

India's Growth Story: A Model of 'Riskless Capitalism'?

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Abstract

This paper seeks to theoretically analyse the change in growth patterns in post-reform India. While 1991 marks a break in the Indian economy in terms of its opening up, it was not the 1990s which saw spectacular rates of growth such as those seen in the 2000s. Our attempt here is to situate two significant booms that the post-reform period has witnessed so far, 2003-04 to 2007-08 and 2009-10 to 2010-11, in a macrotheoretic model.

1 Methodological Choice

This work belongs in the tradition of demand-driven growth models. A few words are in order on the methodological choice made here. While growth under capitalism has been the subject matter of enquiry since Adam Smith, modern growth theory came into existence arguably through Harrod [1939]. It was an attempt to analyse Keynes' argument on the functioning of a capitalist economy in a dynamic set up. Harrod [1939] had argued that under capitalism, where accumulation is driven by expectations about the market, there will be instability in this process because the market gives the capitalists perverse signals. Moreover, while the decision to invest by capitalists is individual, their decisions have a collective effect *ex post* on the extent of market available to all. His article contained two knife-edges that the growth process under capitalism throws up – one between the

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actual and the warranted rate of growth and the other between the warranted and the natural rate of growth.

The first knife edge also happens to be the dividing line between two mutually exclusive traditions in modern growth theory: supply-driven (Solow-Swan, Cass-Koopmans, New Growth Theory) and demand-driven (Kaleckian, Marxian). While the former does not acknowledge the existence of the first knife-edge, for the latter, it is central. So, the supply-driven growth models solve just the second knife-edge (by endogenising the capital-output and savings ratios), which Harrod himself did not pay much attention to in his celebrated article (of the 20-odd pages, he devoted just the last four on it). A defining characteristic of the tradition of supply-driven growth models is the presence of a production function as opposed to an investment function. The reverse holds true for demand-driven growth models.

That the investment function is critical to analyse growth in a capitalist economy can be best appreciated by looking at Sen [1970]. He brings out the limitations of the supply-driven growth models by showing that introducing the role of expectations in the investment behaviour of the capitalists in a model such as Solow [1956], instead of assuming unrealistically that all savings are necessarily invested, brings back Harrodian instability *despite* assuming a neoclassical production function with perfect substitutability between labour and capital. He goes on to show that such a flexibility makes the process of accumulation even more unstable than Harrod had initially proposed. Given that all the mainstream models of growth, including the more recent endogenous growth theory, assume that *ex ante* savings are invested, Sen's critique remains valid for this entire spectrum.

As opposed to this, the tradition of demand-driven growth models takes the first knife edge as a point of departure. Kalecki [1962] presented a critique of Harrod [1939] from a different perspective. He argued that while it is true that the warranted rate of growth is unstable (Kalecki called it 'ephemeral') in that the economy slides down or explodes in either direction, there is a *stable* zero rate of growth in the absence of an exogenous stimuli. In other words, the problems of accumulation under capitalism are such that the normal state of affairs would be what Marx called a case of simple reproduction. So for there to be a positive rate of accumulation, some form of exogenous stimuli (exogenous to the process of accumulation) is required. Kalecki believed that innovations play that role from within the capitalist sector whereas the State could also play the role from outside a

pure *Laissez Faire* system.

We do not present an exhaustive survey of Kaleckian or Harro-
dian growth models here and instead refer to authoritative accounts
of the heterodox traditions presented in an edited volume by Setter-
field [2010]. However, a special mention of Skott [2010] from this
volume needs to be made here since it draws a comparison between
Kaleckian and Harroddian models of growth. Skott [2010] presents a
basic Harroddian model, with inputs from Steindl [1952], as follows. If
 g is the rate of growth of capital stock, u is capacity utilisation (ac-
tual output as a proportion of the technologically given full capacity
output) and u_0 the desired capacity utilisation of the capitalists, Har-
rod’s argument can be interpreted as the capitalists trying to increase
or decrease the rate of growth of capital stock according to whether
the actual capacity utilisation is greater or less than the desired one.
More formally,

$$\dot{g} = b(u - u_0); \quad b > 0$$

This system produces a steady state at the desired rate of capacity
utilisation but this steady state is unstable just as Harrod had argued.
Skott [2010] then introduces elements of reserve army of labour from
the Marxian tradition and income distribution from the Cambridge
tradition as possible ways through which this unstable system can
produce a stable equilibrium at the desired rate of capacity utilisation.

In contrast to this Harroddian tradition, which is dynamic in na-
ture, Skott [2010] argues ‘(a)t a methodological level ... the standard
Kaleckian approach may have unfortunate consequences since it plays
down the need to “think dynamically”’ (p. 126). To substantiate this
claim, he uses the versions that were presented in seminal contribu-
tions by Rowthorn [1982], Dutt [1984], Taylor [1985] in the Kaleckian
framework, where, instead of a change in the rate of growth of capital,
its *level* is made a function of capacity utilisation (and/or the rate of
profit¹),

$$g = a + b(u - u_0); \quad a, b > 0$$

We believe, however, that this is not the only way in which Kalecki’s
own work can be interpreted. In fact, Kalecki [1962]’s response to

¹To draw a comparison across these traditions, we have tried to keep the form of the
investment functions similar and left out the components which are dissimilar across these
models. Therefore in the Kaleckian tradition presented above, we have included the desired
capacity utilisation whereas the rate of profit does not find a mention.

Harrod's argument was presented in a *dynamic* setup. So, much like Harrod [1939], it was the change in and *not* the level of the rate of growth which Kalecki [1962] had discussed. Specifically, Kalecki [1962] addressed the issue of whether the Harroddian instability in a capitalist system is unbounded. The concept of a ceiling provided by an upper bound to profit inflation was discussed extensively in later responses to this question but a discussion on the floor was not given as much emphasis, which was the focus of Kalecki [1962]'s paper.

Kalecki argued that a precipitous fall from the Harroddian rate of growth does not make the system remain permanently unstable with a free fall in the rate of growth even below the zero rate of growth. On the contrary, the lower bound of a zero rate of growth is where the economy gravitates towards when it falls on the lower side of the Harroddian knife edge.

Patnaik [1997] presents such a version of Kalecki [1962], which produces *both* the rates of growth Kalecki was alluding to in a single function, which compares with the Harroddian function used above by Skott [2010], in the following form

$$\dot{g} = b(u - u_0)g$$

It is easy to see that such an investment function produces two rates of growth, one associated with a stable zero rate of growth and another, the unstable Harroddian warranted rate, with the desired rate of capacity utilisation. A diagrammatic representation of a discrete time version of this function produces the same shape of the investment function that Kalecki [1962] had presented².

Addition of an exogenous component to this investment function, for eg. innovations, can make the comparison of this version of Kalecki [1962] with the ones used later in the Kaleckian tradition better,

$$\dot{g} = a + b(u - u_0)g$$

This system again produces two rates of growth but now the lower rate is positive instead of zero just as found in Rowthorn [1982], Dutt [1984], Taylor [1985]. Seen in the light of the preceding discussion, the later representations of Kalecki can be seen as focussing *exclusively* on the lower rate of growth.

²See Patnaik [1997] for a discrete time version of this function.

In this paper, we improvise on this dynamic version of the investment function of Kalecki [1962], Patnaik [1997] by bringing in finance related issues, which were also raised by Steindl [1952].

2 Stylized Facts about the Indian Economy since 2000

Following are certain stylized facts based on the empirical evidence presented in Azad et al. [2016], which the theoretical model attempts to explain.

