

Anatomy of a Non-bank Run

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March 11, 2023

ABSTRACT

Preliminary: Do not cite

Using a unique supervisory database of non-banking financial companies (NBFCs) matched to their borrowers and lenders, we investigate the anatomy of a non-banking financial crisis in India that followed the collapse of IL&FS, an NBFC, in September 2018. Post-IL&FS default, there was a run by short-term creditors of NBFCs, making it difficult for them to roll over their short-term debt. Exploiting the ex-ante differences in NBFCs' exposure to runs for identification, we find that NBFCs with high exposure see a significant decline in commercial paper growth, attributable entirely to mutual funds, which faced redemption pressure from panicked investors post-IL&FS. NBFCs cannot substitute with alternate funding sources such as debentures or bank credit. Subsequently, NBFC credit also declines. While banks step in to support healthy NBFCs, they *cut back* credit to weaker ones. This selective bank support can have beneficial effects during the non-banking crisis: ringfencing limits contagion to the traditional banking sector, while providing support to healthier NBFCs.

JEL Codes: G01, G21, G23, G28

Keywords: Non-banking financial companies, Shadow banks, India, bank run, financial crisis

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1 Introduction

Maturity transformation makes asset-liability mismatches inherent in financial institutions, making them susceptible to runs. To counter this, governments can insure banks via lender of last resort and deposit insurance. While such support is costly, it gives rise to other problems, such as the associated moral hazard challenges which can then be addressed through banking supervision (Tirole and Farhi, 2021). Non-banking financial institutions, on the other hand, have similar asset-liability mismatches but do not have access to insurance or LOLR and are subject to light-touch regulation, making them more fragile. Indeed, frequent crises are an inherent feature of non-bank lending and driven primarily by non-bank funding instability (Quirin Fleckenstein, 2020).

Despite the inherent cyclicity and fragility of the non-banking sector, crises in the non-banking financial sector have received much less attention. Of central importance are the real effects of non-bank runs. The literature on bank runs provides some guidance. On the one hand, bank runs and banking crises can have cleansing effects (Gropp et al., 2022; Jordà et al., 2022) by reallocating funds to safer banks and improving credit discipline (Schumacher, 1998). On the other, if funds move to worse banks (Acharya et al., 2022) or if recovery is protracted due to market frictions impeding credit reallocation (Jordà et al., 2022), aggregate allocative efficiency can decline post-crises. An added complication is the interlinkages between the traditional banking and non-bank financial sector. While banks can provide support through stable funding to an ailing non-banking sector, non-banking shocks can also be transmitted and amplified to the traditional banking sector making ring-fencing a desirable policy goal (Tirole and Farhi, 2021).

This paper studies a non-bank run focusing on linkages to traditional banks. To empirically investigate the cleansing effects of a non-banking crisis in India, we examine the September 2018 default of a large NBFC, Infrastructure Leasing & Financial Services (IL&FS), and study its impact on the financial sector and its real effects.

Using our unique dataset, we produce two main sets of results. The first set of results examines the impact of the runs on NBFC funding flows. NBFCs with higher vulnerability had greater decline in commercial paper growth, attributable entirely to mutual funds, which started pulling out of the commercial paper market after they faced redemption pressure following the IL&FS de-

fault. Commercial paper outflows were larger for weaker NBFCs. Further, the NBFCs that faced outflows were not able to substitute with other forms of funding such as term loans from banks or debentures. The second set of results is on the impact of the crisis on credit disbursement. NBFCs with greater exposure to runs see their credit decline across all sectors viz., industry, services and retail. The impact on NBFC investments, which form a small portion of NBFC portfolio, is limited. On the borrower side, we examine interlinkages with the banking sector and find evidence of ring-fencing by banks that cut lending to weaker banks. Banks also *increase* lending to healthier NBFCs, ensuring support during the crises. Our findings provide a playbook for handling a non-bank crisis: limiting contagion but extending support to better NBFCs.

Our primary data source is derived from a supervisory database on NBFCs, compiled by the Reserve Bank of India (RBI), India's central bank. In addition to providing access to financial variables such as balance sheets and income statements that are not publicly available, our dataset enables us to establish links between each NBFC and its borrowers and lenders. This is critical because our dataset contains information on the asset and liability structure by maturity, which is necessary for empirical identification, as well as information on the NBFCs' borrowers. For a subset of 57 NBFCs that account for 80% of all assets, we also have data on funding and the corresponding financial instruments for each entity that lends to these NBFCs. To supplement this data, we have incorporated information on the balance sheet and performance data of traditional banks from regulatory filings also provided by the RBI.

In September 2018, the NBFC sector underwent a crisis triggered by the IL&FS default. This event created widespread panic regarding the liquidity and solvency of the NBFC sector. Mutual funds, facing redemption pressure from their investors, pulled out of the commercial paper market of the NBFCs, draining liquidity from the non-banking system. This flight of commercial paper from the non-banks was a "run" on the NBFC sector. In contrast to traditional bank runs instigated by depositors with little to no insurance, this non-bank run was triggered by short-term creditors withdrawing from the NBFC commercial paper as they became worried about the liquidity and solvency of the non-banking sector. The IL&FS default and the resulting crisis in the non-banking financial sector during 2018-2019 is often termed India's "Lehman moment".

This paper examines the effect of this run in the non-banking sector and the aggregate effects of such a run. To this end, we exploit variations in the structure of NBFC liabilities — the short-term asset-liability mismatch — to identify non-banks more vulnerable to the run. Our supervisory data allows us to compute the asset-liability maturity (ALM) mismatch using inflows minus outflows in the short-maturity (less than one year) bucket to the total outflows. The 2018-2019 NBFC crisis, triggered by the IL&FS default, resulted from mutual funds pulling out of the commercial paper market. Though commercial paper is considered a relatively safe asset due to its short maturity and high credit rating during good times, it can become susceptible to rollover risk during periods of stress, as evidenced during the Global Financial Crisis in the US. (Kacperczyk and P., 2010) Our measure of the short-term asset-liability mismatch captures this susceptibility to runs due to the drying up of the commercial paper market during the IL&FS crisis. We classify NBFCs with below-median short-term asset-liability mismatch as having higher exposure to the run since they are unable to meet their liability obligations using the inflows generated from their assets. NBFCs with high exposure were similar in terms of profitability (operating expense), liquidity (cash ratio) and asset performance (non-performing asset ratio) pre-IL&FS default, measured as of March 2018.

Our main results are as follows. The IL&FS shock sparked a domino effect as markets became reluctant to lend to NBFCs due to the fear of potential defaults by other NBFCs, triggering a non-banking run. Consequently, NBFCs were liquidity-constrained and faced difficulties in debt repayments, particularly on loans with shorter maturities. We find that NBFCs with higher ex-ante exposure to runs — i.e. with worse short-term ALM mismatch — saw 14.51 (S.E.=4.67) pp lower growth in commercial paper (CP) in response to the IL&FS default.

We then investigate which categories of entities that subscribed to CPs, such as mutual funds, banks, NBFCs, and others, experienced the most substantial decline. The decline in CP funding of NBFCs with higher exposure was mainly on account of withdrawals of mutual funds¹. Mutual funds subscribing CPs of NBFCs with higher exposure declined by 10.62 pp (S.E.= 10.61), consistent with mutual funds pulling out of the commercial paper market post-IL&FS.

¹As of March 2020, mutual funds constituted the largest group of subscribers, accounting for 57% of the total, which increased to 66% as of December 2021.

Which NBFC experienced the highest CP losses? We explore heterogeneity in CP flows across size (measured by log of total assets), provisioning coverage ratio (measured by provisioning over total non-performing assets) and operating expense (measured by operating costs over total income). Larger firms (above-median total assets) with higher ALM exposure suffered a 5.56 pp (S.E.= 2.28) outflow of CP funds, compared to smaller NBFCs. NBFCs with higher exposure and above-median provisioning ratios were better off and could salvage a liquidity drain. For these healthier non-banks, commercial paper inflow increased 0.78 pp (S.E.= 0.078), indicating that NBFCs with higher provisioning against impaired assets gave them a greater buffer against capital erosion. Finally, we examine the effect of operating expenses, an indicator of firm efficiency and find no effect. To sum up, NBFC size and provisioning affected CP funding for higher exposure firms but were indifferent to firm efficiency or liquidity.

