In quest for policy 'silver bullets' towards triggering a v-shaped recovery

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In Quest for Policy 'Silver Bullets' towards Triggering a V-shaped Recovery *

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Abstract

Our paper attempts to identify policy 'silver bullets' that ascertain a sustainable growth revival in the aftermath of the COVID-19 shock. The study focuses on India, one of the largest emerging market economies of strategic importance, globally. Using a novel business cycle dating algorithm, we identify up-cycle and down-cycle phases in India's GDP growth rate cycle. Our paper also implements dynamic factor analysis using several high frequency indicators for tracking private investment activity in India. We find that a boost to private investment can arrest a growth deceleration (down-cycle), via consumption and output channels. In addition, we observe that both quantum and quality of public expenditure play an important role in arresting the growth deceleration. For both these channels to work, credit offtake is crucial for a bank-dominated economy such as India. Besides addressing legacy issues relating to banking NPAs, we also highlight that a timely reduction of monetary policy rate supported by an accommodative liquidity stance could help smoothen the path to growth recovery.

JEL Codes: C32, C51, C53, E32

Keywords: Turning Point Analysis, Investment-led Recovery, Capex, Credit, GNPA, Liquidity

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1 Introduction

A growing literature focuses on the disparate business cycle properties between advanced economies (AEs) and emerging market economies (EMEs). It is observed in Acharya *et al.* (2020) that an average EME represent higher volatility in economic output, growth, and trade balance relative to an AE. Importantly, the extent of consumption smoothing in the EMEs over a business cycle has improved over the years but remains lower to an AE. Further, it is observed that trade balances in EMEs remain significantly more counter-cyclical than in AEs. Similar differences are also highlighted in Aguiar & Gopinath (2007) and Neumeyer & Perri (2005). Given that AEs behave distinctly from EMEs in their business cycle, interest rate, and path to recovery, policy prescriptions associated with a sustainable growth revival is likely to remain different for an EME. Accordingly, our paper attempts to analyse and understand policy choices for India's growth revival in the aftermath of the Covid-19 shock.

A comparison of the business cycles across EMEs in the past 50 years suggest that there has been a secular increase in the length of an economic expansion and a substantial reduction in the amount of time that economies spend in recession. IMF(2005) points out that deep recessions have virtually disappeared in the last three decades for prominent economies. Barring the recent Covid-19 led growth collapse, the Indian economy has not experienced a recession since 1991 based on the IMF's definition of a business cycle. Given the depth and dimension of disparities in the business cycle for India and AEs, we evaluate the effectiveness of consumption, government expenditure and investment channels of stimulus and sustainable recovery.

Unlike advanced economies, the consumption path is generally more volatile in EMEs. Radulescu *et al.* (2019) has explored the role of investment and consumption in boosting economic growth during a crisis episode for the central and eastern European (CEE) economies. The authors found out that consumption can only provide a transient push to economic growth, however, investment facilitates a sustainable recovery because it generates greater opportunities for job creation. For India, among the few available studies, Ahluwalia (2002)

pointed out that the Indian experience is not much different from the CEE countries and observed that there is unidirectional causality from private investment to economic growth (Ahluwalia (2002)).

In addition to private investment, we also explore the role of quantum and quality of government expenditure in facilitating output growth in the context of EMEs. Galì *et al.* (2007) observed that in the presence of non-Ricardian households (also known as rule-of-thumb consumers) under a New Keynesian DSGE framework, an increase in government spending has an expansionary effect on output via the consumption channel. Typically, rule-of-thumb consumers are unable to smooth their consumption path due to their inability to borrow or save and their consumption at each period determined by their contemporaneous labour income. These findings resonate well with EMEs with large informal sectors and, according to ILO (2013), India has over 90 per cent of the total labour force categorised as informal workers, who work without any social security benefits, paid leave, and absence of any formal job contract.

Finally, for both private investment and government spending to have a perceivable impact on GDP growth, credit offtake is crucial for a bank dominated economy. Further, given that banks are predominantly state owned in India, the role of credit is of paramount importance for growth revival. In this context, Jordà *et al.* (2016) has observed in their study that household debt and timely access to credit can help revive demand and generate personal wealth. The permanent income hypothesis proposes that higher debt implies higher future income. Debt will likely allow the household to acquire goods and services now and pay them back in a gradual manner through a higher, anticipated income.

To get a deeper insight into the post COVID-19 economic recovery, we identify the up-cycle and down-cycle periods of Indian growth cycles. Our findings resonate with that of Radulescu *et al.* (2019) and Ahluwalia (2002), as we observe that an investment push during a down-cycle provides a greater boost to GDP growth than private consumption. Further, much like Jordà *et al.* (2016), our empirical findings indicate that during an up-cycle it is

credit that drives GDP growth and liquidity in a surplus mode has provided requisite support to credit disbursement, especially during the recent down-cycle. Furthermore, several robustness checks confirm that an investment-led revival lends greater support to consumption by generating higher income. Overall, our study bets on the importance of an investment-led path for an enduring growth revival.

The rest of the paper is organized as follows. Section 2 provides a comprehensive review of the literature on the drivers of growth, including cross-country experiences as well as literature specific to India. Section 3 briefly describes the data used for our analysis and Section 4 presents the methodology. Empirical results are provided in section 5. We put our concluding remarks in section 6.

2 Literature Review

Given the nature of disparities in business cycles that prevail between AEs and EMEs, it requires a more concerted effort on account of private investments, government expenditure, and access to credit and liquidity for a broad-based economic recovery. This is especially true in the aftermath of an adverse shock such as the recent Covid-19 pandemic. Accordingly, in this section, we elaborate on the literature and how each of these channels contribute to economic growth with a focus on emerging economies.

