

AMIYATOSH PURNANANDAM*
McCombs School of Business, University of Texas

ARUSHI SHARMA†
Independent Researcher

Corporate Investments in India: Lack of Investment Opportunity or Lack of Funds?[§]

ABSTRACT This paper investigates the key drivers of corporate investment in India. Specifically, we analyze the relative importance of investment opportunities available to firms, measured by Tobin's Q, and the financial constraints they face in capitalizing on these opportunities. We show that capital expenditure responds positively to investment opportunities, especially after the financial sector reforms in the mid-2010s, consistent with the idea that these reforms have improved the allocative efficiency of the Indian financial system. Yet, there is strong evidence of financial frictions that Indian firms face as evidenced by a significant correlation between investments and the availability of internal cash flows. Our findings highlight the quality-quantity trade-off of corporate investment in India: the quality of investment has improved in the past decade but it has come at the expense of the quantity of investment for firms without access to wider credit markets.

Keywords: *Financial Constraint, Corporate Investment*

JEL Classification: *G21, G23, G28, O16*

1. Introduction

Capital investments by the private sector are vital for a country's economic growth. For India to achieve a sustained level of growth in the range of 6-8 percent per annum over a long period of time, its private

* amiyatosh@utexas.edu

† arushis@umich.edu

§ We are grateful to participants at Columbia India Conference, 2025; India Policy Forum, 2025; Dr Poonam Gupta, and Dr Amartya Lahiri for helpful comments on the paper.

The findings, interpretations, and conclusions expressed are those of the authors and do not necessarily reflect the views of the Governing Body or Management of NCAER.
--

sector must invest at a consistent pace in the coming decades. What drives investments by Indian corporations and what frictions do they face in doing so? At a very broad level, corporate investments are driven by two primary factors: investment opportunities available to the firms and their ability to capitalize on these opportunities by raising enough external funds. Lack of opportunities or lack of funds to capitalize on them can both have severe implications for corporate investments, and consequently on economic growth, employment generation, and overall development of the country. Our paper analyzes the drivers of corporate investment in India within this overarching framework, and provides suggestions for policy initiatives to boost growth. We pay special attention to the effect of financial sector reforms in the mid-2010s to shed light on the effectiveness of these policies and draw lessons for future reforms.

We build our empirical work under the framework of classical Tobin's Q model of corporate investment, augmented further with theories of investment under the presence of financial frictions (Tobin 1969; Hayashi 1982). The core idea of Tobin's Q model is simple and intuitive: if the market value of a firm is higher than the replacement value of its assets, then the assets are valued higher inside the firm as compared to outside. Therefore, firms with a higher ratio of market value to replacement value, popularly known as Tobin's Q , should invest more. While the precise measurement of a firm's replacement cost and market value, especially for the marginal assets, remains a contentious issue in the literature, a well-known first approximation of Q is the ratio of market-to-book value of a firm's assets. Tobin's Q provides a succinct measure of the firm's investment opportunity set. If firms face no financial frictions, their investment should solely respond to variation in their investment opportunity set: firms with higher Q should invest more and periods with higher Q should see more corporate investments in aggregate.

Unfortunately, firms might not be able to invest as much as is dictated by their investment opportunity set because of the various financial frictions they face. A large literature in finance and economics emphasizes the role of information and agency frictions that limit a firm's ability to raise funds to fully capitalize on their investment opportunities as captured by their Tobin's Q . For example, firms might face credit rationing due to information frictions as in Stiglitz and Weiss (1981), or they may be limited in their ability to raise external funds due to agency conflicts as in Holmström and Tirole (1997).

Seminal work by Fazzari et al. (1988) develops this idea rigorously by introducing the idea of "investment-cash flow sensitivity". The core idea is simple: if firms are unable to raise external capital to fund all their profitable investments, then their investment would be sensitive to their internal cash flows in addition to Q . Specifically, they show that firms invest more when they have higher internal funds, after accounting for differences in their investment opportunity set as captured by Tobin's Q . Since internal funds are least costly in terms of financial friction cost—for example, they do not suffer from the adverse

selection cost faced by an informed insider—the finding by Fazzari et al. suggests the presence of large financial frictions for private corporations in the U.S. (see Hubbard (1998) for further discussions).¹ A natural implication of this line of research is that policies, at both the macro and firm levels, which can alleviate financial frictions can also help boost corporate investment and thus aid in economic growth. How large are these frictions for the Indian corporations? What factors exacerbate and help alleviate these frictions? What implications did recent policy reforms, such as cleaning up of the banking sector's balance sheet, have on investment growth in India? Our empirical study is geared towards addressing these questions for Indian corporations using recent data.

Our primary sample covers all publicly listed Indian companies in the CMIE Prowess database between 2006 and 2024 since better data availability after 2005. Our focus on listed firms is driven solely by the fact that we need market prices of a firm's equity to compute their Q , our main proxy for investment opportunity. In some analysis, we also make use of a subset of unlisted companies for which sufficient data are available for the particular analysis. We measure the intensity of investment by the ratio of annual capital expenditure scaled by total assets of the firm at the beginning of the year. During our sample period of 2006–2024, the investment rate averaged around 7 percent of the asset value of the firm, with a large cross-sectional and time-series variation. Notably, the average investment rate was between 8 and 10 percent during 2006–2008, that is, before the Global Financial Crisis (GFC), and it gradually declined to a level below 6 percent by 2020, that is, before the COVID-19 pandemic. After a significant decline to a level of 4 percent during the pandemic year, there has been some recovery in corporate investments in recent years. These patterns present a clear aggregate picture: corporate investments declined in the last decade, but they are on a recovery path since the post-pandemic period.

In our core empirical analysis, we show that Indian corporations invest more when they have higher Q consistent with the basic theory of investments proposed by Tobin (1969) and Hayashi (1982). One standard deviation increase in Q is related to almost 0.20 standard deviation higher investments in the following year. The estimate translates into a 1.4 percent higher investment for a unit increase in Q . As a benchmark, Fazzari et al. (1988) find a corresponding estimate of 3 percent, suggesting that investments by Indian firms are relatively less sensitive to their Q in India as compared to their U.S. counterparts.² Further, we find that Indian firms invest more when they have higher internal

1. Fazzari et al. (1988) spurred a voluminous literature on corporate investments and financial constraints. They can be broadly divided into three categories: (a) mis-measurement of marginal Q , (b) the endogenous relation between a firm's internal cash flows and investment opportunity set, and (c) measures of financial constraint. Notable contributions include Kaplan and Zingales (1997); Altı (2003); Erickson and Whited (2000); Gomes (2001); Whited (1992); Rauh (2006).

2. A natural caveat in comparing these sensitivities across countries is that they differ in their accounting standards and hence we should interpret them with caution.

cash flows, a finding consistent with the presence of the financial constraints they face in raising external funds. One standard deviation increase in internal cash flows is associated with an increase of almost 0.06 standard deviation higher investments.

A key empirical question, from both the academic and policy perspectives, is concerned with the nature of firms which exhibit higher investment-cash flow sensitivity as it allows us to better understand the kind of firms that face more constraints. Various proxies and measures of financial constraints have been proposed in the literature. We focus on two key measures of financial constraints. Our first measure is a firm's listing status since listed firms have wider access to the public equity market and arguably suffer from a lower asymmetric information problem due to the enhanced disclosure requirements they face. Surprisingly, we do not find any differential sensitivity across listed and unlisted firms when we estimate a model of investment-cash flow regression after dropping the *Q* variable.³ Therefore, access to the public equity market does not ameliorate the average Indian firm's dependence on internal cash flows when it comes to their investment decisions.

