Paranoia or Prudence?
How Much Capital Is Enough for the RBI?

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To assess whether the Reserve Bank of India is overcapitalised, two approaches are employed. First, the methodology and risk tolerance parameters used by major central banks are applied to the RBI's balance sheet. Second, a simple cross-country econometric framework relating optimal capital to its possible determinants is used. Both suggest (conservatively) that the RBI has substantial excess capital—in excess of ₹4.5 lakh crore—which could be profitably deployed elsewhere, not for financing general government operations or the deficit but, for example, to recapitalise the public sector banks conditional on them being reformed.

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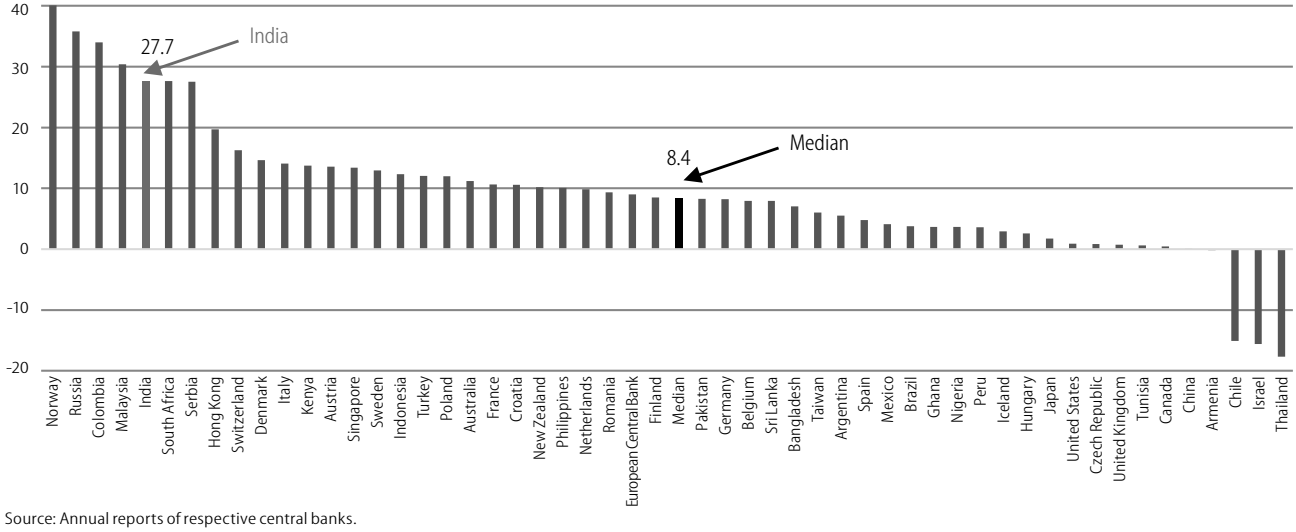
The Reserve Bank of India (RBI), like other central banks, must ensure the credibility, autonomy, and effectiveness of its policy actions. The RBI is a counterparty in many financial transactions and is expected to deliver on its obligations even in the worst possible market conditions and times for the country. As a consequence, the RBI needs to have a very resilient balance sheet. That is, the RBI needs adequate capital reserves and other buffers that it can use to stabilise the economy during times of distress.

But how much capital should a central bank hold?[1] This is a question that has no clear answer either in theory or practice. In theory, there is a spectrum of views. At one end is the view that central bank capital holdings do not matter, for three reasons. First, central banks can always deliver on their domestic obligations regardless of their net worth because they can always issue liabilities ("print money"). Second, central banks are part of the government and it is the broader government balance sheet that matters, not that of any of its constituents. Third, as long as overall conditions are reasonable, central banks' stream of profits will eventually make up for any capital shortfalls because of their unique ability to generate income or "seigniorage" (Ernhagen et al 2002). As monopoly providers of a zero-interest liability, namely currency, which the public will always demand (at least, until the world becomes cashless), central banks will always generate net income as long as the assets they hold provide some returns (Buiter 2008). As shown here, this has certainly been true for the RBI. For these reasons, a number of central banks such as those of Israel, Chile, the Czech Republic and Mexico have continued to operate quite successfully for long periods with negative capital.

