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Fiscal rules and debt dynamics in India

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ABSTRACT
Using an accounting framework, I examine the evolution of national and sub-national public debt in India from 1981 to 2017, with reference to the FRBM Review Committee Report, which stipulates the debt targets at 60% and 20%, respectively. I find that a larger share of debt movement is explained by changes in interest rate, growth and inflation, than by accumulation of new debt, for both national and sub-national debt. Simulations show that a strict perusal of the debt targets will force the government to run surpluses, while relaxing the targets generates fiscal space up to 4% of the GDP.

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The establishment of fiscal rules in India is a recent phenomenon, with the promulgation of the Fiscal Responsibility and Budget Management (FRBM) Act in 2003. The aim of the Act was to conduct 'prudential debt management consistent with fiscal sustainability through limits on the Central Government borrowings, debt and deficits'. This mandated the government to target the gross fiscal deficit and bring it down to 3% of the GDP by 2007–08.

Figure 1 shows the movement of gross fiscal deficit since the inception of FRBM Act. Except for 1 year, the 3% target was not hit. In the light of various criticisms (Buiter and Patel 2010; Bhaduri 2006) and inability to meet deficit targets, the government to set up a FRBM Review Committee. In its report released in 2017, the Committee recommended that instead of targeting the deficit (a *flow*), the anchor now be shifted to the debt-to-GDP ratio (a *stock*, called 'debt ratio' henceforth). Following the Maastricht Rule,[1] the report recommended that the government systematically reduce its debt to 60% of the GDP by 2023. With the debt to GDP ratio currently at 69%, there have been calls for increased fiscal prudence. The evolution of debt, however, depends on two factors – one, new borrowing undertaken during a time period (also known as primary deficit), and the combined effect of growth, interest rate and inflation on the previous year's debt ratio (called Fisher Dynamics here).

In this paper, using data from 1981 to 2017, I undertake a debt decomposition and separate the evolution of public debt into change due to primary deficit and Fisher Dynamics, for national and subnational debt. In my examination of the evolution of subnational debt, I consider two cases-if the chosen states together were to target their

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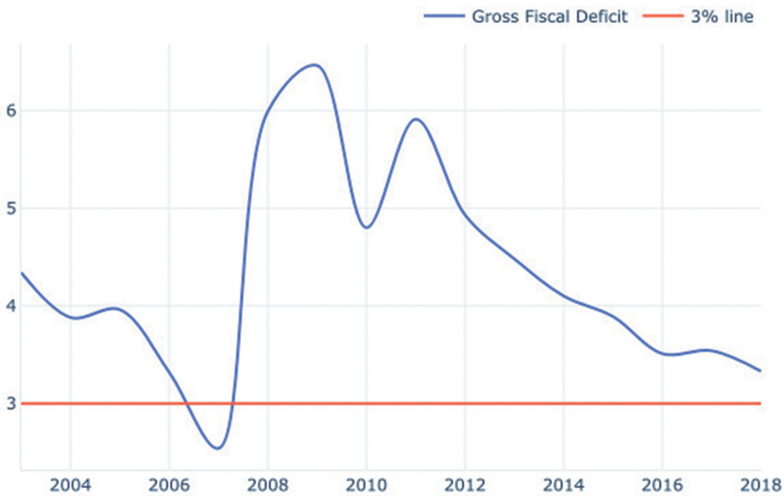

Figure 1. Gross Fiscal Deficit (as a percentage of GDP- 2003-2018). Source: RBI-DBIE

combined debt ratio, and if each state were to separately target its own debt ratio. Second, using the available priors, I run simulations into the future to estimate the amount of primary deficit/surplus the government(s) will have to run if it were to achieve a debt target over a fixed time period.

I use debt decomposition as a technique to study debt evolution over time because it helps clearly identify the variables that drive the change in the debt trajectory. The debt-to-GDP ratio of a country can change due to many factors: new borrowings, change in growth rate, debt forgiveness, tax revenues, interest rates and so on. Decomposition helps understand the relative strength of each variable in driving this change. This has significant policy implications. For example, if a large share of debt change is driven by the growth rate, rather than accumulation of new debt, then reducing the primary deficit will be an ineffective policy.

In my study, I find that Fisher Dynamics dominate (explain 50% or more of the change in debt-to-GDP ratio) primary deficits over this entire time period as drivers of debt change for national debt, and 22 years for sub-national debt.

For each individual state, while primary deficit drove debt change in the early 1980s, Fisher Dynamics took over as the dominating factor as debt ratio rose for most of the states. Finally, the simulations show that a 60% target for national debt, and 20% target for sub-national debt will force the central government and half of the chosen states to run surpluses. The shift in targets in form of the new fiscal rules has significant policy implications and any form of debt targeting in the future will have to account for the dominant role of Fisher Dynamics in driving debt movement.

Previous work

There has been significant literature examining the question of debt sustainability. Broadly, standard theories specify two conditions for a stock of debt to be sustainable

(Escolano 2010; Buiter and Patel 1992). These are (a) Transversality condition: This means that, for any given stock of debt, the net present value of debt over an infinite time period must equal zero. (b) No-Ponzi Game-This is an extension of the transversality condition when present debt can only be serviced by taking on new debt. Hence, a No-Ponzi game will be a state where the rate of growth will always be more than the rate of interest.

Kotlikoff and his colleagues made a contribution to the debate on debt sustainability, through a new system of debt accounting (Auerbach, Kotlikoff, and Gokhale 1994). They argue that the burden of debt persists across governments and generations, and hence the debt burden needs to be estimated across present and future generations. The impacts of fiscal policy changes on the future generations are calculated by taking up the net present value of the rate of policy (tax, for example) over the projected future returns to the government.

A number of studies argue that there exists a threshold level of debt, beyond which output is affected negatively (Reinhart and Rogoff 2010; Westphal and Rother 2012; Cochrane 2011). These claims were contested by studies finding a much reduced impact of debt on GDP, using a different methodology (Herndon, Ash, and Pollin 2013). Some other literature also finds that there is reverse causality, i.e. low growth leads to an increased debt ratio (Ash, Basu, and Dube 2017)

There has been recent literature criticizing the idea of debt targets. The Maastricht Rule which argues for fiscal deficit to be fixed at 3% for all the EU countries, and the debt to GDP ratio at 60%, has been critiqued for being arbitrary (Pasinetti 1998). Pasinetti argues that there is a key difference in looking at the total debt to GDP ratio and the public debt to GDP ratio. Given that there are imbalances between public and private debt in various countries, the divergences in debt levels reduce once we consider total indebtedness over public debt. Given how private debt is rising rapidly, the ratio of public debt is already reducing, leaving no a priori reason for a fixed debt target, especially when it brings with it large human costs-unemployment and potential recession.

Other work focuses on the interest-growth differential, arguing that as long as the No-Ponzi condition is satisfied, the government can run deficits indefinitely, as debt value will converge to a finite number. Hence, the welfare costs of running deficits are lower than expected (Blanchard 2019). Conventional theory postulates that interest rate is endogenously determined. But in reality, the central bank fixes it exogenously and gives an additional degree of freedom as far as policy stability is concerned. By having an alternate conception of the interest rate, it is possible for policy to have a greater role in sustainability (Aspromourgos, Rees, and White 2009)

In the Indian context, there have been studies that focus on the role of high growth in eroding debt ratio (Rangarajan and Shrivastava 2003) and the U-shaped relationship between debt ratio and growth (Kaur and Mukherjee 2014). A state-level panel data analysis showed that state-level debt is sustainable, in the long run. However, with the restructuring of State Power Distribution (SDL) loans, this may not persist, especially for certain states (Kaur et al. 2018). Another study argues that having a homogenous fiscal deficit target for all states will lead to uneven burden for some (Roy and Kotia 2018). There have been some country-level (Rangarajan and Shrivastava 2003) and state level (Roy and Kotia 2018) studies undertaking decomposition. However, the former has not been extended beyond 2003, and there has not been explicit state-by-state decomposition in the latter case. This paper aims to fill these gaps in the existing literature.