Role of private investment in promoting economic growth: Unlike high-income countries, it is a consensus that growth in low and middle-income countries is consumption-led and not necessarily investment-led, given the higher consumption share of GDP in some of these economies, see Mishra (2011) and Diacon & Maha (2015). However, Radulescu *et al.* (2019) look at the role of investment vis-à-vis consumption in stimulating economic growth after a crisis in the central and eastern European (CEE) countries. The paper finds that consumption is effective in reviving GDP, but only in the short run, as its contribution is relatively low in job creation. Moreover, investment leads to sustainable recovery mainly

because of its contribution to job creation and also to GDP. Ahluwalia (2002) and Villa (2008) observe that the direction of causality runs from private investment to economic growth in India and Italy, respectively. Countries such as USA, Japan, France, and Germany laid out the right incentives to innovate (intellectual property rights etc.) that rapidly boosted productivity, which remained the major force behind sustained economic growth in these countries. Low- and middle-income nations of the 80s, on the other hand, such as Singapore, China, and Korea aimed at setting up the initial conditions that provided the potential for catching up with AEs. Some of these economies could accelerate their growth by resetting their initial conditions that put them on a convergence path to the developed nations. One of the fundamental ingredients that can speed up the process of convergence is investment. East Asian economies were able to grow at a miraculous pace by building up capital stock and investment remained consistently over 25 per cent of GDP. In the case of India, Ahluwalia (2002) finds that state-level variations in private investment can significantly explain heterogeneous growth paths across Indian states.

Impact of government expenditure on economic growth: There is a vast literature that attempts to understand the general equilibrium effects and the magnitude of the output multiplier due to fiscal policy shocks. Fiscal policy shocks can either be attributed to shocks to spending or tax rates. As discussed in Galì *et al.* (2007), increases in government spending typically have an expansionary effect on the output, although the effect on consumption is debated. However, since consumption is the largest component of total GDP, the effect that fiscal policy has on consumption crucially determines the sign and magnitude of the government spending multiplier. Empirical evidence on pre-global financial crisis US quarterly data suggests that fiscal expansion via government spending shocks have a positive contemporaneous effect on output, and especially a large and positive effect on current consumption, whereas an insignificant effect on investment (see Blanchard & Perotti (2002), Fatàs & Mihov (2001), Galì *et al.* (2007)). Perotti (1999) also find that under ânormal timesâ the response of consumption to government spending is positive. Caggiano *et al.* (2015) point

out that the timing of a spending expansion is very important. Based on US data, they show that fiscal multipliers are much higher in deep recessions and are statistically different from fiscal multipliers during strong expansionary periods. Therefore, the effectiveness of fiscal policy can be maximized if fiscal expansion is targeted during episodes of recession in the business cycles of advanced economies (AEs). With a lack of access to saving instruments, the literature assumes that households in emerging market economies have a larger share of non-Ricardian households. Unlike standard infinitely lived Ricardian households whose current consumption decisions do not just depend on current incomes but also on future incomes, for households in the EMEs these multipliers could have muted values.

The importance of credit for facilitating economic growth: Finally, several papers in the DSGE literature analyse the effect of credit market frictions, and the interaction between the real and financial sector through the balance sheet of banks and other financial intermediaries (see Gerali *et al.* (2010); Gertler & Karadi (2011); Agènor *et al.* (2014)). Gerali *et al.* (2010) show that credit plays a crucial role in propagating real sector transmissions, policy-induced liquidity also plays a crucial role for credit creation. In EMEs, capital markets are underdeveloped, and intermediation costs are often high. Therefore, banks play a crucial role in overall GDP growth in India and several other EMEs as they are the main source of credit for private consumption and investment (see Ghosh *et al.* (2020); Panetta *et al.* (2009)).

Finally, the inter-connections among endogenous feedbacks, bank capital and economic fluctuations is prevalent in the literature. Typically, in a DSGE framework, firms that produce the intermediate good face working capital constraints, and these are financed by borrowing from financial intermediaries. Due to several idiosyncratic or adverse aggregate shocks, firms are unable to repay their loans which result in defaults (rising NPAs), hurt banksâ capital, and in presence of regulatory limits, may impact credit disbursements (see Hristov & Hülsewig (2017)). The authors show that unanticipated shocks to bank capital could have a significant impact on the real economy, especially on investment despite

abandoned funding liquidity.

3 Data

For tracking the investment cycle, the high-frequency monthly indicators such as IIP-core, manufacturing activity, and cement and electricity production were combined. High-frequency indicators such as IIP-consumer goods, automobile sales, air passenger and rail passenger were used to track the consumption cycle. All the high-frequency indicators were sourced from CEIC database.[1] Data on private final consumption expenditure (PFCE) and gross fixed capital formation (investment) are available at a quarterly frequency and obtained from CEIC. For executing the regression analysis, we obtain a relatively long time-series data on quarterly GDP with the base year 2011-12 by splicing together GDP series of past base years such as 2004-05 and 1999-2000. We used the spliced quarterly GDP series and adopted the GDP cycle dating algorithm to create dummies that capture the up-cycle and down-cycle.

Data on government final consumption expenditure (GFCE), revenue and capital expenditure data for the centre and states were obtained from the CEIC. We consulted the official data from the Ministry of Statistics and Programme Implementation to arrive at the contribution of GFCE to GDP growth and the share of public vis-à-vis private sector including households in the total capital formation.[2] As we can see in Figure 1, left panel, government final consumption expenditure (GFCE) as a percentage of GDP has been hovering around 10-14per cent during the period 2016-20. From 2016, however, its share in GDP has steadily increased from 10.3 per cent to 14 per cent in FY2021.

In terms of YoY growth, real GFCE grew at 14.2 per cent during the FY2010, the year following the Global Financial Crisis due to a massive fiscal stimulus in response to the GFC. The real GFCE growth has since never been as high and in FY2021 had decreased to 5.8

[1] CEIC is a data aggregator that collects data from different ministries, government documents and other data originators.

[2] The Ministry of Statistics and Programme Implementation has decided to merge the CSO and National Sample Survey Office (NSSO) into the National Statistical Office (NSO)