We next consider a firm's age as a proxy for financial constraints motivated by the work of Hadlock and Pierce (2010) who show that firm age—that is, how young a firm is—is a strong indicator of the financial constraints that a firm faces. The investment-cash flow sensitivity is significantly higher for younger firms, consistent with the idea that young firms face larger frictions in raising external capital to fund their positive Net Present Value (NPV) projects. A newly born firm exhibits almost 30 percent higher sensitivity as compared to the firm with the median age in our sample. Combined with our earlier result that access to public equity market does not seem to affect the investment-cash flow sensitivity, the finding suggests that younger firms face higher frictions in accessing other sources of external funds such as bank loans or the bond market. Therefore, policy designs that can help smaller and young firms get better access to credit markets can be helpful in spurring investment growth in the economy.

In the remainder of our analysis, we turn to two important events during our sample period—one related to a structural reform in the Indian financial sector and the other to a crisis in the system. The first event, namely the Indian Bankruptcy Code of 2016, is a bankruptcy reform act that was aimed at faster resolution of distressed assets and consequently improving access to external finance. The implementation of this act also roughly coincided with the cleaning up of the Non-Performing Assets (NPAs) of the Indian banking system. We consider these two events as a step towards a structural reform of the Indian financial system, and analyze how firms invested in capital expenditure after

3. We cannot control for *Q* in these regressions since these are unobserved for unlisted firms. Instead, we include industry-year fixed effects in these models to account for industry-time specific variation in investment opportunity sets.

these reforms. We first document that corporate investments have become more sensitive to Q after 2015, a finding consistent with the idea that after these reforms, the quality of investments has improved: firms with better projects are investing more. The quantitative magnitude of the effect is strong as well, signifying an almost 50 percent increase in investment- Q sensitivity after the reform compared to before. Second, we show that post-reform, investment-cash flow sensitivity has come down considerably, indicating that firms rely less on internal funds as compared to before the reform. On an average, this is indicative of relaxation of financial constraints over time. However, the constraints remain large in the absolute sense.

The average effects mask an important variation across firms: we show that firms which depended heavily on bank borrowings experienced significantly stronger investment-cash flow sensitivity after the reforms. Bank borrowing is a major source of financing for most Indian firms, including the listed companies. The evidence is consistent with the idea that the banking sector was less willing to extend credit to the borrowers dependent on them, and lacking any other source of funds, these firms cut their investments when they had little-to-no cash flows to invest. The finding is consistent with both increased level of screening and heightened risk-aversion of the banking sector in the post-2015 period. Collectively, these results show that during the post-reform period, financial constraints became more binding for firms that were bank-dependent, but less binding for firms with other sources of credit such as the corporate bond market or Non-Banking Financial Institutions (NBFIs). Therefore, firms with access to broader credit markets, that is, beyond bank financing, faced lower constraints and as a result, they were able to invest at a higher rate even when they had a relatively small amount of internal cash flows. A plausible policy prescription that emerges from these analyses is that improving access to market-based credit can enhance private investment in the country. Policies geared towards deepening the corporate bond market or non-bank sources of lending can be beneficial from this perspective.

Of course, such a policy is not without its own risk. We shed some light on this issue in the final part of the paper. NBFIs have become an important source of financing for Indian firms over the years (Agarwal 2024). In our final set of tests, we use the NBFIs crisis of 2018-19 in India as a shock to access to external funds. We now compare firms that borrowed from the NBFIs with firms that never borrowed from them to estimate our base model in a difference-in-difference setting. Such an empirical specification is relatively less immune to the critique of investment-cash flow literature such as mis-measurement in Q or the endogenous relation between cash flows and the investment opportunity set. We find that after the collapse of Infrastructure Leasing & Financial Services Limited (ILFS), firms that borrowed from the NBFIs decreased their investment by a significant amount, as compared to before the collapse. Therefore, while accessing non-bank sources of funds can be a useful tool to increase credit and

investments, on average, it also comes with the risk of increased vulnerability to these shocks, as would be expected in any economy that increases its reliance on non-bank sources of funds. While beyond the scope of this paper, a plausible policy prescription to balance these conflicting effects of non-bank lenders is to require them to hold more equity capital that can limit the occurrence of stress in this sector. Wider access to a well-capitalized non-bank lending system can be a potential mechanism to improve investment growth in the country.

A limitation of our study is that our cross-sectional regressions cannot precisely pin down the drivers of aggregate patterns in investments. However, our results are consistent with the economic intuition that the banking sector increased their credit standards after the reform. Only the most creditworthy borrowers or firms with access to non-bank sources of funds, for example, the largest firms, could obtain credit from banks. Consequently, investments occurred in the most valued firms, that is, the investments became more sensitive to Q , on average, and firms with access to non-bank credit became less constrained. Our study cannot tease out the effect of macroeconomic shocks on corporate investments since we cannot aggregate the micro effects without properly considering the role of macro events and aggregation across firms. The aggregate investment can come down due to broader macro trends, for example, due to aggregate decline in demand or unexpected shocks such as COVID-19 for all firms, whereas our study only allows us to comment on the distribution of investments across firms. A careful examination of these overall effects is beyond the scope of this paper as it requires a detailed examination of these macro trends and a model that can capture the aggregate effects, including the effect of reallocation of credit and investments across firms.

In sum, our paper makes three key points. First, Indian firms, especially younger firms, face significant frictions in raising external capital. Therefore, alleviating frictions in access to small firms can be a reasonable approach to improve corporate investment in India. Second, equity-market dependence does not seem to matter much for investment cash flow sensitivity, suggesting that it is primarily the credit market friction that needs to be addressed for achieving higher growth. Third, after the bankruptcy code reform and NPA clean-up, firm investment has become more sensitive to Q and less to their internal cash flows. Part of this effect comes from increased importance of market-based sources of credit that bring with them the element of market discipline and better screening of projects. Therefore, in a cross-sectional sense, the allocative efficiency of financial markets has improved. However, in the aggregate, the level of investment has come down. Policy initiatives that can widen the access to market-based credit to smaller and younger firms can be an effective tool in boosting investments.

2. Data and Sample

In this paper, we use firm-level data from the Prowess database, maintained by the Centre for Monitoring Indian Economy (CMIE). Prowess is a comprehensive financial database covering over 50,000 Indian companies, including both publicly listed and a substantial number of unlisted firms. The database provides detailed information on financial statements and market indicators, allowing for the construction of key variables used in our analysis.

We start with annual financial data for all firms available in the database. We exclude firms classified under financial services (NIC codes: 64–66) and drop observations with non-positive equity-to-asset ratios to remove firms that are likely to be insolvent or financially distressed. The dataset is further augmented with firm-year information on market capitalization. Our sample consists of non-financial firms in India spanning the period 2006–2024. We further restrict the sample to firms with non-missing and strictly positive values of Tobin's Q, which serves as a proxy to identify listed firms. The resulting panel of listed firms comprises over 2,000 companies, covering more than 20,000 firm-year observations. The effective sample size varies across key variables due to missing financial information.