The accounting framework

I carry out a debt decomposition using the following accounting framework (Mason and Jayadev 2014; Hall and Sargeant 2011)

$$\Delta b = \left(\frac{i - g - \pi}{1 + g + \pi}\right) b_{t-1} + d_t + \ sfa \quad (1)$$

Δb, is the change in debt to GDP ratio, i is interest rate, calculated by dividing year-on-year interest payments by outstanding liabilities. g is the *real* growth rate, and π is inflation. d is the primary deficit. b_{t-1} is the debt ratio in the previous year. *sfa*refers to as stock flow adjustments, which includes debt write – offs.

The equation shows that the debt to GDP ratio changes due to four factors. It rises when the primary deficit and interest rate rises and falls when growth and inflation rises. This is because as a rise in g and π leads to a rise in output, which leads to a fall in the debt/GDP ratio, while a rise in i and d lead to a rise in the total liabilities, leading to a higher debt-to-GP ratio. It rises or falls with the *sfa* depending on the sign. The combined effect of interest rates, growth and inflation on debt ratio is also known as Fisher Dynamics.

The debt decomposition separates the change in debt in two parts: one, due to new borrowing (d_t), and two, due to Fisher Dynamics. Note that the Fisher Dynamics becomes the dominant driver of debt change when the debt ratio is large, and the opposite when the debt ratio is small.[2]

The decomposition is done as follows. Let the liabilities be denoted by l. The change in liabilities is given by

$$\Delta l = l_n - l_0 \quad (2)$$

Normalized by GDP, this can be written as

$$\Delta b \ = \ b_n - \ b_0 \quad (3)$$

The change in debt/GDP ratio attributed to the primary deficit (γ) is given by

$$\gamma = \frac{PD}{\Delta l} = \left(\frac{\sum_{t=0}^{n} d_t}{\Delta l}\right) \times 100 \quad (4)$$

where PD is the primary deficit, t = 0, refers to the first year of the periodization, and t = n refers to the last year of the periodization. The change in debt/GDP, due to fisher dynamics (τ) is calculated as a residual[3] and given by

$$\tau = \frac{FD}{\Delta l} = \left(\frac{\Delta l - \gamma}{\Delta l}\right) \times 100 \quad (5)$$

where FD refers to Fisher Dynamics (inclusive of *sfa).*

The calculation of the relative strength of Fisher Dynamics versus primary balance is simply:

If

$$\gamma > 50\%$$

then primary deficit is the dominating factor, else it is Fisher Dynamics.

Data

Table 1 shows the data and sources for variables used in the decomposition for both national and subnational debt.

Evolution of national debt

Figure 2 shows the debt to GDP ratio for India from 1980 to 2016.

The peaks and troughs of the graph serve as the beginning and end points of the periodization. Table 2 shows this.

Table 3 presents a debt decomposition of Indian public debt according to the aforementioned periodization.

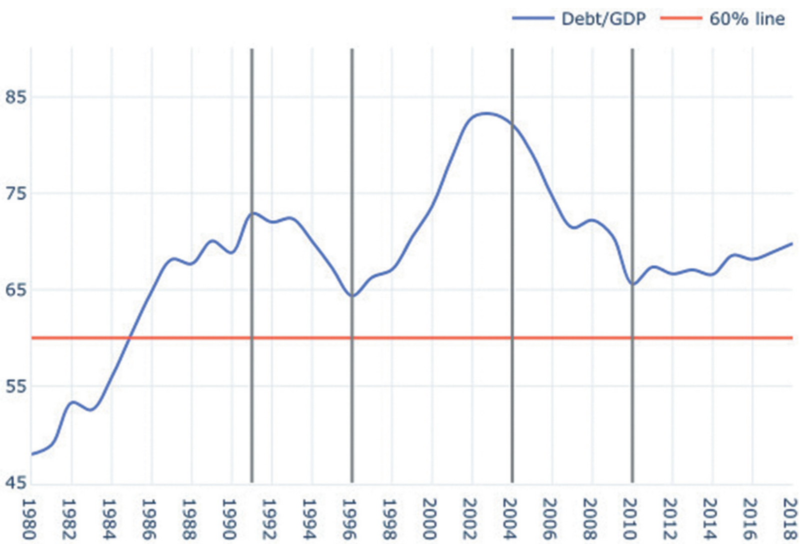

Figure 2. Debt/GDP Ratio: 1980–2017 (Source: DBIE-RBI).

Table 1. Data sources and variables.

Variable	Source	Comments
Nominal GDP and Growth Rate	RBI-DBIE	Real growth calculated by subtracting inflation from nominal growth
Inflation (National)	World Bank	Based on Consumer Price Index
Outstanding Liabilities	RBI-DBIE	-
Interest Rate	RBI-DBIE	Calculated by normalizing interest payments by outstanding liabilities
Primary Deficit	RBI-DBIE	Normalized by GDP
Nominal GSDP and Growth	EPW Time Series	Real growth calculated by subtracting inflation from nominal growth
Inflation (State)	EPW Time Series	Calculated using GSDP deflator
Outstanding Liabilities (State)	EPW Time Series/Handbook of Statistics on Indian States/State Budgets: A Study of Finances	
Interest Rate (State)	NITI Aayog/Handbook of Statistics on Indian States/ State Budgets: A Study of Finances	Calculated by normalizing interest payments by outstanding liabilities
Primary Deficit (State)	NITI Aayog/Handbook of Statistics on Indian States/ State Budgets: A Study of Finances	Normalized by GSDP.

Table 2. Periodization of national public debt.

Period Start	Period End	Peak/Trough
1981	1991	Peak
1992	1996	Trough
1997	2004	Peak
2005	2010	Trough
2011	2017	Peak

Table 3. Disaggregation of national public debt.

Period	Δb(%)	γ	τ	Comments	r v/s g
1981–1991	24.95%	44%	56%	*High d, falling π, rising i*	g > r
1992–1996	8.52%	28%	72%	*Sharp rise in g, fall in d*	g > r
1997–2004	17.76%	31%	69%	*Low g, low π, High i*	g > r
2005–2010	16.53%	29%	71%	*High and rising π, high g, stable i*	g > r
2011–2017	3.30%	34%	66%	*Falling π, stable g and d*	g > r

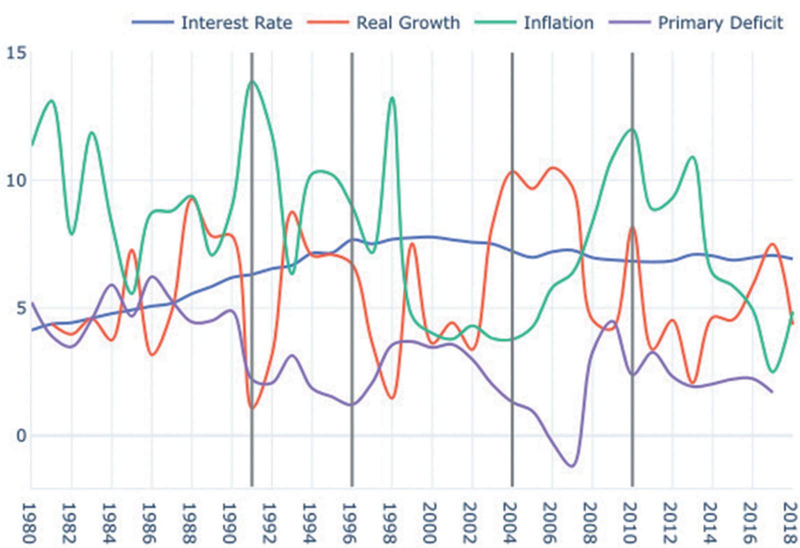

Figure 3. Growth, Interest Rate, Inflation and Primary Deficit: 1981–2018 (Source: DBIE-RBI and Author's calculations).