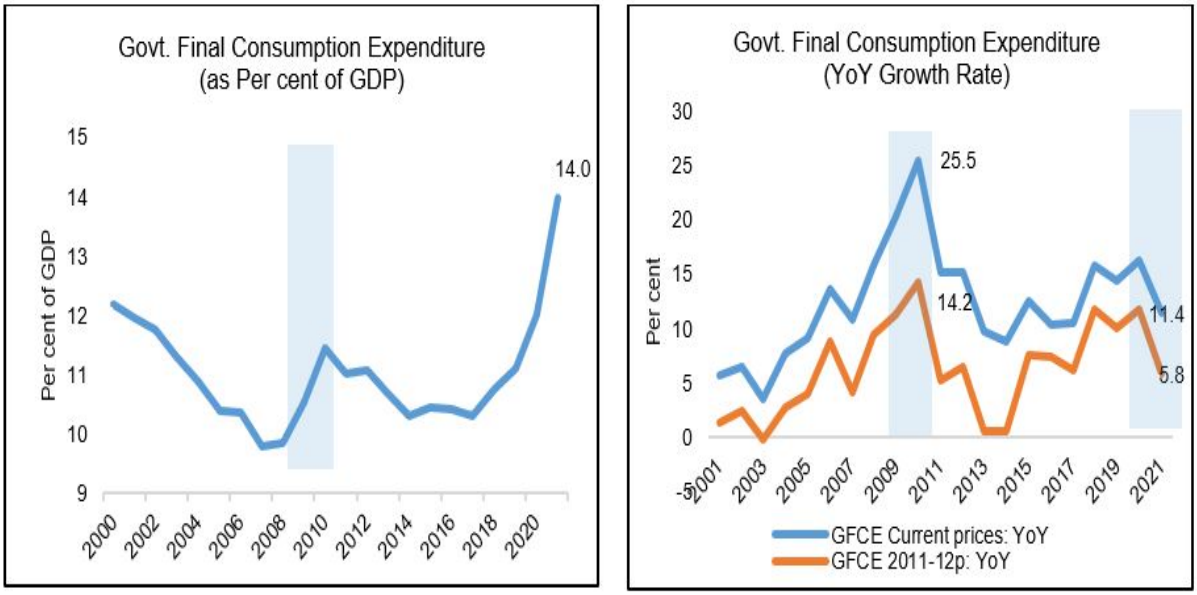


Figure 1: Trends in Government Final Consumption Expenditure (GFCE)

per cent, as fiscal imbalances grew during the pandemic period with revenues falling sharply promoting some spending restraint. These are shown in see Figure 2.[3]

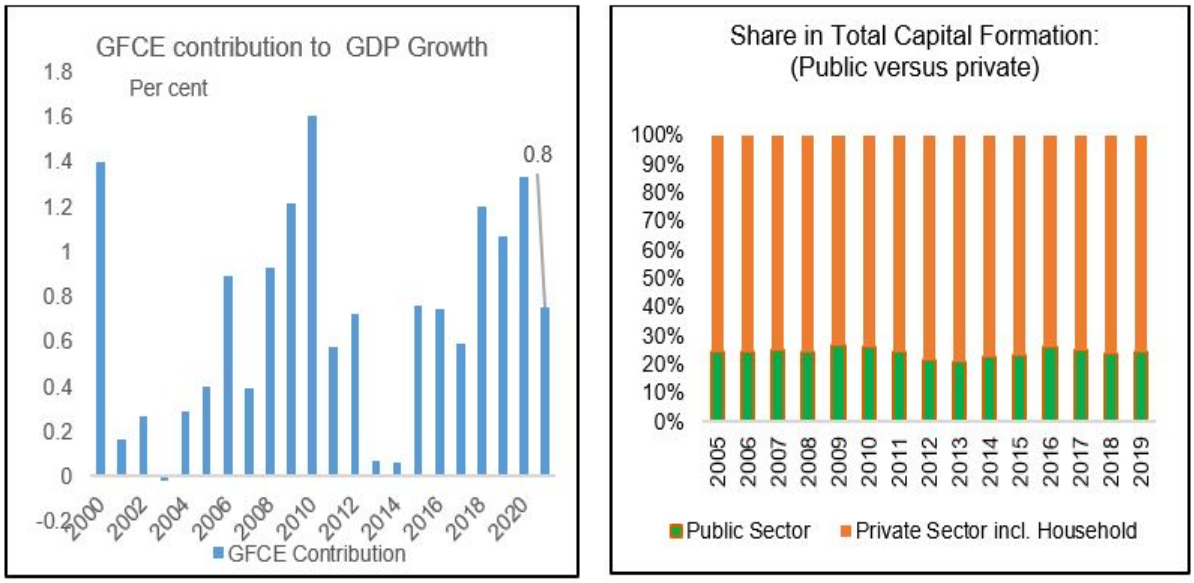


Figure 2: Quality of Government Final Consumption Expenditure (GFCE)

Data on bank credit to private non-financial sectors from prominent advanced economies

[3]The Ministry of Statistics and Programme Implementation has decided to merge the CSO and National Sample Survey Office (NSSO) into the National Statistical Office (NSO).

(AEs) and emerging market economies (EMEs) were obtained from the Bank for International Settlements (BIS) database. Data on non-food credit as well gross non-performing assets (GNPA) were obtained from the Database on Indian Economy (DBIE), Reserve Bank of India. RBI conducted an Asset Quality Review (AQR) of banks in 2015 to address the concerns of NPAs (see RBI (2015); John *et al.* (2016); and Vishwanathan (2016)). The overall GNPA ratio increased steadily from 3.3 per cent in FY2013 to 4.7 per cent in FY2015. In FY2016, Public Sector Banks, the most important banking sub-category, witnessed the highest GNPA to total advances ratio across all sub-categories at over 14.5 per cent and at the same time, the lowest Capital to Risk-Weighted Assets Ratio (CRAR), both of which indicate poor quality of balance sheets. Between FY2015 and FY2016, the Y-o-Y growth in GNPAs was over 80 per cent, and in FY2017, the overall GNPA ratio for SCBs stood at a whopping 9.9 per cent.

We have created suitable dummies for measuring the liquidity position, which was assigned a value '1' if the reverse repo net of repo rate was positive. All financial markets data such as weighted average call rates (WACR), interest rates on 91-day treasury bills and 10-year government securities were sourced from Bloomberg, L.P. Finally, the economic policy uncertainty (EPU) index for India was sourced from the webpage of Baker, Bloom and Davis (BBD).[4]

4 Methodology

Turning points in the growth rate cycle are determined by identifying the local peaks and troughs - using the first and fourth quartiles of GDP growth, i.e., the lowest 25 per cent and the highest 25 per cent of the growth distribution. The economy can be in either of two mutually exclusive phases of the growth rate cycle that is, an up-cycle or a down-cycle.

[4]The news-based EPU index for India uses a similar approach adopted in the construction of the monthly EPU index for US. All prominent english newspapers in India, such as The Economic Times, the Times of India, the Hindustan Times, the Hindu, the Statesman, the Indian Express, and the Financial Express are used to arrive at this index.