1. **Two Booms:** Post-2000, there have been two phases of high growth so far in the Indian economy. The first phase saw a boom between 2003-04 and 2007-08 (5 years) and a bust in 2008-09 whereas the second was a short-lived boom for two years between 2009-10 and 2010-11 followed by a decline. We present two distinct stories below for these two economic booms.
2. **Corporate Investment:** Private corporate investment grew faster than public investment during the booms, with a sharp rise in the take-off year (2003-04) which, as a percentage of GDP, increased from 6.5% to 10.3%.
3. **Flow of Bank Credit:** Annual flow of credit (as a percentage of GDP) from the public sector banks (PSBs) saw a structural break in 2003-04 and reached high levels during both the boom periods, with a decline in between the two booms during 2008-09. Credit flow from the private sector banks did not follow this trend.
4. **Nature of Bank Credit:** There was a fundamental difference in the nature of bank credit between the two booms:
 - (a) In the non-financial corporate sector, the share of high debt-equity ratio companies (DER_{i5}) in total debt fell during the first boom. Similarly, the share of bank borrowings by companies with interest coverage ratio (ICR) being less than 1 in total bank borrowings also fell during the first boom.
 - (b) During the second boom, however, the share of DER_{i5} companies' bank borrowings in total bank borrowings rose, as also the share of bank borrowings by companies with ICR_{i1} . This implies that by the time of the second boom, the banks

were recklessly lending to already highly indebted companies.

5. **Real Interest Rates:** One of the important developments for the first boom is that the real interest rates *fell* significantly from 12% in 2000-01 to 2.5% in 2008-09. This was also reflected in the fall of the prime lending rate of the SCBs. In contrast, for the second boom, however, the real rate of interest, short as well as long, *increased*.
6. **Fiscal Policy:** The high fiscal deficits of the 1980s had fallen in the 1990s. Following the enactment of the Fiscal Responsibility and Budgetary Management (FRBM) legislation, fiscal deficit was reduced drastically in India during the period of the first boom. A “pause” button was pushed on the FRBM following the global recession and the fiscal deficit expanded from 2008-09.
7. **Current Account:** Prior to the first boom, there was a positive current account balance for three consecutive years starting from 2001-02 that turned into a deficit again since 2004-05. In contrast, the second boom happened despite a worsening current account deficit as a result of the global crisis. Import intensity of the Indian economy has been steadily rising in the high growth phase and continues to rise today.
8. **Gross External Financing Requirements (GEFR):** India’s Gross External Financing Requirements (GEFR) defined as the sum of the current account balance (negative) and debt servicing on external debt in that period and the short-term debt stock at the end of the previous period as a proportion of national income, which had peaked at around 7% in 1990 and 1991, the time when India experienced its first BoP crisis, fell through the 1990s, and with the current account balance turning positive between 2001-2004, it reached a low level around 2% in 2002 before the first boom. Prior to the second boom, in 2008, however, the GEFR/GNI had risen to 8%, a level higher than 1990-91.

3 A Macrotheoretic Model of Growth

From these stylized facts, we develop a macrotheoretic model, which can be used as a framework to explain the growth trajectory of the Indian economy and analyse its faultlines.

3.1 Two Constraints

Any economy functions under two constraints. With nominal commitments carried over from the past, there is an internal constraint that the rate of profit should at least be equal to the interest accrued on the debt taken in the past. At a microeconomic level, this is measured by the interest coverage ratio (ICR), which when less than one means the firm does not have enough profits to even pay the interest accrued on past debt. The internal constraint of our model is the inequality that the ICR for the entire non-financial corporate sector should be greater than 1.

On the other hand, there is an external constraint set by the availability of foreign exchange. This is particularly relevant for developing economies like India with persistent current account deficits and negative net foreign assets positions. This constraint tightens when the import intensity grows with the growth rate. The external constraint in our model is the BoP condition, i.e. the GEFR should be equal to net capital inflows and change in foreign exchange reserves.

Let us look formally at these constraints, which can be seen as boundaries for the system to function well where neither the domestic financial sector comes under severe strain nor the economy is faced with a balance of payment crisis.

3.1.1 The Internal Constraint

- We make the classical assumption on savings that workers consume all their wages W while the capitalists save all their post tax profits³. Taxes are levied only on profits P . GDP measured from the income side will be the sum of wages and profits and from the expenditure side, it is the sum of consumption of workers, private corporate investment (I), government expenditure (\bar{G}) and net exports in domestic currency $\bar{X} - M$. This will give us a relationship between the growth rate g and the degree of capacity utilisation u , which is the ratio between actual O and

³This is done purely for simplifying reasons so the results will not change even if we were to assume both that workers save and capitalists consume a part of their incomes. That would introduce a few more variables without adding much to the analysis since the savings rate plays no role in our argument here.

technologically given output O^f .

$$\begin{aligned} W + P &= W + I + \bar{G} + \bar{X} - M \\ (h + m)O &= I + \bar{G} + \bar{X}; \quad h = \frac{P}{O}, M = mO \end{aligned}$$

Dividing by K ,

$$\begin{aligned} (h + m) \cdot \frac{O}{O^f} \cdot \frac{O^f}{K} &= g + \xi + \bar{x} \\ u &= \frac{g + \xi + \bar{x}}{(h + m)\beta} \end{aligned} \quad (1)$$

where,

$$g, \xi, \bar{x}, \beta = \frac{I}{K}, \frac{\bar{G}}{K}, \frac{\bar{X}}{K}, \frac{O^f}{K}$$

- The internal constraint requires corporate retained earning [profits P - tax T - dividends $(1 - \theta)$ as a proportion of post-tax P] to be more than the interest payment on accrued debt.
- Corporate sector can borrow a total of D (corporate debt) from domestic and international finance at i and i^f with shares μ and $1 - \mu$ respectively.

$$\begin{aligned} \theta(P - T) &\geq i\mu D + i^f(1 - \mu)D \\ g &\geq \frac{(h + m)[i^f + (i - i^f)\mu]}{(h + t)\theta} \delta - \xi - \bar{x} \end{aligned} \quad (2)$$

$$\begin{aligned} \text{where, } t &= T/O \\ \delta &= D/K \end{aligned}$$

- Upward sloping line with danger zone below it (see figure 1). Corporate tax breaks, relaxation of ECB norms, appreciation of currency eases this constraint (shifts down or rotates clockwise).

3.1.2 The External Constraint

- Being a developing country, it faces a foreign exchange constraint as well. The requirements arise, among other things, out of the current account needs as well as the international debt servicing payments accrued in the past.