Our key dependent variable, investment, is measured as the ratio of additions to gross fixed assets to lagged total assets. Investment opportunities are measured by Tobin's Q, calculated as the ratio of the market value of assets to the book value of assets. Bank borrowing is defined as the sum of short-term and long-term borrowings from banks. NBFIs borrowing and market borrowing are constructed analogously, based on borrowings from NBFIs and market sources, respectively. Bank dependency is measured as the ratio of bank borrowing to total borrowing, where total borrowing is the sum of short-term and long-term borrowings from all sources. Firm size is proxied by the natural logarithm of the book value of lagged total assets. All continuous variables are winsorized at the 2.5th and 97.5th percentiles to mitigate the influence of extreme outliers.

Table 1 reports summary statistics for the key variables used in our analysis of listed firms, the sample that forms most of our empirical tests. The average investment-to-asset ratio is 0.07, with a standard deviation of 0.08. The average equity-to-asset ratio is 0.47 and standard deviation is 0.22. Investment opportunities, as measured by Tobin's Q, average 1.64. The median value of Tobin's Q is 1.15, while the 90th percentile is approximately 3.28. Cash flow-to-asset and collateral-to-asset ratios average 0.07 and 0.31, respectively. Regarding financing sources, average bank borrowing is ₹2,069 million, with a median of ₹475 million. Borrowings from NBFIs and market-based sources average ₹17.47 million and ₹110.94 million, respectively. Bank borrowing constitutes

approximately 60 percent of total borrowings, on average, whereas the shares of NBFI and market borrowings are 3 percent and 6 percent, respectively. Since firms also borrow from multiple other sources, such as inter-corporate loans or loans from promoters, these fractions do not add up to 1.

TABLE 1. Summary Statistics—Listed Firms

	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>p25</i>	<i>Median</i>	<i>p75</i>	<i>p90</i>
Cash Flow/Asset	19,821	0.07	0.11	0.01	0.07	0.13	0.19
Equity/Asset	22,486	0.47	0.22	0.30	0.45	0.63	0.78
Investment/Asset	17,862	0.07	0.08	0.01	0.04	0.09	0.17
Collateral/Asset	22,422	0.31	0.19	0.15	0.29	0.44	0.58
Q	22,486	1.64	1.29	0.89	1.15	1.84	3.28
BankBorrowing	18,272	2,069.19	3,011.80	35.80	474.75	2,708.20	8,743.10
NBFIborrowing	18,272	17.47	44.54	0.00	0.00	0.00	142.00
MarketBorrowing	18,272	110.94	266.41	0.00	0.00	0.00	846.40
BankBorrowing/ totborrowing	17,117	0.60	0.39	0.23	0.68	0.96	1.06
NBFIborrowing/ totborrowing	17,117	0.03	0.10	0.00	0.00	0.00	0.09
MarketBorrowing/ totborrowing	17,117	0.06	0.16	0.00	0.00	0.00	0.21

Source: Prowess Database (CMIE); Author's calculations.

Note: Borrowing-related variables are summarized for post-2010 observations. Sample of all listed firms covered in Prowess database. Ratio variables are winsorized at 2.5% from both tails.

We also report comparable statistics for a large sample of unlisted firms in Table 2. Unlisted firms display slightly lower investment rates, averaging 0.06, with similar dispersion. The average equity-to-asset ratio is 0.45, with a standard deviation of 0.24.

TABLE 2. Summary Statistics—Unlisted Firms

	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>p25</i>	<i>Median</i>	<i>p75</i>	<i>p90</i>
Cash Flow/Asset	23,821	0.06	0.12	0.00	0.06	0.13	0.21
Equity/Asset	34,238	0.45	0.24	0.27	0.43	0.63	0.81
Investment/Asset	24,598	0.06	0.08	0.01	0.03	0.07	0.16
Collateral/Asset	33,658	0.26	0.20	0.08	0.22	0.39	0.56

Source: Prowess Database (CMIE); Author's calculations.

Note: Sample of all unlisted firms. Variables are winsorized at 2.5% from both tails.

3. Empirical Analysis

We first present some summary statistics to motivate our empirical work that exploits cross-sectional and time-series variation with the panel data. Figure 1 presents the evolution of corporate investment in India over time based on the sample of listed firms. In the early parts of our sample, that is, just before the onset of the GFC, Indian firms invested at a high rate of over 10 percent, on average. There has been a steady decline since 2011 when the investment rate fell below 8 percent and finally to a level below 6 percent between 2015 and 2018. The COVID-19 pandemic further decelerated the decline, with an all-time low investment rate of just over 4 percent in 2021. Since then, the private sector capital expenditure has improved, reaching a level of 7 percent by 2024.

FIGURE 1. Average Investment/Assets over Time

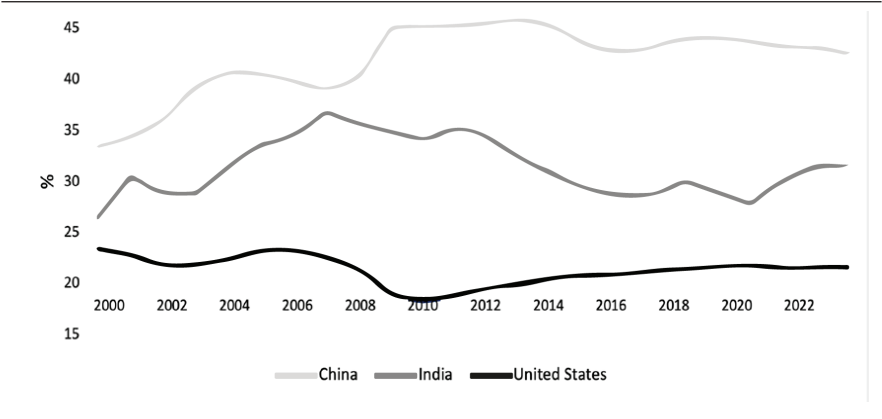


Source: Prowess Database (CMIE); Author's calculations.

The aggregate statistics reveal the challenges faced by the Indian economy in terms of low capital investment, especially considering the important role of these investments in aiding the aggregate economic growth. For example, China has a significantly higher rate of private investment as compared to India, as shown in Figure 2.⁴

4. The figure plots the aggregate private sector capital expenditure as a fraction of the Gross Domestic Product (GDP). Therefore, we cannot directly compare it with our base measure, the investment rate, used in the rest of the paper. The figure, however, provides a broad sense of private investments in these economies.

FIGURE 2. Cross-Country Comparison



Source: World Bank.

3.1. Base Model

What are the primary drivers of investment in India? We address the central question of our paper with the following regression model using the panel data of all listed firms covered in the CMIE database over the period 2006-2024:

$$\frac{I_{i,t}}{A_{i,t-1}} = \alpha_i + year_t + \alpha Q_{i,t-1} + \beta \frac{CF_{i,t}}{A_{i,t-1}} + \epsilon_{it}; \tag{1}$$

where $\frac{I_{i,t}}{A_{i,t-1}}$ measures the capital expenditure of firm *i* in year *t* scaled by its asset value at the end of year *t* – 1; $Q_{i,t}$ measures the market-to-book ratio of the firm’s asset; and $CF_{i,t}$ is the net operating cash flow of the firm. We include the year and firm fixed effects in the model to soak away broad macroeconomic trends and firm-specific skills. We include control variables such as firm size in different specifications that we describe later as we present the results. We standardize all the variables in the study so that our coefficients can be interpreted in terms of units of standard deviation of each variable. All standard errors are clustered at the firm level.

