Investment Slowdown in India: Role of Monetary policy, Financial Sector and Economic Uncertainty

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Research

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Abstract

Investment slowdown during the post-GFC period in India has affected the growth potential and productivity-led growth in India. We study the underlying factors for investment slowdown in India at disaggregate level - private investment, private corporate investment and household sector investment - using quarterly data from 2004-05 to 2019-20. The study finds that aggregate investment gets affected by aggregate demand, fiscal-monetary policy measures, financial sector development, exchange rate and economic uncertainty. We find similar results for private investment along with other essential determinants such as public investment, cost of capital, business confidence and uncertainty. Finally, private corporate investment is found responsive to bonds market development, real exchange rate, debt service ratio, business confidence and economic uncertainty, besides the conventional variables. Thus, to counter the current investment slowdown, there is a need to develop capital markets, strengthen monetary transmission, implement appropriate fiscal policies and reduce uncertainty in the economy.

JEL Classification: E22, E52, E62, E32.

Introduction

Growth theories – endogenous, exogenous and institutional – suggest that investment and, therefore, capital formation is one of the key drivers of productivity-led growth (Solow, 1957; Romer, 1986; Grossman and Helpman, 1991). The empirical evidence from cross-sectional and country-specific studies clearly establishes that countries with higher investment rates are generally more successful than those with low and volatile investment cycles (Krugman, 1994; Topcu et al., 2020). The low investment makes an economy perform below its potential capacity, hindering structural transformation and limiting opportunities for the poor to improve their livelihoods (White, 2005). The investment boom during pre-GFC facilitated by a credit boom and financial leveraging ended in 2008, and since GFC, investment rates have decelerated across the world, including amongst developing countries. Investment growth decelerated from 10% in 2010 to around 3.5% in 2017 in emerging markets and developing economies (EMDE). Lower investment growth in the post-crisis period has undermined output expansion and living standards across countries (Gordon, 2018; Ollivaud et al., 2018; OECD, 2017).

The investment rate in India increased from 20% in the early 1990s to 25% in the 2000s (Fig-1), as the period witnessed wide-ranging policy changes focused on globalisation, privatisation and deregulation, which were implemented to ensure higher productivity-led growth and prevent any further balance of payment crises like 1991. From 2003-04 to 2007-08, India experienced a boom period of investment mainly contributed by private corporate sector investment (Fig-2). However, corporate sector investment declined immediately after the GFC, though the household sector investment continued to increase till 2011-12 due to both fiscal-monetary stimulus measures, resulting in the aggregate investment rate reaching the peak of 34.3% in 2011-12. However, the investment rate declined and fell to 30.8% in 2018 before a marginal increase in 2019 (See Fig-1). This has happened despite the stable economic fundamentals and various policy measures announced by the Indian government on diverse fronts, (prudential monetary policy, fiscal policy, instilling confidence by the ease of doing business, and legal and regulatory frameworks, among others. This disconnect requires a systematic answer to the ongoing public debate of investment slowdown and, more importantly, when it has already affected India’s growth momentum.2 (Economic Survey, 2017-18) and sustaining 7–8% economic growth in the medium term seems difficult with the current state of the economy.

Moreover, the investment slowdown has been attributed mainly to household investment falling from 15.75% in 2011-12 to 11.26% in 2017-18. Though the corporate sector investment recovered by 50% from 10.8% in 2008-09 to 12.4% in 2018-19, it is yet to revive to its peak of 14.2% in 2007-08 (Fig-2). The private investment – household and corporate investment – behaved differently pre- and post-GFC period. This necessitates examining the investment dynamics at a disaggregated level to understand the nature of the slowdown more comprehensively. Studies in developed countries’ contexts highlight the investment heterogeneity across institutions and their varying response to the prevailing macroeconomic policy framework. In the current paper, we mainly focus on private investment, including the corporate sector, assuming it to be more market-
oriented and responsive to changes in policy shifts and the overall macroeconomic environment. We also find the drivers of
the household investment while taking stock of its sharp slowdown and beyond the coverage of existing literature in India.
This distinguishes our study from previous literature in analysing the investment dynamics at a more disaggregated level,
especially the corporate and household sectors, in addition to aggregate and private investment. Additionally, models used in
the current study do not merely cover standard macroeconomic variables (such as output, monetary and fiscal policy,
external sector etc.) for studying investment behaviour, instead deepening the understanding of recent policy debates on the
subject while including various structural and financial factors like business confidence and economic uncertainty; monetary
policy transmission; corporate debt overhang and financial sector development. Third, the utilization of ARDL bounds-testing
approach over quarterly data ranging from 2004–2019, covering both periods of investment boom (2004–2011) and its
subsequent slowdown in recent years (2012–2019). The period is also sufficient to examine the effectiveness of different
policy measures on the monetary and fiscal front and an improved business regulatory framework providing space for
relatively market-driven economic activities. In this context, the objective of the current study is to not only understand the
underlying factors for the investment slowdown in India, but also draw possible policy implications for reviving investment
and achieving higher growth in the country. It is hoped that the comprehensive and careful empirical analysis of investment
slowdown in India would be useful to other developing countries experiencing investment slowdown as well.

[1] The investment rate of India witnessed a jump from 28% to 34% during this period, and the corporate investment rate
contributed to this jump.

[2] Economic Survey, 2917-18 reports that investment slowdown in India has been for more duration than the investment
slowdown period, on average, for other developing countries. Further, it reports that investment slowdown resulted in a fall in
real per capita-GDP by about 2.3 percentage points.

[3] Many policy debates have cited that the weak investment performance has been associated with terms-of-trade shocks,
slowing capital flows, debt burdens; bad balance sheets in both financial and corporate sectors; and uncertainties arising
from rising protectionism and geopolitical issues.