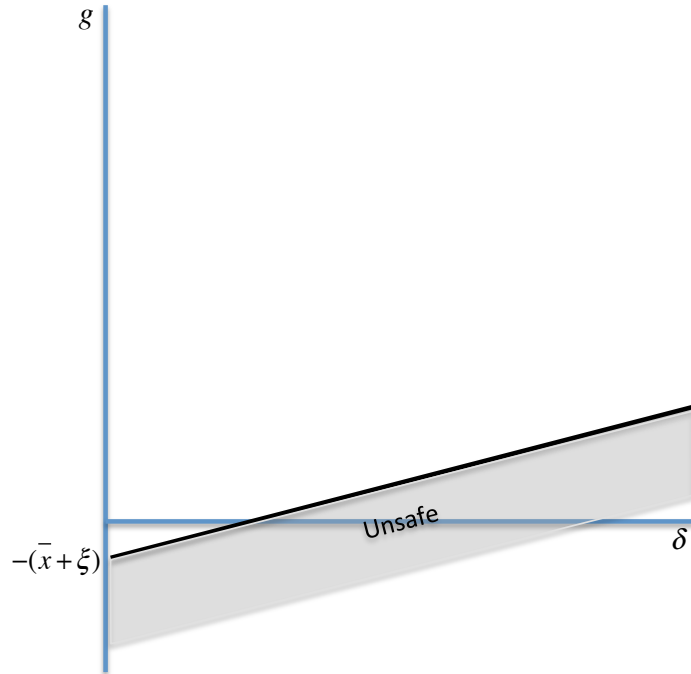


Figure 1: The Internal Constraint

- In the capital account, there are 3 kinds of net capital flows F – debt, which is positively related to the difference between domestic interest rates i minus some ‘country risk’ ρ and international rate of interest i^f ; foreign portfolio investment, FPI, which moves with the stock market and growth; and foreign direct investment, FDI, which is positively related to the difference between the rates of growth of the recipient nation and the nation of origin of finance. These along with an autonomous component (α_0) determined by the push factors from the originating countries result in:

$$f = \alpha_0 + \alpha_i(i - \rho - i^f) + \alpha_g(g - g^f); \quad f = F/K; \alpha_0, \alpha_i, \alpha_g > 0$$
- External constraint can be represented as the total foreign exchange requirements from the current account (net imports) plus the interest payments on accrued foreign debt should be equal to net capital inflows and change in foreign exchange reserves. Formally, $(M - \bar{X}) + i^f(1 - \mu)D = F + \Delta R$ (change in reserves ΔR). Dividing this by the capital stock and substituting for f

gives us:

$$i^f(1 - \mu)\delta = \alpha_0 + \alpha_i(i - \rho - i^f) + \alpha_g(g - g^f) + \Delta r + \bar{x} - mu\beta$$

$$i^f(1 - \mu)\delta = \bar{c} - \left(\frac{m}{h + m} - \alpha_g \right) g$$

$$\text{where, } \bar{c} = \alpha_0 + \alpha_i(i - \rho - i^f) - \alpha_g g^f + \Delta r + \bar{x} - m \left(\frac{\xi + \bar{x}}{h + m} \right)$$

$$\Delta r = \Delta R/K$$

(3)

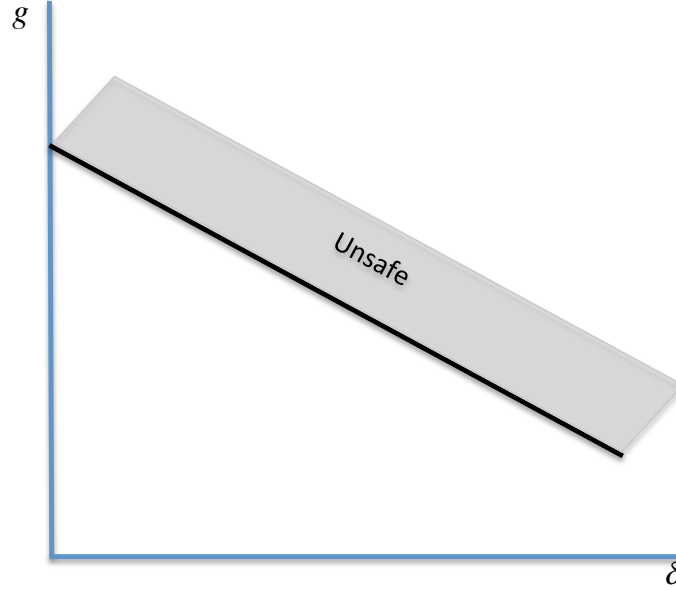


Figure 2: The External Constraint

- This is a negatively sloped line depicting the trade-off between growth and external account stability (see figure 2) is ensured by the condition $\frac{m}{h+m} > \alpha_g$ i.e. imports rise faster than the FDI as the growth rate rises. The unsafe zone lies above this external constraint.

3.2 Behavioural Functions

The model presented below is about investment decision making of private firms aggregated at a macro level. There are two interdepen-

dent decisions to be made in this regard. First, how much of investment is to be undertaken? Second, how is this investment going to be financed?

For the first decision, firms have to take into account alternative forms of holding their wealth (Keynes [1937]⁴). These assets can broadly be classified into three categories: capital assets, claims over capital assets and money. For the existence of these assets, it is necessary that the net returns on all three are equal on the margin. This gives us a relationship between the expected rate of return on holding an asset, through expected profits net of risks, and claims over capital assets, through the net interest rate, which have to be equal to the liquidity premium that money commands. Since they have to be equal, the opportunity cost of directly holding a capital asset can be compared to the returns of any of the other two assets. For reasons of tractability, the first two forms are chosen for comparison. The return on holding capital assets enters the investment decision through the expectations of demand and the return on holding a claim over an asset enters as an opportunity cost of not making the investment. This results in an investment function described later.

Having determined the size of the investment, for the second decision, firms need to make a choice between internal and external funds to finance it. Cost of the loans determines the share of investment to be financed externally.

Since the interest rate figures in this decision making, we first present how it is determined by the lending authorities i.e. the banks⁵.

3.2.1 Banks' Behaviour

Bank lending plays a central role in our model. Their role enters the picture through the cost of loans which is given by the sum of interest rates and lender's risk as in Kalecki [1937]. Banks set a nominal interest rate i as a markup on the nominal interest rate fixed by the central bank \bar{i} , which is called the repo rate in the case of India. This markup represents the risk premium associated with a given debt instrument.

⁴See Azad and Saratchand [2016] for a simplified interpretation of Keynes [1937] which also addresses this question of asset choice.

⁵This model does not subscribe to the monetarist view of an exogenous money supply. The view taken here is in the endogenous money tradition as described in Kaldor [1986] and essays on interest rates in Kalecki [1969]. Even the mainstream tradition in monetary theory, the New Keynesian economics, accepts the endogenous money argument.

Kalecki [1937] had argued that given the asymmetry of information about profitability between lenders and the borrowers, the lenders ask for a higher risk premium as the leverage (or debt-equity ratio) rises. Also, what matters for investment is not the nominal rate of interest but the real rate of interest, so, we convert the relationship between the nominal into a real rate of interest by subtracting expected inflation from both the sides⁶, which gives us the following.

$$r^d = \bar{r} + \sigma(\delta)$$

$$\begin{aligned} \text{where, } r &= \text{expected domestic real interest rate} \\ \bar{r} &= \text{repo rate minus expected inflation} \\ \sigma &= \text{risk premium} \end{aligned} \tag{4}$$

For simplicity, we assume the risk premium to be linear in debt-capital ratio. So, the risk premium consists of a constant component σ_0 representing the difference in the maturity of a particular debt instrument and treasury bonds and a variable component σ_b which increases with δ as Kalecki [1937] had argued. Accordingly, the equation above can be written as,

$$r^d = \bar{r} + \sigma_0 + \sigma_b \delta \tag{5}$$

Both \bar{r} and σ_b play a critical role in our story, the former through the central bank and the latter through the change in the risk premium demanded of the firms by the *public* sector banks. A fall in either or both will lead to a fall in the real cost of loans, which will affect investment positively as shown below.

The reason for an emphasis on the word public above is because we argue that in the neoliberal period, the nature of intervention by the state changed in India from a *dirigiste* regime of direct demand management i.e. through public investment (except in periods of economic crises) to one where it influenced the banks owned by it to facilitate corporate investment. The exact nature of this intervention, elaborated in the model below, can be briefly described as follows.