We then examine whether NBFCs are able to substitute into alternate forms of funding in the form of term loans from banks, debentures, and from other entities. Overall borrowing is a staggering 58.8pp lower for NBFCs with high run exposure. High-exposure NBFCs saw a 14.5 pp decline in commercial paper growth during the IL&FS period. The decline was not limited to the CP market, as NBFCs were unable to tap alternate sources of funding. NBFC borrowing from debentures declined by 30.15 pp owing to lower issuance of debentures by high-exposure NBFCs.

Going a layer deeper, we examine how the effect of the crisis impacted NBFC credit and sectoral lending. NBFC credit declined by 32.54 pp as a consequence of the crisis. Further, in Panel B we report that NBFCs cut down credit to the retail sector by 29.78 pp, to the industry sector by 15.68 pp, and to the services sector by 20.14 pp as a consequence of the crisis. This is our first result pointing to ring-fencing by banks who reduced lending to NBFCs with higher asset-liability mismatches by nearly 46 pp as a consequence of the IL&FS crisis. Potentially, these banks did not provide fresh credit to 'riskier' NBFCs, thereby ensuring some degree of cleansing effect in the bank-NBFC relationship.

We dig deeper into the 'cleansing effect' of the crisis and isolate the behaviour of banks lending to NBFCs different quality NBFCs (healthy and unhealthy) based on their extent of exposure or ALM mismatch. Banks' lending to NBFCs increased by 0.55 percentage point, but only for healthy

NBFCs. Our analysis reveals a null effect of banks lending to unhealthy NBFCs, which further confirms the cleansing effect of crises as banks reallocated their loans to good-quality NBFCs after the crisis.

Related Literature: Our paper relates to several distinct strands of literature. First, our paper is related to the vast literature on bank runs. A large theoretical literature examines the reasons for runs including Diamond and Dybvig (1983); Chari and Jagannathan (1988); Calomiris and Kahn (1991); Diamond and Rajan (2001). Recent work has shifted to empirical characterizing runs Bernanke (1983); Saunders and Wilson (1996); Calomiris and Mason (1997); Iyer and Puri (2012); Blickle et al. (2022); Schumacher (1998). This paper adds to the literature by examining a non-banking run in the context of India and the consequences of non-banking runs that are distinct from a pure banking run.

Our paper is also related to the literature on whether having a thriving non-banking financial sector is a good or a bad thing. On one hand, literature suggests shadow banking is subject to regulatory scrutiny or constraints on the traditional banking system that can potentially impede innovation and distort lending market. The light-touch regulation of non-banks allows them to undo these adverse effects of regulation (Ordoñez, 2018). Indeed Feve and Pierrard (2019) and Buchak and Seru (2018) show evidence for the emergence of shadow banks when bank regulation becomes more stringent in different contexts. On the other hand, a more negative view contends that circumventing regulation may not be such a good thing as once a crisis emerges, off-balance sheet activity may be forced to be taken on-balance sheets spreading contagion from the traditional to the non-banking financial sector (Acharya and Suarez, 2013; Gorton and Metrick, 2010; Pozsar and Boesky, 2013). An alternate viewpoint, similar to the context in India is how the lightly regulated NBFCs can evade regulation during good times but once a crisis emerges, the regulator may be forced to step in to avoid contagion effects to the remaining economy (Acharya and M Richardson, 2009; Claessens and Singh, 2012; Buchak and Seru, 2018).

2 Institutional Details - An Overview of NBFCs

In India, non-banking financial institutions form a diverse group that includes entities like merchant banking firms, stock exchanges, stock-broking/sub-broking companies, *nidhi*² companies, alternative investment fund companies, insurance companies, pension funds, as well as NBFCs, All India Financial Institutions, and primary dealers. The latter three are overseen by the Reserve Bank of India (RBI (2022b)). NBFCs are finance companies that are permitted to carry out financing activities like lending and investments. NBFCs have been in existence since the pre-independence era, and RBI began regulating the sector in 1964, making it one of the earliest central banks to do so. The regulations have been revised multiple times in view of the dynamic nature of the sector. Currently, the Reserve Bank classifies NBFCs based on their liability structure as deposit-taking NBFCs (NBFCs-D) and non-deposit taking NBFCs (NBFCs-ND). Based on their asset size, non-deposit taking NBFCs i.e. NBFCs-ND are classified into systemically important NBFCs i.e. NBFCs-ND-SI if the asset size is above INR 5 Bn and others as non-systemically important NBFCs (other NBFCs-ND). NBFCs in India operate in niche segments like vehicle financing, infrastructure lending, factoring, lending against gold, microfinance etc. Hence, based on the type of activities they undertake, they are classified into 11 type of NBFCs. There were 9640 NBFCs registered with the Reserve Bank as of July 2022 of which 415 were NBFCs-ND-SI, 49 were NBFCs-D and the rest were NBFCs-ND (Report on Trend and Progress of Banking in India RBI (2022b)).

NBFCs have a prominent role in the financial landscape of the country. The sector has grown by leaps and bounds in recent times and had an asset size of nearly 38 trillion in March 2022. NBFCs' credit to GDP ratio grew from 8.6 per cent in 2013 to 12.3 per cent in 2022 and as a share of bank credit from 15 per cent in 2013-14 to 25 per cent in 2021-22 (Report on Trend and Progress of Banking in India, (RBI, 2022b)). Among financial institutions, they are the largest borrowers (Financial Stability Report, (RBI, 2022a)).

Globally, NBFIs have a much larger presence and their share in global financial assets have increased to 49 per cent in 2020. Advanced economies account for the largest share in NBFIs assets

²*Nidhi* companies encourage and promote savings among its members, and provide them with credit facilities for their personal and business needs. They typically accept deposits from their members and then lend to them, providing a source of credit for those who may not have access to traditional banking services

with US having the largest share followed by UK and Japan. Among emerging market economies, China has the largest share and India accounts for less than one per cent share of NBFIs assets globally (Financial Stability Board, 2021). Financial Stability Board (FSB) has identified 5 economic functions (EF) as the "narrow measure" to capture the financial stability risks posed by NBFIs. EF1 comprising money market mutual funds, fixed income funds, credit hedge funds etc have the largest share in the narrow measure. Activities of financing companies, leasing/ factoring companies and consumer credit companies are classified as EF2 and have a lower share of 6.7 per cent globally. NBFCs in India are largely financing companies with their business akin to banks, and hence are classified under EF2. Within India, EF2 has a share of 77 per cent and EF1 has a share of 23 per cent. Hence, NBFIs in India are dominated by NBFCs when financial stability concerns are assessed (Rajnish Kumar Chandra and P., 2022)

The sector went through turmoil when Infrastructure Leasing Financial Services Limited (IL&FS), a large NBFC of 30 years, defaulted on its repayments. The conglomerate had a complex group structure with nearly 347 subsidiaries, of which only a few were listed. The group was involved in different business segments such as real estate, transportation and financial services. IL&FS Limited, the group holding company, was registered as a core investment company with the Reserve Bank and its sole purpose was to lend to group companies. State-owned insurance firm Life Insurance Corporation (LIC), Orix Corporate of Japan and other large Indian banks such as Housing Development Finance Corporation, Central Bank of India and State Bank of India were its main shareholders. The behemoth had a debt of INR 970 Bn of which INR 570 Bn was lent by public sector banks.

Initially, one of its subsidiaries, IL&FS Transportation Networks Limited, defaulted on inter corporate deposits worth INR 4.5 Bn of Small Industries Development Bank of India (SIDBI) in June 2018. Amidst rising interest rates, cost overruns and stalled projects, IL&FS limited had been facing liquidity challenges for some time. On September 4, 2018, IL&FS had to meet two payment obligations- a CP of LIC Mutual Fund that had to be redeemed and a INR 10 Bn short-term loan from SIDBI. Though LIC Mutual Fund initially agreed to rollover the CP, it subsequently decided against it at the last minute. IL&FS paid off the CP, but defaulted on the debt from SIDBI, which set

off the alarm bells. Rating agencies downgraded the company and its subsidiaries to junk status. This led to a spiral of risk aversion and share prices of listed arms of IL&FS plummeted. Fearing lock-in of their funds, mutual funds, which subscribe nearly 60 per cent of CPs of NBFCs, started pulling out resulting in a sharp decline in assets under management and leading to a liquidity crunch for other NBFCs and HFCs (Chart 1)³.