**Determinants Of Investment: Literature Review**

**3.1. Studies on Factors Affecting Investment**

Broadly, four main theories can be used to explain investment behaviour, namely: (i) acceleratory theory, which emphasizes
on demand-side factors as measured by the level of output; (ii) neoclassical theory, which underlines the role of capital costs;
(iii) ‘Q-theory’, which hypothesis about the role of excess market valuation over replacement costs leading to investment and;
(iv) liquidity theory, which recognizes market imperfections due to asymmetric information between firm and funds suppliers
and, accordingly highlights the role of internal sources of funds as a key factor affecting the investment decisions of firms
(Fazzari et al. 1998; Celik et al., 2018). Further, few studies found liberalization and financial openness also affects the FDI
flows (Ullah and Inaba, 2014; Arif-Ur-Rahman and Inaba, 2020).

The existing empirical literature has examined these established theories along with several other macroeconomic factors to
understand the direction and magnitude of their effects on investment. One of the most crucial factors affecting private
investment is aggregate demand, usually proxied by output or output growth (Greene and Villanueva 1991; Fielding 1997).
Besides output, studies have also investigated the impact of monetary policy and changes in the interest rate on investment.
Theoretical literature suggests that higher interest rates increase borrowing costs and thereby limit investment activities,
which has been supported by studies such as Wuhan and Khursid (2015) for China. On the other hand, as per the McKinnon-
Shaw hypothesis (1973), higher interest rates can incentivize foreign capital inflows and encourage savings through financial
intermediaries, which can, in turn, raise investible funds in a phenomenon known as the “conduit effect”.  

Similarly, there are mixed empirical results when it comes to the effect of fiscal policy on investment. A set of
studies(Martinez-Lopez, 2006; Cavallo and Daude, 2011) find evidence for a crowding-in hypothesis, wherein higher public
investing in infrastructure and other public goods crowds in private investment by creating an investment friendly environment and thereby improving marginal productivity of private capital. But expansionary fiscal policies requiring excessive government borrowings can lead to both real and financial crowding out and, thus, a fall in private investment. Moreover, the rising deficit can lead to distortionary taxation, discouraging private investment (Carlton, 1979; Bartik, 1992).

There have also been studies examining the effect of inflation- an indicator of economic stability and macroeconomic stability – on investment. Results reveal that high inflation levels can raise concerns amongst investors about a potential fall in demand and hence, producing at excess capacity. As a result, firms may be reluctant to invest when inflation levels rise above a threshold level (Bloom et al., 2001). Further, high and rising inflation lowers purchasing power and adversely affects the supply of financial resources. In addition, the studies by Byrne and Davis, (2004); and Dasilva-Filho, (2007), argue that higher rates of inflation create uncertainty which in turn affects the investment through reduced real returns. In contrast, stable prices reduce uncertainty and allow for a more favourable allocation of resources (McClain and Nicholes, 1993).

The development of financial markets, particularly capital markets, facilitates investment through access to financial resources via bonds, debentures and equity markets. Developed financial markets are instrumental for ensuring efficient capital allocation through a competitive price mechanism and channelling the same to productive investments (Ngerebo, 2006; Ndikumana, 2000). In contrast, financial repression policies regarding credit controls discourage private investment. The study by Ang (2009) supports that financial sector development matters to investment in India and Malaysia. Similarly, Lim (2014) - who utilized a panel data of 129 countries spanning 1980–2009 – reported that financial development and institutional quality were essential for explaining cross-country differences in capital formation.

Besides domestic factors, empirical studies have also examined the impact of external factors on investment, including external debt, capital inflows, terms of trade (TOT), foreign direct investment (FDI) and exchange rates. The role of external debt emanates from the complementary effect that external financial resources can have on domestic savings and hence, investment; this is especially the case in many developing countries where savings tend to be low owing to lower income levels (Were, 2001). However, rising debt can lead to debt overhang, utilization of internal sources for debt servicing, financial distress, credit supply restrictions and high default probabilities particularly in times of financial turbulence, which eventually lowers investment (Bernanke et al., 1999; Buettig et al. 2016). The role of external constraints - such as debt shock and debt service – can also influence private investment (Borensztein, 1990). Giordano et al. (2019) analyse investment at the firm level for Italy and report that indebtedness and the debt-service ratio dampen private investment.

Similarly, the impact of FDI on investment could be either positive or negative. FDI inflows can lead to positive spillovers by improving access to advanced technologies, newer markets, better management and branding networks. As a result, an economy's overall productivity increases, stimulating domestic investment (Chen et al, 2017). However, FDI can also crowd out domestic investment if local firms are underdeveloped, and as such, foreign firms have an undue advantage in the domestic economy in terms of their technological and managerial expertise. In addition, resources like skilled labour, fiscal resources, etc., may be limited in developing countries, and local firms may be unable to compete with foreign firms for these resources (Jansen, 1995).

The real exchange rate (RER) impact on investment moves both ways-positive as well as negative. Currency depreciation boosts exports and, through the multiplier effect, domestic output. As a result, firms may increase investment in the economy to take advantage of the higher domestic and foreign demand. At the same time, if the country is import-dependent and its import content of the exports is high, depreciation can put pressure on its balance sheet by increasing the cost of imported inputs. The worsening fiscal situation accompanied by falling profits for firms (as production costs increase due to costlier imports) will dampen investment activities in the economy (Bahmani-Oskooee et al., 2016). Additionally, currency depreciation affects investment as it changes the cost of capital raised in the overseas market.

Lastly, the recent empirical literature has identified business confidence and economic uncertainty as key investment factors. Khan and Upadhayaya (2019) utilize the quarterly data for the USA and conclude that business confidence has the predictive
ability for the investment cycle. As investment is forward-looking, investors look at future expectations and prefer to channel resources to stable economies, where there is less ambiguity and arbitrariness in policy implementation; accordingly, uncertainties affect the investment through these expectations (Economic Survey, 2018-19).