Against this, another view is that if central banks run short of capital, this may bias their monetary policy, leading to higher inflation (Bindseil et al 2004). For example, Adler et al (2016) show that central banks with weak capital positions tended to have lower interest rates than might otherwise be warranted.[2] There is also the concern that if government finances are themselves fragile, central banks cannot rely on the government to recapitalise them in difficult circumstances, and that they should protect themselves by building up their capital (Rajan 2016).

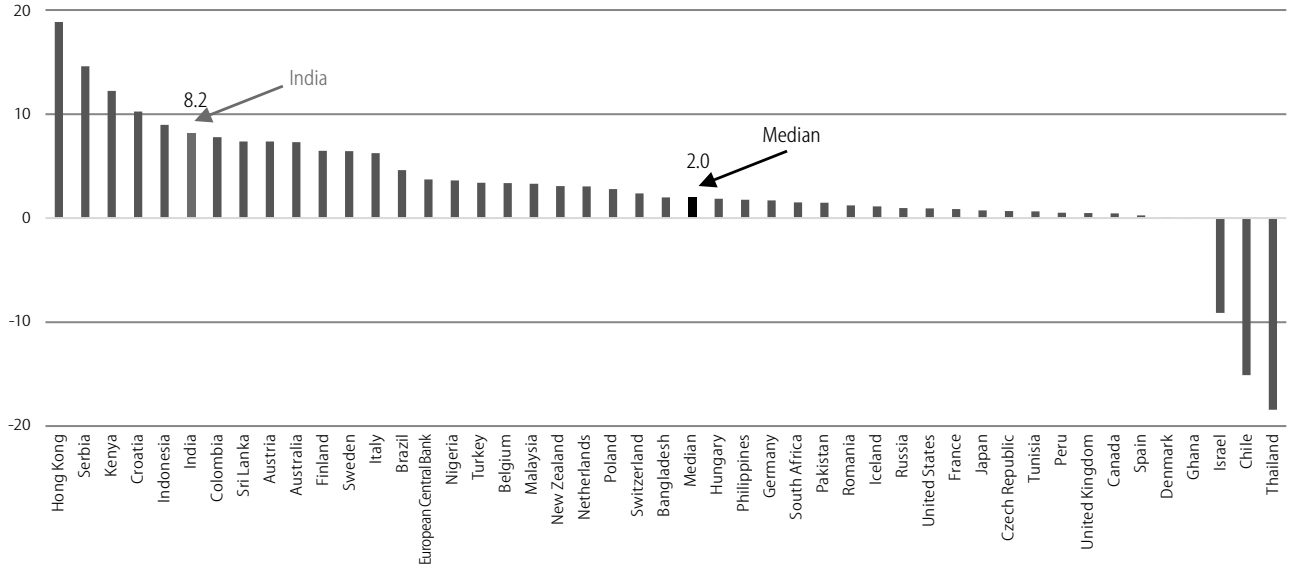
Yet another view is that central banks need capital not so much for economic reasons but for political ones. For example, if central banks are short of capital and need to turn to governments, their independence might be compromised (Rule 2015). A twist to this argument is that if central banks are unable to make profits and unable to contribute to the public exchequer,

Figure 1: Capital as a % of Total Assets



Source: Annual reports of respective central banks.

Figure 2: 'Core Capital' as a % of Total Assets



Source: Latest available annual reports of respective central banks.

they could come under public scrutiny and even attack (Olivier and Svensson 2007; Christensen et al 2015; Stella 1997; Klueh and Stella 2008).

In practice, this ambiguity is reflected in the range of central banks' actual capital position. Figure 1 depicts the ratio of shareholder equity to assets for various central banks. Shareholder equity is defined to include capital plus reserves (built through undistributed earnings) plus revaluation and contingency accounts.[3] This ratio varies from over 40% in the case of Norway to negative capital in the case of Israel, Chile and Thailand, with a median central bank holding of 8.4% (in a sample of 54 major developed and emerging market economies for 2016–17).[4]

Figure 1 also reveals that the RBI is an outlier amongst the major central banks. It holds about 28% in capital, which is the fifth largest amongst all major central banks. Two of the four above India in this ranking are oil exporters.