DSP mutual fund (a joint venture between DSP group and Blackrock) dumped CPs worth INR 3 Bn of Dewan Housing Finance Corporation Ltd. (DHFL) another large, AAA-rated housing finance company (HFC), a category of NBFC, at a discount which further aggravated the panic in the financial markets with stock prices plummeting by 60 per cent on intra-day trades.⁴

Large NBFCs especially faced massive fall in their market caps, rapid rise in yields and hence, higher borrowing costs (Chart 2). NBFCs also faced massive sell-offs of their shares. Stress spills over to the CPs traded in the secondary market with massive hike in spreads (Chart 3). Raising CPs to repay short term obligations became challenging for NBFCs and subsequently, a few other NBFCs and HFCs defaulted on their borrowings. Aggregate CPs outstanding in the economy contract and mutual funds withdrew from CP holdings of NBFCs with flows from mutual funds in the negative zone on a year-on-year basis. Reportedly, 12 asset management companies through 32 funds held an aggregate INR 22.83 billion in debt securities of IL&FS and its subsidiaries at the end of August⁵. The government apprised National Companies Law Tribunal about possible collapse of many mutual funds in case of collapse of IL&FS⁶. Subsequently, the RBI was empowered to remove the directors of NBFCs, supersede their board and appoint administrators in order to improve governance and protect the interests of depositors and creditors along with a slew of other regulatory measures to restore confidence and maintain stability.

³<https://www.moneycontrol.com/news/business/companies/ilfs-timeline-when-and-what-happened-so-far-3005211.html>

⁴<https://economictimes.indiatimes.com/markets/stocks/news/dhfl-paper-sale-by-dsp-triggered-panic/articleshow/65908110.cms>

⁵<https://www.reuters.com/article/india-il-fs-idINKCN1M51UY>

⁶<https://www.livemint.com/Companies/CyjMeTHnMU4sln81WZ7AKI/Government-takes-control-of-ILFS-Uday-Kotak-to-be-on-board.html>

3 Data

The data used for our study are obtained from supervisory returns filed by NBFCs on a quarterly basis in the COSMOS system, the business objects (BO) database, and the eXtensible Business Reporting Language (XBRL) platform. These returns are a critical part of the offsite surveillance conducted by the Reserve Bank on NBFCs. They play a crucial role in improving the effectiveness of supervision by providing analytical insights that are essential for formulating regulatory policies. They offer valuable information on the performance of NBFCs between two inspection cycles and serve as an early warning system for on-site inspections, as well as for tracking trends in the sector.

The regulatory returns are periodically updated due to the constantly evolving nature of the sector. In 2014, the regulatory framework was revised and the threshold asset size for NBFCs-ND-SI was increased from INR 100 Bn to INR 500 Bn, which led to a revamp of the regulatory returns that NBFCs had to file. In 2019, the returns were further revised and expanded to include new returns that capture the activities of core investment companies and peer-to-peer lending platforms, which are recent entrants in the fintech space. The revisions also broadened the scope of existing returns.

Data for all classifications of NBFCs registered with the Reserve Bank (except HFCs) are captured in these platforms. HFCs report to National Housing Bank (NHB). NBFCs-ND-SI and NBFCs-D are required to file data on a quarterly basis while non-systemically important NBFCs are required to file an annual return. As such, the reporting requirements are very granular and comprehensive. Hence, the data we use in our study are elaborate and differ substantially from what is publicly available on NBFCs. Firstly, data of only a few NBFCs are available publicly while our dataset covers the whole universe of the NBFC sector. Secondly, information on only some balance sheet indicators and profit and loss statements are available on annual basis and quarterly basis, respectively while we use granular NBFC-wise quarterly data in our analysis. Over and above balance sheets and profit and loss statements, which are more comprehensive in our data, supervisory data also include asset classification, provisioning, asset liability mismatch, CRAR, exposure of banks and other financial institutions to NBFCs, sectoral credit and non performing

assets (NPAs), public deposits held by NBFCs, interconnectedness with other financial entities, loan sales and securitisation, etc. in a detailed manner. For example, overall CP issuances of NBFCs are available publicly but dis-aggregated data on how much CP is held by banks, mutual funds, other investors etc. is available with us.

To assess the liquidity status of NBFCs, we analyze their asset-liability mismatch during the period under study. NBFCs provide data on their cash inflows, such as interest income from investments, performing loans, and other activities, and outflows, such as repayments on various types of borrowings, on a quarterly basis as part of their structural liquidity return. The structural liquidity return is a reflection of the balance sheet, where asset accruals correspond to inflows and liability accruals correspond to outflows. NBFCs report these detailed information for different maturity periods, such as 0-7 days, 8-14 days, 15-30 days, 1-2 months, 2-3 months, 3-6 months, 6 months-1 year, 1-3 years, 3-5 years, and more than 5 years. By using total inflows and outflows in a particular maturity period, we can calculate the liquidity position of an NBFC in a given quarter. Essentially, our data helps identify which NBFCs faced mismatch in which maturity buckets during each period. In any given quarter, an NBFC that has more outflows than inflows in a specific maturity bucket, normalized with outflows of the corresponding maturity bucket, is defined as having liquidity stress in that bucket. In this study, we have combined all buckets up to the 6 months to one-year maturity bucket to determine the short-term liquidity position of an NBFC in a quarter.

The period of analysis for our study is from June 2018 to March 2019. Our analysis focuses on a total of 332 investment and credit companies (ICCs), which are predominantly privately-owned NBFCs. Their business activities are similar to those of banks, mainly lending to the retail, services, and industrial sectors, while some are also involved in investment activities. These NBFCs primarily rely on borrowing from banks and markets. We have excluded infrastructure finance companies (IFCs) from our analysis, as they are typically government-owned NBFCs with sovereign backing and are primarily involved in lending to large infrastructure projects, particularly in the power sector. We have also excluded microfinance institutions (NBFCs-MFI), which mainly provide small ticket, unsecured short-term credit to borrowers. These three categories of

NBFCs are the major players in the NBFC lending space, and ICCs accounted for 51.3 percent of the sector's total assets as of September 2022 (RBI, 2022b).

Our study utilizes a unique dataset obtained from supervisory data on banks and other financial institutions' (FIs) exposure to NBFCs. This dataset includes information on the amount of loans provided by each bank/FI to an NBFC, such as term loans, working capital, debentures, commercial paper (CP), and others, on a quarterly basis. Therefore, we have access to information on how much each bank/FI lent to an NBFC, as well as whether it was a direct exposure, such as term loans or working capital, or indirect exposure, such as through subscription of debentures/CPs. Our analysis focuses on 57 large NBFCs that constitute 85 percent of the sector, with 239 observations on average per quarter. Additionally, we match this dataset with supervisory data on bank variables filed by scheduled commercial banks in OSMOS.

As far as we know, our study is the first of its kind in the Indian context. While there have been some studies conducted by RBI that have utilized these supervisory data for empirical analysis, we are aware of only one other article that has done so (Acharya et al., 2013).

3.1 Summary Statistics

Table 1 shows the summary statistics of all the variables used in our analysis, covering variables used in the first set of results. All variables are year-on-year growth of stock variables. Ex-ante exposure (continuous) captures the asset-liability mismatch (ALM) calculated as a ratio of total outflows subtracted from total inflows to total outflows. It indicates that on average, NBFCs had 1.8 times the necessary funds required for immediate repayment requirements. The exposure variable is highly variable and NBFCs with lower ALM or having adequate funds for repayment in the short term are concentrated in the 90th percentile. We define ex-ante exposure as a binary variable for our empirical analysis. We categorize NBFCs based on their tendency to rollover risk by assessing their level of mismatch value. A lower value of mismatch indicates a higher level of rollover risk. Therefore, we consider NBFCs with a below-median mismatch value to have a higher exposure to rollover risk, while those with an above-median mismatch value are classified as low-exposure firms. We use a dummy variable to depict firm exposure, where higher-exposure firms take the value '1', while low-exposure firms are denoted by '0'.