3.2 Studies on the Investment Slowdown in developing countries like India

The theoretical and empirical literature has examined the underlining reasons for the investment slowdown in developing countries during the post-GFC era, both at the global and national levels. According to Banerjee et al. (2015), uncertainty about the future state of the economy and expected profits is the dominating factor governing investment rather than financing conditions. Kose et al. (2017) find the investment slowdown in the economies of BRICS (Brazil, Russia, India, China, South Africa) and commodity exporters. The plausible factors for slowing investment rate in many emerging and developing economies include weak growth prospects, terms-of-trade shocks for oil exporters, private debt burdens, and increased geopolitical and geo-economic risks. Weak growth in developed economies, such as the United States and EU countries, has also worsened growth prospects in developing economies and hence, discouraged private investment in such economies. Further, as given in the paper, rising financial market uncertainty and macroeconomic policy uncertainty after the GFC have also played an important role in slowing down investment (Banerjee et al., 2015; Kose et al., 2017).

There have also been several studies which have examined recent trends in investment behaviour and its various determinants in India. Chakraborty (2007) finds crowding out phenomena in India from 1970-71 to 2002-03. Apart, the study could not evidence the significant impact of credit, cost of finance, and the output gap in determining private corporate investment. In contrast, Bahal et al. (2018) report the crowding-out effect in India over the period 1950–2012. However, the opposite is true when they restrict the sample to post-1980 or conduct a quarterly analysis since 1996, marking a heterogeneous response of investment inter-temporally. There have also been state-wise studies such as the one by Malik (2012), who empirically analyse the determinants of investment in 15 Indian states for the period 1993–1994 to 2004–2005. The results reveal that gross fiscal deficit, infrastructure development, labour productivity and market size are vital factors for explaining inter-state differences in investment.

Similarly, Anand and Tulin (2014) use the quarterly data for the period 1996 to 2012 and conclude that changes in real interest rates and standard macro-financial variables could hardly explain the investment slowdown. The study finds that macroeconomic factors could largely explain the behaviour of private corporate investment in India but could not fully account for the current downturn. This implies that the changing business environment also significantly impacts corporate investment. Results reveal that business climate, cost of doing business, financial sector development and state of infrastructure are important macroeconomic dimensions affecting the recent deceleration in investment in India; however, study could not answer the role of monetary policy in explaining investment behaviour.

In addition to key investment determinants such as economic size, interest rate and bank credit, Raj et al. (2018) found that the investment rate in India has been characterised by a three-year cycle between 1950- 51 to 2017-18. The study hails that timely assessment of cyclical investment is required to correct and follow appropriate policy measures to safeguard against future slowdown. Analysing annual data ranging from 1995–2017 with OLS method, it was hailed that uncertainty in the
Based on the above arguments and empirical evidences, it is clear that slowdown of private investment in India could be due to a host of factors such as output, fiscal policy, monetary policy, macroeconomic stability, economic uncertainty external stability, real exchange rates. It may be noted that most empirical studies have relied on the accelerator model to explain investment behaviour. However, the accelerator model may be better suited for advanced economies as it is based on assumptions of a perfect capital market, absence of liquidity constraints, and abstraction from the role of government. Accordingly, past research has highlighted the role played by financial sector development, measured by activities of financial intermediaries and capital markets, towards determining investment in developed economies (Gurley and Shaw, 1955; Greenwood & Smith, 1997). According to the existing literature, the investment slowdown in India can be linked to debt burden and tight financial markets (RBI, 2019), heightened levels of policy uncertainty and an unfavourable business environment (Tokuoka, 2012; RBI, 2013; Anandand Tulin 2014); the slower pace of public investment (Bahalet al., 2018) and macroeconomic uncertainty attached with fluctuating external demand (Dastidar and Ahuja, 2019). Most of these studies also reported that the economic activity, real interest rate, fiscal deficit and bank credit were India's major determinants of investment activity. Nevertheless, almost all the studies have focussed on investment at an aggregate level and as such, have not analysed the effect of these factors on institutional level investment, such as corporate and household sectors investment. In addition, the literature has overlooked the role of various institutional and financial factors such as the credit gap, monetary policy transmission effect, bonds market development; business confidence; and economic uncertainty. In recent years’ financial sectors have advanced in developing economies, and constraining factors of investment, likewise imperfect capital markets, less liquidity, higher interest rate and poor mobilization of financial resources - have eased. These hygienic factors have been well experienced by India since the beginning of the 21st century. Thus, there may be a need to revisit the suitability of the basic accelerator model for explaining investment behaviour in developing economies.

In this context, the current study bridges these research gaps by including multidimensional indicators in its empirical analysis to study the nature of investment behaviour in India more comprehensively.

Methodology

After an extensive literature review and a careful look at the recent debates on investment slowdown, we examine the roles of several economic dimensions – including aggregate demand, fiscal policy, monetary policy, financial flows, twin balance sheet indicators, business confidence, economic uncertainty and external sector - in determining investment. We put special emphasis on private investment in general and corporate investment in particular, as they tend to be more market-oriented and hence, more sensitive to macroeconomic changes. Thus, we estimate the following investment functions (Eq-1 to Eq-4), assuming the heterogeneity of investment across institutions. The total investment function (TINV) is estimated as:

\[ TINV_t = \beta_0 + \beta_1 output_t + \beta_2 GFD_t + \beta_3 NX_t + \beta_4 CG_t + \beta_5 X_t + u_t \] ........(1)

Where TINV is investment rate at aggregate level, GFD is gross fixed deficit, NX is the exchange rate, CG is credit gap and X is a set of variables capturing the financial development, business environment, uncertainty and monetary policy pass through effects. The detailed list of variables is presented in annexure table A1.