Figure 3 shows how growth, interest rate, primary deficit, and inflation have changed for the same time period.

Figure 2, Figure 3 and Table 3 together tell a comprehensive story of how public debt in India has evolved. From 1981 to 1991, debt ratio rose by 25%, of which 44% was due to a high primary deficit, and 56% due to Fisher Dynamics. Here, falling inflation and rising interest rates played a prominent role in driving the debt ratio up. By and large, debt is inflated away in the periods 1992–96 and 2005–10, while debt deflation and consistently high interest rates account for rises in the debt ratio in the other periods. The extent of the rise and fall is determined to some extent by how one variable counteracts the effect of another variable. For example, from 2011 to 2017, there is a steep fall in inflation, but growth as remained stable on an average. The debt ratio has risen by only 3%, compared to the period 1997–2004, where low average g and π, is not counteracted by the other two variables, which remain stable. The debt ratio rises by almost 18% in this period. Two facts emerge from the debt decomposition of India's national debt. Firstly, $g > r$ in every period ($r = i - \pi$), which means that India has satisfied the no-Ponzi condition throughout this time period. Second, Fisher Dynamics dominates primary balance as the driver of debt change, which means that understanding future debt movement will involve accounting for the role of these four variables.

Evolution of state debt

The N.K. Singh Committee Report recommends a Centre-State sharing of the debt burden and posits that the state liabilities should not cross 20% of GDP (Singh et al. 2017), with the Centre bearing the rest of the burden. There is a vast literature arguing for the benefits of fiscal federalism, centring around the argument that decentralization reduces information asymmetries between voters and the governments and enhances efficiency of policies (Tiebout 1956; Oates 1999). There is also literature arguing that decentralization of expenditures can lead to a free-rider problem, where the local governments become increasingly dependent on the national governments for bail-outs during times of fiscal distress (Guo, Pei, and Xie 2018). In India, the Centre-state relationship assumes significant importance, as the system of governance is quasi-federal, with the Centre having more power in the matters of distribution of finance. Exogenous factors like low buoyancy of central transfers, and linking of these transfers to states' fiscal performance has been responsible for rising debt ratios in states (Rao 2002), while internal factors like rise in gross borrowings, and off-budget borrowings have also contributed (Singh et al. 2017). Given the presence of inter-state heterogeneities, the recommendation of a homogenous debt target has significant impacts both for the combined and individual state finances. The Report argues that the existence of heterogeneities has no significant impact on the overall path of fiscal consolidation that has been proposed.

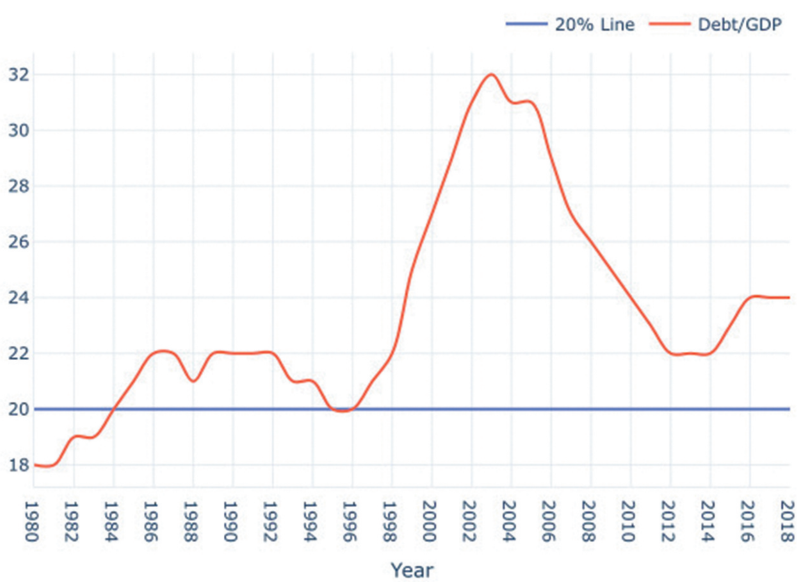

Figure 4. State Debt as a percentage of GDP (Source: DBIE-RBI and Author's calculations).

Figure 4 shows the changing state debt/GDP ratio over time. The overall debt ratio has not been very high, mostly hovering around the 20% mark except in the mid-2000s, when there was a sharp spike. As of 2018, debt/GDP ratio stands at 24%, which means that the states will have to collectively enact policies to reduce their combined liabilities by 4% over the next 5 years.

I choose the ten biggest states (by population): Bihar, Andhra Pradesh, Madhya Pradesh, Uttar Pradesh, Karnataka, Maharashtra, Gujarat, Rajasthan, Tamil Nadu and West Bengal. I then examine two scenarios. First, if these states *together* had to maintain their combined debt to GSDP ratios to 20%. This scenario means that these states are effectively treated as a country. Second, if each state had to enact policy *separately*, to ensure that its own debt was 20% of its SDP.

Scenario-1: if the states together target 20% debt

In this scenario, I examine the combined effect of total inflation, interest rates and primary deficit on the combined debt ratio. Figure 5 shows the evolution of the total debt as a percentage of GSDP.[4]

The debt ratio rises steadily in the 1980s and 1990s, and accelerates in the late 1990s, and starts declining from the early 2000s till about 2014, after which it starts rising again. Except for the period 1992–1996, the trajectory of debt for these 10 states is similar to that of national debt.

Figures 5 and 6 and Table 4 together give us a comprehensive story of the evolution of state debt. From 1981 to 1991 and 2014 to 2016, primary deficit dominated Fisher Dynamics as a driver of debt change. In both these periods, both g and π have remained relatively low and non-fluctuating. In the other three periods though, Fisher Dynamics have been significantly dominant. Especially, in 1997–2004, when the debt ratio rose by 11% and 2005–13, where it fell by more than 13%, a large part of the debt was simply deflated or inflated, due to fluctuations in g and π. In the latter period, a combination of falling interest

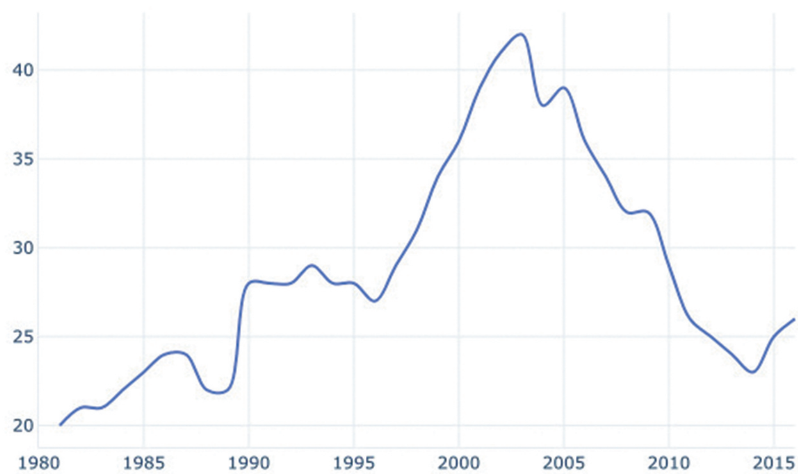

Figure 5. Debt as a percentage of GSDP: The States (Source: DBIE-RBI and Author's calculations).