From an up-cycle continuation, UC_t a transition to a local peak, P_t can be made or the up-cycle can be continued, but not vice versa as only $P_t \rightarrow DC_{t+1}$ is admissible. Similarly, from a down-cycle continuation, DC_t, a transition can be made to a local trough, T_t but $T_t \rightarrow DC_{t+1}$ with a probability of 1. Additionally, a few censor rules are applied, such as eliminating back to back peaks or troughs and ensuring that there is at least a one quarter gap between a peak and a trough. These additional censor rules help to cleanly identify turning points in the GDP cycle. OECD uses a turning point detection algorithm, which is a simplified version of the original Bry and Boschan (BB) routine (see Bry & Boschan (1971), OECD (2020)).

$$\text{up-cycle}_t \equiv \begin{cases} UC_t \\ P_t \end{cases} \tag{1}$$

$$\text{down-cycle}_t \equiv \begin{cases} DC_t \\ T_t \end{cases} \tag{2}$$

Next, the Dynamic Factor Model (DFM) specification used for our analysis is similar to Harvey (1989) and Holmes et al. (2014). A single-index dynamic factor (DF) is used to extract an underlying, consensus trend from multiple high-frequency indicators. DFs are useful in tracking macroeconomic signals as they can weed out noisy or idiosyncratic signals. The following set of specifications represent the DFM in a state-space specification.

$$x_t = Bx_{t-1} + w_t, \text{ where, } w_t \sim MVN(0, Q) \tag{3}$$

$$y_t = Zx_t + a + v_t, \text{ where, } v_t \sim MVN(0, R) \tag{4}$$

$$x_0 \sim MVN(\Pi, \Gamma) \tag{5}$$

The economic indicators (y) are modelled as a linear combination of an underlying $DF(x_t)$, factor loadings (X) plus some offset terms, (a). This is referred to as the ob-

servation equation. The transition equation represents the dynamic factor modelled as a multivariate autoregressive process with v_t as the process error. Broadly, the DFM can be represented using two stochastic components, (i) an unobservable common component, x_t and an (ii) idiosyncratic component v_t.

We run multiple causality tests in our analysis by estimating the following VAR model:

$$Y_t = c_0 + c_1 Y_{t-1} + ... + c_p Y_{t-p} + d_1 X_{t-1} + ... + d_p X_{t-p} + u_t \quad (6)$$

$$X_t = e_0 + e_1 X_{t-1} + ... + e_p X_{t-p} + f_1 Y_{t-1} + ... + f_p Y_{t-p} + v_t. \quad (7)$$

We test the null hypothesis, $H_0 : d_1 = d_2 = ... = d_p = 0$, against the alternative hypothesis, H_A where H_A : Not H_0. In other words, the acceptance of the null suggests that X does not Granger-cause Y. Similarly, the acceptance of H_0 where H_A : Not H_0 suggest that Y does not Granger-cause X, where $H_0 : f_1 = f_2 = ... = f_p = 0$.

Finally, Sims *et al.* (1990) proposed that the null hypothesis in a standard Granger causality test may represent a non-standard distribution, especially in the presence of a unit root test. Toda & Yamamoto (1995) (T-Y) suggested a solution to the problem, especially in models plagued with unit-roots and co-integration, see Ghosh & Bhadury (2018). Keeping in mind that inferences drawn from a standard Granger causality test can be problematic, we adopt a T-Y procedure. Running a T-Y routine would require testing each of the time-series variables to determine their corresponding order of integration and then determining the highest order of integration (m) for the group of time-series variables. The next few steps would involve setting up a well-specified VAR without autocorrelation, checking the order of co-integration etc. As a final step, a robust VAR framework needs to be setup with (m) additional lags for each time-series variable while performing the Wald test. It is important not to include the coefficient of these extra lags while performing the Wald test. As proposed by Toda & Yamamoto (1995), this will help in fixing up the asymptotics by

generating a Wald test statistic which follows a chi-squared distribution with (p) degrees of freedom under the null hypothesis.[5] The rejection of null would suggest the absence of Granger non-causality or the presence of causality under a robust framework.

5 Empirical Results

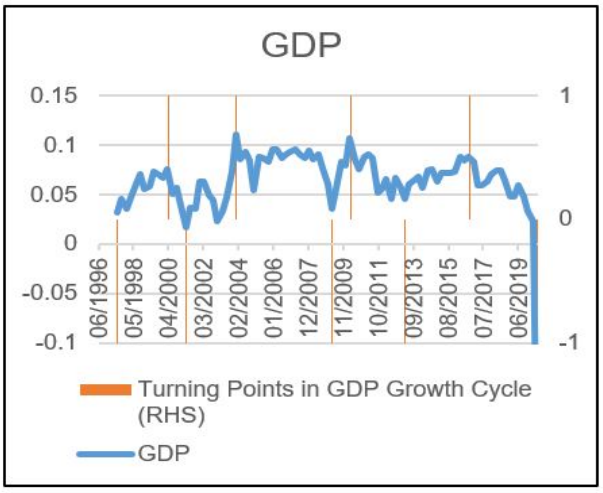
In this section, we summarize all our empirical findings, which (a) provides evidence that investment plays a crucial role as a driver of growth, rather than consumption in the case of India; (b) the government's expenditure, especially capital expenditure acts as a driver of growth during a down-cycle, and (c) credit acts as a driver of growth during a down-cycle, whereas during an up-cycle, GDP growth drives credit growth. We take cues from these findings, analyse the current state of these policy variables and make policy recommendations.

5.1 Consumption and Investment as Drivers of Growth

There is a clear disparity between Emerging Market Economies (EMEs) and Advanced Economies (AEs) when it comes to comparing their business cycle properties. A comparison of the business cycle over the past 50 years suggests that there has been a secular increase in the length of expansion and a substantial reduction in the amount of time economies spend in recession. Deep recessions have virtually disappeared in the last 30 years, (see IMF (2005)). Barring the recent Covid-19 led growth collapse, prominent economies have not experienced a recession since 1991, based on the IMF's definition of the business cycle. Most economic cycles in emerging economies are better characterized as growth rate cycles of accelerations and slowdowns around a (time-varying) trend in GDP growth rate rather than business cycles of output expansions and contraction. We capture the EM characteristics by identifying turning points and studying economic properties around its vicinity.

[5]While setting up the VAR, time-series variables in levels must be used and not the differenced data.