Since the investment slowdown in India is attributed to private investment, we also estimate the private investment function (PINV) separately. Private investment is sensitive to monetary and fiscal policy changes, and accordingly, the base model has
been modified to include variables for these policy measures. In order to check the effect of crowding out/in phenomena, we use public investment as an alternative to fiscal policy. For capturing the effect of monetary policy, we have used the real lending rate as it represents the rental cost of capital. X includes same set of variables as of Eq. 1. Thus, the private investment function is:

\[ PINV_t = \beta_0 + \beta_1 \text{output}_t + \beta_2 \text{GFD}_t / \text{Pub Inv}_t + \beta_3 \text{RLR}_t + \beta_4 X_t + u_t \quad \cdots \cdots (2) \]

Within private investment, corporate investment is relatively more market-oriented and sensitive to changes in the macroeconomic environment. Scholars (Baha et al., 2018; Dastidar and Ahuja, 2019) have also expressed the view that the slowdown of private investment, particularly corporate investment, is due to the twin balance sheet problem – balance sheet stress in both corporate and banking sectors - that has plagued the Indian economy since the GFC. The overleveraging of the corporate sector after the credit boom period of 2003-08 and the twin balance sheet problems have put pressure on both demand and supply of credit and debt sustainability in the wake of weak growth prospects. Thus, for the corporate investment function (CINV), we have modified the base investment model to include more indicators for debt. The ‘X’ set of variables has been expanded to include variables such as corporate indebtedness, debt service ratio, real exchange rate and financial constraint through credit gap. As such, the corporate investment function is represented by:

\[ CINV = \beta_0 + \beta_1 \text{output}_t + \beta_2 \text{GFD}_t + \beta_3 \text{RLR}_t + \beta_4 X_t + u_t \quad \cdots \cdots (3) \]

Following the Giordano et al. (2018), we specify the ensuing function for household sector investment (HINV):

\[ HINV = \gamma_0 + \gamma_1 \text{RDY}_t + \gamma_2 \text{GFD}_t + \gamma_3 \text{NX}_t + \gamma_4 X_t + \mu_t \quad \cdots \cdots \]

Where RDY is the real per-capita disposable income, X is a set of controlling variables, including credit gap, household debt, economic environment at domestic and global levels.

4.1. Selection of Variables and Data Sources

We tried our best efforts to capture the wide range of dimensions after going through extensive theoretical and empirical literature and recent debates about investment fluctuations. In our functions (Eq-1 to Eq-4), the investment is measured as gross fixed capital formation as a percentage of GDP. As for the explanatory variables, aggregate demand is measured by real gross value added; fiscal policy by gross fiscal deficit as a percentage of GDP; and monetary policy by real lending rate and transmission effect, i.e., the gap between lending and repo rate. Public investment is also considered to examine the argument of crowding-in or crowding-out.

Further, we emphasise on analysing the effect of banking and capital market developments on investment. For the banking sector, we consider the credit gap (actual values from the trend level) as a percentage of GDP, which captures the mismatch between demand and supply of financial resources. We have used two indicators to capture capital market developments: (i) corporate debt as a percentage of GDP (that includes the financial resources generated through bonds, treasury bills, etc.) and (ii) debt overhang, defined as the deviation of actual series from trend line has been widely used in recent literature (BCBS 2010). In one of the models, we use bank credit and corporate debt as a percentage of GDP in combined form to analyse the effect of financial sector development. Moreover, the study also examines the role of the debt service ratio, which is measured by the amount of income used for interest payments and amortisations. As economic uncertainty and business confidence also matter for investment (Giordano et al., 2019; RBI, 2013), we include economic uncertainty (Business Outlook Survey, RBI) measured through cross-sectional dispersion in the subjective expectations of firms interviewed by RBI. Besides, the global risk dimension is measured through the USA volatility index, capturing the behaviour of capital movements across countries. The later four dimensions have remained a matter of discussion for the current investment slowdown; however, a few studies explored the empirical attestation.
The study utilises quarterly data from 2004-05Q1 to 2019-20Q1. The period chosen has several advantages for understanding the determinants of investment in India. For one, it covers the two distinct phases of investment behaviour—the period of high investment growth (2004–2011) and the period of investment slowdown (2012-19). The time period also marks a period of several policy changes, including changes in monetary and fiscal policies and various measures undertaken to improve the business environment. Examining investment responses to these changes can help us understand the effect of different macroeconomic variables on investment. The data sources used for our empirical analysis include World Development Indicators; Bank for International Settlement and International Financial statistics; various publications from the Reserve Bank of India (RBI), including the Handbook of Statistics on the Indian economy and; a publication by Business Outlook. A detailed explanation of these variables and their sources is provided in Appendix Table A1.

4.2. Method of Analysis

The first important step while using the time series data is checking for the stationary properties of variables. We use Augmented Dickey Fuller (ADF) test, and the results reveal that most of the series are non-stationary at the level form except public investment, corporate investment, private non-financial sector credit, gross fiscal deficit and business confidence. However, all the series exhibit stationary behaviour at the first difference. Given the mixture of I (0) and I (1) variables, we use ARDL model (Pesaran et al., 2001) for empirical estimation as it can be applied irrespective of integration properties of the variables (mixture of I(0) and I (1)) variables (Pesaran and Pesaran, 1997).