Table 3 provides the regression estimation results. Column (1) of the table only uses the lagged value of the firm’s *Q* as the explanatory variable in addition to the firm and year fixed effects. We find a positive and significant coefficient of 0.1994: firms with one standard deviation higher *Q* invest almost 0.2 standard deviation more. The effect translates to an increase of almost 1.4 percent in investment for every unit increase in *Q*. A positive and significant coefficient on *Q* is expected, and is consistent with the basic economic theory that firms with greater access to good projects should invest more. Efficient

economies should have higher sensitivity of investment to Q as it measures how efficiently the capital is deployed in the economy. Lower sensitivity of investment to Q corresponds to a system where investments across firms are distributed in accordance with the opportunities they have. Hence, firms with poor opportunities invest more as compared to the ones with better opportunities, resulting in a loss of economic efficiency. While we cannot directly compare these coefficients across countries due to the inherent differences in accounting standards and economic structure, the estimated coefficient for the Indian economy is lower than the coefficient estimated for the U.S. firms in various studies. For example, Fazzari et al. (1988) find a corresponding estimate of 3 percent as compared to 1.4 percent that we document for our sample.

TABLE 3. Investment- Q and Cash Flow Regression

	<i>Investment/Asset</i>		
	(1)	(2)	(3)
Lagged Q	0.1994*** (0.0168)	0.1920*** (0.0169)	0.1921*** (0.0171)
Internal Cash Flow		0.0592*** (0.0121)	0.0572*** (0.0121)
Log (Assets)			-0.3404*** (0.0522)
Firm Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Sample	Listed Firms	Listed Firms	Listed Firms
Nobs	16,898	16,612	16,612
Adjusted R-squared	0.2541	0.2551	0.2590

Source: Prowess Database (CMIE); Author's estimations.

Note: Standard errors in parentheses, * $p < .10$, ** $p < .05$, *** $p < .01$.

In Column (2) of Table 3, we add the internal cash flow of a firm as an additional explanatory variable. We find a positive and significant coefficient on cash flows, suggesting that firms with higher cash flows invest more even after holding their investment opportunities constant. The effect is economically large: an increase of almost 0.06 standard deviation in investment for a standard deviation higher cash flow. In an ideal frictionless benchmark, investments should only depend on the extent of projects that a firm has. Said differently, firms with good projects should be able to raise money to fund their positive NPV projects (Modigliani and Miller 1958). But in reality, firms face frictions in raising capital even for good projects. Therefore, those with more internal cash flows invest more. The positive and significant coefficient on the cash flow variable is consistent with the idea of large financial constraints that the Indian firms face. Column (3) of Table 3 shows that the coefficients on either Q or cash

flows do not change with the inclusion of firm size, as proxied by the log of their total assets, as a control variable.

3.2. Variation across Firms

Early work on investment-cash flow sensitivity focused on sorting firms based on ex-ante characteristics and then studying whether firms that are more likely to be constrained exhibit higher investment-cash flow sensitivity. For example, the work by Fazzari et al. (1988) and several others focused on firms which pay dividends versus firms that do not. Since dividend payment can be a residual decision, net of investment decision of a firm, we choose other firm characteristics that have more natural and economically appealing properties in terms of sorting firms along the dimension of financial constraints. We first study whether a firm is listed on the Bombay Stock Exchange (BSE) or National Stock Exchange of India Limited (NSE). Financial frictions are likely to be lower for the listed firms: they have access to the public equity market and also provide better disclosure to the public, making a key source of frictions, namely the asymmetric information problem between the insiders and outsiders of the firms, less acute. A natural limitation of this specification is that we are unable to control for Q. Therefore, we include fixed effects for time-varying industry level investment opportunity by including fixed effects for the industry-year pair in the regression model.

TABLE 4. Investment-Listed and Unlisted Firms

	<i>Investment/Asset</i>	
	(1)	(2)
Listed Firm	0.1818*** (0.0423)	0.1749*** (0.0421)
Internal Cash Flow	0.0536*** (0.0088)	0.0520*** (0.0089)
Listed Firm * Internal Cash Flow	0.0111 (0.0143)	0.0086 (0.0144)
Log (Assets)	-0.5708*** (0.0316)	-0.5952*** (0.0319)
Firm Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Industry-Year Fixed Effects	No	Yes
Sample	Full Sample	Full Sample
Nobs	37,920	37,824
Adjusted R-squared	0.2807	0.2925

Source: Prowess Database (CMIE); Author's estimations.

Note: Standard errors in parentheses, *p < .10, **p < .05, ***p < .01.

We estimate the model by including the interaction of a firm's listing status with its cash flows. Results are provided in Table 4. We find no differences in investment-cash flow sensitivity across listed and unlisted firms in our sample. These results suggest that dependence on internal cash flows is not due to differential access to equity markets; rather, firms' access to credit markets seem to be driving the results. Therefore, policy decisions aimed at improving access to credit are likely to be helpful in allowing firms with lower cash flow, but better opportunities, to invest more.

We now consider a firm's age as another ex-ante characteristic for its financial constraints.

Young firms face higher information and agency frictions since both their business and managers are less likely to be well established in financial markets. Hadlock and Pierce (2010) provide compelling evidence that firm age is one of the strongest measures of financial constraints used in the empirical literature. Using the date of incorporation of a firm as its founding date, we create a measure of firm age in years and repeat the regression model used earlier with listing status as the proxy for constraints. Results are provided in Table 5. We find a significant negative coefficient on the interaction term cashflows $\times$ age. Therefore, younger firm's investments are more sensitive to their internal cash flows as compared to their older, more established counterparts.

TABLE 5. Investment-Firm Age

	<i>Investment/Asset</i>	
	(1)	(2)
Internal Cash Flow	0.0772*** (0.0130)	0.0927*** (0.0248)
Internal Cash Flow * Firm Age	-0.0007** (0.0003)	-0.0011** (0.0005)
Log (Assets)	-0.5518*** (0.0313)	-0.3393*** (0.0523)
Lagged Q		0.1932*** (0.0170)
Firm Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Sample	Full Sample	Listed Firms
Nobs	37,920	16,612
Adjusted R-squared	0.2803	0.2592

Source: Prowess Database (CMIE); Author's estimations.

Note: Standard errors in parentheses, *p < .10, **p < .05, ***p < .01.

Overall, these results show that access to external funds is a critical factor impeding investments by the Indian firms, and that the younger firms face higher frictions. Access to the public equity market is unlikely to be an inhibiting factor.

3.3. Reforms in the Financial Sector

We now analyze the effect of two key reforms in the mid-2010s on our base case estimates: the 2016 Insolvency and Bankruptcy Code (IBC) that reformed the bankruptcy procedure for Indian businesses and cleaning up of non-performing loans of the banking sector. Agarwal (2024) provides a comprehensive discussion of these reforms and the institutional background. In a nutshell, these reforms were aimed at improving creditor rights by improving the resolution of distressed assets in a timely manner, and improving the risk-culture of the Indian banking sector. While the specifics of these two reforms are different and they target different objectives, a connecting theme across the two reforms is to improve the allocation of capital by the Indian credit markets. Streamlining the bankruptcy resolution can increase access to credit by all creditors, but specially by arm's length or non-relationship creditors who may lack access to precise information about the borrowers' prospects. Seminal work by La Porta et al. (1998) shows the importance of creditor rights on credit creation in an economy. However, increased creditor rights might also result in a bias for liquidation and it may also change the composition of the debt structure that a firm obtains (Vig 2013).