To determine the turning points in the GDP cycle for India, we identify local maxima and minima using the first and fourth quartile of GDP growth, that is, the lowest 25 per cent and the highest 25 per cent of the growth rates, as described in detailed in the Section 5. Figure 3 date stamps turning points and helps identify phases of up-cycle and down-cycle in the GDP growth cycle over the last two decades.[6]



Sl. No.	Phase	Quarters
Cycle 1	Down-cycle	Jun-2000 to Mar-2001
	Upcycle	Jun-2001 to Dec-2003
Cycle 2	Down-cycle	Mar-2004 to Mar-2009
	GFC	Dec-2008 to Sep-2009
	Upcycle	Jun-2009 to Mar-2010
Cycle 3	Down-cycle	Jun-2010 to Mar-2013
	Upcycle	Jun-2013 to Sep-2016
Cycle 4	Down-cycle	Dec-2016 to Dec-2019

Figure 3: Up-cycle and Down-cycle in India's GDP Growth

As a next step, we look at the role of investment vis-à-vis consumption in stimulating economic growth around turning points. To correctly gauge the effects of a policy change on the economic activity, it is useful to observe the effects of a policy on different sectors within an economy. Unfortunately, inclusion of multiple indicators in a regression specification may lead to degrees-of-freedom problems. In order to meet both the objectives, we identify high-frequency indicators that are able to track the investment and consumption cycle well. For tracking the investment cycle, we construct a single-index dynamic factor from

[6]Based on RBI (2007) we have distinguished between growth cycle and growth rate cycle methodologies. While a growth cycle measures deviation of the actual GDP growth rate from its long-run trend growth in GDP, a growth rate cycle, on the other hand, tracks the cyclical upward and downward swings in the growth rate of GDP. Emerging economies such as India, often face spurts of acceleration and deceleration in growth rate and, therefore, we have used the growth rate cycle methodology to understand the different phases of India's growth experience.

high-frequency indictors such as cement and electricity production, IIP-core and manufacturing activity. Similarly, the dynamic factor for consumption activity is constructed using automobile sales, IIP-consumer goods, and air and rail passenger numbers. Figure 4 plots the dynamics of composite indicators of consumption and investment in the recent periods. There was a sharp drop in consumption and investment during the April-June quarter of 2020, followed by a sharp rebound in the subsequent quarters. It is clear from the figure that the contraction in consumption was sharper than investment.

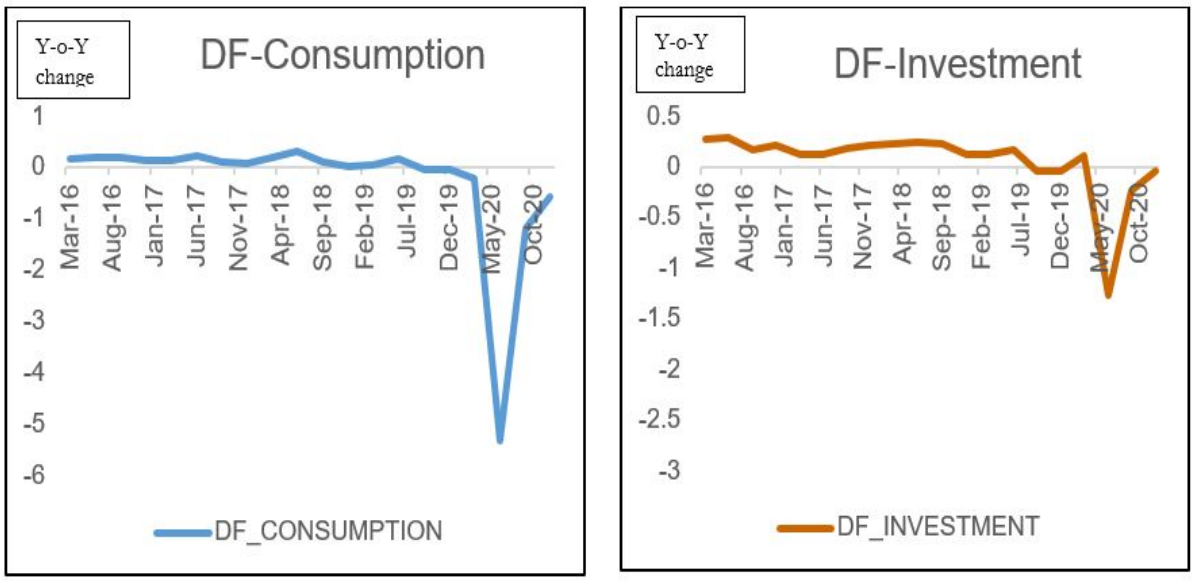


Figure 4: Composite Indicators of Consumption and Investment

We estimate a autoregressive AR(1) model of GDP growth augmented by (i) current-period dynamic factor capturing investment cycle named as DF-Investment and (ii) current period dynamic factor capturing consumption cycle named as DF-Consumption in separate model specifications. We look at the role consumption, investment in boosting GDP growth around a down-cycle and an up-cycle phase of the GDP growth cycle. For each of the model specifications, we report the coefficients estimates for the augmented component during an up-cycle/ down-cycle phase in Table 1. It is observed from our analysis that an increase in investment during a down-cycle boosts GDP growth more than during an up-cycle. For example, a 1 per cent increase in investment growth during a down-cycle raises GDP growth

by 16 basis points as against 8 basis points during an up-cycle. This pattern holds true for consumption, as discussed specification (1) and (2) below.

Table 1: Composite Indicators of Consumption and Investment

Dependent Variable	GDP	GDP	GDP: excl consumption	GDP: excl. investment
	1	2	3	4
DF-Consumption×Up-cycle	0.08		0.13*	
	(0.069)		(0.08)	
	[0.33]		[0.29]	
DF-Consumption×Down-cycle	0.06***		0.05***	
	(0.003)		(0.005)	
	[0.92]		[0.68]	
DF-Investment×Up-cycle		0.08		0.06
		(0.047)		(0.042)
		[0.35]		[0.17]
DF-Investment×Down-cycle		0.16***		0.08***
		(0.017)		(0.015)
		[0.71]		[0.42]

Note: The standard errors of estimates are provided in parentheses and the Adjusted R^2 are provided in square brackets. The estimation period of the study is 2004Q1:2020Q2 and the number of observations is 66. Finally, $^{*}: p < 0.10; ^{**}: p < 0.05; ^{***}: p < 0.01$.