The ARDL approach to co-integration is estimated with following specification:

$$\Delta Y_t = \beta_0 + \sum_{i=1}^{q} \gamma_i \Delta Y_{t-i} + \sum_{i=1}^{r} \phi_i \Delta X_{t-i} + \sum_{i=1}^{s} \psi_i \Delta Z_{t-i} + \theta_1 Y_{t-1} + \theta_2 X_{t-1} + \theta_3 Z_{t-1} + \mu_t \quad \text{.........(5a)}$$

Once the long-run relationship is established, the next step deals with the estimation of short-run behaviour and speed of adjustment with following error correction model:

$$\Delta Y_t = \beta_0 + \sum_{i=1}^{q} \gamma_i \Delta Y_{t-i} + \sum_{i=1}^{r} \phi_i \Delta X_{t-i} + \sum_{i=1}^{s} \psi_i \Delta Z_{t-i} + \alpha ECM_{t-1} + \mu_t \quad \text{.........(6)}$$

As for the results of cointegration tests, the F-statistic and t-statistic are found to be significant when we consider aggregate investment/private/corporate/household investment as the dependent variables alternatively and all other variables as explanatory variables, thereby confirming the long-run relationship at level form of the selected variables.\[7\] This investment is measured with the private non-financial corporate sector. Financial corporate sector investment is dropped due to its negligence share in overall investment.

\[8\] Results for unit root and cointegration tests are not reported for the sake of brevity; however available to authors upon request.

Empirical Results: Investment Drivers

5.1. Aggregate Investment

The estimation results for aggregate investment functions are reported in Table 1. We estimate various functions with alternative variables considering theoretical and empirical literature and recent debates on investment drivers. The coefficient value for lagged error-term is negative and statistically significant in all the models suggesting that any disequilibrium in the past quarter is adjusted to the equilibrium level in the long run. The output variable (OUTPUT), representing aggregate demand in the economy, has a statistically significant and positive coefficient. The coefficient value indicates that a 1% increase in output would lead to expansion in investment in the range of 0.42–0.54% (Models T1-T5). The finding is in accordance with the accelerator principle of investment theory, and thereby slower expansion in output in the past decade.
can be regarded as a key factor for lower investment rate. India's growth trajectory has been slowing over the last six years and reached its lowest level in 2020-21. We find that expansionary fiscal policies represented by a gross fiscal deficit \((GFD)\) holds positive and significant coefficient values (Models T2, T3 & T5), supporting the crowding-in effect phenomenon of public expenditure, as reported by Chakraborty (2007) and Bahal et al., (2018) in the Indian context. The post-crisis investment slowdown was accompanied by moderate deficit levels as there has been some fiscal consolidation in recent years to curb inflation. The suitability of the accelerator principle coupled with the crowding-in effect indicates the revival of rural demand through moderate expansionary fiscal policy.

We consider a set of variables to examine the impact of monetary policy, monetary policy transmission and financial sector development. Real interest rate \((RLR)\) exerts a positive coefficient value (Model T4) in accordance with the 'McKinnon-Shaw' hypothesis, which postulates higher rates stimulate savings and liquidity position for credit delivery, thereby boosting investment. Next, we find a negative and significant impact of monetary policy transmission \((LR_REPO, Model T1)\) which is measured as the difference between lending and repo rates. The results suggest that lack of monetary policy transmission, a common phenomenon in developing countries like India, does not help investment. In the post-GFC period, lending rates in India did not move in tandem with monetary policy benchmark rates as, banking and financial institutions found it difficult to pass on the benefits of an accommodative monetary policy due to increased financial stress, bad balance sheets and other efficiency criteria. In other words, lowering benchmark rates may not necessarily lead to investment expansion in the absence of a proper monetary policy transmission mechanism.

The credit gap \((CREDIT\_GAP)\) variable, a proxy for the financial sector and availability of credit, has a positive and significant coefficient value (Model T4), suggesting that the positive credit gap (actual credit being higher than the trend level of credit) is associated higher investment. India experienced a very high positive credit gap before the GFC, a period which coincided with the investment boom. However, the credit gap became negative after GFC, more so since the 2014 asset quality review\(^9\), which has affected investment negatively. Therefore, the credit gap is an important factor in explaining the recent slowdown in investment. Further, it is also observed that a rising debt gap \((DEBT\_GAP, Model T4)\) has a significantly negative impact on investment, thereby supporting liquidity theory argument.

We use an alternative variable for financial sector development \((FD)\) given by the sum of bank credit and corporate debt expressed as a percentage of GDP; the coefficient of a variable was found to have an expected sign but was statistically insignificant (Model T3). This could be an upshot of the overleveraging of the corporate sector in India, which made both banks and the corporate sector cautious about debt sustainability after the GFC. The construction sector, particularly investment in construction by the household sector, has also declined substantially (almost 5% of GDP) due to falling property prices, bad balance sheets of companies and new regulations. This may have further discouraged the household sector from accumulating debt for construction type of investment activities.

Coming to the external sector, the exchange rate \((NX)\) is found to affect investment negatively, implying that depreciation leads to lower investment. The possible reason for this is that depreciation makes imports costlier and makes the business environment less conducive to accessing foreign resources, be it in foreign investment or overseas financial borrowings. Moreover, depreciation increases the price of imported goods - which are mostly inputs and intermediate goods in the Indian case - thereby reducing profit margin and thereby constraining investment. Although currency depreciation can increase domestic investment due to increased domestic and foreign demand as exports become relatively cheap, evidence shows that India has not been particularly successful as an exporter\(^10\). Therefore, falling exchange rates could not help sustain higher growth in exports compared to imports, and accordingly, the import side effect of currency depreciation on investment tends to dominate. More importantly, the Indian investment has moved in tandem with the global slowdown and it order to capture this dimension, we have added the global volatility index. In Model T5, the coefficient value of global risk \((GR)\) is negative and significant, indicating the responsiveness of domestic investment to the global environment. Lastly, the coefficient values for economic uncertainty \((EU)\) and business confidence \((BC)\) have expected signs and significance. Economic uncertainty forces economic agents to defer investment, while improved business confidence motivates investors.
to cash in on untapped economic activities. Our findings align with Anand and Tulin (2014), who concluded that increased uncertainty and low business confidence have adversely affected investment in India.

Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model T1</th>
<th>Model T2</th>
<th>Model T3</th>
<th>Model T4</th>
<th>Model T5</th>
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<td>-0.662*</td>
<td>-0.910*</td>
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<tr>
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<td>0.447*</td>
<td>0.546*</td>
<td>0.471*</td>
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<tr>
<td>GFD</td>
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<td>0.515**</td>
<td>0.215*</td>
<td>0.252</td>
<td>0.541**</td>
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<td>-0.601*</td>
<td>-0.294*</td>
<td>-0.433*</td>
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<td>0.201***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FD</td>
<td></td>
<td></td>
<td></td>
<td>0.017</td>
<td></td>
</tr>
<tr>
<td>RLR</td>
<td></td>
<td></td>
<td></td>
<td>0.199*</td>
<td></td>
</tr>
<tr>
<td>DEBT_GAP</td>
<td></td>
<td></td>
<td></td>
<td>-0.440*</td>
<td></td>
</tr>
<tr>
<td>GR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.116**</td>
</tr>
</tbody>
</table>

Source: Authors’ Computation, EU: Economic uncertainty, BC: Business confidence. Note: *, **, *** indicate the statistical significance at 1, 5 and 10% levels, respectively, L1# is the coefficient of the lagged error term and indicates the speed of adjustment.

5.2. Private Investment

The estimation results of private investment functions are reported in Table 2. The sign and significance of past error-term confirm the movement towards equilibrium in the long run. Similar to the aggregate investment, the output variable representing the demand side of the economy is statistically significant and positive (Models P1 to P4). Thus, aggregate demand is a key factor in explaining private investment. On the fiscal policy front, we find contrasting results, with fiscal deficits having a positive effect (Model P3) and public investment having a negative effect (Model P4) on private investment. A larger government size matters for investment due to its effect on aggregate demand. In the aftermath of the financial crisis, there had been a decline in aggregate demand which is one of the major reasons for the economic slowdown and hence, investment in India. In such a situation, the higher fiscal deficit helped large social programmes, which boosted aggregate demand and investment in the economy. However, higher public investment can crowd out private investment through increased interest rates and limited financial resources.

Similarly, private investment responds negatively to increases in real interest rates (Models P1, P2 and P4), even though increases in interest rate seem to positively impact aggregate investment, signifying the need for disaggregated level analysis of the investment. The reason is that aggregate investment includes public investment, which is not purely guided by market principles, whereas private investment is sensitive to market dynamics as firms strive to maximise their profits. As per the neoclassical theory, higher interest rates increase the cost of capital for private firms, which discourages private investment. After the GFC, there has been an upward surge in the real interest rate due to the moderation of the inflation rate. As such, the real interest rate does not matter much for private investment under normal circumstances. However, a higher interest rate, accompanied by rising uncertainty, lack of aggregate demand and twin balance sheet problems, is certainly not conducive to
private investment. Thus, a higher real interest rate is relevant for private investment as it affects the policy scope for maintaining lower lending rates.

### Table 2
Long-run Analysis: Private Investment

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model P1</th>
<th>Model P2</th>
<th>Model P3</th>
<th>Model P4</th>
<th>Model P5</th>
</tr>
</thead>
<tbody>
<tr>
<td>$L_1$</td>
<td>-0.37*</td>
<td>-0.53*</td>
<td>-0.42*</td>
<td>-0.38*</td>
<td>-0.514*</td>
</tr>
<tr>
<td>$L_{OUTPUT}$</td>
<td>0.097*</td>
<td>0.107*</td>
<td>0.089*</td>
<td>0.369*</td>
<td>0.417*</td>
</tr>
<tr>
<td>$GFD$</td>
<td>0.64</td>
<td>0.35</td>
<td>1.24*</td>
<td>1.005*</td>
<td></td>
</tr>
<tr>
<td>$RLR$</td>
<td>-0.52*</td>
<td>-0.47*</td>
<td>-0.24</td>
<td>-0.52*</td>
<td></td>
</tr>
<tr>
<td>$EU$</td>
<td>-79.23*</td>
<td>-93.28*</td>
<td>-41.25*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$BC$</td>
<td></td>
<td>0.29*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$DEBT$</td>
<td></td>
<td>0.15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pub_inv</td>
<td></td>
<td></td>
<td>-1.42**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$NX$</td>
<td></td>
<td></td>
<td>-0.35*</td>
<td>-0.426*</td>
<td></td>
</tr>
<tr>
<td>$CREDIT_GAP$</td>
<td></td>
<td></td>
<td></td>
<td>0.111</td>
<td></td>
</tr>
<tr>
<td>$GR$</td>
<td></td>
<td></td>
<td></td>
<td>-0.169*</td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors’ Computation, Note: EU: Economic uncertainty, BC: Business confidence, RLR: Real lending rate, debt: corporate debt (% of GDP), NX: Nominal exchange rate. Note: *, **, *** indicate the statistical significance at 1, 5 and 10% level, respectively, $L_1$ is the coefficient of lagged error term and indicates the speed of adjustment.

Amongst other variables, the exchange rate has a significant and negative coefficient value (Model P4) which shows that depreciation lowers private investment. The Indian industry continues to be heavily dependent on imports for many of its inputs and intermediate products, including raw materials, machinery and equipment, oil etc. Depreciation increases the cost of such imports, affecting the profitability of private sector firms and hence, their willingness to invest. Similarly, economic uncertainty is also found to dampen private investment (Models P1, P3 and P4), and this finding is in line with the recent literature (Anand and Tulin, 2014). Private investment is negatively associated with volatile behaviour in global risk (Model P5). Economic uncertainty, business confidence and overall business climate are indicative of investors’ expectations about rates of return and future growth prospects and as such, are essential for determining private investment. Finally, the indicator for the bonds market (Model P3) has a positive but insignificant value. The private investment includes household investment, but the sector does not access funds directly through the bonds markets. Thus, developments in the bonds market have little bearing on household investment, however, the exclusive effect on corporate investment are elaborated on in the next sub-section.