Motivated by this line of work, we ask whether the Indian banking sector's reforms changed the key drivers of investment decisions of firms. There are two, not mutually exclusive, channels that can affect the investment decisions of firms. If creditors are more confident in their ability to recover the distressed debt, then firms with better projects can obtain credit even if they do not have enough internal cash flows. Therefore, the investment-cash flow sensitivity should decrease after the reforms. At the same time, if banks are more prudent in their lending decisions, then credit, and by extension investment, is more likely to flow to firms with higher Q . On the other hand, if banks make imprudent lending decisions, as was evident by large hidden losses of the Indian banks due to their lending decisions in the late 2000s, firms with poor investment opportunities might get credit and over-invest. Therefore, the investment- Q sensitivity is likely to go up after these reforms.

We create a dummy variable *postNPA* that equals one for years after 2015 and zero otherwise. We estimate the following model:

$$\frac{I_{i,t}}{A_{i,t-1}} = \alpha_i + year_t + \alpha_1 Q_{i,t-1} + \alpha_2 Q_{i,t-1} \times postNPA + \beta_1 \frac{CF_{i,t}}{A_{i,t-1}} + \beta_2 \frac{CF_{i,t}}{A_{i,t-1}} \times postNPA + \epsilon_{it}; \quad (2)$$

where α_2 and β_2 allow us to estimate the differential effect of Q and cash flows on investments before and after the process of reform started.

TABLE 6. Investment-NPA Reform

	<i>Investment/Asset</i>	
	(1)	(2)
Lagged Q	0.1469*** (0.0286)	0.1388*** (0.0285)
Post-NPA * Lagged Q	0.0524* (0.0269)	0.0678** (0.0276)
Internal Cash Flow	0.0574*** (0.0121)	0.0951*** (0.0202)
Log (Assets)	-0.3569*** (0.0531)	-0.3511*** (0.0531)
Post-NPA * Internal Cash Flow		-0.0596** (0.0232)
Firm Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Sample	Listed Firms	Listed Firms
Nobs	16,612	16,612
Adjusted R-squared	0.2593	0.2598

Source: Prowess Database (CMIE); Author's estimations.

Note: Standard errors in parentheses, * $p < .10$, ** $p < .05$, *** $p < .01$.

Table 6 presents the results. Column (1) of the table shows that the sensitivity of investment to Q increased significantly after the reforms. The economic magnitude is meaningful as well. The unconditional coefficient (that is, β_1 in the model depicted in Equation (2)) is about 0.15, whereas the coefficient on the interaction term is 0.05. Therefore, the sensitivity increased by almost one-third of the earlier level after the reforms. Higher sensitivity of investment to Q is indicative of more efficient capital allocation in the economy after the reforms since firms with better investment opportunities are investing more as compared to the pre-reform era.

Column (2) of Table 6 includes the interaction of the post-reform dummy variable with the cash flow measure. After the reforms, the investment-cash flow sensitivity has come down. Therefore, financial constraints faced by firms have also come down for the average firm. Where did these firms obtain funds during this period?

We now consider variation in their sources of funds. There are three primary sources of credit for our sample firms: bank credit, credit from the corporate bond market, and credit from NBFIs. We create measures of borrowings from

these sources by dividing a firm's borrowing from each source to the firm's total borrowings. Since there are some other categories of borrowing, for example, inter-corporate loans, loans from promoters, deferred long term tax credit, and so on, the sum of these three categories does not equal one. As shown in Table 1, bank borrowing represents an overwhelmingly large fraction of the firm's total borrowing, followed by market and NBFI borrowing. Interestingly, borrowing from the NBFI has been rising over time, as shown in Figure 3. The average firm's borrowing from the NBFI sector reached a peak of 4 percent in 2018 in our sample before a significant drop after the collapse of ILFS.

FIGURE 3. Borrowing from NBFIs



Source: Prowess Database (CMIE); Author's calculations.

We now estimate the following triple-difference model to assess how investment-cash flow sensitivity has evolved before and after the reforms for firms that depend on banks versus other sources of credit:

$$\begin{aligned}
 \frac{I_{i,t}}{A_{i,t-1}} = & \alpha_i + year_t + \alpha_1 Q_{i,t-1} + \beta_1 \frac{CF_{i,t}}{A_{i,t-1}} + \beta_2 \frac{CF_{i,t}}{A_{i,t-1}} \times postNPA + \\
 & \gamma_1 Bank_{i,t} + \gamma_2 postNPA \times Bank_{i,t} + \beta_2 \frac{CF_{i,t}}{A_{i,t-1}} \times Bank_{i,t} + \\
 & \beta_2 \frac{CF_{i,t}}{A_{i,t-1}} \times postNPA \times Bank_{i,t} + \epsilon_{it};
 \end{aligned} \quad (3)$$

$Bank_{i,t}$ measures the percentage of borrowing that a firm obtains from banks. Results are provided in Table 7. We estimate the model by including different interaction terms in steps, and document these results in different columns

of the table. Column (1) of the table, which omits the triple-interaction term, shows that bank dependence does not have any additional explanatory power in explaining the investment-cash flow sensitivity for the entire sample. Column (3) of the table presents the key findings. The double interaction term between *postNPA* and *cashflow* variable is negative and significant, indicating that firms which did not rely on bank borrowings experienced a significant decline in their investment-cash flow sensitivity after the reforms. Bank-dependent firms, on the other hand, experienced a significant increase in investment-cash flow sensitivity after reforms. Said differently, after the financial sector reforms started in India, there was a divergence in the financial constraints faced by firms. Firms with access to other sources of credit, such as the corporate bond market of NBFIs, saw a relaxation in their constraint, whereas bank-dependent borrowers experienced an increase.

TABLE 7. Investment-Bank Dependence

	<i>Investment/Asset</i>		
	(1)	(2)	(3)
Lagged Q	0.1926*** (0.0170)	0.1923*** (0.0170)	0.1961*** (0.0172)
Internal Cash Flow	0.0512** (0.0205)	0.0573*** (0.0121)	0.1380*** (0.0374)
Bank Borrowing	-0.0219 (0.0233)	-0.0341 (0.0408)	-0.0384 (0.0411)
Bank Borrowing * Internal Cash Flow	0.0086 (0.0236)		-0.0652 (0.0433)
Log (Assets)	-0.3409*** (0.0522)	-0.3412*** (0.0522)	-0.3343*** (0.0525)
Post-NPA * Bank Borrowing		0.0167 (0.0429)	0.0228 (0.0431)
Post-NPA * Internal Cash Flow			-0.1207*** (0.0426)
Post-NPA * Bank Borrowing * Internal Cash Flow			0.0988** (0.0502)
Firm Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Sample	Listed Firms	Listed Firms	Listed Firms
Nobs	16,612	16,612	16,612
Adjusted R-squared	0.2590	0.2590	0.2595

Source: Prowess Database (CMIE); Author's estimations.

Note: Standard errors in parentheses, *p < .10, **p < .05, ***p < .01.

These results show that the average decrease in investment-cash flow sensitivity after the reforms masks an important distributional effect. On average, larger firms have better access to non-bank sources of funds. These firms experienced improved access to credit as the reform process started. On the other hand, smaller and younger firms that lack access to wider markets experienced a decline.