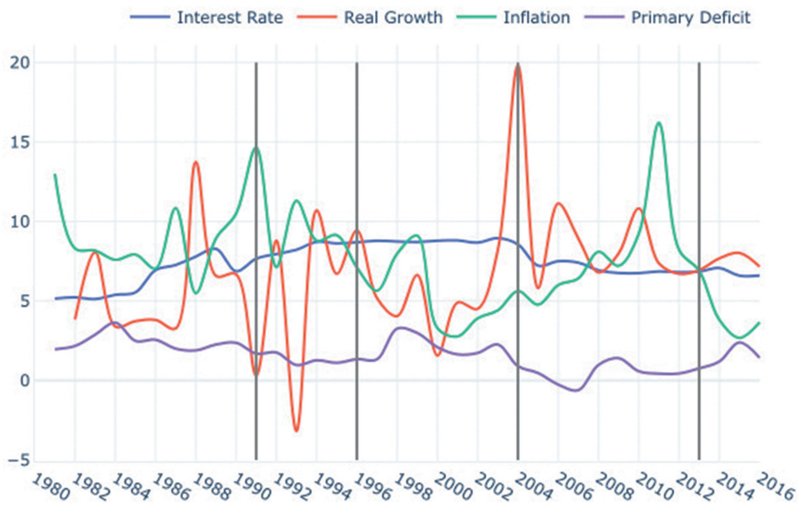

Figure 6. Fisher Dynamics: The States (Source: RBI, EPWTS, Author's calculations). All numbers are percentages.

Table 4. Periodized disaggregation of state debt.

Period	Δb(%)	γ	τ	Comments	r v/s g
1981–1991	7.45%	60%	40%	Falling π, Low g, Rising i	$g > r$
1992–1996	0.57%	43%	57%	Sharp rise in π, fluctuating g, Rising i, Falling d	$g > r$
1997–2004	10.66%	41%	59%	Falling π and g, mild rise in d, high i	$g > r$
2005–2013	13.65%	21%	79%	Very high g, rising π, fall in i and d	$g > r$
2014–2016	1. 95%	60%	40%	Stable g, Sharp fall in π, rise in d	$g > r$

and primary deficit made it highly conducive to accelerate the fall. As in the case of national debt, for all the periods, the no-Ponzi condition is satisfied by these states. The key difference between the trajectories of national and combined state debt pertains to the last period. In both cases, there is a small increase in the debt ratio, but Fisher Dynamics dominate in the national case, while in the sub-national case, primary deficit drives 60% of this change. This is because the fall in b in the previous period was so large that d became the dominant factor, while the Fisher Dynamics term was relatively small. This also means that the favourable cushion provided by Fisher Dynamics has weakened, and this will mean that some states will have to run a surplus, by cutting on expenditure. The next section addresses the question of how the burden of debt will be distributed across these states.

Scenario-2: if each state were to target 20% debt

Here I explore the debt dynamics, considering a situation if each state was to maintain a debt ratio of 20%. Figure 7 shows the liabilities of each state as a percentage of total state liabilities.

These states combined account for three-fourths of the total liabilities, making them fairly representative of state debt. Two things emerge from the chart. One, that each state has different overall debt trajectories, though some common trends can be identified. Two, a large percentage of the total liabilities is borne by three states alone: Uttar Pradesh,

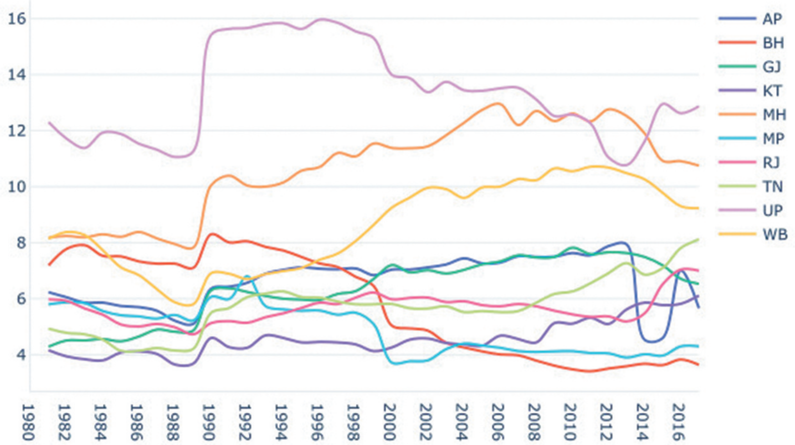

Figure 7. State liabilities as a share of total liabilities (Source: Handbook of State Statistics, Author's calculations).

Maharashtra and West Bengal; the three of them account of one-third of total debt stock. This is indicative of the uneven distribution of debt and has implications, which are discussed later.

Figure 8 shows the interest rate-growth differential against the primary balance for each state. All the values are 10 year averages, and both interest rate and growth (denoted here by g_{nom}) are *nominal*. Every bubble represents a state, and the size of the bubble varies relative to the 10-year average debt ratio (this means debt/GSDP ratio). Interest-growth differential is negative for all the states, which means that, on average, nominal growth has always exceeded nominal interest rates. Second, the graph highlights the diversity in the kinds of situations the states face. For example, West Bengal with a huge debt ratio, and the smallest interest-growth

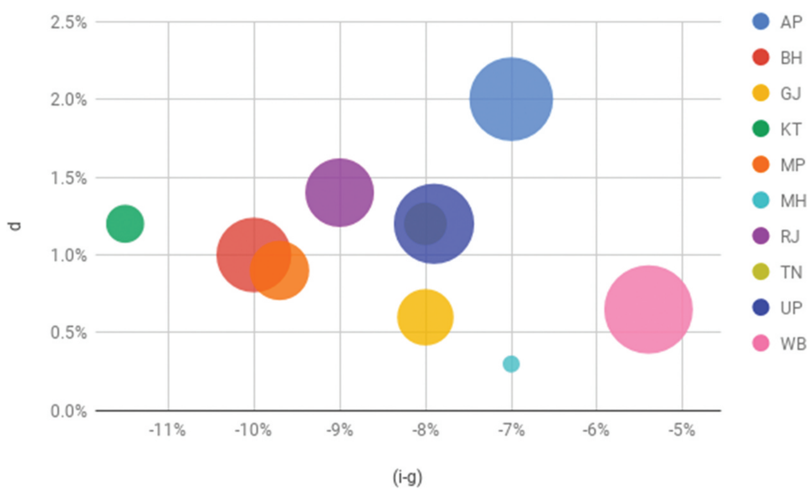

Figure 8. 10-year averages for interest-growth differential and primary deficit (Author's calculations).

differential, will have to undertake run surpluses to hit the 20% target, compared to Karnataka, which has a small debt ratio and is running a modest deficit. It is important to remember that for high debt ratios, Fisher Dynamics will have a larger impact, while for small debt ratios, primary deficit will dominate. , While both Andhra Pradesh and Maharashtra have around the same interest-growth differential, Maharashtra's low deficit, combined with its small debt ratio makes it easier for it to reach the target compared to Andhra Pradesh.

