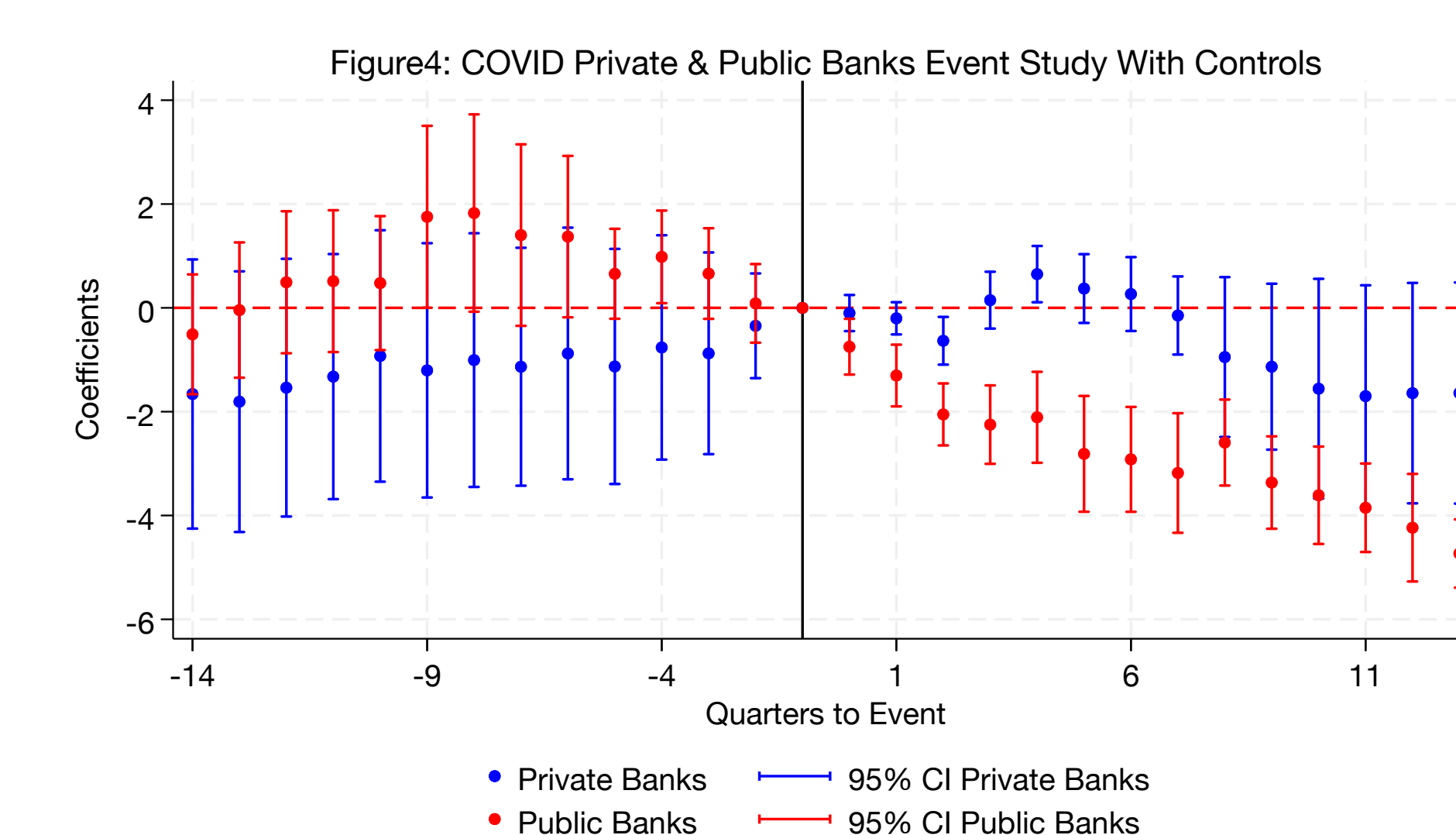