### 5.2.3. Private Corporate Investment

Having a clue of varying response of investment drivers on aggregate and private investment, we go in-depth towards drivers of corporate and households’ investment separately. The results for the long-run analysis of private corporate investment are reported in Table 3. As with other components of investment, an increase in aggregate demand has a positive effect on private corporate sector investment. After the GFC, and especially after 2012, the slowdown in growth has adversely affected demand and, thereby, prospects for capacity expansion or new investments for the corporate sector. In fact, India’s corporate sector has been suffering from excess capacities across industries for several years now.
However, unlike aggregate and private investment, a rising fiscal deficit has a negative impact on corporate investment (Model C4). This may be due to the real and financial crowding out of the private corporate investment as there is an increase in public investment. More importantly, the monetary policy transmission effect has a significant and negative value (Model C4). It can be argued that the poor pass-through effect of monetary policy has been the reason for a continuing slowdown in corporate investment, even when monetary policy rates were lowered. Thus, there is a need for a competitive financial system ensuring effective monetary policy transmission.

Amongst financial variables, credit-gap has a positive influence on private corporate sector investment (Models C2-C4), as evident from the positive and significant value of its coefficient. This clearly supports the idea that the slowdown of corporate sector investment is due to a lower or negative credit gap, mostly due to the twin balance sheet problem. Moreover, the development of bond markets has a positive and significant effect on private corporate investment (Model C1) as it improves access to financial resources. In addition, the current study makes an attempt to understand how investment is affected by balance sheet indicators of the corporate sector, especially with respect to debt sustainability. For this purpose, we have considered the debt-service ratio, which indicates the utilisation of profits for interest payment of owed debt. The value of its coefficient is negative and significant (Model C3), indicating that rising debt pressure prevents the corporate sector from expanding its business activities.

In the external sector, the real exchange rate has a significant and negative impact (Model C3) on private corporate investment, similar to aggregate and private investment. India is an import-dependent country when it comes to essential inputs and intermediate products. Therefore, depreciation of the exchange rate makes imports costlier and dampens private corporate investment. As for economic uncertainty and business confidence, they are also found to be significant determinants of corporate investment in India.

### Table 3

Long-run Analysis: Corporate Investment

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model C1</th>
<th>Model C2</th>
<th>Model C3</th>
<th>Model C4</th>
<th>Model C5</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1#</td>
<td>-0.618*</td>
<td>-0.701*</td>
<td>-0.698*</td>
<td>-0.748*</td>
<td>-1.388*</td>
</tr>
<tr>
<td>OUTPUT</td>
<td>0.0364**</td>
<td>0.217**</td>
<td>0.395*</td>
<td>0.124**</td>
<td>0.198*</td>
</tr>
<tr>
<td>GFD</td>
<td>-0.100</td>
<td>-0.067</td>
<td>-0.038</td>
<td>-0.149***</td>
<td>-0.155**</td>
</tr>
<tr>
<td>RR</td>
<td>-0.013</td>
<td>-0.134</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU</td>
<td>-3.367</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEBT</td>
<td>0.173***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LR_REPO</td>
<td></td>
<td></td>
<td></td>
<td>-0.292**</td>
<td></td>
</tr>
<tr>
<td>CREDIT_GAP</td>
<td>0.275**</td>
<td>0.413*</td>
<td>0.237*</td>
<td>0.377*</td>
<td></td>
</tr>
<tr>
<td>RX</td>
<td>-0.058</td>
<td>-0.200*</td>
<td>0.053</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU</td>
<td></td>
<td></td>
<td></td>
<td>-13.44***</td>
<td></td>
</tr>
<tr>
<td>DSR</td>
<td></td>
<td>-0.793***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC</td>
<td></td>
<td></td>
<td>0.211*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NX</td>
<td></td>
<td></td>
<td></td>
<td>0.059**</td>
<td></td>
</tr>
<tr>
<td>GR</td>
<td></td>
<td></td>
<td></td>
<td>-0.048*</td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors’ Computation, Note: RX: Real effective exchange rate, *, **, *** indicate the statistical significance at 1, 5 and 10% level, respectively.
As observed, private investment is dominated by the household sector, including the small and medium-size enterprises falling into the informal sector. Following Giordano et al. (2019) and limited data availability for the informal sector, we estimated the household investment function with per-capita real disposable income rather than the national output along with other explanatory variables (Table 4). The positive coefficient value of the disposable income suggests that the falling income level of the recent past has led to household investment slowdown. All other controlling variables captured through different dimensions in models (H1-H4) hold the coefficient value as expected and in line with the private investment.

### Table 4
Long-run Analysis: Household Investment

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model H1</th>
<th>Model H2</th>
<th>Model H3</th>
<th>Model H4</th>
</tr>
</thead>
<tbody>
<tr>
<td>$L1#$</td>
<td>-0.420*</td>
<td>-0.475*</td>
<td>-0.565*</td>
<td>-0.566*</td>
</tr>
<tr>
<td>$RDY$</td>
<td>0.371*</td>
<td>0.384*</td>
<td>0.326*</td>
<td>0.324*</td>
</tr>
<tr>
<td>$GFD$</td>
<td>0.151</td>
<td>0.444**</td>
<td>0.425*</td>
<td>0.057</td>
</tr>
<tr>
<td>$NX$</td>
<td>-0.478*</td>
<td>-0.442*</td>
<td>-0.413</td>
<td>-0.541*</td>
</tr>
<tr>
<td>$HDEBT$</td>
<td>-0.727</td>
<td>-0.206</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$EU$</td>
<td>0.266</td>
<td></td>
<td>-0.248</td>
<td></td>
</tr>
<tr>
<td>$ES$</td>
<td></td>
<td>-14.828</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$LR_REPO$</td>
<td></td>
<td></td>
<td>-0.404*</td>
<td></td>
</tr>
<tr>
<td>$CREDIT_GAP$</td>
<td></td>
<td></td>
<td>-0.116</td>
<td></td>
</tr>
<tr>
<td>$GR$</td>
<td></td>
<td></td>
<td>-0.108*</td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors’ Computation, Note: $HDEBT$: Household debt to GDP ratio, $L1\#$ is the coefficient of lagged error term and indicates the speed of adjustment.