Our results so far indicate a key benefit of access to wider sources of funds. These benefits come at a cost as firms become more vulnerable to shocks in the non-bank financial sector. Indeed, after the collapse of ILFS, the flow of credit came down significantly from the NBFI sector, as shown in Figure 3. We use this collapse to shed light on the flip side of dependence on alternative sources of funds. We create a dummy variable *postILFS* that equals one for 2019 and after, and zero otherwise. We estimate the following difference-in-difference regression:

$$\frac{I_{i,t}}{A_{i,t-1}} = \alpha_i + year_t + \alpha_1 Q_{i,t-1} + \alpha_2 Q_{i,t-1} \times postILFS + \beta_1 \frac{CF_{i,t}}{A_{i,t-1}} + \beta_2 \frac{CF_{i,t}}{A_{i,t-1}} \times postILFS + \epsilon_{it}; \quad (4)$$

Results are provided in Table 8. As shown in Columns (1) and (2) of the table, which uses a dummy variable to assess whether a firm has accessed funds from the NBFI sector or not, we do not find any meaningful difference in investment across firms with or without access to NBFI before and after the collapse of ILFS. However, Column (3) of Table 8 uses the extent of borrowing from the NBFI sector as the measure of dependence on NBFI and finds a strong result: firms that borrowed heavily from NBFI experienced a significant decline in their investments in the post-2019 period.

Overall, our results show that firms with access to non-bank credit markets have experienced lower constraints in recent years. However, dependence on these sources of funds comes with its own risk as the firm's investment becomes more sensitive to shocks in this market.

TABLE 8. Investment-NBFI Borrowing Regression

	<i>Investment/Asset</i>		
	(1)	(2)	(3)
Lagged Q	0.1926*** (0.0170)	0.1927*** (0.0171)	0.1924*** (0.0170)
Internal Cash Flow	0.0576*** (0.0121)	0.0559*** (0.0160)	0.0573*** (0.0121)
Log (Assets)	-0.3428*** (0.0522)	0.3427*** (0.0528)	-0.3443*** (0.0523)
NBFI Dummy	0.0773** (0.0338)	0.0782** (0.0342)	
NBFI Dummy * post-ILFS	-0.0686 (0.0475)	-0.0695 (0.0476)	
NBFI Dummy * Internal Cash Flow		0.0088 (0.0422)	
Post-ILFS * Internal Cash Flow		-0.0037 (0.0224)	
NBFI Dummy * post-ILFS * Internal Cash Flow		0.0227 (0.0603)	
NBFI Borrowing			0.0165** (0.0075)
Post-ILFS * NBFI Borrowing			-0.0199** (0.0099)
Firm Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Sample	Listed Firms	Listed Firms	Listed Firms
Nobs	16,612	16,612	16,612
Adjusted R-squared	0.2592	0.2591	0.2593

Source: Prowess Database (CMIE); Author's estimations.

Note: standard errors in parentheses, *p < .10, **p < .05, ***p < .01.

4. Discussion and Conclusion

We document that Indian firms face significant friction in raising enough external capital for investments. Frictions are especially binding for younger firms of the economy. We do not find any meaningful difference in financial constraints faced by listed firms versus their unlisted counterparts. The results suggest that a primary source of external financing friction is lack of access to credit markets.

Our results show that investment decisions have become more efficient, that is, they respond more to a firm's investment opportunity set, after the series of

financial sector reforms that were initiated in the mid-2010s. However, firms without access to wider non-bank credit markets face substantially higher financial constraints after the reforms. A possible reason for these findings is that banks have tightened their lending standards, whereas non-bank credit institutions are more willing to lend as a result of reforms such as IBC, 2016. As a result, our evidence suggests that the quality of lending from the banking sector to the non-financial sector has improved as compared to the pre-reform period. Therefore, banks are likely to have a better portfolio of credit risk, as evidenced by a continued decline in their NPA ratio in recent years. At the same time, firms that depend heavily on banks face more frictions in raising funds for their investments in the post-reform period.

Our results, at a broad level, show a trade-off between financial stability and credit creation. As banks tighten their standards for lending to the corporate sector, financial stability improves. However, it comes with a decline in credit and investment for firms without access to other sources. Although our study cannot quantify the optimal balance across these two objectives, our analysis does provide some tangible recommendations. First, policy initiatives that can facilitate wider access to non-bank credit for smaller and younger firms can help in boosting private investment in India. Second, as firms move towards alternative sources of funds, it becomes more important to pay careful attention to financial stability concerns that might emanate from the non-bank sector. Increased monitoring of NBFIs and their adequate capitalization can be critical as the economy moves towards a more efficient frontier of credit quantity and financial stability trade-off.

References

- Agarwal, Ruchir. 2024. “The Past and Future of Indian Finance”, India Policy Forum, 20: 193–305. New Delhi: National Council of Applied Economic Research (NCAER).
- Alti, Aydogan. 2003. “How Sensitive Is Investment to Cash Flow When Financing Is Frictionless?”, *Journal of Finance*, 58(2): 707–722.
- Erickson, Timothy and Toni M. Whited. 2000. “Measurement Error and the Relationship between Investment and q ”, *Journal of Political Economy*, 108(5): 1027–1057.
- Fazzari, Steven M., R. Glenn Hubbard, and Bruce C. Petersen. 1988. “Financing Constraints and Corporate Investment”, *Brookings Papers on Economic Activity*, Economic Studies Program, The Brookings Institution, 19(1): 141–206.
- Gomes, João F. 2001. “Financing Investment”, *American Economic Review*, 91(5): 1263–1285.
- Hadlock, Charles J. and Jennifer R. Pierce. 2010. “New Evidence on Measuring Financial Constraints: Moving beyond the KZ Index”, *Review of Financial Studies*, 23: 1909–1940.
- Hayashi, Fumio. 1982. “Tobin’s Marginal Q and Average Q : A Neoclassical Interpretation”, *Econometrica*, 50(1): 213–224.

- Holmstrom, Bengt and Jean Tirole. 1997. "Financial Intermediation, Loanable Funds, and the Real Sector", *The Quarterly Journal of Economics*, 112(3): 663-691.
- Hubbard, R. Glenn. 1998. "Capital-Market Imperfections and Investment", *Journal of Economic Literature*, 36(1): 193-225.
- Kaplan, Steven N. and Luigi Zingales. 1997. "Do Investment-Cash Flow Sensitivities Provide Useful Measures Of Financing Constraints?", *Quarterly Journal of Economics*, 112(1): 169-215.
- La Porta, Rafael, Florencio Lopez-de Silanes, Andrei Shleifer, and Robert W. Vishny. 1998. "Law and Finance", *Journal of Political Economy*, 106(6): 1113-1155.
- Modigliani, Franco and Merton H. Miller. 1958. "The Cost of Capital, Corporation Finance and the Theory of Investment", *The American Economic Review*, 48(3): 261-297.
- Rauh, Joshua D. 2006. "Investment and Financing Constraints: Evidence from the Funding of Corporate Pension Plans", *Journal of Finance*, 61(1): 33-71.
- Stiglitz, Joseph E., and Andrew Weiss. 1981. "Credit Rationing in Markets with Imperfect Information", *American Economic Review*, 71(3): 393-410.
- Tobin, James. 1969. "A General Equilibrium Approach to Monetary Theory", *Journal of Money, Credit and Banking*, 1(1): 15-29.
- Vig, Vikrant. 2013. "Access to Collateral and Corporate Debt Structure: Evidence from a Natural Experiment", *The Journal of Finance*, 68(3): 881-928.
- Whited, Toni M. 1992. "Debt, Liquidity Constraints, and Corporate Investment: Evidence from Panel Data", *Journal of Finance*, 47(4): 1425-1460.