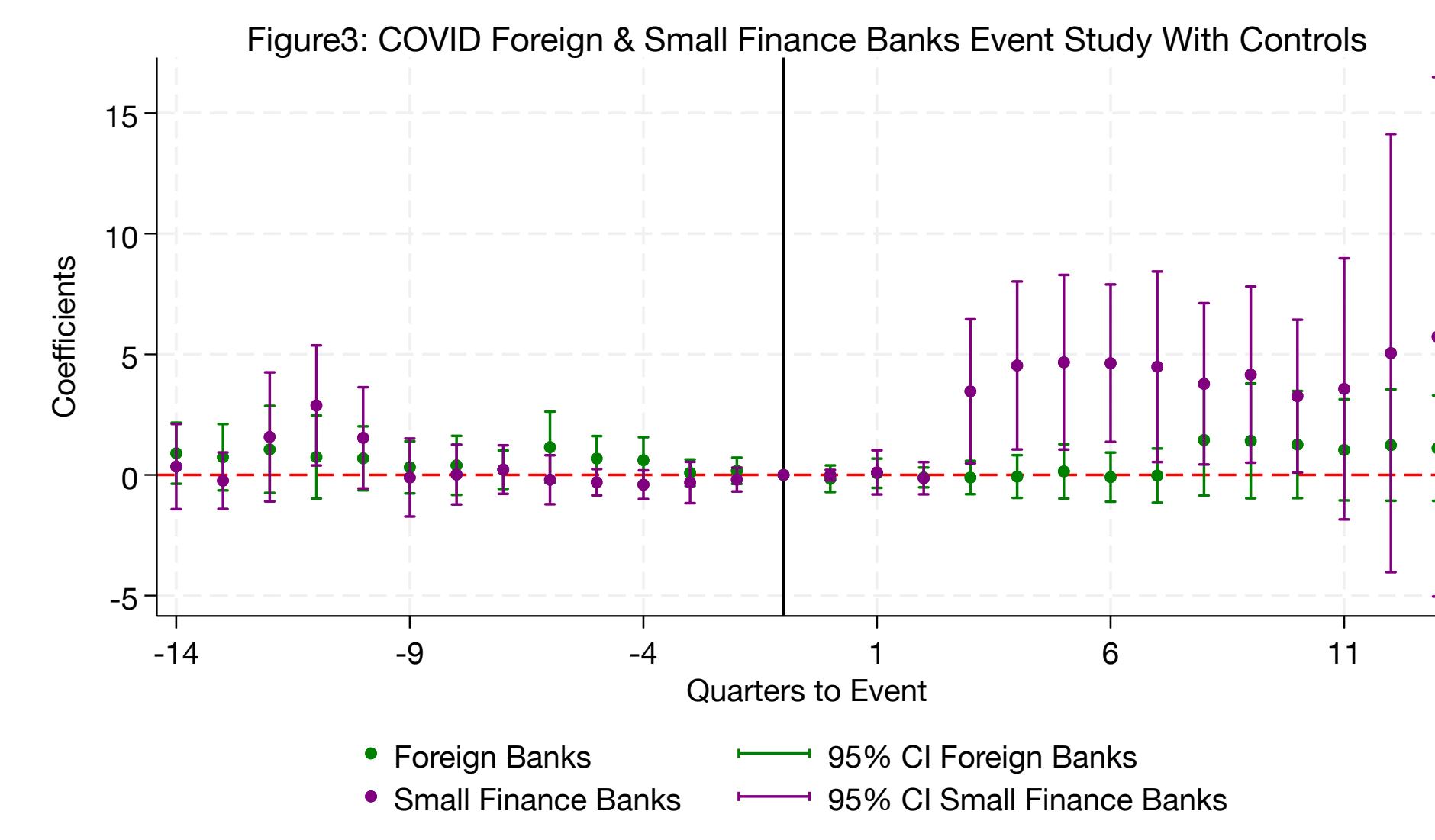
Empirical Strategy: Event Study