These state-owned banks were made to relax their risk function, which happened because there was an implicit guarantee on these

⁶Since our primary focus here is not on how expectations of inflation are formed, we are leaving out the dynamics of inflation from the discussion in this paper.

loans provided by the state. In the process, risk-taking, the *raison d'être* of private investment, was passed on to the public sector banks. So, while the upside of high profits generated through successful investment projects were not shared with the lenders, the losses incurred in failed investments was passed on to the state to clean up. This is being witnessed in India today in increasing corporate delinquencies and the clamour for debt write-offs. This, in essence, is the process of “riskless capitalism”, the former Reserve Bank of India (RBI) governor was alluding to (Rajan [2014]):

...Faced with [an] asymmetry of power, banks are tempted to cave in and take the unfair deal the borrower offers. The banks debt becomes junior debt and the promoters equity becomes super equity. The promoter enjoys riskless capitalism even in these times of very slow growth, how many large promoters have lost their homes or have had to curb their lifestyles despite offering personal guarantees to lenders?

...Who pays for this one way bet large promoters enjoy? Clearly, the hard working savers and taxpayers of this country! As just one measure, the total write-offs of loans made by the commercial banks in the last five years is Rs. 1,61,018 crore, which is 1.27% of GDP.

3.2.2 Firms' Behaviour

As noted above, firms make a choice between different forms of holding their wealth. We have presented above the process which determines the return (interest rate) on holding an indirect claim over a capital asset. We now need to look at the expected return on directly holding a capital asset to be able to make a comparison between these alternative forms of holding wealth. The way the expected return on an investment project (holding a capital asset directly) is determined is as follows.

Assuming the life of an investment project is n time periods and the prospective stream of yields are $q_1, q_2 \cdots q_n$ corresponding to those years. The expected rate of return on this investment on the margin (marginal efficiency of investment, MEI) is that rate which when used to discount this stream of prospective yields, gives rise to a magnitude that equals the initial cost of the investment project. Keynes [1936] postulated the MEI to be a decreasing function of the magnitude

of current investment on account of decreasing returns to scale and imperfect competition (see (A) in figure 3).

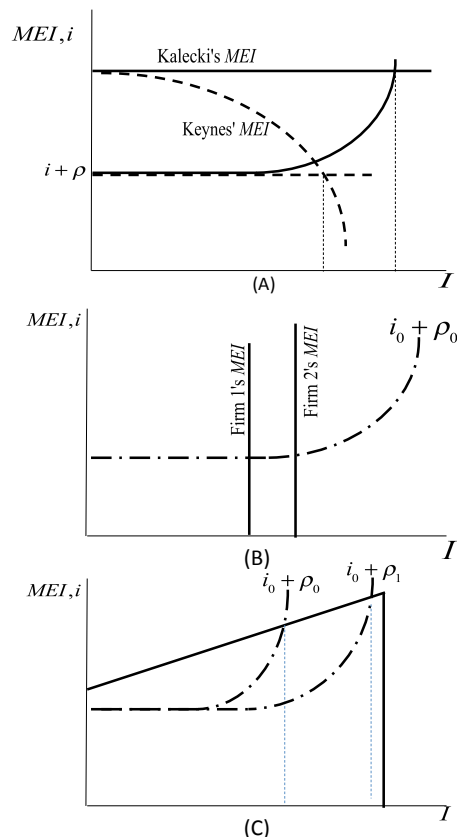


Figure 3: (A) Keynes' Vs Kalecki's MEI and Principle of Increasing Risk; (B) MEI in an established Oligopoly; (C) MEI in a nascent oligopoly

Kalecki [1937], however, argued that the above-mentioned reasons to explain the negative slope of the MEI in Keynes [1936] are both invalid, the first one on purely logical grounds whereas the second one contradicts the logical universe of Keynes' analysis. Diseconomies of scale may be relevant only when the capital stock is given but the very act of investment increases the capital stock, invalidating the premise of diseconomies of scale i.e. fixity of some 'factor of production'. Also, the case of imperfect competition, Kalecki [1937] argued, violates the competitive structure that Keynes [1936] assumed through his book

(see (A) in figure 3).

It is clear that the shape of the MEI schedule would be determined by both the nature of economies of scale as well as the nature of competition in an industry. With increasing returns to scale under competitive conditions, the MEI is an *increasing* function of the amount of investment (Steindl [1945]). On the other hand, if an industry is functioning strictly under conditions of *established* oligopolies, where it is near impossible to expand the market *share* of a firm through price cutting, the limit to investment of a firm is set by its expectations about the rate at which the industry itself expands (a proxy of which could be firm's past capacity utilisation). Under such conditions, the MEI is a vertical schedule at the level corresponding to expectations about demand (see (B) in figure 3). Each firm within this industry will have its own vertical MEI, the height of which is determined by the scale of operation of that firm, and the limit is determined by the share that the firm enjoys in the market (see the difference in the height as well as the position of the MEIs of firms 1 and 2 in (B) of the figure). As can be seen, for such industries, the rate of interest or the amount of credit available will have no influence on the investment level unless the firms are credit constrained and not demand constrained⁷.

But what if there are increasing returns to scale but the industries have *not yet* matured⁸ into established oligopolies i.e. industries in which large firms are still competing to establish their market shares? This would give us a kinked investment schedule. There is an upward sloping portion of the MEI showing increasing returns to scale, which is also a continuous function depicting the possibilities of expanding a firm's share at the cost of its competitors in the same industry. Since there is imperfect competition, each firm faces a limit to maximum sales set by the industry demand curve, depicted here by the vertical line at the kink in the MEI schedule (see (C) in figure 3).

The process described above determines the MEI under differing stages of maturity of an industry. However, it is not just the MEI that matters while calculating the returns from an investment, there is another component – borrower's risk – that goes into the decision making. The rationale for borrower's risk is as follows.

⁷An investment function for such an industry with the two possibilities existing (but obviously exclusive of each other) can be imagined as $g = \min\{e(\delta), f(u)\}$; $e', f' > 0$.

⁸The word 'maturity' used for these industries has the same meaning as Steindl [1952] had used in the title of his seminal work.

As the magnitude of investment increases, it is likely that a part of that investment starts getting financed by external sources. As a result there arises a borrower's risk on account of two factors: (a) higher is the debt as a proportion of own capital, higher is the risk of a loss to own capital; (b) since capital good is illiquid, distress sale in the event of failure of expectations leads to losses, the magnitude of which rises as investment rises. This implies that greater the proportion of borrowed funds to own funds (gearing ratio δ), the higher is the risk of losing one's own capital.

To arrive at the prospective net profit from an investment project, therefore, one needs to subtract the borrower's risk from the MEI. Higher the gearing ratio, higher the borrower's risk and lower the investment by firms on the upward sloping portion of the MEI, which is typically representative of new (but not necessarily financially small) entrants in industries who are in the process of getting established.

At any given point in time, there will be mature industries, where demand (vertical MEI) sets the limit to invest with no role of finance (unless there is a severe credit squeeze as explained in footnote 7), as well as nascent industries, where demand (by influencing the MEI) as well as finance constraint (through borrower's risk) together set the limit to investment that the firms would like to undertake.

The Macroeconomic Investment Function: Based on the discussion above, we can think of an investment function for the economy as a whole, which has four components with their relative importance determined by the weightage of different categories of industries (mature or nascent) for the period under consideration.