Overall borrowings of NBFCs as well as its subcomponents- banks, debentures and CP grew in double-digits. These borrowing sources also show high variability and are in the 90th percentile. CP growth was on average lower than bank borrowings and borrowing via debentures. CP growth was driven by mutual funds while bank borrowings growth was largely on account of growth in term loans.

4 Identification Methodology

We use a difference-in-differences framework to estimate how ex-ante exposures impacted NBFC borrowing/lending during the IL&FS period. We use the following baseline specification for our analysis:

$$\Delta Y_i = \alpha + \beta \times \text{Ex-Ante Exposure}_i + X_i + \epsilon_i \quad (1)$$

In Equation (1), we exploit heterogeneity in ex-ante short-term asset-liability mismatch of NBFC ‘*i*’ during the IL&FS phase. The dependent variable of interest are - i) funding by CPs, ii) bank borrowing or bond market borrowing, and iii) credit and investment. Y_i denotes the change in the dependent variable(s), based on the average balance-sheet data for the pre-period i.e. between June 2018 and September 2018, and the post-period i.e. between December 2018 and March 2019. The main coefficient of interest, β , measures the impact of ex-ante exposure on the outcome variable. We examine how ex-ante exposure impacts rollover risk during the post-IL&FS episode.

The ex-ante exposure of NBFC *i* exploits variation in the shortest tenure bucket of less than one year, which we use as an indicator for the immediate funding requirements of the firm. We add up all maturity buckets up to one year, as explained in the previous section, to get this short-tenure bucket. The exposure variable is in net terms as it includes repayment of term loans to banks and CP obligations to be rolled over or repaid adjusting it with the incoming payments. The ex-ante exposure indicator is derived from the short-term asset-liability mismatch (ALM) of

the firm, which is calculated using the following formula:

$$\text{Short-term ALM mismatch}_i = \frac{\text{Contractual Inflows} - \text{Contractual Outflows}}{\text{Total Outflows}} \quad (2)$$

In Equation (2), ALM_i denotes the ability of NBFC 'i' to repay short-term borrowings within the one-year period. A low short-term ALM mismatch implies outflows are more than inflows in a year, thus making NBFC 'i' more prone to rollover risks, or the risk of being unable to repay debts within one-year period. We interpret the ALM indicator using a binary classification, where firms with below-median short-term ALM mismatch denote higher ex-ante exposure and take value 1, while firms with above-median ALM mismatch indicate lower ex-ante exposure and take the value 0.

Finally, we control for a vector of NBFC-level characteristics such as NPA ratio, operating expense ratio, and cash ratio as of June 2018.

5 Main results

5.1 Ex-ante Exposure Correlates

Table 1 presents the summary statistics that illustrate the distribution of NBFCs categorised by their exposure level and growth of funding sources like commercial papers and mutual funds. Further details about the summary statistics are provided in Section 3. The analysis is based on 332 ICCs which constitute approximately half of the NBFC sector by asset size.

5.2 Role of NBFC Balance-Sheet on Exposure

In this sub-section, we delineate the effects of ex-ante balance-sheet characteristics on short-term exposure or ALM mismatch of the NBFCs. We follow the baseline specification using Equation (3) below:

$$\Delta \text{Ex-Ante Exposure}_i = \alpha + X_i + \epsilon_i \quad (3)$$

where X_i are NBFC balance sheet characteristics such as operating expense, cash ratio, and NPA ratio of NBFIs. The dependent variable is $Ex - AnteExposure_i$, which is the ex-ante short-term asset-liability mismatch of NBFC 'i' during the IL&FS phase.

Table 2 reports the results of Equation (3). The regressions reveals a null effect, which means that ex-ante balance sheet characteristics do not impact short-term exposure. This eliminates the scope for endogeneity and gives a clean setting for examining the effects of the IL&FS shock. In the coming sub-sections, we delve into understanding the impact of the IL&FS crisis.

5.3 NBFCs and Commercial Papers Decline During IL&FS

In this subsection, we investigate the liquidity conditions of NBFCs during the IL&FS period. We exploit how heterogeneity in the ex-ante asset-liability mismatch of NBFCs impacted their commercial paper (CP) holdings when the crisis happened. We use the following specification:

$$\Delta CP_i = \alpha + \beta \times \text{Ex-Ante Exposure}_i + \epsilon_i \quad (4)$$

where the dependent variable of interest is $CPgrowth_i$ i.e. growth in commercial papers subscribed by NBFC i .

Table 3 reports regression results from Equation (4) about the funding flows in NBFCs during the IL&FS phase. Panel A of Table 3 reports the impact of CP subscribed by all lenders i.e. mutual funds, banks, other NBFCs. We find that NBFCs with higher ex-ante exposure, or worse ALM, faced significant loss in the commercial paper market as short-term financing requirements reduced by 14.51 pp (S.E.= 4.67) in response to the shock. The IL&FS shock sparked a contagion effect, as markets became reluctant to lend to NBFCs due to the fear of potential defaults by other NBFCs. Consequently, NBFCs were liquidity-constrained and faced difficulties in debt repayments, particularly on loans with shorter maturities. CPs are a preferred route for meeting short-term obligations and are generally rolled over. By analyzing Panel A's columns (2) to (5), we investigate which types of entities that subscribed to CPs, such as mutual funds, banks, NBFCs, and others, experienced the most significant decline. The decline in CP funding of NBFCs with higher exposure was mainly on account of withdrawals of mutual funds. Mutual funds subscrib-

ing CPs of NBFCs with higher exposure declined by 10.62 pp (S.E.= 10.61). This is in alignment with the occurrence in the post IL&FS default- mutual funds turned cautious in subscribing to CPs floated by NBFCs. However, our results show that it was the weak NBFCs- the ones with higher asset-liability mismatches that were affected adversely.

Panel B of Table 3 reports the interaction of CP growth with NBFC characteristics such as size (measured by log of total assets), provisioning coverage ratio (PCR) measured by provisioning over total non-performing assets and operating expense (measured by operating costs over total income). We utilise information of these NBFC characteristics to assess which characteristics suffered maximum outflows from the CP market for the NBFCs with high-exposure or ALM mismatch. Columns (1)-(3) show the interaction term for firm exposure and characteristics, which is the coefficient of interest. Column (1) shows that larger firms (above-median total assets) with higher ALM exposure suffered a 5.56 pp (S.E.= 2.28) outflow of CP funds, as compared to smaller NBFCs with lower exposure. Column (2) shows that NBFCs with higher exposure but also above-median PCR were better off and could salvage a liquidity drain. For these 'healthier' firms, CP inflow growth increased by 0.78 pp (S.E.= 0.078), as compared with firms below-median PCR with lower exposure. This indicates that NBFCs with higher provisioning against impaired assets had greater buffer against capital erosion. Finally, we examine the effect of operating expense of NBFCs, an indicator of firm efficiency, which is measured by operating expenses to total income. Column (3) reports a null effect of firm inefficiency on CP funding. In a nutshell, NBFC size and provisioning buffers affected CP funding for higher exposure firms, but were indifferent to firm efficiency or liquidity.

5.4 Alternate Sources of Funding for NBFCs During Crisis

During the IL&FS episode, the CP market faced redemption pressures causing many high-exposure firms to face a liquidity crunch. In this context, firms with an ex-ante short-term asset-liability mismatch faced greater challenges in raising funds. This subsection aims to examine whether there were differences in access to alternative funding sources during the crisis based on varying levels

of ex-ante exposures. We follow Equation (5) below:

$$\Delta \text{Borrowings}_i = \alpha + \beta \times \text{Ex-Ante Exposure}_i + \epsilon_i \quad (5)$$

where the dependent variable of interest is *Borrowings_i*. We report NBFC responds to alternative sources of funding such as banks, mutual funds, and other entities.

Table 4 reports the regression results from Equation (5). Overall borrowings, i.e. growth in total borrowings of NBFCs with high exposure declined by 58.8 pp (S.E.= 6.17). Our study breaks down the overall decline in NBFC borrowings and reports that subscription to commercial papers reduced by 14.5 pp (S.E.= 4.67) during the IL&FS period. The decline was not limited to the CP market, as NBFIs were unable to tap alternate sources of funding. NBFC borrowing from debentures reduced by 30.15 pp (S.E.= 5.79) owing to lesser issuance of debentures by high-exposure NBFCs after their extant debt matured. Column (4) in Table 4 points at ring-fencing by banks who reduced lending to NBFCs with higher asset-liability mismatches by nearly 46 pp (S.E.= 6.03) as a consequence of the IL&FS crisis. These banks did not provide fresh credit to ‘riskier’ NBFCs, thereby ensuring some degree of cleansing effect in the bank-NBFC relationship.