Figure 2 depicts the percentage of retained earnings and contingency reserves to assets for various central banks. This is a different and narrower measure of capital ("core capital") that is confined to realised profits and losses and excludes valuation losses/gains. On this measure also, the RBI is an outlier: its core capital is the sixth highest amongst major central banks, and at 8.2% is well above the median figure of 2%.

This situation raises an obvious question: Why is India such an outlier? Is this case warranted by something unusual about the RBI and Indian conditions? This paper attempts to answer this question in two ways. The first is to estimate the level of capital needed to deal with the risks the RBI faces, by taking the framework used by other central banks and applying it to Indian data and the RBI's balance sheet. This approach suggests that the RBI is holding about 11 percentage points (₹3.6 lakh crore) more capital than it needs. Put another way, it would take extreme assumptions, not employed elsewhere, to justify the RBI's current level of capital.

Perhaps there are some special factors in India's case, which require the RBI to hold more capital. Accordingly, we also run a simple cross-country econometric model relating capital to the

underlying features of an economy that might be relevant in influencing optimal capital. Even after taking India's special factors into account, the existing levels of capital seem excessive, by 16–22 percentage points of total assets, translating into an absolute range of excess capital of ₹5.3 lakh crore to ₹7.3 lakh crore.

Background

Table 1 describes the balance sheet of the RBI. As of end-June 2018, it has total assets of ₹36 lakh crore, of which 73% are Foreign Currency Assets (FCA), 17% are rupee securities, and 4% is gold. On the liability side, notes and deposits amount to 71%, and capital to 27.7%. Of the latter, 8.2 percentage points are equity and retained earnings, and 19.6 percentage points are valuation buffers.

Table 1: Reserve Bank of India Balance Sheet as on 30 June 2018 (₹ crore)

Liabilities	2016–17	2017–18	Assets	2016–17	2017–18
Capital	5	5	Notes, rupee coin, small coin	624	935
Reserve fund	6,500	6,500	Gold coin and bullion	1,31,732	1,44,023
Other reserves	226	228	Foreign currency assets	23,68,683	26,35,074
Deposits	8,96,348	6,52,597	Rupee securities (including treasury bills)	7,55,750	6,29,745
Other liabilities and provisions	8,94,684	10,46,304	Loans and advances	17,256	1,63,855
Notes issued	15,06,331	19,11,960	Investment in subsidiaries	3,370	3,370
			Other assets	26,679	40,592
Total liabilities	33,04,094	36,17,594	Total assets	33,04,094	36,17,594

There is a basic asymmetry in the balance sheet of a central bank: the vast bulk of the assets accrue interest but many of its liabilities are interest-free. Hence, most of the central banks, including the RBI, generate a large net interest income, or "seigniorage." Most of this income is transferred to the central government, but a considerable portion is retained, as allowed under Section 47 of the RBI Act.[5]

If the RBI is highly profitable and does not undertake any risky lending (like commercial banks), why does it have to make provisions for its assets? Because its main assets are subject to risk, especially market (that is, price) risk. The value of foreign currency assets is adversely affected in rupee terms when the rupee appreciates and foreign interest rates rise (as higher interest rates reduce the price of bonds). Holdings of domestic government securities are adversely affected by increases in domestic rates. Gold holdings decline in value when the price of gold declines.

To guard against all these potential losses, the RBI maintains internal reserves (Table 2). In addition to equity and retained earnings, the capital reserves have, over the years, been supplemented by a series of buffers to cushion contingencies. These include: the Currency and Gold Revaluation Account (CGRA) and the Investment Revaluation Account (IRA) to protect it against adverse movements in the exchange rate and volatility in the price of gold, domestic and foreign securities. There is also a contingency fund (CF) to meet unexpected and unforeseen contingencies. To these, an additional buffer in the form of the Asset Development Fund (ADF) has been added since 1997–98, to meet the needs of internal capital expenditure and investments in subsidiaries and associated institutions. Realised gains are transferred to CF and ADF. The CGRA and IRA are comprised of unrealised gains.[6]

Table 2: The Buffers of RBI as of 30 June 2018 (₹ crore)