I carry out a debt decomposition, similar to the one done for national debt (Refer to Appendix B for decomposition tables for each state and Appendix C for the changes in growth, interest rate, inflation and primary balance). Most states follow a trend of rising debt through the 1980s and 1990s, peaking at around 2004–05, followed by a steep decline. (Refer Figure C1(a-j)). Primary deficit and interest rates remain relatively stable, while growth and inflation see a lot of fluctuations. Finally, it is important to note that most of the states started with low debt ratios, in the 1980s, and 70% of them have low debt ratios presently, as of 2017. In 6 out of the 10 states, Fisher Dynamics dominated primary balance as the driver of debt change. In particular, for the period 2005–13, barring Karnataka, 60% or more of the debt change for each state has been driven by Fisher Dynamics. Primary balance dominated Fisher Dynamics for 6 out of 10 states in the first period, and in 5 out of 10 states in the period 2014–16.

Similar trajectories, different stories

The initial debt ratio and Fisher Dynamics play an important role in influencing the movement of debt. Two different states can have similar debt trajectories, that is, similar patterns of peaks and troughs, with very different factors driving these trajectories. Consider two states, Madhya Pradesh (MP) and Tamil Nadu (TN). Figure 9 shows the changing debt trajectories of both states.

Both states have broadly similar trajectories. However, their starting points are different, with TN starting with a lower debt ratio than MP, while their debt ratios as of 2017 are

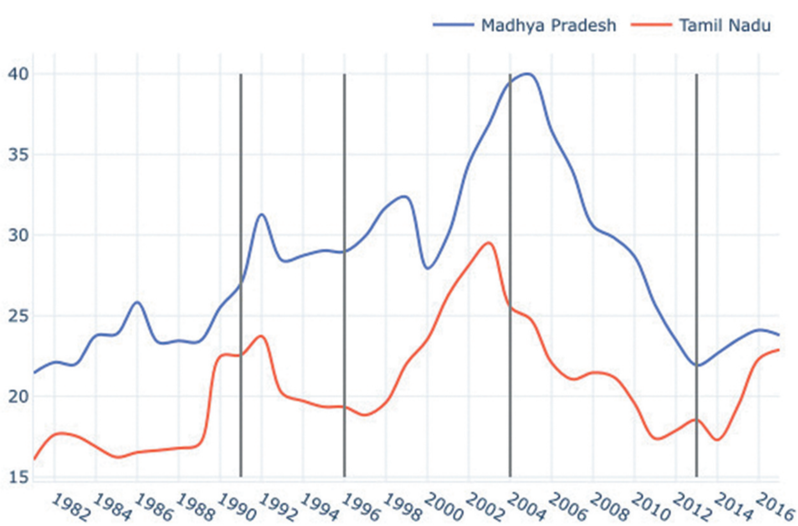

Figure 9. Debt as a percentage of GSDP: Madhya Pradesh and Tamil Nadu (Source: Handbook of State Statistics).

almost equal. The following tables show the debt decomposition of both these states for various periods, from 1981 to 2017.

The main factor separating the two states is the *time* and the *extent* to which Fisher Dynamics dominate. From 1981 to 2004, MP experienced rising debt/GSDP, with primary deficit being the key driver for the most part, while for the same period TN experienced a net rise, with 1992–1996, being a phase of falling debt. In MP, however, from 1992 to 1996, Fisher Dynamics worked in the opposite direction, pushing the debt ratio upwards. This rise was driven primarily by a steep fall in growth and inflation. The key period is 2015–13, where Fisher Dynamics is overwhelmingly dominant in both states, but in MP, this contributes to a fall in the debt ratio which is more than the combined rise in the last three periods. This pulls down the debt ratio to a level low enough for primary deficits to dominate again. The same is true for TN, where primary balance again mildly dominates Fisher Dynamics. Thus, the underlying forces driving the similar-looking trajectories for both states are markedly different.

How will debt change in the future?

The past few sections have demonstrated the importance of growth, interest, and inflation in determining debt trajectories over the last 36 years. Given how critical these variables are, it is important to assess the implications of various policy decisions in the present on future debt trajectories. Simulations allow us to visualize how the debt trajectory will look like in the future, with certain initial conditions. In order to simplify analysis, Equation 1 is written as

$$b_{t+1} = \left(\frac{1+i}{1+g_{nom}}\right) b_t + d_t \tag{6}$$

where both interest rate and growth are nominal, and d_t is the primary balance[5]

The constant level of primary balance d_n that the government will have to maintain, for time period n to increase or reduce debt from initial debt b_0 to final debt b_n is given by (Roy and Kotia 2018):

$$d_n = \frac{(b_n(1+a)^{-n} - b_0)a}{(1+a)^{-n} - 1} \tag{7}$$

where $a = \frac{i - g_{nom}}{1 + g_{nom}}$

The values of i, and g_{nom} are chosen randomly from a given range, which is determined by observing how these numbers have been varying historically for the last 10 years.[6]

Future national debt

Using two scenarios, both using targets from the N.K. Singh Committee Report, one can see how drastically different policy scenarios can be. The first case is called 'accelerated consolidation'. Here, b_0 = 69% and b_n = 60%. The government has to reach b_n in 5 years (n = 5). i varies in the range 5–8% and g_{nom} varies in the range 9–12%. The resultant d for every i and g_{nom} is shown in form of a mesh plot in Figure 10.

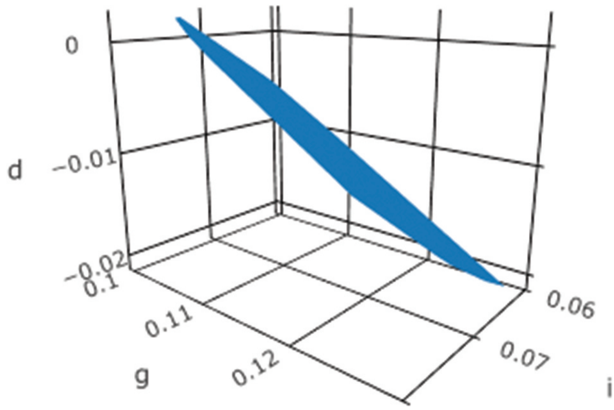

Figure 10. Accelerated Consolidation (Source: Author's calculations).

Figure 10 shows that the government can run a deficit up to 2% if interest rates are very low and growth is very high. However, presently interest rates are moderate (around 6%), while real growth is very low (around 5.7%). This means that even the favourable growth-interest dynamics will not be sufficient for debt to fall to 60%. The only way this will be possible is by cutting on spending. Thus, a strict targeting regime in such a small time window will force the government to run surpluses.

Let us look at another case. Here $b_n = 85\%$ and $n = 40$, with all other parameters remaining the same. This is what the Report terms as 'relaxed targeting'. The debt to GDP ratio is slowly allowed to rise over a very long time, to a critical value, pegged here at 85%. The resultant mesh plot is shown in Figure 11.

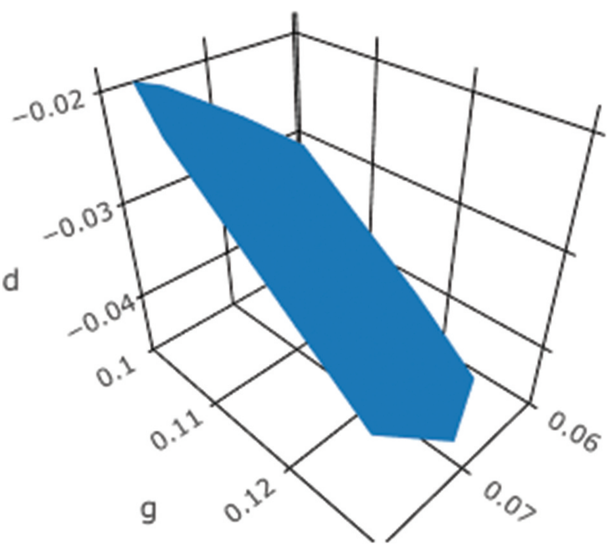

Figure 11. Relaxed Targetting (Source: Author's calculations).