As a robustness check, we also look at the second-round impact of consumption and investment boost on GDP. In specification (3) and (4), we net out consumption and investment from GDP, respectively. It is observed from our analysis that an increase in investment during a down-cycle boosts GDP growth more than during an up-cycle. For example, a 1 per cent increase in investment growth during a down-cycle raises GDP growth by 8 basis points as against 6 basis points during an up-cycle. The standard errors and adjusted R^2 are reported in first and third brackets for each coefficient estimate. It is observed in all specifications that coefficient estimates around a down-cycle are significant around at 1 per cent. Overall, we observe that an increase in the dynamic factors capturing investment and consumption cycles provide a greater push to GDP growth during a down-cycle. The pattern holds with private investment across all four regression specifications.

Table 2: Toda-Yamamoto Granger Causality Test

	Maximum Order of Integration (m)	Optimal Lag Selection (p)	Lag Interval for endogeneous variable	Exogeneous Lag	p-value
Consumption					
Investment	2	4	$[1-4]$	6	0.00*
Investment					
Consumption	2	4	$[1-4]$	6	0.00*

Note: Null Hypothesis: The row variables do not Granger cause row variables (in bold). The estimation period of the study is 1997Q2:2020Q2. Finally, $^{*}: p < 0.10;^{**}: p < 0.05;^{***}: p < 0.01$.

Table 2 reports the bivariate Granger causality test results between investment and consumption. Generally, Wald test is used to check the linear restrictions on the VAR parameters. However, Wald-statistic does not follow its usual asymptotic chi-square distribution under the null, especially when some of the data are non-stationary (see Toda & Yamamoto (1995)). Therefore, to correct for the ânuisance parametersâ in the test statistic, we apply the T-Y procedure. We begin with determining the order of integration between two time-series variables using the ADF test. Following that we determine the maximum order of integration (m) between the two series. The next step involves setting up a VAR model with data in levels, and finding the maximum lag length for the variables (p). Additionally, the LM test is performed to check for auto-correlation and ensure that the VAR specification is well specified. It is important to include the coefficients for the extra âmâ lags as exogenous lags in order to fix the asymptotic assumptions of the Wald test statistic.[7]

We find reasonable evidence of Granger causality from investment to consumption but not vice versa. We reject the null of no causality from investment to consumption at 1 per cent level of significance (Table 2). The result supports our conjecture that efficiently investing in private capital opens up a new virtuous cycle of investment with the expansion of businesses, higher demand for labour, and more jobs, which further improves consumption spending.

[7]The Wald test statistics will be asymptotically chi-squared distributed with p degrees of freedom under the null hypothesis. Rejection of the null hypothesis supports the presence of Granger causality.

5.2 Fiscal Policy as Driver of Growth

In evaluating fiscal policy's role in reinvigorating growth, in line with Caggiano *et al.* (2015), it may be noted that the GFCE's contribution to growth during FY2009-FY2010 was historically at its highest. It suggests that the fiscal stimulus policy in response to the GFC had a large contribution to growth, thereby indicating that fiscal expansion could help during extreme events like GFC and have significantly higher impact on growth as compared to other periods.

Turning to the empirical evaluation, in Table 3 we find for the sample of our study (Q4:2005 to Q1:2020), central government expenditure has a two-period lagged effect on GDP excluding GFCE. However, when we break it down into centre's revenue and capital expenditure, we find that revenue expenditure does not have a significant effect on GDP, but capital expenditure has a two-period lagged significant positive effect on GDP. As an additional robustness check, we test whether the result holds true when we combine the centre and state capital expenditure. Our results suggest that a 100 bps increase in the combined capital expenditure for the central government and the state government increases GDP by around 2bps.[8]

[8] Additionally, the combined central and state government revenue expenditure has no effect on GDP. These results are available from the authors on request.

Table 3: The Impact of Government Final Consumption Expenditure (GFCE) during up-cycle and down-cycle of growth

Dependent Variable	GDP exc. GFCE	GDP exc. GFCE	GDP exc. GFCE
Rev. Exp. Growth (-2)	-0.03		
	(0.035)		
	[0.34]		
Rev. Exp. Growth (-2) $\times$Up-cycle	0.06		
	(0.039)		
	[0.35]		
Rev. Exp. Growth (-2) $\times$Down-cycle	-0.10^{***}		
	(0.036)		
	[0.40]		
Cent. Cap. Exp (-2)		0.01^{***}	
		(0.006)	
		[0.37]	
Cent. Cap. Exp (-2) $\times$Up-cycle		0.03	
		(0.02)	
		[0.35]	
Cent. Cap. Exp (-2) $\times$Down-cycle		0.01^{*}	
		(0.006)	
		[0.35]	
Cent. + State Cap. Exp (-2)			0.02^{***}
			(0.007)
			[0.44]
Cent. + State Cap. Exp (-2) $\times$Up-cycle			0.03
			(0.018)
			[0.37]
Cent. + State Cap. Exp (-2) $\times$Down-cycle			0.02^{*}
			(0.007)
			[0.41]

Note: The standard errors of estimates are provided in parentheses and the Adjusted R^2 are provided in square brackets. The estimation period of the study is 2005Q4:2020Q1 and the number of observations is 58. Finally, $^{*}: p < 0.10; ^{**}: p < 0.05; ^{***}: p < 0.01$.

Now, borrowing from the approach followed in Caggiano *et al.* (2015), we break down

the period of our study between up-cycle and down-cycle in GDP growth. We find that during an up-cycle, there is no effect of a central government spending increase in either categories which include revenue expenditure and capital expenditure (also for the combined expenditure of the centre and states). However, an increase in the revenue expenditure during a down-cycle causes a drag on GDP growth by 10 bps. On the other hand, an increase in the capital expenditure during the down-cycle increases the GDP growth by up to 2 bps. This suggests that not only does fiscal spending expansion matter the most when it is required the most, as in Caggiano *et al.* (2015), the quality of spending also matters in its impact on growth.

5.3 Credit as Driver of Growth

The existing literature as discussed in Section 2 clearly indicates the revival in consumption, intertwined with fiscal policy and bank credit. Despite bank credit being an important source of funding, India experienced poor credit growth in 2020 even though several measures were taken to infuse liquidity into and through the financial system such as yield management via "Operation Twist", G-Sec buyback, and Government Security Asset Purchase (GSAP) measures (see Figure 5).