Category	Amount
Capital	5
Reserve fund	6,500
Other reserves	228
Contingency fund (CF)	2,32,108
Asset development fund (ADF)	22,811
Total ("core capital")	2,61,652
Valuation buffer*	7,08,188
Surplus transferable to the Government of India	50,000
Miscellaneous (bills payable, gratuity, provisions for payables)	33,197
Total	10,53,037

* Valuation Buffer includes CGRA, Investment Revaluation Account–Foreign Securities (IRA–FS), Investment Revaluation Account–Rupee Securities (IRA–RS), Foreign Exchange Forward Contracts Valuation Account (FCVA) and Provisions for FCVA (PFCVA). Refer to Appendix 2 (p 43) for details of each of the accounts.

How has the RBI's capital evolved over time? Figures 3 and 4 (p 38) provide the answers. They show that over the past 20 years: (i) There has not been a single year when the RBI has made a realised loss. (ii) Nor has there been a year when core capital has declined, reflecting the point made earlier that seigniorage provides a consistently healthy source of income. (iii) Total capital (equity, retained earnings and valuation buffers) has also been rising consistently, apart from four years where there were valuation losses that exceeded realised profits.

Even as a share of assets, the RBI's buffers have been rising and stand at healthy levels far in excess of most other central banks, as shown in Figure 1. In short, the RBI has not experienced any serious threats to its balance sheet in the last 20 years, despite several bouts of intense economic stress, in 1998, 2008–09 and 2013. This is not coincidental. It is noteworthy—and a point that is often missed—that profits are high during years of stress. The reason is that stress years are associated with currency declines. Consequently, the RBI books profits on its foreign exchange sales (since it is selling dollars for more rupees than it paid for them) and enjoys large valuation gains on its remaining reserves (since they are now worth more in terms of rupees).

To determine the policy approach towards maintenance of these equity capital/buffers, the RBI had set up various committees in the past. Table 3 highlights the recommendations of these committees.

The Malegam Committee, in its report submitted in 2013, observed that the total capital to cover various risks faced by

Table 3: Past Recommendations of Size of Reserves/Buffer

Committee	Key Recommendations
Usha Thorat Committee (2004)	• Assuming that total assets consist of FCA and gold, the CGRA + CR (Contingency Reserve) can together be 12.26% of total assets
	• CR requirements for interest rate risk may be taken as 2% of total assets
	• Provision of 3.5% towards other risks such as monetary and exchange market operations, investments in subsidiaries and associates, operational risks, etc
Subrahmanyam Committee (1997)	• Internal reserves for absorbing shocks in external assets should be at least 25% of FCA and gold
	• 5% of total assets should be set aside towards losses which cannot be absorbed by current earnings
	• There should be a reserve of 2% of total assets towards systemic risks

Figure 3: Realised Profits, Valuation Gains, Capital, and Core Capital (₹ lakh crore)

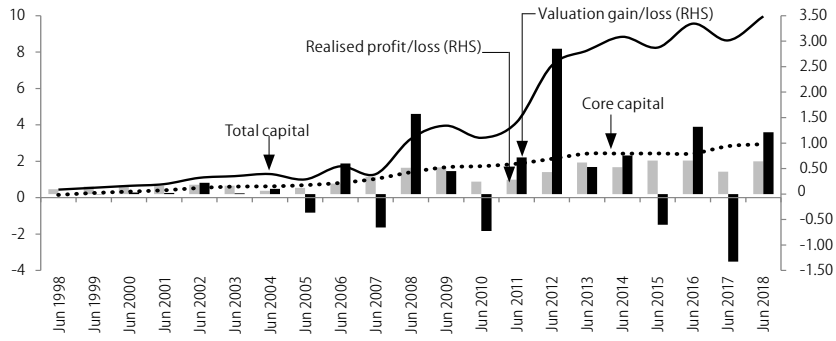
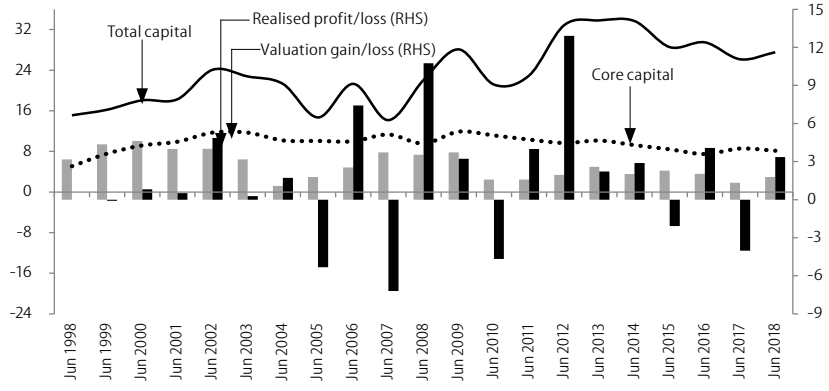