Comments and Discussion^{*}

Chair: Suman Bery

NITI Aayog

Amartya Lahiri

University of British Columbia

Let me start by saying that it is a great paper, I really enjoyed reading it and learnt a lot.

What drives investment? It is a huge issue. Just to put it in perspective, no major developed country today has been able to develop without having sustained investment rates, that is, about 35 percent for three to four decades at a time. China has been doing it for a while. And so have Japan and Korea, while India is sort of chugging along. We crossed 35 percent savings during just one year, in 2008 or 2009. But the rest of the time, we have been having trouble getting past 30 percent on a sustained basis, which is a huge issue.

Investment is done by both the private and the public sectors. For the last 12 odd years, private corporate sector investment has been fluctuating between 11 and 13 percent. And this is despite the fact that public sector capital expenditure has been trying to cover up for some of this with a huge amount of investment in the last ten-odd years. But that is not a long-term solution. Growth in the country cannot be sparked by public sector investment trying to make up for a private sector shortfall. The question, therefore, is: What is driving private sector investment? Can we learn something? In that regard, this is a hugely important paper.

The way the paper is structured is that the authors use the Q theory of investment to examine the issue. As Amiyatosh explained, Tobin's Q is the ratio of market value of assets to the replacement value of assets. Intuitively, the idea is simple, that you should invest if Q exceeds one. And if not, you should not invest. The way they test it is to use the Prowess database to test the predictive power of Q and then augment that to see if they can find other determinants of investment that may be muddying the picture. In particular, a big focus is on credit constraints as measured by internal cash flows. That is really what the paper is doing. Both Q and cash flows have predictive power,

^{*} To preserve the sense of the discussions at the India Policy Forum, these discussants' comments reflect the views expressed at the IPF and do not necessarily take into account revisions to the conference version of the paper in response to these and other comments in preparing the final, revised version published in this volume. The original conference version of the paper is available on NCAER's website at the link provided at the end of this section.

which is interpreted in the paper as indicative of financial constraints. The paper also finds evidence that cash flow effects are smaller for older firms vis-à-vis smaller and younger firms.

That also rings true when we think of who are more likely to face credit constraints. The younger firms that do not have as much of a history are likely to face bigger constraints. These results are pretty similar to what people have found in other studies, for example, the U.S. in particular, where it has been studied extensively, but in other countries too. This is a common set of findings. The authors then go further to look at the post-2016 period, when a bunch of reforms were introduced, including the implementation of the Insolvency and Bankruptcy Act (IBA) in 2016, and the Non-Performing Asset (NPA) write-offs from bank balance sheets, which recapitalized a whole lot of banks. That improved the credit situation, at least from the lending side, post-2016.

Just a small note—I am curious to know why the authors chose 2015 as the reform year, because the reforms actually went into effect in 2016. I would have used 2016 and not 2015 as the breakpoint for the sake of robustness. Anyway, what the authors find is that the cash flow sensitivity of non-bank dependent firms decreased post-reform, as one might expect, but the cash flow sensitivity of firms that are highly dependent on banks actually increased. They interpret that as saying that the allocation of credit was becoming more efficient, on the one hand, but on the other hand, firms that did not have a history were finding it increasingly hard to get bank lending.

Of course, this was the period when banks were also rerouting a lot of lending through Non-Banking Financial Companies (NBFCs) as a result of which NBFCs expanded their footprint. There must be a testable implication of this: the share of bank lending to larger firms should have risen post-2016 because the banks were just rerouting most of the other lending through the NBFCs. It is just a quick sanity test that one could do.

I am going to spend the balance of my time on a couple of quibbles with Q because the basis of the whole exercise is the Q theory. But is that a useful benchmark to use at all? There are two sets of concerns here. The first issue is that there is a long issue about the theory because it really works off marginal Q. However, the data is always average Q, and those two things coincide only under very special conditions. The paper by Hayashi (1982) cited in the paper showed that you need constant returns to scale for average and marginal Q to coincide. People have spent a huge amount of time trying to get around the problem of how to test this theory when the data inherently tends to be average Q as opposed to marginal Q. There has been a lot of work with people trying to find better ways of testing it, and they generally find weak support, at best.

Studies often find that variables like profits and cash flows tend to outperform Q. That has been the main takeaway of a lot of this work: other variables seem to matter a lot. And this interpretation is somewhat similar to this paper. The other

papers have interpreted it as a failure of Q. It is akin to evidence suggesting that investment is driven not by Q but by something else.

Therefore, I have one basic question: Are the results showing the failure of Q theory or are they providing evidence of financial constraints? In other words, as regards whatever is picked up by Q, it is perhaps mis-measuring something that is more fundamentally important and these financial constraints are just soaking up what is missing in the theory.

The second issue with Q is that the numerator of this variable is the market value of assets, which is essentially measured by using stock market valuation. The question to ask is thus: Are managers basing investment decisions on market valuations or are they basing them on fundamentals? For instance, one particular fundamental could be the present discounted value of profits. It is almost like a permanent income kind of story where investment decisions are based on a stable long-run flow of profits as opposed to a market valuation, which can move around for all kinds of reasons. Indian stock market indices like the PE ratio have been north of 20 for the last 15 years, some are about 25. So, my question is: How much focus should a manager put on stock market valuations when deciding investment? I would have liked to have seen a measure of profits in there, which the Centre for Monitoring Indian Economy (CMIE) collects. If profits are what matters, then internal cash flows are going to pick up the role of profits and perhaps that is what we are seeing. It is just a quick additional variable to put in to help us understand whether the results are showing a failure of Q or whether it is evidence of some deeper financial constraint.

With that said, I want to talk about a bigger issue of investment in India and how I see this paper feeding into that bigger question. One thing that people have repeatedly found is that profits drive investment. So, let us look at what has been going on with corporate profits. One reason why investment has been tepid is that corporate profits have been tepid.

In addition, it could be that corporates are very leveraged and cannot, therefore, take on any further leverage in order to invest. That could be a second constraint. A third factor could be that credit growth has been very weak and firms are thus just unable to invest.

Let us now look at corporate profits during the five-year periods, 2014-2019 and then 2019-2024. As one can see, there has been a big pickup in corporate profits. Corporate profits have almost doubled pre-tax during the last five-year period relative to the previous five-year period in terms of growth. The second question is: How fast have they been growing? And this is in terms of the ratio of profits to salaries. Profits were growing far slower than salaries till 2019. But since then, profits have been rising at a much faster pace than salaries. So clearly, profits do not seem to be the issue. Hence, profits have been growing, and yet corporate investment is not really moving.

What about corporate leverage? After 2016-17, corporate leverage has been on a secular decline. There has been a deleveraging until the last year and a

half. But certainly, there does not seem to be any excess leverage overhang on corporates. If anything, significant deleveraging has happened. So, that does not seem to be a big constraint.

As regards credit availability, from 2011-12 onwards, there was a decline in credit growth till about 2016-17. But since then, aside from the pandemic bubble, bank credit growth has actually picked up. It shows in the total credit-to-GDP ratio availability, which has been fairly constant. It has been showing some cyclical fluctuations beyond 2016, but the credit-to-GDP ratio has not really changed. In other words, overall, all kinds of credit to the private sector as a share of GDP has held its own, and has grown at the rate of GDP growth. Therefore, it does not seem that credit has really been squeezed in the economy. Maybe there is an allocation issue, as pointed out in the paper. But overall, there does not seem to be a big credit squeeze in the economy.