As depicted in the figure, this policy allows the government to run deficits up to 4%. This happens due to three factors. One, the favourable interest-growth dynamics slow down the rise in debt. Two, the large time period allows for more space for the government to spend. Finally, and most importantly, the choice of the target itself, as being an upper critical value as opposed to an arbitrary fixed lower bound allows for further space. While the 85% target is also arbitrary, it gives the government huge fiscal space, allowing it to provide fiscal stimulus, undertake additional investments in education/health and so on.

State debt in the future

Using the method for national debt, simulations were run for all the 10 states. The simulations give the range of constant primary balance each state has to maintain for 5 years, for a range of g_{nom} and i (chosen randomly), to go from their debt ratio (as of 2017), to 20% in the next 5 years. One hundred such combinations of i, g_{nom} and d, were obtained and plotted (See Appendix A for mesh plots for each state). Figure 12 summarizes the findings.

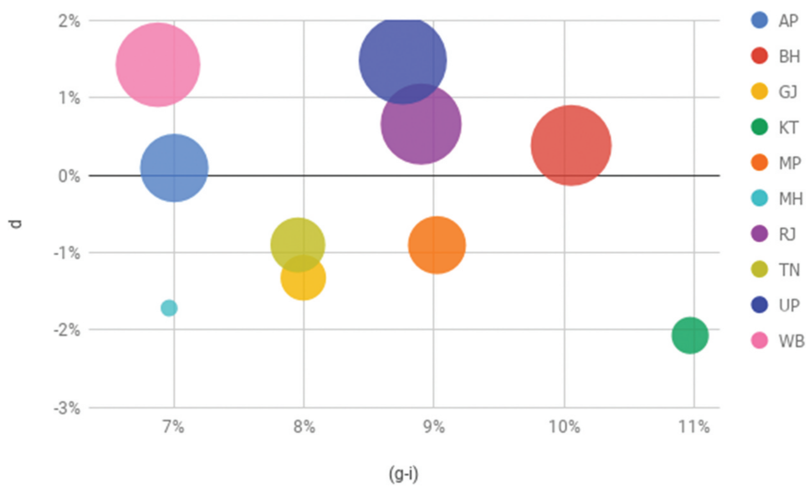

Figure 12. Simulations (Source- Author's calculations).

The horizontal axis shows the average growth-interest differential from the obtained simulated values, and the vertical axis shows the average d from the obtained simulated values. A positive d denotes a surplus, while a negative d, a deficit. Like the chart in Figure 8, the size of the bubble represents the state's current debt ratio. Exactly half the states will have to run a surplus, and the other half can run a deficit. Interestingly, the deficit running states are the ones with the smaller debt ratios. This means that despite high debt ratios and high growth-interest differential, the effect of Fisher Dynamics is not sufficient enough to erode debt fast enough to hit the 20% target in time. Also, the surplus running states are relatively poor, and have relatively weak institutions, while the deficit running states are relatively prosperous and fast growing. Thus, having a homogeneous debt target has the dangerous potential of widening regional inequality.

There are multiple scenarios concerning sub-national fiscal consolidation. If the states choose to target a combined debt ratio (Scenario 1), it will lead to practical coordination issues. As the strength of Fisher Dynamics has weakened, the key point of contention will be to determine which state will continue spending at existing levels, and which states will have to constrain spending. This will also mean that states might have to ignore their region-specific considerations in favour of hitting the debt target. In Scenario 2, the possibility of exacerbating regional inequality looms large. The question of what kind of fiscal consolidation to follow, however, remains an open one and lies beyond the purview of this paper.

Conclusion

India's current macroeconomic situation is a favourable one as far as debt dynamics are concerned. For the last decade or so, nominal interest rates are lower than nominal growth, which means that the cost of running a deficit is low. The debt decomposition of the last 36 years showed that the Fisher Dynamics play a very strong role in determining debt dynamics. This is true both for the centre and the states, but more for the former, where Fisher Dynamics have contributed more to the debt dynamics than primary balance. While the effects are varied for states, the role of the fisher dynamics has increased significantly with time, with the fluctuations in interest rates and growth influencing debt dynamics much more now than they did in the 1980s.

The N.K. Singh Committee Report's recommendation that the anchor for debt sustainability be shifted from the fiscal deficit to the debt-to-GDP ratio has significant policy implications. Relying on reducing deficits alone to hit the proposed debt targets would be insufficient, as such a policy relies on a view which equates debt and borrowing. Such a view hides the key role played by Fisher Dynamics in driving debt change. Simulations show that the imposition of a 60% national debt target will most likely lead the government to cut spending, while a 20% target for sub-national debt will force at least half of the 10 states to run surpluses. Analysis of sub-national debt also reveals the underlying heterogeneities in each state. A homogeneous target will lead to an unequal sharing of the burden, as fast-growing states can continue to spend, while slow-growing states will have to cut spending. Overall, the cost of pursuing a 60% debt to GDP ratio in the short term is high. Running primary surpluses will mean a reduction in government spending, which will negatively affect output and employment. In contrast, postponing the same target over a longer time or even allowing debt to rise is a better policy to pursue, as it allows the government to keep spending, while the Fisher Dynamics ensures that debt ratio rises slowly, well within the critical threshold of 85%. Any policy in the future will have to consider the important role of Fisher Dynamics in determining debt trajectories, and the distributional consequences of debt targets.

This exercise has also revealed that good coordination between monetary and fiscal policy is essential, given the strong presence of Fisher Dynamics. The monetary authority has control over interest rates (i), while the government has control over spending (d). When the debt ratio is high, the monetary authority can cut interest rates, which will give the government more fiscal space. Similarly, when the debt ratio is low, the government can run deficits by increasing spending. Thus, depending on the interest rate-growth differential, both agencies can act in a coordinated manner to maintain macroeconomic stability.

Notes

1. The European Union drafted a series of 'convergence criteria', which refer to certain targets member countries had to agree to hit, in order to maintain price stability, sound public finances, and exchange rate stability. Under these criteria, members had to agree to not let the government debt-to-GDP ratio exceed 60%.
2. When the debt ratio is small, the first term in the equation is relatively smaller to the primary balance, while it is relatively larger to the primary balance when the debt ratio is large.
3. Naturally, it follows that $\lambda + \tau = 100\%$. However, this does not mean that the values of λ and τ, are lesser than 100%. For example, if a state runs a primary surplus over a time period, then the change in primary deficit will be negative, and thus $\lambda < 0$, and hence, $\lambda > 100$.
4. In Figure 4, the state debt stock is normalized by GDP, to track their debt trajectory with reference to the FRBM Committee target of 20%, for *all* Indian states. In Figure 5, I normalize the stock by GSDP instead of GDP, as I am exploring the case where the chosen *sample* states target 20% of their combined debt stock.
5. A positive sign means surplus, and negative, deficit.
6. For example, if the current debt level is 50%(b_0), the government wants to reduce it 40%(b_n) in 10 years(n) and i varies from 3–5% and g varies from 7–9%. If $i = 4.7\%$ and $g = 7.9\%$, then plugging these values in the formula will yield $d_n = -0.008$, which is the minimum primary balance the government will have to maintain for 10 years to get to the desired target.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

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Appendix A. Statewise Debt Simulations

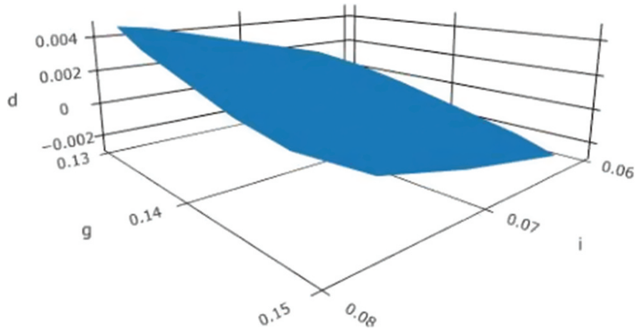


Figure A1. Andhra Pradesh. (All sources: Author's calculations).