Figure 4: Realised Profits, Valuation Gains, Capital, and Core Capital (in % of assets)



a central bank like the RBI was in excess of what was required. It recommended the transfer of the entire surplus to the government, over a period of three years starting from 2014.

The RBI's Current Economic Capital Framework

The Economic Capital Framework (ECF) is a structural break from previous methodologies which largely involved analysis of scenarios to arrive at the potential risk to the RBI balance sheet. The ECF has been designed after holding broad consultations with various other central banks and the Bank for International Settlements (BIS). The ECF considers the following risks in deciding the capital requirement:

(i) Market risk, which captures the risk arising out of changes in valuation of the assets of the RBI, including foreign reserves, gold and g-secs. (ii) Credit risk in the form of losses arising due to default by counterparties. (iii) Operational risk, which arises from losses incurred from inadequate or failed internal processes, people and systems; or from external events (including legal risk). (iv) Contingent risk, which arises from:

(a) The RBI's Emergency Liquidity Assistance (ELA) operations and their impact on the balance sheet size and structure (for example, losses on collateral obtained when injecting emergency liquidity into troubled banks); (b) Inflation management operations; (c) Currency stabilisation operations.

Market risk: In computing market risk,[7] the RBI like many other central banks now uses a value-at-risk (VaR) framework. A VaR is a risk quantification methodology which can be used to estimate the expected loss in a given securities portfolio for a given time period with a certain confidence level (in terms of a probability measure). For example, if one says that the 99% VaR for a portfolio is 15% for a 1-year period, then it implies that in only 1% of cases (approximately three days out of 250 trading days in a year) the portfolio losses will be greater than 15%. So, a VaR analysis requires an assessment of returns and their risk first; and second, a determination of risk tolerance. Putting these two together will then provide a basis for estimating how much risk buffer—in the case of central banks, equity and other forms of capital—the RBI should hold.[8]

Four key choices are made in VaR exercises:

(i) The time unit for calculating returns (gains and losses): for example, on a daily, weekly, fortnightly, semi-annually, or annual basis.

(ii) The historical sample for calculating returns: A VaR model uses some relevant long-run period as the sample. An S-VaR restricts the sample to a period of high volatility and will therefore, by definition, yield estimates for required capital greater than those from a VaR.

(iii) Risk tolerance: Decisions have to be made about the confidence level to apply in the VaR analysis. Should buffers be adequate to protect against the 5% most adverse outcomes, the 1% most adverse outcomes, the 0.1% most adverse outcomes? Answers are based on risk preferences of decision-makers.[9]

(iv) Expected shortfall model/analysis: There is another model that central banks deploy called expected shortfall model. The expected shortfall model does not really use a different sample; rather it uses an underlying VaR or S-VaR analysis and adopts a particular confidence level. Then instead of estimating the risk at a particular confidence level, it calculates the risk (weighted average) of all the outcomes to the left of (or more adverse than) the outcome associated with a particular confidence level.