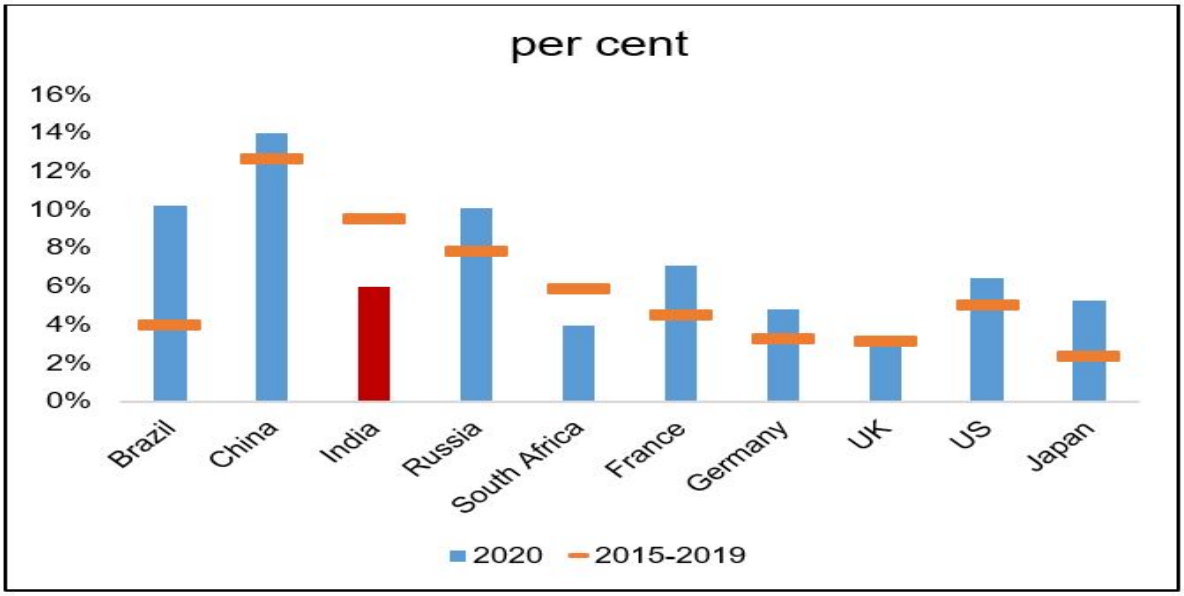


Figure 5: Average Growth in Bank Credit to Private Non-Financial Sector

Table 4: Factors that affect credit in India during a down-cycle

Dependent Variable	Non-Food Credit Down-cycle (1)	Non-Food Credit Down-cycle (2)	Non-Food Credit Down-cycle (3)
Non-Food Credit Down-cycle $(t-1)$	0.680^{***} (0.079)	0.689^{***} (0.077)	0.684^{***} (0.080)
Liquidity $(t-2)$	0.030^{***} (0.007)	0.024^{***} (0.008)	0.027^{***} (0.008)
WACR $(t-4)$	-0.002^{*} (0.001)		
91 Day TBill $(t-4)$		-0.005^{**} (0.002)	
10-Yr GSec $(t-4)$			-0.006 (0.006)
$GNPA > p75$ $(t-2)$	-0.018^{**} (0.008)	-0.017^{**} (0.008)	-0.017^{**} (0.008)
Investment $(t-2)$	0.644^{**} (0.253)	0.538^{**} (0.249)	0.629^{**} (0.258)
Uncertainty $(t-2)$	-0.00 (0.000)	-0.00 (0.000)	-0.00 (0.000)
Constant	0.013 (0.013)	0.037^{*} (0.019)	0.047 (0.047)
Adj. R^2	0.9	0.9	0.9
No. of Obsns.	56	56	56

Note: Liqudity = 1 if Rev. Repo > Repo. Uncertainty is a news-based index. GNPA > p75 = 1 if GNPA of PSBs as per cent of total advances exceeds its historical p75 value. Finally, $^{*}: p < 0.10; ^{**}: p < 0.05; ^{***}: p < 0.01$.

An analysis of drivers of non-food credit indicates that apart from its own lag, liquidity is extremely important for credit expansion in India. As we see from Table 4, amongst other variables, credit is most significantly, with two-quarter lags, affected by liquidity in the system.[9] As we can see, during a down-cycle, when the financial system is flushed with liquidity, there could be an almost 3 per cent higher credit than when the system lacks liquidity.

Apart from liquidity, the quality of banksâ balance sheet also matters. If the NPA levels are very high, it could result in a decline in the credit growth. We measure this by the variable which captures high GNPA (dummy), and we find that if GNPA is greater than the 75^{th} percentile historical levels, its regression coefficient is negative and significant.[10] Because of past legacy issues, as we show in Figure 6, India entered 2020, i.e., the pandemic year, with high NPA levels in the banking system, in fact, one of the highest amongst major economies.

Further, given the negative relationship between credit and NPA, high non-performing assets could partially explain the muted credit growth in India. This is shown in Figure 7.

Other crucial variables that affect credit growth are weighted average call rate (WACR) and the 91-Day T-bill rate, both of which indicate the extent of tightness (or ease) in monetary policy. We also find that uncertainty (which is measured using a news-based index) does not affect credit growth. Investment activity, which is another demand side channel, also positively augments credit growth.

[9]Liquidity in the above regression is a dummy variable as follows: Liquidity = 1, when Reverse Repo > Repo; Liquidity = 0, otherwise.

[10]GNPA = 1, GNPA as per cent of total credit > 75^{th} percentile of it historic time series and GNPA = 0, otherwise.