5.5 Declines in NBFC Credit

Going a layer deeper, we examine how the cleansing effect from banks impacted NBFC credit distribution and loans at the sectoral-level. In the IL&FS period, NBFCs experienced a decrease in their liquidity, which made it difficult for them to service their asset-liability mismatch. Additionally, their funding from commercial papers and banks also diminished, as shown in previous sections. Consequently, this section examines whether credit constraints transmitted from high-exposure NBFCs to sectoral loans.

$$\Delta \text{Credit}_i = \alpha + \beta \times \text{Ex-Ante Exposure}_i + \epsilon_i \quad (6)$$

To isolate the effect the banks on NBFCs, we use a fixed-effect for financial institutions (FI), as shown in column 2.

In Panel A of Table 5, we find that overall credit of high-exposure NBFCs declined by 32.54pp

(S.E.= 8.71) during the IL&FS period. Panel B reports NBFC credit to three sectors - retail, industry and services. Credit to the retail sector declined most by 29.78 pp (S.E.= 4.84). Typically, retail lending, which is composed of vehicular loans, gold loans, microfinance loans, education loans, consumer durables, and housing, are extended for relatively shorter tenure as compared to the other sectors. It is likely that in the event of a funding constraint, NBFCs reduce retail loans. This explains the larger decline reported in retail lending of NBFCs as compared to industry and services. The alternate scenario could be that high-exposure NBFCs were ones more concentrated more on retail lending, which then saw a decline in credit.

The next affected sector was the services sector, as credit declined by 20.14 pp (S.E.= 5.81). This meant NBFCs reduced lending to commercial real estate (CRE), trade and transport operators. Finally, NBFC lending to industry sector declined by 15.67 pp (5.92). These loans were relatively longer-term infrastructure loans, which suffered the least.

6 Bank Lending to NBFCs during IL&FS

In this section, we delve into understanding the reaction of the banking sector to a shock in the non-bank sector. For this, we use the data of 57 NBFCs matched with their respective lenders-banks, mutual funds, financial institutions, CPs, debentures, provident funds, pension funds, insurance funds etc. In a nutshell, the data shows the exposure of various entities in the financial system to a particular NBFC in a given quarter. We isolate the behaviour of banks lending to NBFCs, segregating NBFCs into different qualities (healthy and unhealthy) based on their extent of ex-ante exposure or ALM mismatch.

Equation (7) below is the baseline specification to identify the role played by the banking system in 'bailing out' NBFCs.

$$\Delta \text{Bank Lending}_i = \alpha + \beta \times \text{Ex-Ante Exposure} * \text{Bank}_i + \epsilon_i \quad (7)$$

where the role of banks is captured by the coefficient of the interaction term $\text{Ex} - \text{AnteExposure} * \text{Bank}_i$.

Table 5 reports the results from Equation (7), where column (2) of Panel B reports that banks' lending to NBFCs increased by 0.55 pp (S.E.= 0.203), but only for healthy NBFCs. We define the

health of the NBFC based on their median gross non-performing assets as on March 2018. We also include here a fixed effect for effect of all financial institutions that might have affected NBFC borrowings such as mutual funds. Panel C in Table 5, reveals a null effect of banks lending to unhealthy NBFCs, which further suggests a ‘cleansing effect’ as banks reallocated their loans to good quality NBFCs after the crisis. Growth in bank borrowings reduced by 0.162 pp (S.E.= 0) for NBFCs with higher exposure, while borrowing from within banks increased by 0.30 pp (S.E.= 0.108).

7 Conclusion

This paper investigates the anatomy of a non-banking crisis in India. We focus on the IL&FS in September 2018 that triggered a massive run on the mutual funds. Mutual funds facing redemption pressure pulled out of the commercial paper market. As a result, NBFCs that were funded by short-term commercial paper faced a liquidity shock. NBFCs with higher exposure to the short-term asset-liability mismatch saw a decline in commercial paper funding, especially from mutual funds. NBFCs that relied more on short-term funds witnessed higher liquidity crunch, as they were unable to access alternate sources of borrowings like banks and debentures. However, the healthier NBFCs were able to access bank credit whereas the weaker NBFCs saw a *decline* in bank credit. The credit constraints from high-exposure NBFCs were transmitted to further lending at the sectoral level, depending on the loan tenure. Lending to the retail sector declined the most due to its shorter loan tenures, whereas lending to the services and industry sectors was relatively less affected owing to the longer-term nature of these loans.

Overall, our results highlight three factors. First, NBFCs transmitted their credit constraints to borrowers, with short-term retail loans being hardest hit. Second, the banks stepped in to support healthier NBFCs ensuring that the liquidity crisis did not turn into a full-blown solvency crisis. Third, since banks pulled out of weaker NBFCs, there was a ringfencing of the traditional banking sector from the non-bank financial crisis ensuring that the contagion did not spread to the banking sector.

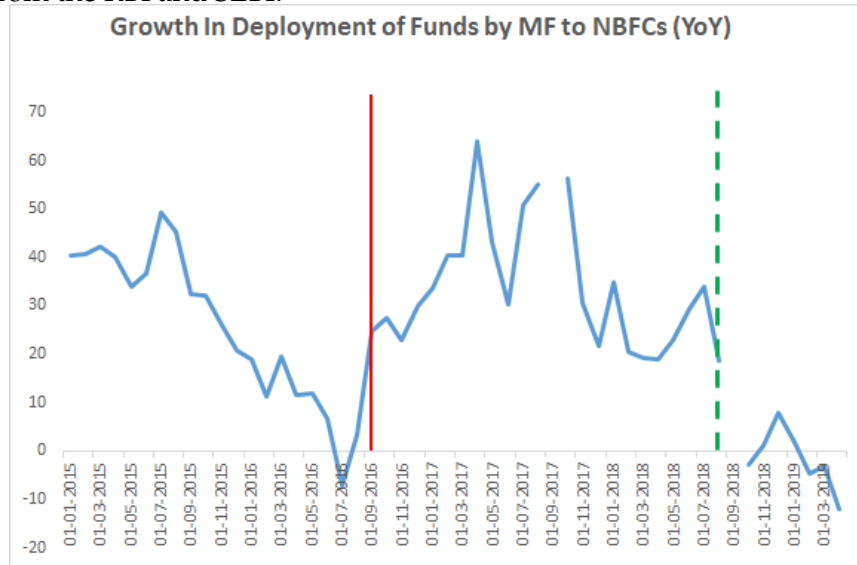
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Figure 1
Growth in Deployment of Funds by Mutual Funds to NBFCs

This figure plots the year on year growth rate in deployment of funds by mutual fund to NBFCs from 1 January 2015 to 1 March 2019. The solid red vertical line is shown as of the date of the ..??. on 1 September 2016. The green dashed vertical line is shown as of the IL&FS default on ..??. 2019. Data is from the RBI and SEBI.



Notes: Source: RBI, SEBI

Figure 2
IL&FS and DHFL Stock Prices

The LHS of the vertical axis of the figure shows the NSE closing stock prices for the overall NBFC sector and DHFL, and the RHS of the vertical axis shows the NSE closing price of IL&FS and its subsidiaries. NSE closing price data is from 1st January 2018 to 31st December 2018. The vertical dashed line on 28 August 2018 is shown as of the date of the IL&FS default, and the dashed vertical line on 19 September 2019 shown as of the DSP sells DHFL's CP.