Table 4 provides data on the choices made by major central banks.[10] Nearly all the central banks work with a 10-day period for calculating returns; most use a VaR (long-run) sample; and most employ a 99% or 95% confidence interval (CI). The Bank for International Settlements (BIS) prescribes norms for commercial banks (under

Table 4: Model and Confidence Level Chosen by Selected Central Banks

Country	Model Used	Confidence Interval (%)
Australia	VaR	
Austria	VaR	99
Belgium	VaR/ES	
Canada	VaR	
Denmark	ES	95
Euro Area (ECB)	VaR/ES	99
Finland	VaR	99
France	VaR	
Germany	VaR	
Italy	VaR	
Netherlands	ES/VaR	99
New Zealand	VaR	99
Poland	VaR	
Spain	VaR	99
Sweden	VaR	
Hong Kong	VaR	95
Chile	VaR	84
Bank for International Settlements (BIS) for Commercial Banks	VaR –99% ES/VaR– 97.5%	

Vintages 2.5 and 3) of a VaR model with a 99% confidence level or an expected shortfall model with a 97.5% confidence level. But these apply to commercial banks, rather than central banks.[11]

To what extent do these choices matter for the optimal level of capital? To answer this question, we undertake our own VaR-type analysis for the market risks of the RBI's asset portfolio. Our assets include all the major ones—foreign currencies, domestic securities, and gold, but are not comprehensive (see Appendix 4, p 43).

Table 5 provides the results. If we apply the sample and confidence intervals used by all other central banks to Indian market data and the actual composition of the RBI's balance sheet, we derive an optimal capital estimate of 14%. If we go with the BIS recommendations for commercial banks, the optimal capital requirement is 13.6%. Only if we take extreme risk-averse assumptions not employed elsewhere, such as S-VaR with 99.99% CI, do we see an optimal capital of 27%, close to the RBI's actual holdings. If the optimal requirement is 14%, this implies the RBI's excess capital is 13 percentage points, or about ₹4.5 lakh crore at end-March 2018.

Table 5: Required Capital for Market Risk under Different Combinations of Unit, Sample, and Confidence Levels (%)

	10-day			Monthly			3-Months			6-Months		
CI	VaR	ES/VaR	S-VaR	VaR	ES/VaR	S-VaR	VAR	ES/VaR	S-VaR	VAR	ES/VaR	S-VaR
97.50	12	*13.6*	14	10	12	13	7	8	11	4	5	10
99.00	*14*	15.5	17	11	13	15	8	9	12	5	6	11
99.99	22	23.3	*27*	19	20	24	14	15	18	8	9	16

The excess capital estimate of 13 percentage points is actually conservative, for an important methodological reason. The BIS recommends that commercial banks calculate the VaR at every point of time to estimate and cover the risks over a 10-day period. Central banks often take these returns and then annualise them. But annualising a 10-day number is effectively assuming that the pattern during the 10-day period will persist for the entire year.[12] Why this assumption is made is not clear. If the central bank's horizon, as opposed to a commercial bank's is longer, then presumably the calculation of returns should be over that longer period.

Accordingly, in Table 5, we also calculated the optimal capital requirement for alternative units for calculating returns—monthly, 3-monthly, and 6-monthly. Once such longer horizons are permitted, the table shows that the optimal capital requirement drops substantially. For example, going from a 10-day to a 1-month horizon reduces the capital requirement by a further 3 percentage points.

Econometric Analysis

It could be argued that there are some unusual features of the Indian economy which would require higher levels of central bank reserves. This point has been made by Rajan (2016), who argued that the RBI needs to be conservative because the government's fiscal position—and hence its ability to capitalise the RBI in adverse circumstances—is not as robust as other comparator countries.

To examine these arguments, we undertake a simple cross-country econometric analysis (see Appendix 5, p 44). We obtain data on the capital position and its potential determinants for a sample of 51 countries, advanced and emerging. The potential determinants we include are the following:

(i) The share of net foreign assets in a central bank's portfolio, to check if capital requirements are affected by the extra riskiness engendered by having foreign assets.

(ii) Capital account openness, to test again whether volatile flows have induced central banks to set side additional capital.

(iii) The inflation framework. In particular, it has been argued that inflation targeting (IT) regimes have different outcomes and transmission mechanisms compared with non-IT regimes.

(iv) The government's fiscal position, proxied by general government debt or by the sovereign rating of a country. Again, the argument could be that less robust fiscal positions might warrant greater capital holdings by the central bank.

(v) Health of the banking system, proxied by the share of non-performing assets in total loans. Central banks may need to provide for risks in the event that they have to provide liquidity or other support to stressed commercial banks.