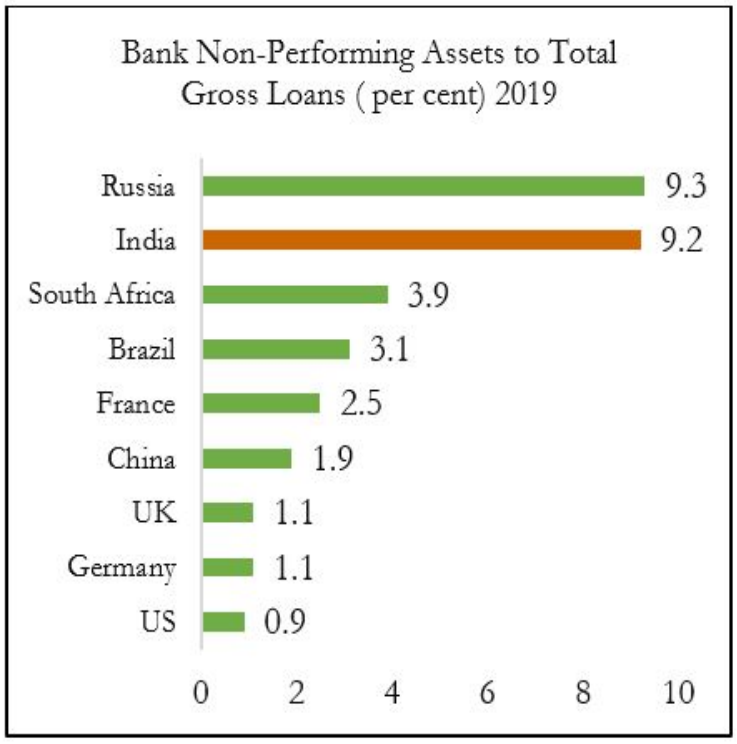


Figure 6: NPA to Total Loans Ratio

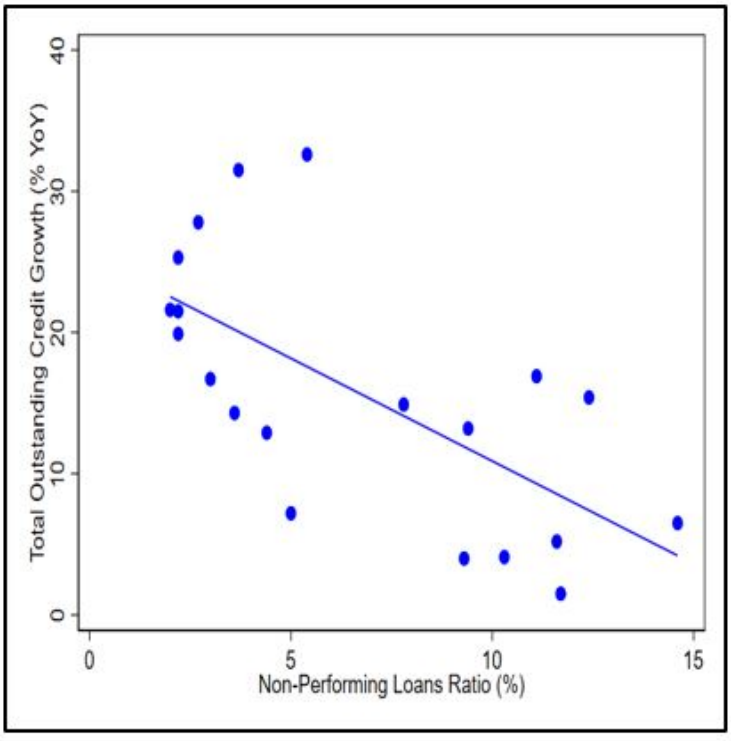


Figure 7: PSBs Credit Growth vs. GNPA Ratio

Table 5: Granger Causality between credit and growth

Null Hypothesis	GDP does not Granger Cause Credit	Credit does not Granger Cause GDP
Up-cycle	1.12	4.95***
	(0.334)	(0.01)
Down-cycle	78.88***	1.04
	(0.000)	(0.361)

Note: All coefficients are F-Statistics Terms with p-values in parentheses. Sample: 55 obs. Granger Tests Conducted with two lags. Finally, $^{*}: p < 0.10; ^{**}: p < 0.05; ^{***}: p < 0.01$.

Turning to the causality analysis in Table 5, indicates that during an up-cycle, however, credit Granger causes GDP. This suggests that when the economy is in a phase of growth recovery, as we are now, during a post-pandemic, credit plays a vital role. However, during a down-cycle, GDP growth Granger causes credit growth. This could be because once the economy reaches peak- growth, and the output gap turns positive, demand side factors alone can keep the credit offtake buoyant.

6 Conclusion

Our study contributes to the existing literature by focusing on a large bank-dominated emerging economy such as India. We identify up-cycle and down-cycle phases in India's GDP growth rate cycle using a novel business cycle dating algorithm. A dynamic factor analysis using several high frequency indicators is used for tracking private investment activity in India. We observe that an increase in consumption and investment provides a boost to GDP growth during a down-cycle as compared with up-cycle phases. Interestingly, we observe that an increase in investment provides support to higher consumption through income channel; however, consumption may not provide such a direct boost to investment. Both the results highlight the importance of an investment-led economic recovery.

In the post pandemic period, as capacity utilisation rates remain low, we observe that a mix of policies may be required for the private sector to kick-start an investment cycle. This calls for an increase in the public investment spending that can crowd-in private investment.

In fact, the share of GFCE as a percentage of GDP peaked at 14 per cent in the middle of the pandemic. Our study is able to shed further insights into the quality of fiscal spending. For instance, we observe that in a period of contraction or deceleration, capital expenditure instead of revenue expenditure contributes to a faster recovery. Our estimates also suggest that the second-round impact of capital expenditure is more pronounced when combined capital expenditure of centre and states is included in the regression specification.

Like many other EMEs, India is a bank dominated economy. Our empirical findings suggest that a credit-driven revival of economic activity plays an important role for a balanced and sustainable recovery. Causal analyses suggest that during an up-cycle credit plays a crucial role for driving GDP growth. Additionally, we observe that surplus liquidity and a reduction in policy rates provides support to credit growth during a GDP down-cycle whereas high GNPA deters credit offtake.

Towards this end, the Reserve Bank of India has provided accommodative liquidity and reduced policy rate to facilitate conducive financial conditions. However, a mix of demand management policies may still be needed as very low-capacity utilization rates may leave little incentive for the private sector to start a strong investment cycle. Therefore, in addition to the slew of measures that have already been initiated by the Government, improvement in the quality of fiscal spending may be needed so that increased public investment spending can crowd-in private investment. Already there has been an increase in offtake of housing credit and personal loans, which indicate an uptick in housing demand and private consumption. Though there is evidence that corporates are sourcing incremental funds from markets (e.g. CP, corporate bonds and IPOs), at this juncture an increase in private sector credit will facilitate an investment-led recovery. In this vein, recognising the need to free the banking sector from legacy stressed assets, several measures have been initiated that include strengthening of the insolvency law and establishment of a bad bank. Going forward, these measures are likely to provide an impetus to the credit growth and thereby smoothen the path leading to sustainable and equitable recovery.

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