Do Government Guarantees Help Financial Stability? Evidence from an Emerging Market

Madhu Kalimipalli, Vijaya B. Marisetty and Lakshmi Shankar Ramachandran[1]

1. Introduction

The relationship between government guarantees to banks and financial stability has been the subject of intense debate since the global financial crisis or GFC (Allen et al., 2015; Allen and Gu, 2018).[2] The post-GFC (i.e. 2010-2018) period, and more recently Covid induced global financial compression, have witnessed significant interventions in the form of explicit or implicit government guarantees, recapitalizations, and loans in countries around the world. The evidence from the Capital Purchase Program (CPP) related to the US government sponsored Troubled Assets Relief Program (TARP) shows that capital infusion significantly reduced contributions to systemic risk, particularly for larger and safer banks, and those in better local economies (Berger et al., 2020).

While government led bank capital infusions in US and other developed markets have been usually contingent an external shock or crisis episode, India presents a unique setting where significant capital infusions happen regularly "every year" to stabilize the weak balance sheets of the public sector banks. Do such repeated government sponsored bank capital infusions lower the financial risks and improve the financial stability? Our study addresses this question.

Extant research finds *conflicting evidence* on the relationship between government guarantees and subsequent bank performance (Allen et al., 2015, Kelley et al., 2016; Acharya et al., 2018). *Guarantees can increase firm value* by (a) reducing asymmetric information as better monitoring by governments can improve financing for corporates, and in turn help GDP growth; (b) improving credit ratings, lowering funding costs, and increasing franchise value; (c) lowering potential systemic risks if the underlying firm falls into Too big To Fail (TBTF) category; and (d) providing a downside insurance (or put option) value to banks especially during crises periods.

[1] Madhu Kalimipalli (corresponding author) is at the Lazaridis School of Business & Economics, Wilfrid Laurier University (mkalimipalli@wlu.ca), Vijaya B. Marisetty is at the School of Management studies University of Hyderabad (marisetty@uohyd.ac.in) and Lakshmi Shankar Ramachandran is at the Weatherhead School of Management, Case Western Reserve University (shankar@case.edu). Summary of the research paper titled "Do Government Guarantees Help Financial Stability? Evidence from an Emerging Market," NSE-NYU Stern Working Paper, 2021.

[2] Financial stability is measured using systemic risk, which refers to quick propagation of illiquidity and insolvency risks, and financial losses across the financial system as a whole, impacting the connections and interactions among financial stakeholders (Billio, et al., 2012).

However, *guarantees can have unintended adverse consequences by* increasing (a) the tendency to take on excessive leverage by firms; (b) moral hazard problems arising from increased risk taking by the borrower; (c) unproductive use of capital by the borrowers affecting the industry wide productivity; and (d) counterparty risks to the guarantor arising from system wide shocks (or systemic risks) and potential bail-out costs for the tax payer. The ultimate effect of "repeated" government guarantees is therefore an open empirical question.

2. Research Issue

In this paper, we shed light on this debate by studying the effect of government guarantees on improving financial stability and thereby averting financial crisis. Specifically, we ask, "Do government guarantees help lower the systemic risks and help financial stability?", and provide comprehensive evidence through the lens of *repeated capital infusions* in an emerging market. In particular, focusing on an emerging market that underwent significant policy and regulatory changes, we undertake a comprehensive study of the impact of repeated government sponsored bank capital infusions on fostering financial stability.

India as the emerging market of particular interest for at least three reasons: (a) Indian public sector banks witnessed significant growth in Non-performing Assets (NPAs) adversely affecting their solvency, and jeopardizing the onerous bank recapitalization effort by the Indian government (Rajan, 2018); (b) Indian markets witnessed multiple domestic and foreign exogenous shocks since GFC that affected the funding costs and loan quality of local banks [3]; and (c) the post-crisis period was also marked by mounting corporate debt among emerging market firms, including India, as corporate leverage significantly increased in the post- GFC crisis period, giving rise to financial stability concerns (Acharya et al., 2015; Dodd et al., 2021).

3. Data Sample

We employ data on Indian government capital infusions into public sector banks for the period 2008-2017 (source: Controller & Auditor General of India, Report No. 28, 2017). The C&AG data is available until 2017; we hand collect data from media sources for two more years and extend the total sample to 2019. The capital infusion data is combined with multiple databases on firm-level financial and default risk, and aggregate risk variables: (a) CMIE (Centre for monitoring

[3] The domestic shocks include Demonetization (2016), Asset Quality Review (2015-16), Insolvency and Bankruptcy Code Implementation (2016), domestic banking frauds (2017-18), and Non-banking Financial company crisis (2018-19).