The question thus is: Why the malaise? Why has the private sector investment not picked up? I highlight a couple of possibilities. The first is that maybe firms are just inefficient. Or firms just perceive very weak demand, and it is not so much whether they have the resources to invest, it is just that they do not want to invest because they do not see a huge value from investing. That would be the case if we do not see much demand for whatever firms are going to produce using their investment.

One very simple way of measuring inefficiency is the capital wedge. A capital wedge is the marginal product of capital divided by the rental cost of capital. If that ratio is not equal to one, it is a sign of some inefficiency. Either money is being left on the table or too much is being dispensed. Either way, this ratio is like a measure of inefficiency. Inefficiencies are indicated by capital wedges that are different from one. In other words, the marginal product is significantly different from the rental cost of capital. We did some work with Urvi Neelakantan of the Federal Reserve Bank of Richmond a few years ago on capital wedges for ASI establishments in India, and found that the most distorted firms were in construction where the wedge was, on average, 29. The next highest wedge was six, coming from firms in the electricity, gas, and water sectors.

The rest were not so bad. These two areas are closely related to infrastructure, which is where a lot of the issues were occurring. But why is this important? The answer is that construction accounts for 55 percent of Gross Fixed Capital Formation (GFCF) in India. Those firms are the most distorted in the Indian economy. Therefore, there is an issue with regard to the efficiency of the firms that are making most of the investment.

The second part is just weak demand. The demand for firm output has to come from either a domestic source, which signifies domestic consumption, or from foreign sources, which signifies export demand. And what is happening to both of them? Consumption growth in India was very low to start with. During the period 2014- 2019, it was 7.2 percent, and has fallen even further since then,

going down to about 5 percent. Manufacturing export growth averaged just 4 percent, just a little above that between 2019 and 2024. Further headwinds are also expected, which is another reason why firms may not want to invest.

This takes us back to the following question: Why should firms invest? Firms which are trying to evaluate the bottom line are thinking a lot about whether they should be putting money in if there is no demand for their product. On the other hand, there is no similar stopping rule when the government invests in public infrastructure. One of the reasons why the Public-Private Partnership (PPP) model may not have succeeded was not because of the government, or because not enough money was put into public capital, or because it was all inefficient. It was just that there was no demand for a lot of stuff that was built. So, if you build highways but nobody wants to willingly pay the tolls, then there is a problem. If you build ports but there are no ships, there is a problem. It is hard to sustain these kinds of investments. And so, if you have a PPP model, somebody is going to suffer losses at some point, if there is deficient effective demand. Hence, the concern about effective demand in the Indian economy, which has to be thought through.

I want to conclude by saying that this is a tremendous paper. The authors could just expand on certain simple things to better link the theory to the test.

General Discussion

The Chair of the session, Suman Bery emphasized the importance of recognizing that a sudden stop in investment happened in 2009 for India, whereas earlier everyone had thought that India was going to be the next China, as large family firms had leveraged themselves to be ready for a big output push. However, this came to a halt in the aftermath of the Global Financial Crisis (GFC). Since then, there has been both caution and conservatism because the desire to retain control of one's firm has now emerged as an important criterion, and going forward, leverage ratios are likely to be different. He suggested that the government has been wise in using the COVID moment and in making some fairly significant decisions on the fiscal side to keep public investment going. He also alluded to the middle-income trap mentioned in the World Bank's World Development Report (WDR), implying that at a certain point, technology diffusion becomes more important than raw capital, asking if India had reached that point. He also questioned if the peaks achieved by China, for instance, were desirable because inefficient capital formation, which has arguably been seen a lot in China, is depriving the society of consumption.

Ufuk Ackigit pointed out the criticality of two issues—first, the direction of investment, and second, the selection of where it is taking place. He said that if firms were classified into two groups, transformative firms versus subsistence firms, shocks such as the one that took place in 2008 may have augured positive

news for India, offering it the opportunity to eliminate the bad apples. However, the opposite argument has been made, saying that firms are now potentially more risk-averse, which is why they are pushing themselves or pulling themselves back, resulting in a potential cleansing. The empirical question that needs to be checked pertains to the relationship between leverage and firm growth. He stated that in the U.S., high-leveraged firms typically grow faster, whereas the opposite is observed in poorly performing economies, wherein overhang becomes a big issue. He also focused on the need for generating more employment and ensuring greater responsiveness to shocks.

Franziska Ohnsorge suggested that central banks should look at inflation as an influencing factor for corporate investment, and flagged the need for identifying factors that would enable an increase in productivity. She also asked that since in terms of the responsiveness to Q for Indian firms, the paper shows a coefficient of 0.19, about half of that of the U.S., which is not because of finance, why is the responsiveness of Indian firms to investment opportunities less than that observed elsewhere?

Ratna Sahay pondered over the question as to why the Indian credit market is facing huge distortions, and pointed to two possible reasons. The first reason is the practice of priority sector lending in India, which creates a huge sectoral distortion in the credit market, as well as financial repression in real interest rates. The second reason for market distortions, according to her, is that as per a study she was involved in, India is among the top five countries in the world that has such a huge share of public sector banks, which face perverse incentives, are bailed out from time to time, and have been seen to be much less efficient than private banks. Thus, there is a need to look closely at the performance of financial firms in the long run.

Heiwei Tang stressed that a lot of the serious issues highlighted in the discussion on the paper, such as youth employment, returns on investment, excess focus on savings as opposed to investment, and the role of Artificial Intelligence (AI) in changing the nature of jobs, are actually global phenomena rather than being just India-specific. In this context, the interest among Indian policymakers to make India a bit more like China needs to be revisited as China too is facing the conundrum of policy support to investment and industrialization, which has fomented concerns about excess capacity and excessive export to other countries, thereby creating tension between China and the rest of the world. Hence, the slower pace of industrialization in India probably signifies a comparative advantage for India vis-à-vis more developed economies like China.

Karthik Murlidharan asserted the need for documenting the distribution of what cost of capital people are paying, and argued that since the marginal impact would be different at different parts of the distribution, the requisite intervention would also be correspondingly different. He also flagged the puzzle of the perceived lack of demand at the lower end of the distribution

despite reports of a decline in poverty in the country. Even if welfare measures like the distribution of free food are taken into account, the reduction in the Gini coefficient seems to point to a fall in poverty. Why then is there a demand problem? He said that answering this question would necessitate a relook at the distributive effects, and also an assessment of the impact of various social protection measures.

Martin Wolf wanted to know the nuances of interpretation of the Q ratios in the paper, and to confirm that a high Q ratio indicates that the market's valuation of the firm is lower than the firm's own valuation of itself, which means that the firm ought to expand its capital base to deal with the high ratio.

Vidhya Soundararajan emphasized the need to disentangle the reasons for the fluctuation in labor share in India, as documented in various studies. While labor share showed a steady decline until 2008, data from the Annual Survey of Industries (ASI), Prowess, and the KLEMS database of the Reserve Bank of India (RBI) indicated that post-2008, the share of labor in Gross Value Added has been going up. Could this have something to do with stagnation in investments, she asked.

All presentations for this IPF session can be accessed
by scanning this QR code or going to:
<https://ncaer.org/event/india-policy-forum-2025/>