Table 6: Estimates for an India Dummy in Central Bank Capital Regressions

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Non-performing assets	0.095						0.098	-0.0280
	(0.277)						(0.267)	(0.309)
Net foreign assets		-0.008					-0.001	0.008
		(0.048)					(0.044)	(0.05)
Capital openness			1.016				1.454	0.861
			(0.853)				(1.575)	(1.491)
Debt to GDP				-0.037			-0.059	-0.02
				(0.033)			(0.036)	(0.028)
Inflation targeting regime					-5.031*		-5.886**	-5.514*
					(2.941)		(2.890)	(2.749)
Credit rating						1.010	0.610	2.546
						(3.010)	(5.108)	(4.811)
India dummy	16.32***	16.89***	18.99***	17.01***	19.07***	16.46***	22.53***	21.60***
	(1.694)	(2.083)	(2.588)	(1.413)	(2.338)	(1.988)	(5.925)	(6.027)
Oil exporter dummy								17.11*
								(9.956)
Observations	51	51	50	50	51	51	50	50
R-squared	0.048	0.047	0.066	0.063	0.100	0.048	0.168	0.282

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

Our results are presented in Table 6. It turns out that the only consistently robust determinant of central bank capital is whether or not countries have an IT regime. Those that do tend to hold less capital on average than countries with non-IT regimes. For our purposes, the key result can be summarised very easily. Regardless of the variables we use and checking for robustness to samples and specifications, we find consistently that India is a complete outlier in these regressions. The India dummy in all these regressions is consistently positively signed and statistically significant at the 1% significance level. Across specifications,

the regressions suggest that the RBI holds about 16–22 percentage points more capital (or about ₹5.7 lakh crore–₹7.9 lakh crore) than the typical country after controlling for the potential determinants of central bank capital. So the econometric analysis reinforces the conclusions obtained in the previous section.[13]

Discussion

So far, the discussion of excess reserves has focused on the overall level of reserves. But about three-quarters of the RBI's reserves are in the form of valuation gains, which has led to some confusion in the public debate. Commentators have wondered whether the valuation reserves are real or just funny money, which cannot be used unless the assets are sold and the gains actually realised. Understanding these issues is essential if progress is to be made in settling this debate.

Are valuation gains 'funny money'? For commercial banks, the answer is simple: valuation gains are very real. Whenever the value of their marketable assets increases, they do not need to sell them to realise the gains. They simply count the gains as profits and (if they wish to) pay them out as dividends.

They do this because standard international accounting practices call for commercial banks to "mark to market" their bonds, so that investors can see the true, that is to say, market value of the securities they hold.[14] That is, when there's an increase in the price of the assets they hold, they immediately record these valuation gains in their income statement. For example, in India, commercial bank treasury income increased sharply throughout 2016 because interest rates on government securities were falling. For commercial banks, then, valuation gains are most certainly real and not funny money.

Central banks, however, tend to follow a somewhat different convention. They also mark their securities and foreign exchange holdings to market, but they do not record the valuation gains in their income statement. Instead, they add the valuation gains to their reserves. They do this not because there is something different about their valuation gains, but because they are exceptionally conservative. They worry that the gains might be reversed: if the rupee appreciates, there will be valuation losses from foreign exchange reserve holdings; if domestic interest rates rise, there will be losses from holdings of g-secs.

At one level, this makes sense. Central banks need to be prudent, for they are the guardians of the currency nation's financial stability. But there is a difference between necessary prudence and excessive caution. Some valuation reserve is clearly needed, but a reserve that is far higher than any likely losses is surely excessive. And the current level of the RBI's reserves is surely excessive.

Let's be specific. We estimate that the current valuation buffer is so large that it could withstand a 30% appreciation of the rupee, reaching a level around ₹50 to the dollar. Such an appreciation is exceedingly unlikely, for several reasons. To begin with, it would be historically unprecedented; an appreciation of that magnitude has never occurred in Indian history. But more to the point, the RBI would never let such an appreciation happen, because it would devastate the economy's competitiveness.