Indian Economy) Prowess database for data on firm-level financial variables and stock, both firm and index, returns; (b) additional firm-level firm level balance sheet data from Capital IQ, and market level data on India and global (U.S.) market factors sourced from Datastream; (c) Credit Research Initiative database of the Risk Management Institute (RMI) of the National University of Singapore (NUS) for the company-level monthly data on probability of default (PD) and distance to default (DTD), and (d) Credit default swap data from Markit.

For the period 2000-2019, we identify 670 financial firms, consisting of 46 banks (both public and private), 519 non-banking financial institutions - or NBFIs -(public and private) and 105 non-financial institutions (broker-dealers, financial subsidiaries of other non-financial corporations, specialized investment vehicles such as funds and securitized assets). We drop all the 105 non-FI firms. From the sample of 46 banks, our data filters yield 24 public and 16 private banks. Out of the NBFI sample of 519 firms, we extract 11 public and 25 private firms (i.e. largest 25 private NBFI firms out of the sample of 505 firms based on asset size). We focus on the final sample of 76 financial institutions consisting of 40 banks and 36 NBFIs. We conduct our study by evaluating several credit risk (PD, PD slope and DTD) and systemic risk (NSRSIK, CoVaR and Network[4]) measures. We provide comparative analysis of the capital infusion effects of treated public banks versus several alternate control samples that respectively include public sector banks not receiving capital infusion, private banks, public NBFIs and private NBFIs.

4. Findings

We provide six key findings on the impact of capital infusions on default and systemic risks.

(1) The treatment public banks receiving government capital infusion have in general higher levels of default and systemic risks compared to the control banks and Financial Institutions (FIs). The time series plots imply that treatment sample banks have far higher implicit default and systemic risks compared to control samples, while public and private NBFIs exhibit higher default and systemic risks from year 2016 onwards (Figure 1).

[4] MES is the marginal expected shortfall computed as the average stock return of a firm when the market return is in the bottom k^{th} percentile in a given year (where k is set to 5% or 1%). NSRISK is expected capital shortfall when the market return is in the lowest k% bracket in a given year, standardized by bank's market capitalization. CoVaR is conditional value at risk measure computed as the change in the value at risk (VaR) of the system when the firm is at the k^{th} percentile minus the VaR of the system when the institution is at the 50th percentile in terms of its stock returns. We report negative of MES and CoVaR measures. Network risk score is a network based systemic risk measure of a financial institution following Das, Kalimipalli and Nayak (2020). Therefore higher MES, NSSRIK, CoVaR and network score measures all signal higher systemic risks.

(2) Univariate analysis shows that the default risk for treated banks increases following capital infusion compared to the other control samples. The default risk rises significantly for treated banks versus control FIs up to three quarters post-infusion. At the same time, the impact of capital infusion on systemic risk of the public sector banks is not significantly different from the control samples. Therefore, univariate results show no support implying reduction of default or systemic risks post infusion for the treated banks (Figure 2).

(3) Robust difference-in-difference regressions reveal several effects.

   a) We find strong evidence of network effects following capital infusions. In particular, capital infusions to public banks are followed by reduction in risks for control samples - default and capital shortfall risks for rest of the public banks and default risks for other FIs - not receiving capital infusions over the following two to three quarters.

   b) Regressions also show that capital infusions are associated with decreases in default and network risks for the treated banks. However, capital infusions are related to significant increases in capital shortfall risks. This implies that while capital infusions help lower the default and network risks, they are associated with significantly higher capital shortfall, signaling a moral hazard problem where treatment banks take on more risky investments.

   c) Further examining the effect of larger sized infusions, we find that larger infusions help treated banks overcome the capital shortfall constraints, yet significantly increase the network risks.

The results are robust to alternate control samples, risk and capital infusion measures, and Placebo tests. Our results therefore highlight the "regulatory trade-offs" in providing capital infusions to the banks.

(4) We next examine three stress periods characterized by significant jumps in capital infusions: 2010-11 (1576%), 2015-16 (256%) and 2017-18 (260%), where the percentage numbers respectively capture the percentage increase in capital infusion amounts compared to the previous year. We find that capital infusions during stress periods helped mitigate overall default and systemic risks for the financial institutions by lowering the capital shortfall and network risks, though CoVaR tail risks shot up. We also find additional risks arising from possible moral hazard driven risk taking.