$$Y_{i,t} = \alpha + \sum_{j \neq -1} \beta_j D_{i,j} + \sum_k \beta_k D_{i,k} + \delta X_{i,t} + S'_{i,t} \Psi + P'_{i,t} \Theta + I'_{i,t} \Lambda + R'_{i,t} \Gamma + \epsilon_{i,t}$$

- $Y_{i,t}$: Gross Non-Performing Assets (GNPA) as a percent of total assets
- $D_{i,j}$ & $D_{i,k}$: Pre and post event dummies respectively
- $X_{i,t}$: Size Controls (Total Liabilities)
- $S_{i,t}$: Sector Controls (5 dummies)
- $P_{i,t}$: Priority Controls (3 dummies)
- $I_{i,t}$: Infrastructure Controls (5 dummies)
- $R_{i,t}$: Region Controls (35 dummies)

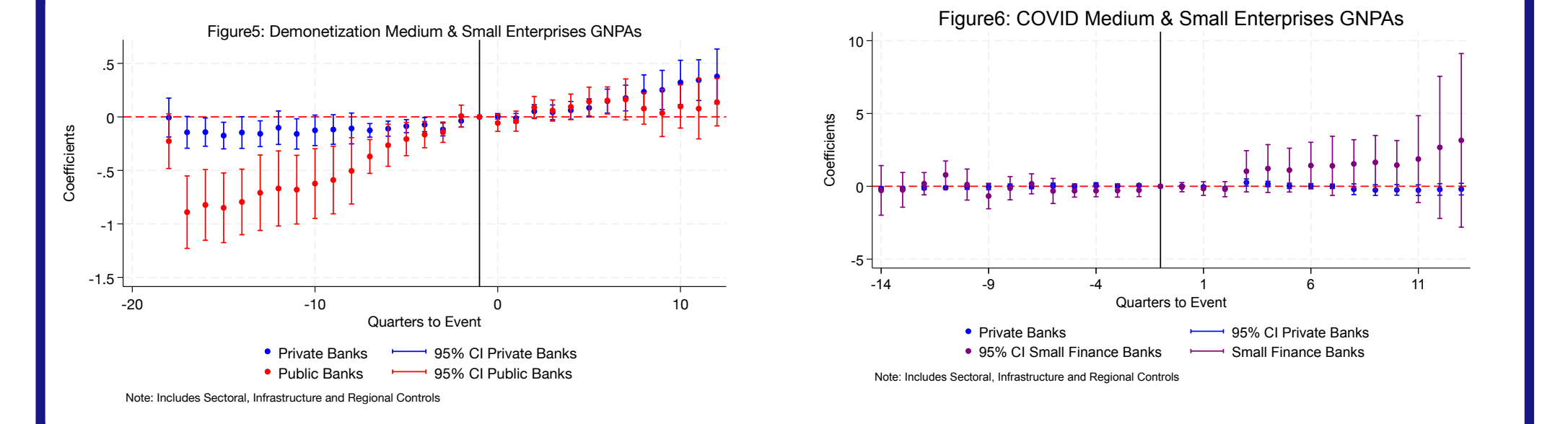
Results: Covid-19

- Foreign Banks are unaffected by Covid.
- Private Banks see an initial decrease and an then increase in GNPA relative to the baseline period.
- Public Banks see a persistent decrease in in GNPA which is due to improved efficiency after a series of mergers.
- Small Finance Banks initially see no change and then a spike in GNPA relative to baseline. The effects for these banks appear to be persistent.



MSE Channel

- After demonetization, there is a persistent increase in GNPA from MSEs.
- After Covid, Private Banks see an increase for one quarter and then return to the baseline level. Small Finance Banks see a persistent increase.



Sectoral Channel

- Post demonetization, Private banks experience a persistent increase in GNPA from the agriculture and services sectors, while an increase for only one quarter from the retail sector. Public banks experience a persistent increase in GNPA from industries and a one quarter increase from agriculture.
- Post-Covid, Private banks see a decrease and then an increase in GNPA from the services and retail sector. Small Finance Banks see no change for two quarters and then experience an increase in GNPA from agriculture, industries and services.

Table 1: GNPA Percent from Different Sectors after Demonetization

Quarter	Private Banks GNPA Percent			Public Banks GNPA Percent	
	Agriculture (I)	Services (II)	Retail (III)	Agriculture (I)	Industry (II)
2017Q1	.0327 (.0217)	.0175 (.054)	-.0047 (.0138)	-.005 (.0593)	.6424** (.2658)
2017Q2	.0687** (.0278)	.0869 (.0722)	.0372** (.0135)	.1038 (.0638)	1.2916*** (.3909)
2017Q3	.0901*** (.0316)	.1329* (.0733)	.0177 (.0193)	.1044* (.0605)	1.294*** (.3697)
2017Q4	.0912*** (.0332)	.1574** (.0683)	.0122 (.0235)	.0968 (.0788)	1.4179*** (.3626)
No. Obs	330	330	495	422	425

Note: The table displays the coefficients for the 4 quarters after the event from the event study with GNPA percent of each sector as the dependent variable. The event studies include size, priority, infrastructure & regional controls. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 2: GNPA Percent from Different Sectors after Covid

Quarter	Private Banks GNPA Percent		Small Finance Banks GNPA Percent		
	Services (I)	Retail (II)	Agriculture (I)	Industry (II)	Services (III)
2020Q3	-.1219 (.0865)	-.0408** (.0167)	.1589 (.1989)	.0306 (.0499)	.0368 (.1466)
2020Q4	-.2636*** (.1015)	-.076*** (.0224)	.0591 (.1212)	.0291 (.0422)	-.0603 (.1062)
2021Q1	.0714 (.1177)	.2773*** (.058)	1.4171** (.5634)	.2517** (.1214)	1.3189** (.6257)
2021Q2	.2105* (.1232)	.4057*** (.0751)	1.7579*** (.6591)	.2922* (.1673)	1.2174* (.7313)
No. Obs	530	530	200	182	203

Note: The table displays the coefficients for the 4 quarters after the event from the event study with GNPA percent of each sector as the dependent variable. The event studies include size, priority, infrastructure & regional controls. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Conclusion

- The persistence of demonetization's effects is surprising; could be a drawback of increased financial inclusion post-demonetization.
- Consistent with Public Banks' mission of financial inclusion, they perform worse than Private Banks post-demonetization.
- Withdrawal of regulatory forbearance of asset classification explains pre-trends for Public Banks.
- The existence of Small Finance Banks (April 2016) appears to take some risk away from Public Banks as they perform the worst post-covid.
- Abandonment of 90 day NPA norm COVID delays the rise and masks the actual increase in NPAs.

References

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