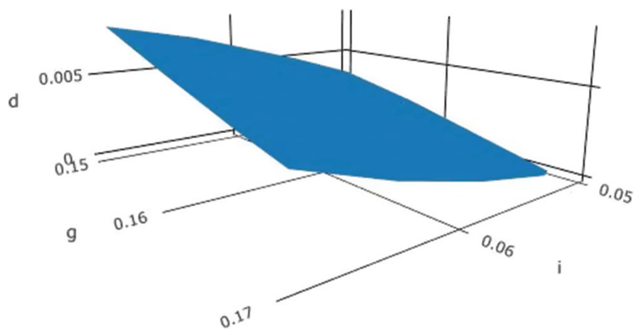


Figure A2. Bihar. (All sources: Author's calculations).

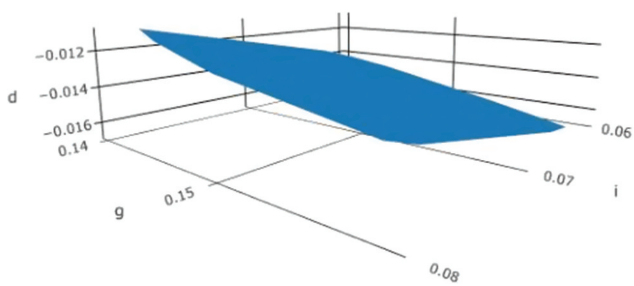


Figure A3. Gujarat. (All sources: Author's calculations).

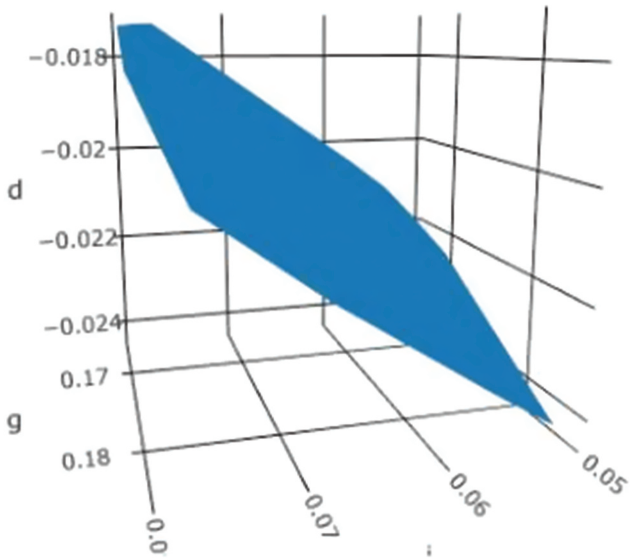


Figure A4. Karnataka. (All sources: Author's calculations).

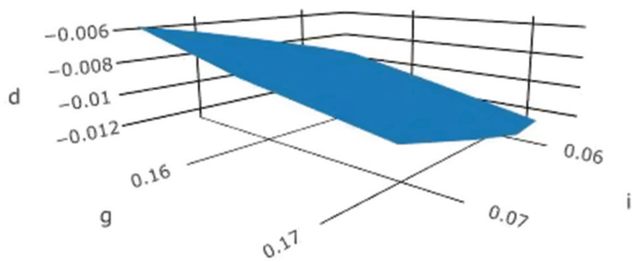


Figure A5. Madhya Pradesh. (All sources: Authors calculations)

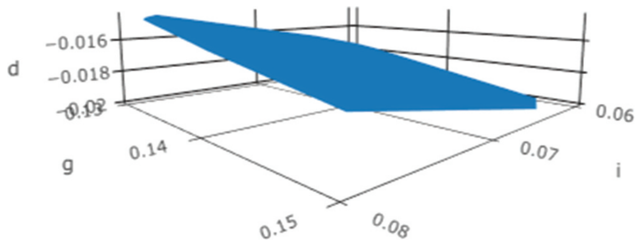


Figure A6. Maharashtra. (All sources: Author's calculations).

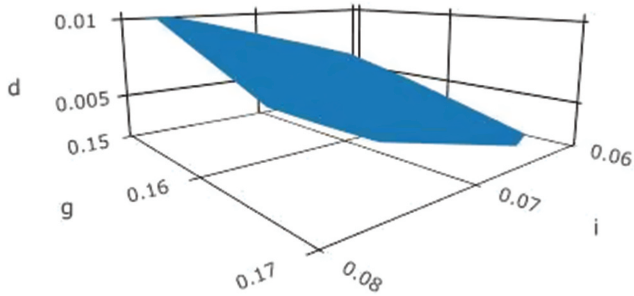


Figure A7. Rajasthan. (All sources: Author's calculations).

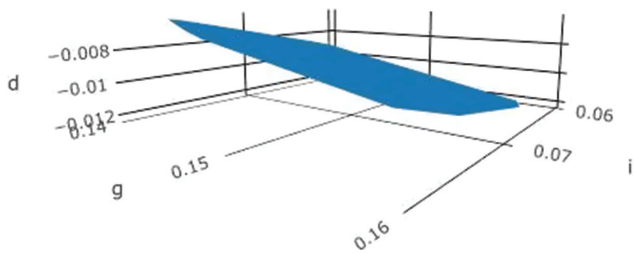


Figure A8. Tamil Nadu. (All sources: Author's calculations).

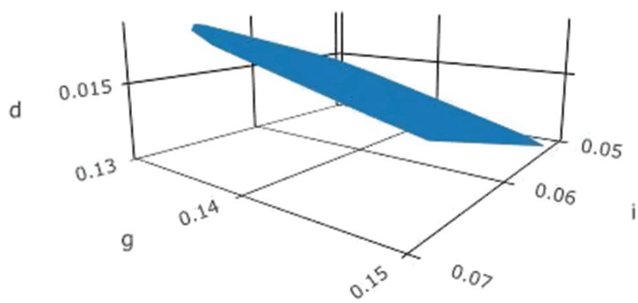


Figure A9. Uttar Pradesh. (All sources: Author's calculations).

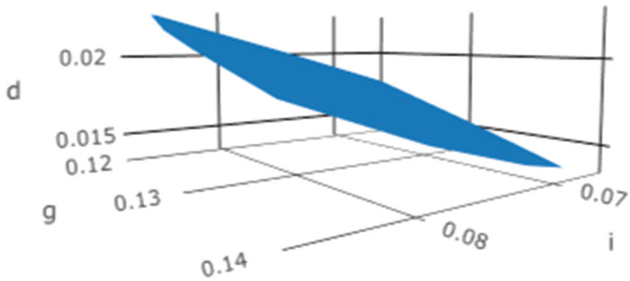


Figure A10. West Bengal. (All sources: Author's calculations).

Appendix B. Decomposition of State Debt

Table B1. Madhya Pradesh.

Period	Δb(%)	γ	τ
1981–1991	5.5%	55%	45%
1992–1996	2%	35%	65%
1997–2004	10.5%	54%	46%
2005–2013	−17.6%	18%	82%
2014–2017	1.9%	67%	33%

Table B2. Tamil Nadu.