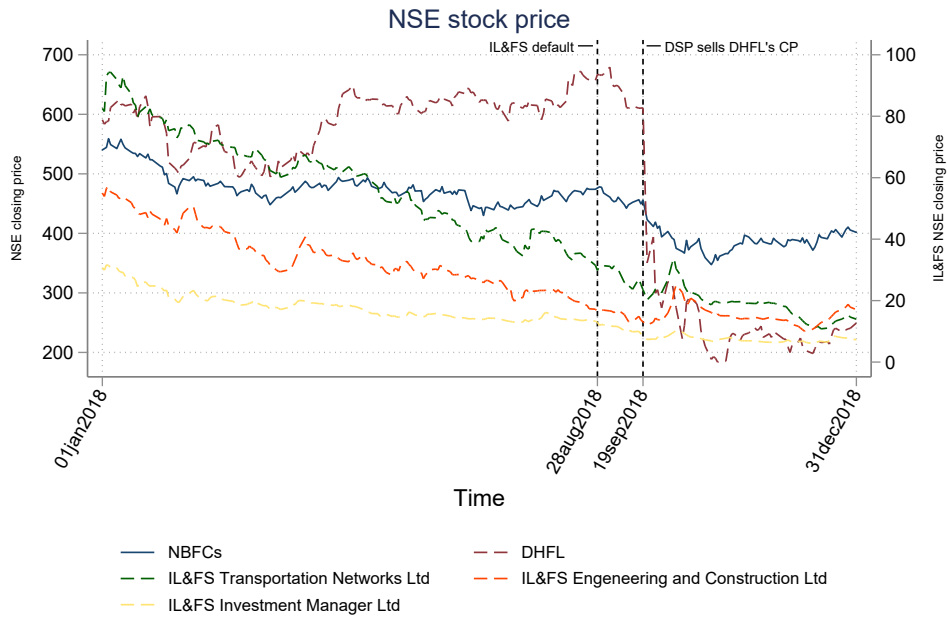


Figure 3
Secondary Market CP Rate minus GSec Rate

The figure shows the secondary market commercial paper rate minus the rate on the government bonds. The vertical dashed line on 28 August 2018 is shown as of the date of the IL&FS default.

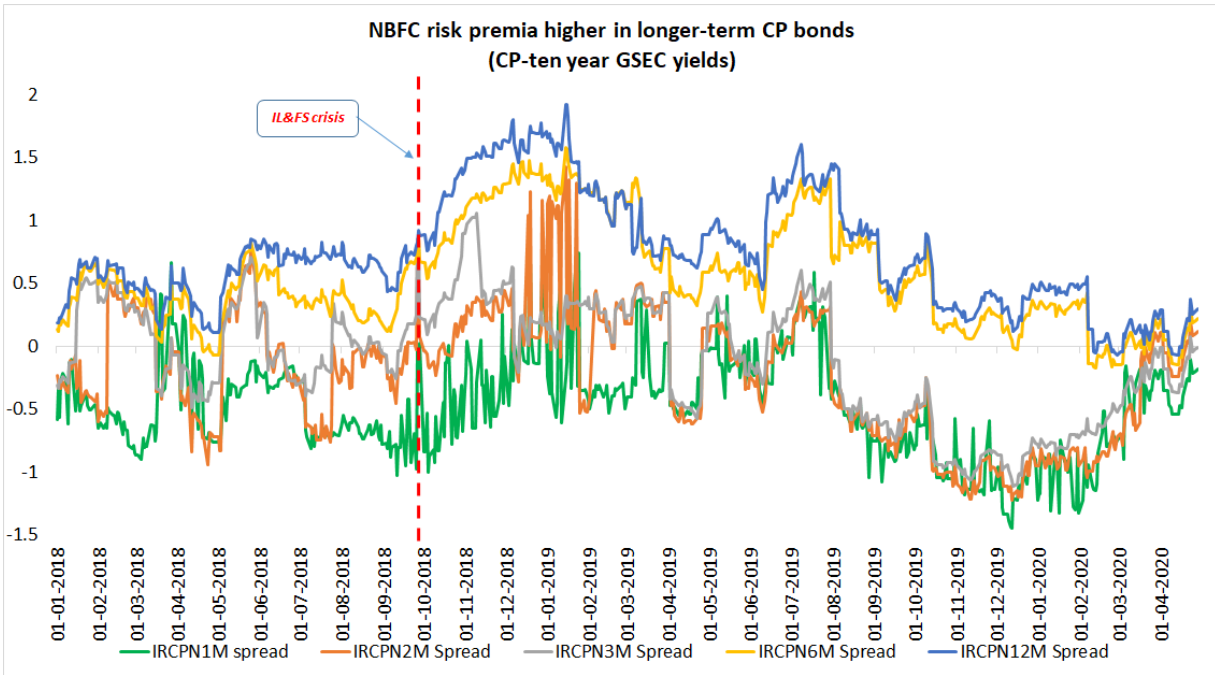
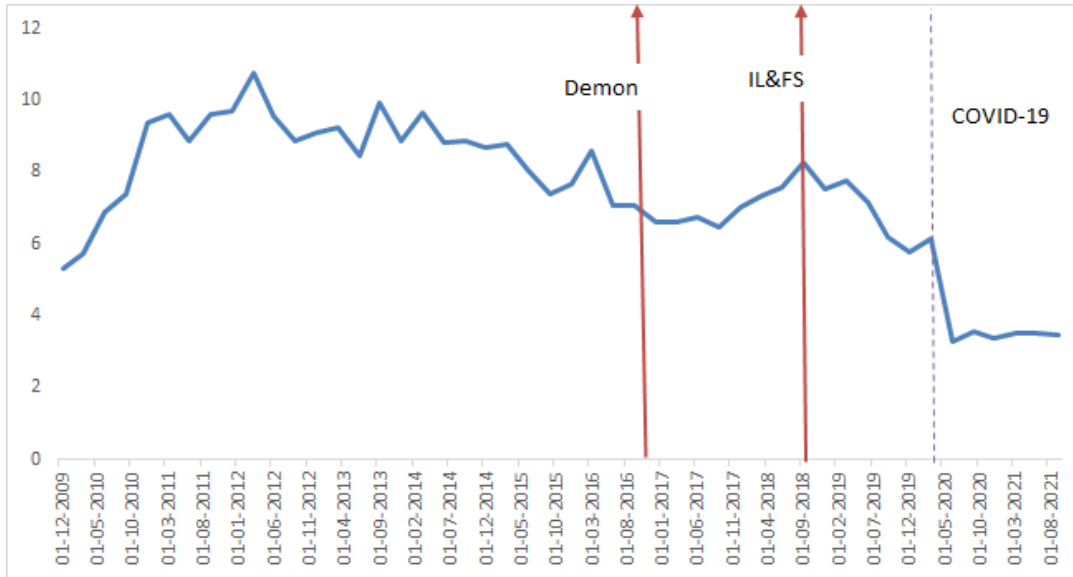


Figure 4
Three Month CP Rates in the Primary Market

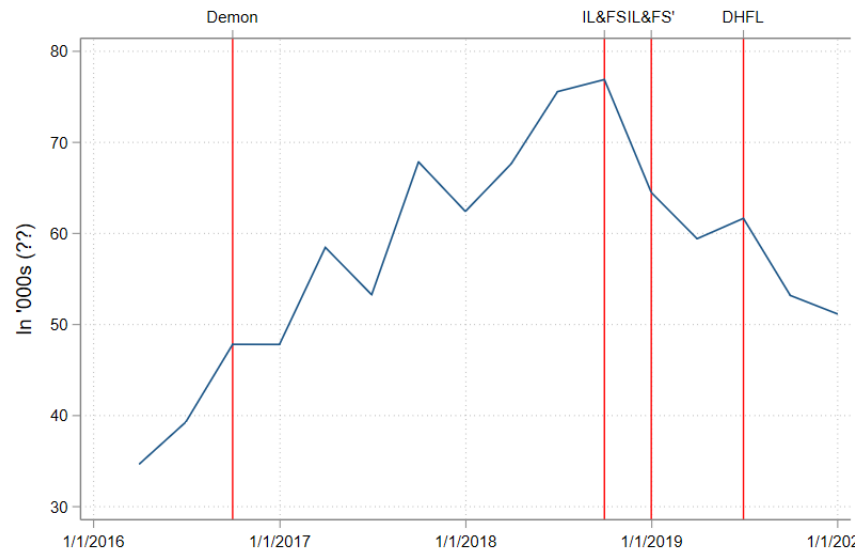
The figure shows the 3-month commercial paper rates in the primary market. The vertical dashed line on the date of demonization on 11 November 2016 and 28 August 2018, the date of the IL&FS default.