(5) We further study the channels through which capital infusion affect the risks. Capital infusion can be beneficial in reducing credit and systemic risks for stronger banks that have high valuations (market to book), high deposit capital (deposits to assets), strong performance (ROE) and low risks (low loans to assets). Similarly, our findings show that certain high ex ante risky firms also benefitted. In particular, we observe reduction in credit, capital shortfall and network risks for smaller banks (in terms of total assets), banks with high interest commitments (low interest coverage ratios), and Low Tier 1 capital banks. However, larger infusions in above settings

exacerbate default and network risks, and in some cases increase market tail exposure i.e. CoVaR risks.

(6) Finally, we examine if capital infusions help lower aggregate risks. We find that aggregate PD spreads become negative post-infusion implying that aggregate default risk of the treatment firms' decrease compared to the control sample. There is, however, no evidence to show that infusions are related to decreases in aggregate systemic risk measures.

5. Summary & Conclusions

Based on the exhaustive sample of government capital infusions into the public sector banks for the period 2008-19, we find no unequivocal evidence that capital infusions persistently lower systemic risks for Indian banks. In fact, banks receiving capital infusions have consistently been risky throughout the sample period, and capital infusions have elicited moral hazard related risk taking by the banks and not necessarily permanently attenuated the underlying capital shortfall or network risks. The emerging market results stand in contrast to the TARP experience in the U.S. markets. To the best of our knowledge, this study contributes to the literature by providing the first study of how government guarantees impact financial stability in the context of emerging markets.

The results from our paper have three main policy implications: *first*, while capital infusions help lower default risks of the recipient banks, policy makers face 'regulatory trade-offs' with respect to mixed effects on systemic risks, as they need to balance the capital shortfall versus network risks. Capital infusions in general lead to lower network risks but higher capital shortfall risks by banks, arising from possible moral hazard concerns. Large infusions are therefore needed to lower capital shortfall risks but they can set off higher network risks. *Second*, during stress periods, policy makers face regulatory challenges as capital infusions in general can help lower capital shortfall, CoVaR and network measures of systemic risk; however, 'large' infusions can increase such risks. *Third*, capital infusions benefit strong as well as weak banks by lowering their credit and systemic risks. Weaker banks include smaller banks, and banks with onerous interest commitments and adverse tier-1 ratios, and hence capital infusions need to be applied to them without exacerbating the moral hard problems.

6. References

Acharya, V., Cecchetti, S. G., De Gregorio, J., Kalemli-Özcan, Ş., Lane, P. R., & Panizza, U. (2015). Corporate debt in emerging economies: A threat to financial stability? The Brookings Institution and the Centre for International Governance Innovation.

Acharya, V. V., Anginer, D., & Warburton, A. J. (2018). The end of market discipline? Investor expectations of implicit government guarantees. SSRN Working paper.

Allen, F., Carletti, E., Goldstein, I., & Leonello, A. (2015). Moral hazard and government guarantees in the banking industry. Journal of Financial Regulation, 1(1), 30-50.

Allen, F., & Gu, X. (2018). The interplay between regulations and financial stability. Journal of Financial Services Research, 53(2-3), 233-248.

Berger, Allen N., Raluca A. Roman, John Sedunov (2020). Did TARP reduce or increase systemic risk? The effects of government aid on financial system stability, Journal of Financial Intermediation, Volume 43, 2020,

Billio, M., M. Getmansky, A. W. Lo, and L. Pelizzon (2012). Econometric measures of connectedness and systemic risk in the finance and insurance sectors. *Journal of Financial Economics 104* (3), 535–559.

Das, S. R., Kalimipalli, M., & Nayak, S. (2020). Banking Networks, Systemic Risk, and the Credit Cycle in Emerging Markets. NSE-NYU Working Paper. SSRN Working paper.

Dodd, O., Kalimipalli, M., & Chan, W. H. (2021), "Evaluating the Impact of Post-Crisis Growth in Emerging Market Corporate Debt", International Review of Financial Analysis. 73, 101610.

Kelly, B., Lustig, H., & Van Nieuwerburgh, S. (2016). Too-systemic-to-fail: What option markets imply about sector-wide government guarantees. American Economic Review, 106(6), 1278-1319.

Rajan, R. (2018). "Note to Parliamentary Estimates Committee on Bank NPAs", (Sept, 6).