[9]Asset Quality Review was carried Reserve Bank of India (RBI) in 2014 to check bank books of scheduled commercial banks for categorizing stress assets and provisions towards those assets.

[10]In fact, India has experienced negative exports for a few quarters in the last decade.

## Conclusion & Policy Suggestions

The objective of the study was to empirically investigate the major determinants of investment and understand the underlying reasons for its current slowdown in India. Results of our empirical analysis show that determinants of aggregate investment include aggregate demand, fiscal policy, monetary policy, financial resources, exchange rate, domestic uncertainty and global risk. Similarly, for private investment, the determinants include public investment, fiscal deficit, user cost of capital and, business confidence and uncertainty, along with measures for demand and financial sector developments. Finally, private corporate investment is found to be responsive to bonds market development, real exchange rate, debt service ratio, business confidence and economic uncertainty in addition to the demand side and liquidity in the economy. Besides, the household investment is sensitive towards disposable income, exchange rate, government financing and global happenings.

On the basis of the analysis, it can be argued that investment slowdown in India can be attributed to the lack of aggregate demand, unfavourable business environment and higher economic uncertainty of the post-GFC era at both levels- global and domestic. Increasing uncertainty and deteriorating business confidence have caused investors to defer or cancel new investments. The global crisis took a toll on the aggregate demand of the Indian economy, which has led to a deceleration in investment since 2012. There has also been a move towards fiscal consolidation and higher real interest rates in recent years,
which has definitely not helped the issue. Moreover, there also seems to be a shortage of financial resources for corporate sector investment, as evidenced by the twin balance sheet problem that has been plaguing India for several years now.

Thus, there is a need to focus on private investment to revive investment in the country. Private investment is composed of household and corporate investment. Corporate sector investment may be boosted by developing financial markets. While the corporate sector has gradually started using bonds and capital markets, there is a requirement for more financing options which can help fill the rising credit gap and provide the corporate sector access to financial resources at reasonable prices. Such a competitive financial system could also pave the way for more a robust monetary transmission effect which can increase investment. Some of the policy suggestions for better monetary policy transmission include ensuring the availability of an efficient payment and settlement system, liquidity management, especially in accordance to the demand and supply, integrated financial markets for better arbitrage processes and the capitalized banking system, liquidity-enhancing interventions and recapitalization of banks. The policies and regulatory environment promoting healthy competition in the banking industry are much needed to enable the efficient-structure hypothesis for wider monetary policy transmission.

In contrast, the household sector relies on financial institutions from the banking and non-banking sector for household investment. Here considering the empirical findings of our study, the key policy suggestion is that there must be an address to resource mismatch issue as banks hesitate to fund amid growing NPAs and potential firms face a capital shortage. There is a need to have a mapping of surplus funds with those of the capital deficient but potential firms. This finding offers a policy suggestion for increased liquidity into the system either through the loose monetary and fiscal policy and also to utilize the corpus of funds generated through the scheme like a sovereign gold bond for strengthening the NBFCs and banking capital base eventually providing the funds for a potential business entity in the economy. For catch-up, the liquidity into construction projects can boost the investment rate as this sector contributes a more significant chunk of overall investment in India.

As such, there should be an emphasis on resource allocation through fiscal policy with more funding to the MSME sector and empowering financial intermediaries to create a spillover effect for propelling the investment. The suitability of the accelerator principle in the Indian case clearly indicates the revival of rural demand through fiscal policy is another important agenda. Lastly, there need to be continuous efforts on the part of the government to improve business confidence and reduce economic uncertainty for reviving investment in India.

Declarations

Acknowledgement:

This paper is part of the project on investment slowdown supported by IMPRESS, GoI. The initial results of the study were presented in the Panel discussion on, “What led to slowdown and how to revive investment in India?” at Institute of Economic Growth on 13th January 2020. We are grateful to Prof. Ajit Mishra, Prof. Kunal Sen, Prof. Renu Kholi, Dr. D. K. Pant, Prof. Sabyasachi Kar and other participants for useful comments and suggestions. Usual disclaimer applies.

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Authors’ contributions: Both the authors are involved from conceptualization to finalization. However, the lead author (Prof. Pravakar Sahoo) contributes more to the overall framework, modelling and writing while the Co-author (Dr. Ashwani Bishnoi) contributes more to the data collection and estimation.

Acknowledgement: The initial results of the study were presented in the Panel discussion on, “What led to slowdown and how to revive investment in India?” at Institute of Economic Growth on 13th January 2020. We are grateful to Prof. Ajit Mishra,
Availability of data and materials: Yes we can share the data. However, we have taken data from paid sources.

Authors' information: Given on the first page of the paper

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**Figures**
Figure 1

India's GFCF (% of GDP)

Source: World Development Indicators (WDI), NAS. Note: NAS data is for fiscal year ending with 2018-19[4]

[4]Differences in values arise due to the computation of investment rate based on current value by WDI and real values by NAS.
Figure 2

GFCF by Institution (% of GDP)

Source: World Development Indicators (WDI), NAS. Note: NAS data is for fiscal year ending with 2018-19[4]

[4] Differences in values arise due to the computation of investment rate based on current value by WDI and real values by NAS.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- AppendixA.docx