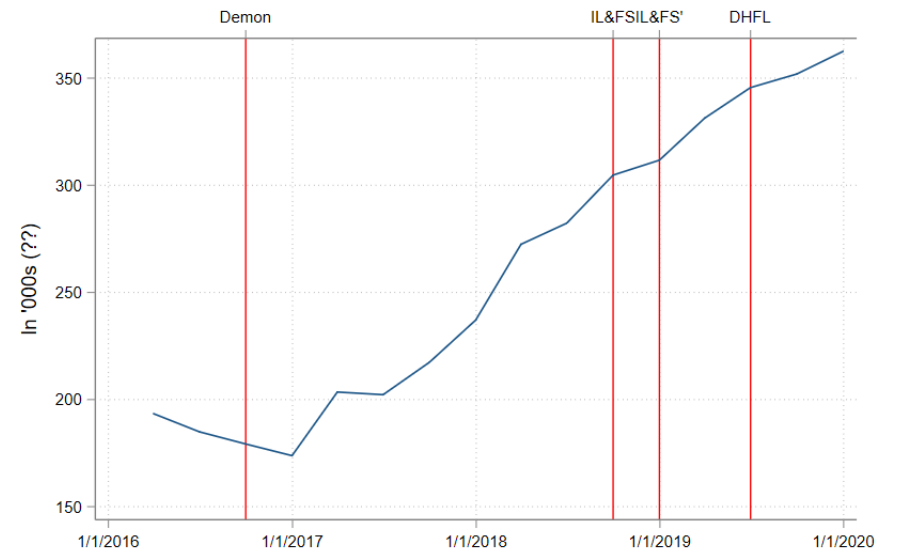
Notes: Source: Prime database

Figure 5 Commercial Paper and Bank Borrowing

The figures below show daily-level commercial paper (Panel A) and bank borrowing (Panel B) from 1st January 2016 to 1st January 2020 and the impact of different events- Demonetization, ILFS and DHFL on them.



(A) Commercial paper



(B) Bank Borrowing

Table 1
Summary Statistics

This table presents the summary statistics of all the variables for the NBFCs used in our analysis. Short-term (less than 1 year) asset-liability mismatch is defined as the ratio of the short-term contractual cash inflows minus the short-term contractual cash outflows to the total outflows and is shown in the table as ex-ante exposure (cont.). Ex-ante exposure is 1 for below median values of the short-term asset-liability mismatch. The remaining growth variables are calculated using balance sheet variables and are average in the post-period to the average in the pre-period. Pre-period is between 2018–September 2018, and the post-period is between December 2018 and March 2019. Data is from the Reserve Bank of India.

	mean	sd	p10	p50	p90
Ex-ante exposure (cont.)	1.8	16.4	0.0	0.0	1.3
Ex-ante exposure	0.5	0.5	0.0	1.0	1.0
Borrowing growth	69.6	62.5	0.0	90.8	130.0
CP growth	18.0	42.1	0.0	0.0	85.8
Bond growth	30.7	53.5	0.0	0.0	118.9
Bank borrowing growth	39.9	58.1	0.0	0.0	129.2
MF CP growth	13.6	36.3	0.0	0.0	70.6
Bank CP growth	6.0	21.8	0.0	0.0	0.0
NBFC CP growth	0.7	6.8	0.0	0.0	0.0
Other CP growth	7.4	28.0	0.0	0.0	0.0
Bank term loans growth	38.2	66.9	0.0	0.0	132.6
Bank working capital growth	13.9	42.9	0.0	0.0	64.7
Bank cash loans growth	25.5	77.8	0.0	0.0	98.7
Bank overdraft loans growth	7.3	27.5	0.0	0.0	0.0
Observations	318				

Table 2
Correlates of the Exposure Variable

The table presents the correlates of the exposure variable. The dependent variable in all columns is the ex-ante exposure. Short-term (less than 1 year) asset-liability mismatch is defined as the ratio of the short-term contractual cash inflows minus the short-term contractual cash outflows to the total outflows. Ex-ante exposure is 1 for below median values of the short-term asset-liability mismatch. The RHS variables operating expense, cash ratio and NPA ratio in columns 1-3, respectively. Data is from the Reserve Bank of India. Observations are at the NBFC level for 318 NBFIs, one quarter before and after the IL&FS period. Robust standard errors are clustered at the firm level

	(1)	(2)	(3)
	Ex-ante Exposure		
Operating Expense	-0.089 (0.071)		
Cash Ratio		0.127 (0.157)	
NPA Ratio			-0.000 (0.001)
R ²	0.006	0.003	0.000
N	254	253	223

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3
Impact on Commercial Paper Funding for NBFCs

Panel A presents the commercial paper growth around the ILFS crisis against the ex-ante exposure variable for NBFCs. The dependent variable is the growth in the total commercial paper subscribed by all lenders (column 1), mutual funds (column 2), banks (column 3), other NBFCs (column 4) and a catch-all category other (column 5). Pre-period is between 2018–September 2018 and the post-period is between December 2018 and March 2019. Growth is calculated using balance sheet variables and is the average in the post-period to the average in the pre-period. Short-term (less than 1 year) asset-liability mismatch is defined as the ratio of the short-term contractual cash inflows minus the short-term contractual cash outflows to the total outflows. Ex-ante exposure is 1 for below median values of the short-term asset-liability mismatch. Data is from the Reserve Bank of India. Panel B shows the heterogeneity across size, provisioning ratio, and operating expenditure ratio. Size is measured as the log of assets, the provisioning ratio is 1 for above median values, and the operating ratio is the operating expenses to the total sales. The dependent variable is the total commercial paper growth between the pre- and post-period, defined as before. Observations are at the NBFC level for NBFIs, one quarter before and after the IL&FS period. Robust standard errors are clustered at the firm level.

Panel A: Commercial Paper Growth

	(1)	(2)	(3)	(4)	(5)
Dependent variables:	All	MF	Bank	NBFC	Other
Ex-ante exposure	-14.507*** (4.673)	-10.618*** (4.054)	-2.237 (2.445)	-0.340 (0.766)	-3.313 (3.145)
R ²	0.030	0.021	0.003	0.001	0.004
N	318	318	318	318	318

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at firm level.

Panel B: Heterogeneity in Commercial Paper Growth

	(1)	(2)	(3)
Dependent variables:	Size	CP Growth Provisioning ratio	OpEx ratio
Ex-ante exposure	32.149** (13.062)	-15.146*** (4.589)	-13.892** (5.859)
Ex-ante Exposure * Variable	-5.562** (2.283)	0.785*** (0.078)	2.543 (7.943)
Variable	11.809*** (1.844)	0.035 (0.055)	-17.516** (7.023)
R ²	0.212	0.056	0.057
N	316	318	318

Table 4
Impact on Alternate Funding Sources

This table presents the funding growth around the IL&FS crisis against the ex-ante exposure variable for NBFCs. The dependent variable is the growth in total funding (column 1), commercial paper (column 2), debentures (column 3), and banks (column 4). Pre-period is between 2018–September 2018 and the post-period is between December 2018 and March 2019. Growth is calculated using balance sheet variables and is the average in the post-period to the average in the pre-period. Short-term (less than 1 year) asset-liability mismatch is defined as the ratio of the short-term contractual cash inflows minus the short-term contractual cash outflows to the total outflows. Ex-ante exposure is 1 for below median values of the short-term asset-liability mismatch. Data is from the Reserve Bank of India. Observations are at the NBFC level for NBFIs, one quarter before and after the IL&FS period. Robust standard errors are clustered at the firm level.

Dependent variables:	(1)	(2)	(3)	(4)
	Total	Growth in borrowing from CP	Debentures	Bank
Ex-ante exposure	-58.802*** (6.173)	-14.507*** (4.673)	-30.147*** (5.797)	-46.015*** (6.031)
R ²	0.222	0.030	0.080	0.157
N	318	318	318	318

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at firm level.