Figure 1: Time series plots of Probability of default (PD), standardized Expected Capital Shortfall (NSRISK) and Network risk score measures over the sample period 2008-2018

We present aggregate time series plots for the treatment and four different control samples for the sample period. Scaled plots are normalized by setting starting values at the beginning of the sample 01/01/2008 to 100. All the variables are defined in footnote 4.

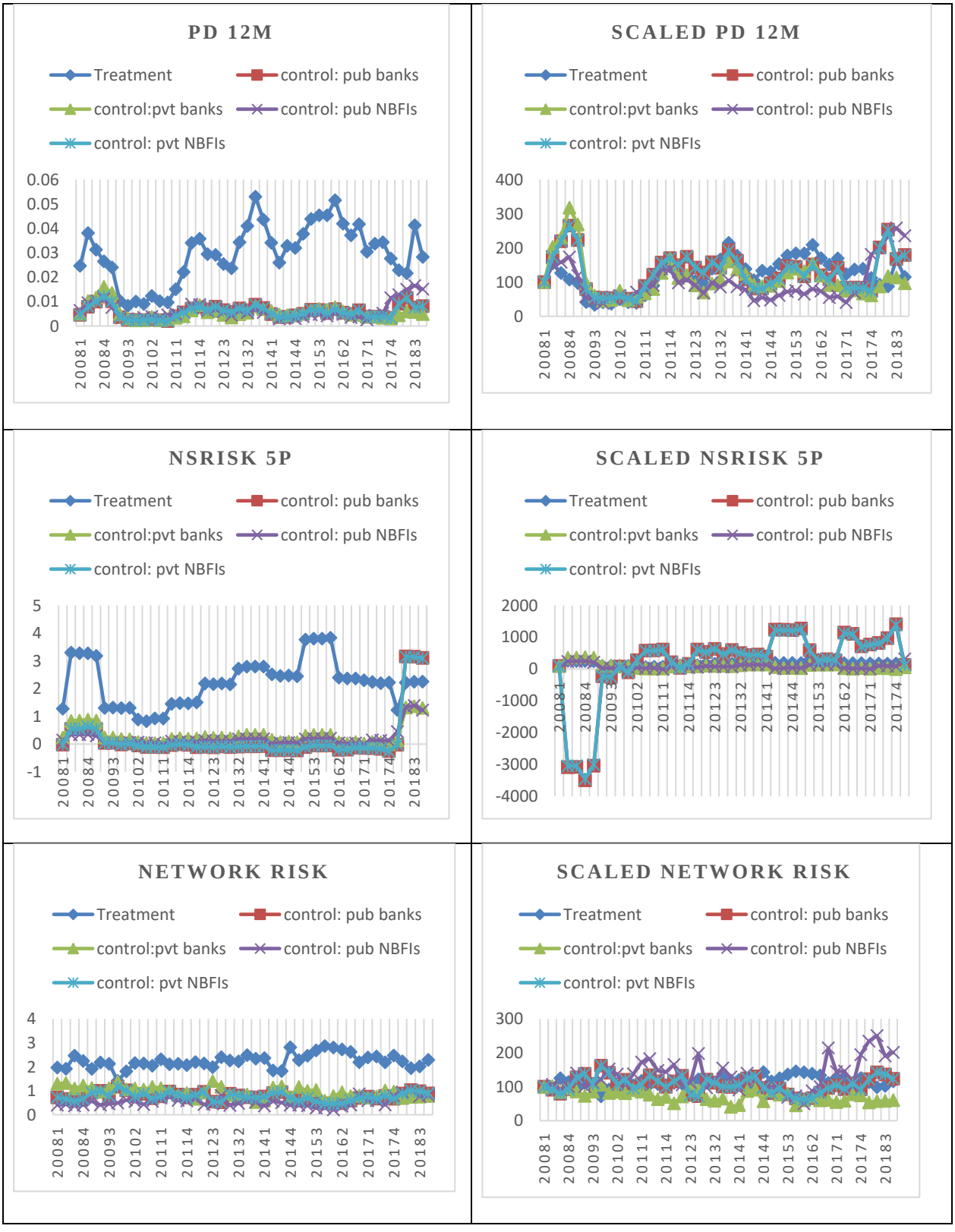

Figure 2: Event window plots of Probability of default (PD), standardized Expected Capital Shortfall (NSRISK) and Network risk score around capital infusion

We present quarterly mean plots (both raw and scaled) for the treatment and four different control samples for the sample period. Scaled plots are normalized by setting starting values at the pre-event 4th quarter to 100. We present ± four quarters around the event (period zero), which denotes the capital infusion date. All the variables are defined in footnote 4.