One, there is an autonomous component of investment γ_0 , which, as Kalecki had argued, is dependent on factors such as innovations. Two, for those firms where finance matters, the cost of loan is an important factor which will affect investment negatively. The interest rate used in this function is a weighted average of the domestic and the international interest rate⁹. Three, capitalists invest based on the difference between the expected degree of capacity utilisation and their desired capacity utilisation (u_0). Four, as argued by Steindl [1952], investment decreases with a rise in the debt-capital ratio as a result of rising borrower's risk, which increases the chances of insolvency¹⁰.

⁹ $r = \mu \cdot r^d + (1 - \mu) \cdot r^f = (\mu \cdot i + (1 - \mu) \cdot i^f) - \pi$, where π is expected domestic rate of inflation.

¹⁰Steindl's theory, taking cue from Kalecki [1937], stands in contrast to the mainstream

$$\dot{g} = \gamma_0 - \gamma_r r + \gamma_u(u - u_0)g - \gamma_\delta \delta \quad (6)$$

where, $\gamma_0, \gamma_r, \gamma_u, \gamma_\delta > 0$

Substituting for u from equation 1, and r from equation 5 and footnote 9, and denoting the Keynesian multiplier by $\Gamma = 1/[(h+m)\beta]$, this gives us a parabolic function in the (δ, g) space of the following form:

$$\begin{aligned} \dot{g} &= Ag^2 - Bg - C\delta + D \\ \text{where, } A &= \Gamma\gamma_u \\ B &= \gamma_u[u_0 - \Gamma(\xi + \bar{x})] \\ C &= \gamma_\delta + \gamma_r\mu\sigma_b \\ D &= \gamma_0 - \gamma_r\{\mu(\bar{r} + \sigma_0) + (1 - \mu)r^f\} \end{aligned} \quad (7)$$

The isocline for this function is a parabola with its axis of symmetry¹¹ parallel to the δ -axis.

The shape of this curve is determined by the coefficients of δ and g , with the specific shape given in fig. 4 derived from the fact that both these are negative. The first is negative for reasons described above. The coefficient of g is negative because the capacity utilisation generated exogenously from exports and government expenditure, $\Gamma(\xi + \bar{x})$, should always be less than the desired capacity utilisation u_0 otherwise the economy will be running without any aggregate demand problems due to these exogenous factors alone.

For a phase diagram analysis¹², we take the partial derivate of this function with respect to either of the variables. A simple way of doing that would be take the derivate with respect to δ , which is negative $-\gamma_\delta$ ¹³. As the debt-capital ratio rises, \dot{g} falls from being positive to the left of the isocline to zero on the isocline and negative to the right of

corporate finance theory, which argues that capital structure does not matter in investment decision making

¹¹The vertex of the parabola is given by $(-\frac{B^2-4AD}{4AC}, \frac{B}{2A})$; the focus by $(\frac{1-(B^2-4AD)}{4AC}, \frac{B}{2A})$; focal length by $\frac{1}{4AC}$.

¹²A formal mathematical analysis of this dynamic system has been presented in the appendix of this paper.

¹³As is obvious, these arrows can be drawn by taking the partial derivative of this function with respect to g itself. Given that \dot{g} is a quadratic function in g , it would yield a critical value of g , which is the vertex of the parabola, below which the derivate is negative and above it the derivative is positive.

the isocline. Accordingly, the arrows point in the directions as shown in figure 4.

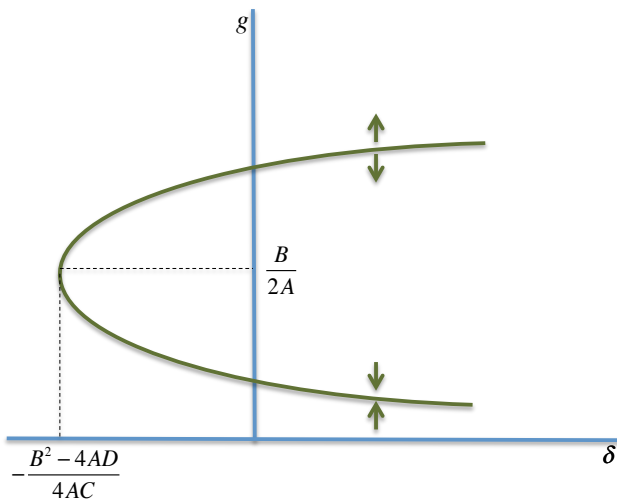


Figure 4: The Growth Isocline

In this parabola, for every value of the debt-capital ratio, there are two growth rates possible, much like in Kalecki [1962]. At lower rates of growth, a decline in the gearing ratio leads to an increase in investment as there is a decline in the borrower’s risk, as captured by $-\gamma\delta$. But after a certain point higher growth rate itself starts dominating this risk averse tendency of the capitalists so that even if the gearing ratio is rising, the rate of growth rises. Such an investment function generates multiple equilibria, as will be seen below.

Let us consider a few stylized facts mentioned earlier to see how this curve responds to them. The discussion presented here can be considered in terms of the two symmetrical arms of the parabola, the upper arm corresponding to the ‘growth begets growth’ tendency whereas the lower one corresponds to the stagnationist tendency.

1. A fall in the real rate of interest due to a fall in the repo rate (\bar{r}), our stylized fact 5, will shift the vertex of the curve laterally to the right (see footnote 11). Similarly a fall in the international rate of interest (r^f) will have the same effect. For the lower arm, this means that the rate of growth would rise for a given debt-capital ratio since a fall in the interest rate pushes investment

demand up.

2. There were two different *triggers* to high growth, though not responsible for its sustenance, in the two phases respectively.
 - (a) In the first boom, it was a sudden spurt in export demand (stylized fact 7) so that export as a proportion of capital stock increased.
 - (b) For the second, it was a policy decision in the post-global economic crisis conditions, when active injection of demand through fiscal policy was made to tide over its effects (stylized fact 6).

Since these are both triggers and not structural changes, we present them as a sudden northward jump off the growth isocline rather than a shift in the curve itself (which would have been justified had these changes been permanent in nature). This means that the rate of growth would rise for a given debt-capital ratio since these factors push up the demand in the short run.

3. A rise in the import intensity ($m \uparrow \rightarrow \Gamma \downarrow$), our stylized fact 7, shifts the vertex to the northwest. For the lower arm, this means that the rate of growth would fall for a given debt-capital ratio since an increase in import intensity means a leakage of demand from the domestic economy i.e. the Keynesian multiplier falls.

Financing the Investment: How is this investment financed? Firms have two options: internal funds and debt¹⁴. The proportion of investment financed by debt depends inversely on the rate of interest rate charged by the commercial banks. Assuming every year a constant part $a < 1$ of the debt is paid off, the debt equation can be modelled in the following manner,

$$\dot{D} = \phi(r)I - aD \tag{8}$$

Again for simplicity, we assume ϕ to be a linear function of the interest rate, which gives us,

$$\phi(r) = \phi_0 - \phi_r r$$

¹⁴Equity financing has not been explicitly modelled here since it does not seem to play any significant role in the Indian growth story so far but interesting things can be done with that especially if equity financing becomes easier when companies grow faster.