Table 5
Bank Support During the IL&FS Crisis

This table presents the heterogeneity in borrowing from banks versus other financial institutions (FI) around the IL&FS crisis. The dependent variable is the change in borrowing between the pre- and post-period. Pre-period is between 2018–September 2018 and the post-period is between December 2018 and March 2019. Growth is calculated using balance sheet variables and is the average in the post-period to the average in the pre-period. Short-term (less than 1 year) asset-liability mismatch is defined as the ratio of the short-term contractual cash inflows minus the short-term contractual cash outflows to the total outflows. Ex-ante exposure is 1 for below median values of the short-term asset-liability mismatch. Bank is an indicator equal to 1 if the financial institution that the NBFC borrows from is a scheduled commercial bank. Column 2 includes FI fixed effects. In Panel A all NBFCs are included. Panel B (C) subsets to healthy (weak) NBFCs defined as those with below (above) median gross non-performing asset ratio as of June 2018. Data is from the Reserve Bank of India. Observations are at the FI-NBFC level. Standard errors are clustered at the NBFC level.

Panel A: All		
	(1)	(2)
Dependent variables:	Growth in borrowing from	
Ex-ante exposure	-0.290** (0.134)	-0.359** (0.176)
Exposure * Bank	0.389*** (0.147)	0.555*** (0.203)
Bank	0.124** (0.063)	
R ²	0.018	0.415
FI-FE	N	Y
N	1064	1064
Panel B: Healthy NBFCs		
	(1)	(2)
Dependent variables:	Growth in borrowing from	
Ex-ante exposure	-0.621*** (0.092)	-0.498* (0.254)
Exposure * Bank	0.643*** (0.121)	0.626** (0.281)
Bank	0.055 (0.087)	
R ²	0.029	0.445
FI-FE	N	Y
N	570	570

Table 5
Impact on Credit and Investment

Panel A table presents the change in credit and investments around the IL&FS crisis against the ex-ante exposure variable for NBFCs. The dependent variable is the change in credit (column 1) and all investments (column 2), long-term investments (column 3), and current investments (column 4). Pre-period is between 2018–September 2018, and the post-period is between December 2018 and March 2019. Growth is calculated using balance sheet variables and is the average in the post-period to the average in the pre-period. Short-term (less than 1 year) asset-liability mismatch is defined as the ratio of the short-term contractual cash inflows minus the short-term contractual cash outflows to the total outflows. Ex-ante exposure is 1 for below median values of the short-term asset-liability mismatch. Data is from the Reserve Bank of India. Observations are at the NBFC level for NBFIs, one quarter before and after the IL&FS period. Robust standard errors are shown. Panel B shows the impact on credit by industry. The dependent variables are the change in credit between the pre- and post-period for the retail (column 1), industry (column 2), and services (column 3). The remaining variables are as defined in Panel A.

Panel A:

	(1)	(2)	(3)	(4)
	Dependent variables: Growth in			
	Credit	All	Investments Long-term	Current
Ex-ante exposure	-32.537*** (8.714)	-4.786 (9.169)	6.281 (8.806)	15.523 (18.113)
R ²	0.042	0.001	0.002	0.002
N	318	318	318	318

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Panel B:

	(1)	(2)	(3)
	Dependent variables: Loan Growth		
	Retail	Industry	Services
Ex-ante exposure	-29.776*** (4.839)	-15.677*** (5.919)	-20.140*** (5.813)
R ²	0.108	0.022	0.037
N	318	318	318

Table 6
Bank Support During the IL&FS Crisis

Panel C: Weak NBFCs		
Dependent variables:	(1)	(2)
	Growth in borrowing from	
Ex-ante exposure	0.262 (0.273)	-0.162*** (0.000)
Exposure * Bank	-0.252 (0.294)	0.228 (0.222)
Bank	0.305*** (0.108)	
R ²	0.027	0.573
FI-FE	N	Y
N	492	492

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Anatomy of a Non-bank Run

Online Appendix

Table A1**Channel: Heterogeneity Tests**

This table presents the various channels through which NBFCs characteristics impact their CP borrowings. The tables shows the heterogeneity across size, provisioning ratio, CRAR, operating expenses, and cash ratio. The dependent variable is the CP growth in size (Column 1), provisioning ratio (Column 2), CRAR (Column 3), operating expenses (Column 4), and cash ratio (Column 5) respectively. Size is measured as the log of assets, the provisioning ratio is 1 for above median values, and the operating ratio is the operating expenses to the total sales. Pre-period is between 2018–September 2018, and the post-period is between December 2018 and March 2019. Growth is calculated using balance sheet variables and is the average in the post-period to the average in the pre-period. Short-term (less than 1 year) asset-liability mismatch is defined as the ratio of the short-term contractual cash inflows minus the short-term contractual cash outflows to the total outflows. Ex-ante exposure is 1 for below median values of the short-term asset-liability mismatch. Data is from the Reserve Bank of India. Observations are at the NBFC level for NBFIs, one quarter before and after the IL&FS period. Robust standard errors are shown.

	(1)	(2)	(3)	(4)	(5)
	Dependent variables: CP Growth				
Variable:	Size	Provisioning ratio	CRAR	OpEx ratio	Cash ratio
Variable	8.657*** (1.048)	0.047 (0.058)	-0.110*** (0.027)	-17.462*** (3.770)	-24.907*** (9.197)
R ²	0.192	0.010	0.044	0.032	0.013
N	316	318	313	318	316

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2
Limited Effect on Commercial Real Estate

This table presents the limited effect on commercial real estate. The dependent variable is Services loan growth in Commercial RE (column 1), Trade (column 2) and Transport Operators (Column 3). Pre-period is between 2018–September 2018, and the post-period is between December 2018 and March 2019. Growth is calculated using balance sheet variables and is the average in the post-period to the average in the pre-period. Short-term (less than 1 year) asset-liability mismatch is defined as the ratio of the short-term contractual cash inflows minus the short-term contractual cash outflows to the total outflows. Ex-ante exposure is 1 for below median values of the short-term asset-liability mismatch. Data is from the Reserve Bank of India. Observations are at the NBFC level for NBFIs, one quarter before and after the IL&FS period. Robust standard errors are shown.

	(1)	(2)	(3)
	Dependent variables: Services Loan Growth		
	Commercial RE	Trade	Transport Operators
Ex-ante exposure	-5.385 (4.438)	-6.902** (3.157)	-5.299** (2.516)
R ²	0.005	0.015	0.014
N	318	318	318

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3
Larger Effects on Smaller Service Firms

This table presents the larger effects on smaller service firms. The dependent variable is Services loan growth to small/micro (column 1), medium (column 2) and large (Column 3). Pre-period is between 2018–September 2018, and the post-period is between December 2018 and March 2019. Growth is calculated using balance sheet variables and is the average in the post-period to the average in the pre-period. Short-term (less than 1 year) asset-liability mismatch is defined as the ratio of the short-term contractual cash inflows minus the short-term contractual cash outflows to the total outflows. Ex-ante exposure is 1 for below median values of the short-term asset-liability mismatch. Data is from the Reserve Bank of India. Observations are at the NBFC level for NBFIs, one quarter before and after the IL&FS period. Robust standard errors are shown.

	(1)	(2)	(3)
Dependent variables: Services Loan Growth			
	Small/Micro	Medium	Large
Ex-ante exposure	-7.862** (3.228)	-4.072 (3.076)	-4.578 (2.858)
R ²	0.019	0.006	0.008
N	318	318	318

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A4
Industry Firms

This table examines the effect on loans disbursed by high exposure NBFCs to industry on the basis of their size. The dependent variable is industry loan growth to small/micro (column 1), medium (column 2) and large (Column 3). Pre-period is between 2018–September 2018, and the post-period is between December 2018 and March 2019. Growth is calculated using balance sheet variables and is the average in the post-period to the average in the pre-period. Short-term (less than 1 year) asset-liability mismatch is defined as the ratio of the short-term contractual cash inflows minus the short-term contractual cash outflows to the total outflows. Ex-ante exposure is 1 for below median values of the short-term asset-liability mismatch. Data is from the Reserve Bank of India. Observations are at the NBFC level for NBFIs, one quarter before and after the IL&FS period. Robust standard errors are shown.

	(1)	(2)	(3)
Dependent variables: Industry Loan Growth			
	Small/Micro	Medium	Large
Ex-ante exposure	-4.324 (3.239)	-6.038* (3.112)	-3.569 (3.299)
R ²	0.006	0.012	0.004
N	318	318	318

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$