Period	Δb(%)	γ	τ
1981–1991	6.5%	59%	41%
1992–1996	−3.2%	40%	60%
1997–2004	6.2%	36%	64%
2005–2013	−7%	29%	71%
2015–2017	4.3%	55%	45%

Table B3. Andhra Pradesh.

Period	Δb(%)	γ	τ
1981–1991	3.6%	49%	51%
1992–1996	−0.8%	49%	51%
1997–2004	33.6%	27%	73%
2005–2013	−13.7%	25%	75%
2014–2017	−13.9%	68%	32%

Table B4. Bihar.

Period	Δb(%)	γ	τ
1981–1991	13.3%	40%	60%
1992–1996	23.9%	−11%	111%
1997–2004	−8.3%	37%	63%
2005–2013	−27.6%	1%	99%
2014–2017	−6.5%	44%	56%

Table B5. Gujarat.

Period	Δb(%)	γ	τ
1981–1991	15.9%	75%	25%
1992–1996	−10.7%	15%	85%
1997–2004	15.3%	45%	55%
2005–2013	−11.7%	19%	81%
2014–2017	−2.9%	19%	81%

Table B6. Karnataka.

Period	Δb(%)	γ	τ
1981–1991	2.5%	57%	43%
1992–1996	−1.3%	56%	44%
1997–2004	7%	39%	61%
2005–2013	−9.6%	44%	56%
2014–2017	−1.7%	57%	43%

Table B7. Maharashtra.

Period	Δb(%)	γ	τ
1981–1991	7%	56%	44%
1992–1996	−3.7%	56%	44%
1997–2004	12.9%	56%	44%
2005–2013	−11.2%	7%	93%
2014–2017	−1.4%	10%	90%

Table B8. Rajasthan.

Period	Δb(%)	γ	τ
1981–1991	−1.4%	42%	58%
1992–1996	−4.1%	50%	50%
1997–2004	17.8%	35%	65%
2005–2013	−23.6%	−2%	102%
2014–2017	−10.2%	70%	30%

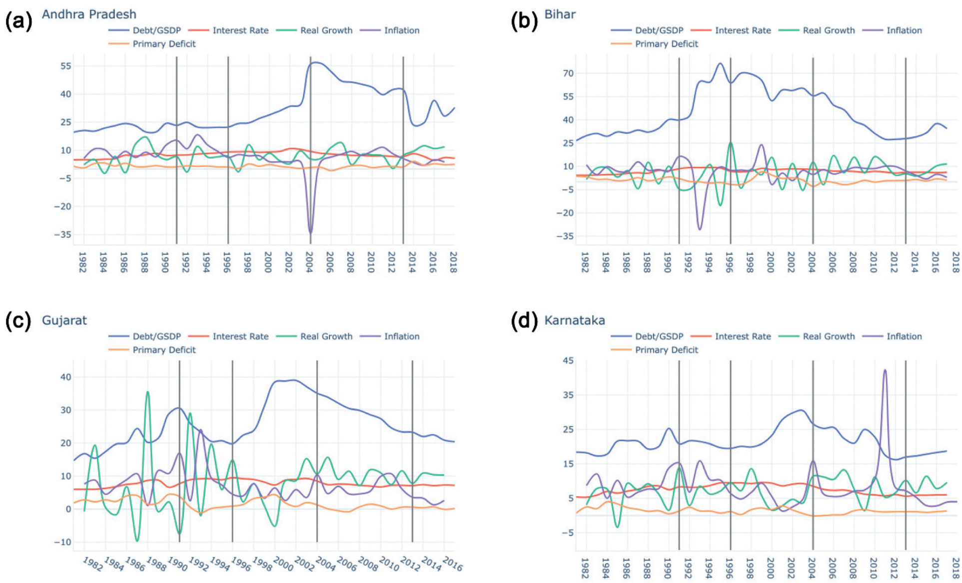
Table B9. Uttar Pradesh.

Period	Δb(%)	γ	τ
1981–1991	12.5%	52%	48%
1992–1996	0.18%	38%	62%
1997–2004	16.5%	33%	67%
2005–2013	−24%	27%	73%
2014–2017	9.3%	40%	60%

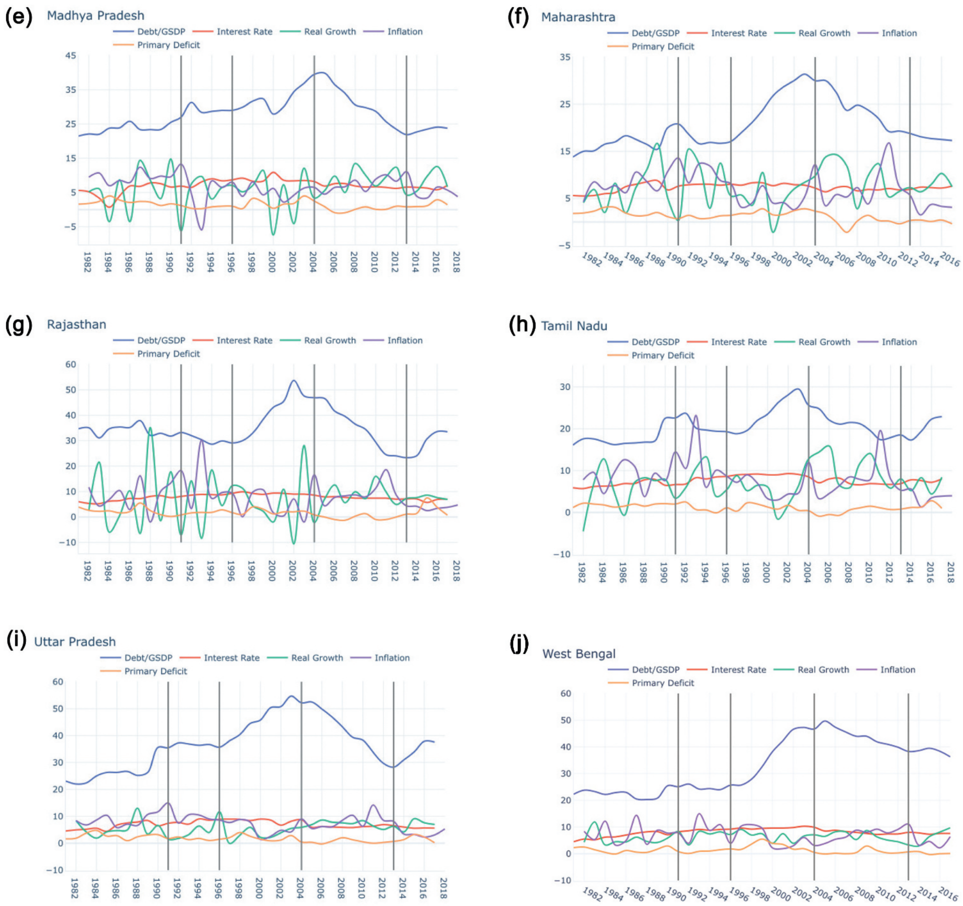
Table B10. West Bengal.

Period	Δb(%)	γ	τ
1981–1991	2.8%	43%	57%
1992–1996	0.6%	38%	62%
1997–2004	20.9%	44%	56%
2005–2013	−8.4%	19%	81%
2014–2017	−20.9%	4%	96%

Appendix C. State Wise Fisher Dynamics



Figures C1. (a-j) All Sources: RBI, EPWTS, and Author's calculations).



Figures C1. (Continued).