Using equation 5 for r and footnote 9, it gives us a differential equation for the debt-capital ratio of the following form,

$$\dot{\delta} = [\phi_0 - \phi_r\{\mu(\bar{r} + \sigma_0) + (1 - \mu)r^f\}]g - a\delta - (1 + \phi_r\mu\sigma_b)g\delta \quad (9)$$

where, $\phi_0 > \phi_r\{\mu(\bar{r} + \sigma_0) + (1 - \mu)r^f\}$

The logic for the latter condition above is that the weighted average of base cost of domestic debt (repo plus the term premium on a given debt instrument charged by a commercial bank) and international debt has to be lesser than the willingness of the firms to finance a part of their investment through debt. Anything contrary to that will be a non-starter as far as corporate debt is concerned because that would mean that the basic cost of debt itself is so high that the firms are in net terms just writing debt off even when there is no debt to begin with (if $\phi(r) < 0$ at $\delta = 0$, $\dot{D} < 0 \quad \forall I > 0$).

The shape of this isocline is a rectangular hyperbola in its second and the fourth quadrant¹⁵. Partial derivative with respect to the debt-capital ratio yields the phase arrows for this isocline,

$$\frac{\partial \dot{\delta}}{\partial \delta} = -a - (1 + \phi_r\mu\sigma_b)g$$

$$\leq 0 \quad \forall g \geq -\frac{a}{1 + \phi_r\mu\sigma_b}$$

Therefore, in the rectangular hyperbola, for the upper curve, $\dot{\delta}$ falls as δ rises and vice versa for the lower curve. Since the lower curve (with negative rates of growth) does not have any economic meaning, the analysis here is based on the upper curve. The phase arrows for the upper curve are accordingly drawn in fig. 5.

Let us look at a few stylized facts in the context of this relationship.

1. According to stylized facts 2 and 3, the increase in the growth rate was accompanied by a rise in the debt-capital ratio. This can be understood as a movement up the debt-isocline.
2. Stylized facts 4(a) and 4(b) represent a clockwise *shift* of the curve, which represents a relaxation in the risk function of the banks ($\sigma_b \downarrow$). While 4(a) represents absence of ponzi finance, 4(b) shows that a credit bubble was sought to be created in the second boom through ponzi finance since here, unlike the first boom, the share of debt of companies who could not even cover their interest payments was increasing.

¹⁵The centre of this hyperbola is given by $g = -\frac{a}{1 + \phi_r\mu\sigma_b}$, $\delta = \frac{\phi_0 - \phi_r\{\mu(\bar{r} + \sigma_0) + (1 - \mu)r^f\}}{1 + \phi_r\mu\sigma_b}$.

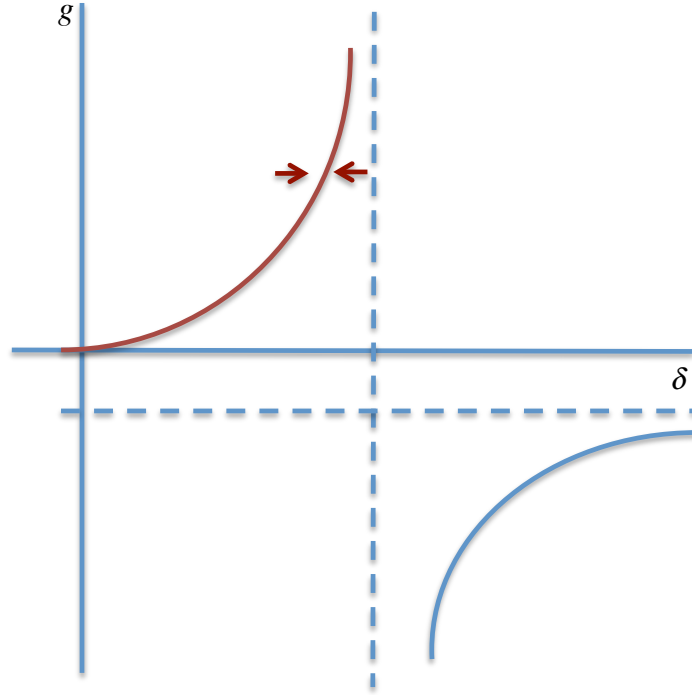


Figure 5: The Debt Isocline

3. Institutional reforms, such as the demise of the Development Financial Institutions (DFIs) in India and the encouragement provided to the commercial banks to expand corporate lending entails an exogenous push to bank lending. In terms of our model, it could be seen as a decline in the autonomous part of the risk function σ_0 . This would move the centre of the hyperbola to the right (see footnote 15) and hence the curve to shift to the right.

3.3 Dynamics of the Macro system

With the help of these two differential equations in two variables, a differential equation system can be set up of the following form,

$$\begin{aligned}\dot{g} &= \Gamma\gamma_u g^2 - \gamma_u[u_0 - \Gamma(\xi + \bar{x})] \cdot g - (\gamma_\delta + \gamma_r \mu \sigma_b) \delta \\ &\quad + \gamma_0 - \gamma_r \{ \mu(\bar{r} + \sigma_0) + (1 - \mu)r^f \} \\ \dot{\delta} &= [\phi_0 - \phi_r(\bar{r} + \sigma_0)]g - a\delta - (1 + \phi_r \mu \sigma_b)g\delta\end{aligned}$$

Such an analytical model will help in analysing different phases of growth in a theoretical perspective while tracking the effects of certain policies under discussion regarding the future trajectory of the economy.

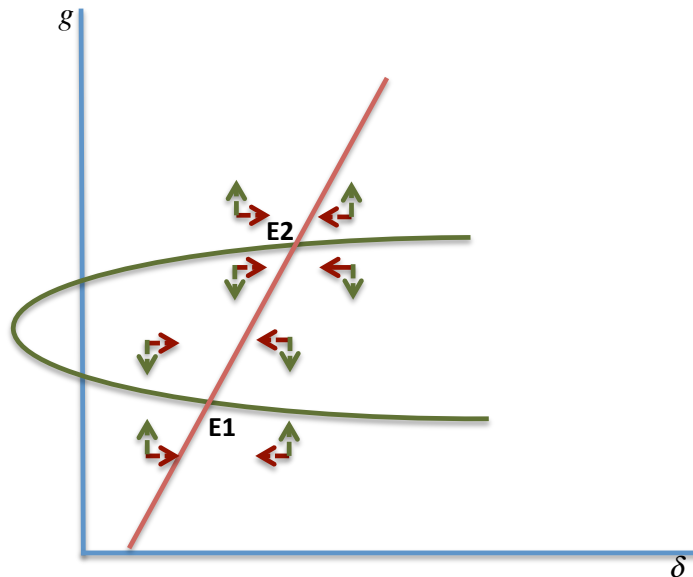


Figure 6: Macrodynamics of the two rates of growth in the model

This system generates two rates of growth, the lower one shown by **E1** is a stable node and the higher one shown by **E2** (with higher δ) is a saddle point (see fig. 6).

3.3.1 Opening Up and the Constraints

External Constraint: Indian economy's external constraint got relaxed with capital account liberalisation which eased the flow of finance ($\alpha_0 \uparrow$). India started attracting higher debt inflows due to the interest rate differential ($i - \rho - i^f$) as well as FPI and FDI. With the rate of growth of exports going up prior to the first boom ($\bar{x} \uparrow$), foreign exchange problem got further relaxed. These factors pushed up the external constraint of our model, thereby, making higher growth *possible* at a given debt-capital ratio.

Internal Constraint: Cheapening of credit through a fall in the nominal interest rate relaxed the internal constraint (see fig. 7), push-

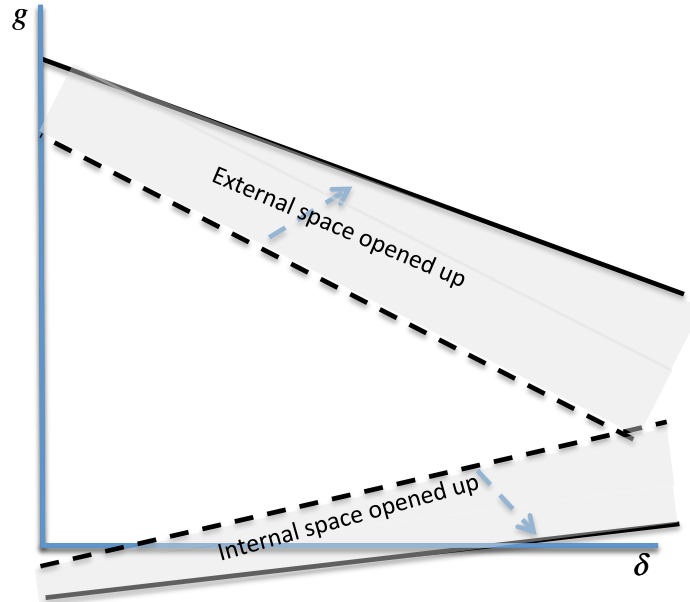


Figure 7: Relaxation of the 2 Constraints

ing it down. Corporate tax concessions, by increasing retained earnings and enabling the corporate sector to raise the debt-capital ratio at a given rate of growth, also relaxed the internal constraint.

Therefore, with financial liberalisation and opening up, both the constraints opened up, thereby creating *possibilities* of a wider range of growth rates than hitherto possible.

We now present a theoretical explanation of the two booms under discussion.

3.3.2 First Boom (5 years): 2003-04 to 2007-08

The debt function: A lowering of the risk function ($\sigma_b \downarrow$) of the public sector banks partly shifts the curve to the right (as shown in the movement of the curve from 1990s to Boom 1 in 8). The fact that increase in bank credit to the corporate sector had almost entirely been contributed by the public sector banks point towards an important role played by the state during this phase of economic expansion. Such rise in the risk appetite of the banks have been facilitated through relaxation of corporate lending norms in order to promote private

investments and PPPs. In terms of the diagram, a fall in the risk function shifts the centre of the hyperbola down and to the right¹⁶.

The other part of the rightward shift of the debt curve is because of the lowering of central bank controlled interest rate ($\bar{r} \downarrow$) as well as international interest rates ($r^f \downarrow$) during this phase, which also encouraged corporate borrowings¹⁷.

So there was double-injection of corporate credit in the economy: risk function relaxation (fall in σ) as well as basic cost of credit reduction i.e. a fall in \bar{r} and r^f (domestically as well as internationally).

The growth function: Both the factors above affect the growth function as well.

A fall in the risk function of the banks enters the investment function through a fall in the opportunity cost of investment, which, for a given value of δ , means the lower arm of the growth curve rises whereas the higher arm falls¹⁸.

A fall in the central bank governed interest rate has an effect beyond the above. The lower arm of the curve goes up further while the upper arm comes down¹⁹.

The overall effect on the shape and position of the parabola as a result of these two routes described above is shown in fig. 4.

Trajectory of the first boom: There are again two steady state growth rates possible, the higher one at B , a saddle point, and the lower one at A , a stable node (see these relative to point N in figure 8).

Since the higher rate of growth is a saddle point, there is one path (partly depicted by 1 in fig. 8) which is stable whereas the rest are unstable. It is possible that the trigger of high exports witnessed before the first boom pushed the economy beyond a critical value (g_c

¹⁶See footnote 15, where, as a result of the fall of the denominators, the centre $g \downarrow, \delta \uparrow$.

¹⁷In footnote 15, the centre of the hyperbola shifts further to the right since the numerator of δ rises.

¹⁸See equation 7 and footnote 11, where with a fall in C , out of the two coordinates, δ decreases whereas g is unaffected both for the vertex and the focus and the focal length increases. As can be easily derived that these two parabolas intersect each other on the y -axis (not shown in the figure).

¹⁹See equation 7 and footnote 11 again, where a fall in \bar{r} leads to an increase in D , which shifts the vertex and focus of the new parabola to the right with the focal length remaining the same.

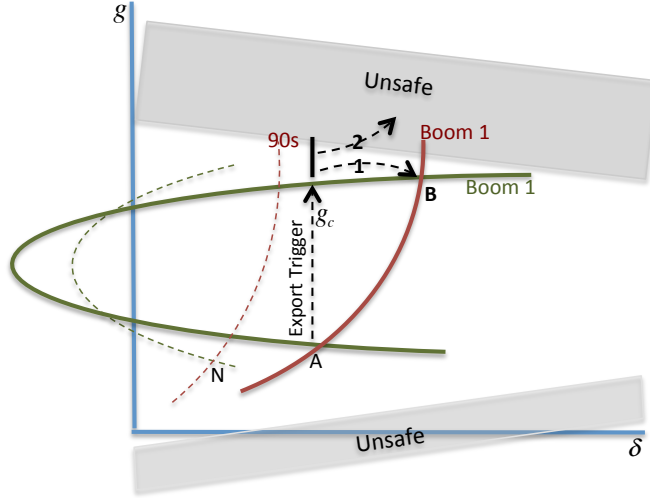


Figure 8: Boom of 2003-04 to 2007-08

in figure 8) after which the upper arm of the growth isocline comes into play. At this point, the economy might take path 1 and *temporarily* settle at B (duration of the first boom). It is temporary because it is a saddle point so that any movement away from the stable arm will be destabilising. The economy witnesses a high growth rate but it comes along with a high debt-capital ratio.

It needs to be noted that an export trigger pushing the economy on path 1 is just as plausible as other unstable paths such as path 2 shown in fig. 8. But in so far as the trigger is great enough to push the economy beyond the critical value of g_c , there will be a spurt in growth and debt-capital ratio with the economy eventually hitting the external constraint.

As discussed above, the initial trigger of high exports prior to the first boom got reversed with the current account balance turning into a negative 2004-05 onwards. As a result of this reversal, the economy would have slid to A . However, it was the growth in the credit financed corporate investment, which saw a structural break in 2003 (stylized fact 2, 3, 4(a)), that provided the impetus to maintain the boom beyond the short period of export-induced growth.

A rising trade deficit as well as short term foreign debt accumulation since 2003, which took the GEFR-GNI ratio to 8% in 2008, also affected the external constraint adversely. A tightening external

constraint can make the higher rate of growth infeasible.

3.3.3 Second Boom (2 years): 2009-10 to 2010-11

The debt function: With the global economic crisis setting in 2008-09, there was a drastic fall in the rate of growth of exports, which dropped the economy from B initially. Therefore, growth rate declined through the year 2008-09. However, the stimulus package announced by the central government, which came in the form of corporate tax concessions as well as increased government expenditure (stylized fact 6), kickstarted the second boom in 2009-10 (see the fiscal trigger in fig. reffig:boom2).

A further increase in the risk appetite of the public sector banks ($\sigma_b \downarrow$) shifted the risk curve to the right (for reasons discussed above), which spurred credit-financed corporate investment²⁰, similar to the first boom.

However, unlike the first boom, the domestic interest rate eventually started rising (stylized fact 5), which pushed the internal constraint up, thereby, making the debt-capital ratio associated with C increasingly unsustainable, which was visible in growing NPAs of the PSBs in the boom period itself. This also gradually pushed the risk curve back but not entirely towards its original position²¹.

The growth function: A fall in the risk appetite had the same effect on the growth function like in the first boom. However, unlike the first boom, here the interest rate rose subsequently. Therefore, there were counteracting effects on the growth curve too. While the focal length of the new parabola increases, for the interest rate increasing to the same magnitude as the fall in the risk function, the lower arm moves down whereas the upper arm moves up (as shown in the growth curve in fig. 9). The two parabolas will intersect²² at $\delta = 1$, which is economically an unrealistic possibility so that part of the two parabolas are not shown in the figure.

²⁰The empirical evidence presented in Azad et al. [2016] shows that the credit injection in the second year of the boom (2010-11) marked a sharp rise over 2009-10.

²¹Assuming the interest rate to have increased to the same magnitude as the fall in the risk function i.e. $d\bar{r} = -d\sigma_b$, it can easily be shown, by partially differentiating eq. 9, for a given value of δ , the debt curve would still shift down as shown in fig. 9.

²²This can be derived by equating the two parabolic equations and finding the intersection point.

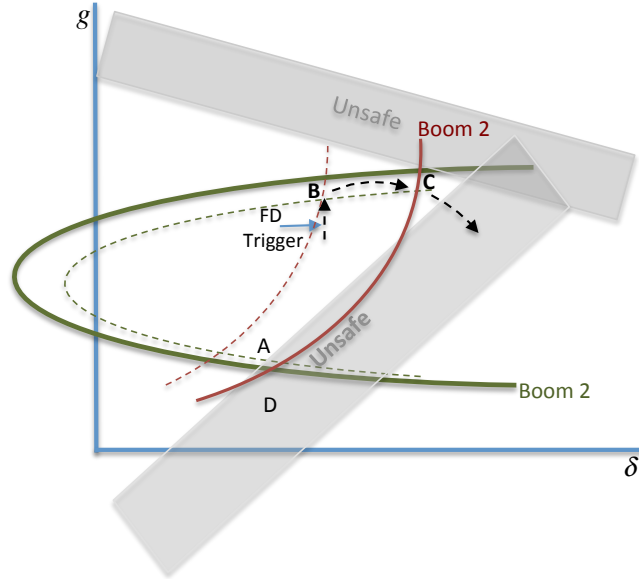


Figure 9: Boom of 2009-10 to 2010-11

Trajectory of the second boom: This boom was, however, short-lived both because of the unstable nature (saddle point) of this growth rate as well as a rise in the domestic real rate of interest from 2010-11 (stylized fact 5) due to RBI's efforts towards inflation targeting. The effect of this increase in the domestic interest rate was muted initially because international borrowing costs got lowered due to monetary easing in the US in the aftermath of the global economic crisis. So, r in our growth isocline increased only partially. In other words, while the cost of domestic credit increased, its international counterpart declined causing a change in the *composition* of corporate credit in favour of higher external commercial borrowings.

With a shift in the growth isocline as a result of the increase in domestic interest rates, the growth rate fell on the unstable path of the saddle point. The economy eventually hitting the lower constraint implies debt defaults, which manifested in the large-scale accumulation of NPAs (non-performing assets) in the bank balance sheets of the PSBs.

4 Conclusion

We have attempted in this paper to provide a theoretical structure to the Indian growth story in the 2000s, which has been inspired by an extensive data analysis covering this period provided in Azad et al. [2016]. We divide this decade in two booms: 2003-04 to 2007-08 and 2009-10 to 2010-11. The first boom was triggered by export surge prior to the boom accompanied by public sector bank lending, debt inflows and low real interest rates. The second boom, however, was a result of a more reckless lending by the public sector banks in the face of interest rate hikes by the RBI. Our argument is that such “riskless capitalism” could not have thrived without the support, active or otherwise, of the state.

For both these booms, we show theoretically in a Kaleckian model, the high growth rates, though possible, are saddle points. As a result of which an initial fall from the saddle path pulls the economy towards a stagnationist growth path (the lower growth rate) or hit the internal constraint with deleterious effects on the balance sheets of the public sector banks.

Appendix: A Formal Solution

The Jacobian Matrix

The dynamic system of our macro model is given by:

$$\begin{aligned}\dot{g} &= \Gamma\gamma_u g^2 - \gamma_u[u_0 - \Gamma(\xi + \bar{x})] \cdot g - (\gamma_\delta + \gamma_r\sigma_b)\delta + [\gamma_0 - \gamma_r(\bar{r} + \sigma_0)] \\ \dot{\delta} &= [\phi_0 - \phi_r(\bar{r} + \sigma_0)]g - a\delta - (1 + \phi_r\sigma_b)g\delta\end{aligned}$$

After linearising this system around the steady states (δ^*, g^*) , the general form of the Jacobian matrix for this system is derived as follows:

$$J = \begin{pmatrix} 2\Gamma\gamma_u g^* - \gamma_u[u_0 - \Gamma(\xi + \bar{x})] & -\gamma_\delta \\ \phi_0 - \phi_r(\bar{r} + \sigma_0) - (1 + \phi_r\sigma_b)\delta^* & -[a + (1 + \phi_r\sigma_b)g^*] \end{pmatrix}$$

Since the system is not linear, the determinant of the jacobian matrix is dependent on the values of the variables, as seen on the main diagonal of the matrix above. The nature of the two steady states would have to be evaluated separately. We look at $E1$ first.

Stability Analysis for E1

To find about the stability of this steady state, the signs of the trace and the value of the determinant at $E1$ need to be derived. The value of g_v at the vertex of the parabola is given by

$$g_v = \frac{\gamma_u[u_0 - \Gamma(\xi + \bar{x})]}{2\Gamma\gamma_u}$$

Given the fact that the steady state rate of growth at $E1$ is below g_v , the first element of the main diagonal is negative. The second element of the main diagonal is negative $\forall g \geq 0$ too. So, the trace of this matrix at $E1$,

$$tr J_{E1} = 2\Gamma\gamma_u g - \gamma_u[u_0 - \Gamma(\xi + \bar{x})] - [a + (1 + \phi_r\sigma_b)g] < 0$$

This also tells us that the determinant of the matrix is positive since the product of elements on the non-main diagonal is negative. This steady state is a stable node as described in the text above.

Stability Analysis for E2

The same exercise needs to be performed for the second steady state. Given the fact that the steady state rate of growth at $E2$ is above g_v , the first element of the main diagonal is positive whereas the second element of the main diagonal stays negative ($\forall g \geq 0$). So, from this information alone, nothing can be said about the trace of this matrix at $E2$. To determine whether there is at least one eigenvalue which is negative, we need to look at the determinant of the Jacobian at $E2$.

Since the slope of the debt isocline is greater than the growth isocline at $E2$, we get a negative value of its determinant:

$$\begin{aligned} \frac{a + (1 + \phi_r\sigma_b)g}{\phi_0 - \phi_r(\bar{r} + \sigma_0) - (1 + \phi_r\sigma_b)\delta^*} &> \frac{\gamma_\delta}{2\Gamma\gamma_u g - \gamma_u[u_0 - \Gamma(\xi + \bar{x})]} \\ [\phi_0 - \phi_r(\bar{r} + \sigma_0) - (1 + \phi_r\sigma_b)\delta^*] \cdot \gamma_\delta &< [2\Gamma\gamma_u g - \gamma_u\{u_0 - \Gamma(\xi + \bar{x})\}] \cdot [a + (1 + \phi_r\sigma_b)g] \\ \therefore, |J|_{E2} &< 0 \end{aligned}$$

This shows that the eigenvalues of this matrix are of opposite signs, thereby, establishing a stable arm for this equilibrium.

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