The secret here is that there is a fundamental asymmetry in foreign exchange intervention. Central banks have limited ability to prevent currency depreciation, since their ability to supply foreign exchange is constrained by the size of their foreign exchange reserves. But they have virtually unlimited ability to prevent an appreciation of the domestic currency, since they have unlimited power to supply domestic currency. So a large appreciation, eroding the valuation reserve, is not only an outcome that the RBI would wish to prevent; it is also an outcome that the RBI has the ability to prevent. As a result, the risks from a large appreciation are minimal. And that means there is scope for transferring part of the valuation reserves without endangering the RBI's financial stability.

Can valuation reserves actually be transferred? Some commentators have argued that even if there is conceptual scope for transferring part of the valuation reserves, there are two practical difficulties. First, the underlying assets—foreign exchange reserves or g-secs—would need to be sold to realise the valuation gains. And second, such sales would roil financial markets, appreciating the exchange rate, causing interest rates to soar, and reducing the money supply.

These concerns, however, are unfounded. We have already established that valuation gains are "real." Consequently, they can be transferred even if they are not realised, just the way that commercial banks count mark-to-market gains as profits, and pay them out as dividends. In this case, there would be no need to make large, destabilising sales of assets into the financial markets. Instead, assets could just be transferred to the government.

Consider a concrete example. Assume that the RBI decided to transfer ₹10,000 crore to the government from its valuation reserves, so that the government could recapitalise a public sector bank by that amount. This could be done as follows:

(i) The central bank would could declare a special dividend of ₹10,000 crore, and credit the government with this amount.

(ii) The PSU bank would issue new shares worth ₹10,000 crore, which the government would purchase using the cash from the special dividend.

(iii) The PSU bank would use the cash to purchase new special (non-negotiable) government securities of ₹10,000 crore.

(iv) The government would use the cash it receives from the PSU bank to purchase ₹10,000 crore in existing government securities from the RBI.

At the end of this series of transactions, the RBI would have ₹10,000 crore fewer bonds and ₹10,000 less capital, while the PSU bank would have ₹10,000 crore more bonds and more capital.

Note that there would be no implication for monetary policy. Base money would be completely unaffected. All that would happen is that the RBI's balance sheet would shrink: its assets would fall by ₹10,000 crore, and so would its liabilities, namely capital in the form of valuation reserve.

Of course, the government does not need to use the special dividend to recapitalise the PSU banks. It could use the money for other financial operations, such as reducing government debt. In that case, the net position of the public sector would remain unchanged: RBI assets would fall, but so would government liabilities.

A further possibility is to follow in the footsteps of the Malegam Committee, which declared in 2013 that since reserves were adequate, the RBI would not need to add any further provisions for the next three years, so it could pay all of its income to the government. In the current circumstances, the transfer policy could continue for even longer, until the capital/asset ratio of the RBI reached a mutually agreed target level.

A related idea would be for the RBI to establish a formula, by which a certain fraction of valuation gains would be transferred to the government each year. Note, incidentally, that even the RBI's realised profits in the current fiscal year are likely to be quite high because it has intervened heavily in foreign exchange markets, to sell dollars from its reserves. As an illustrative example, imagine that over the course of 2018–19 the RBI will sell a net of $30 billion at an average rate of ₹70 to the dollar, reserves which it purchased at an average of ₹60 per dollar. In that case, the RBI would realise a profit of ₹30,000 crore ($30 billion times ₹10) on the sales.

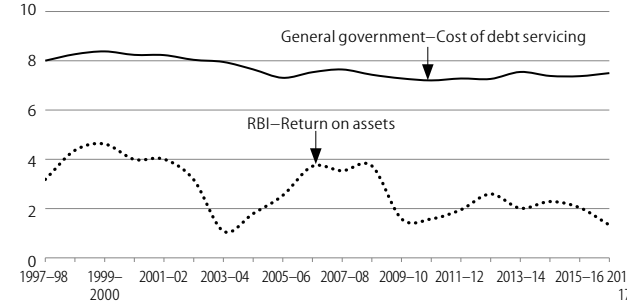
Does the government actually gain from transferring excess capital? Finally, some commentators have argued that the government would not really gain from transferring capital from the RBI, since the consequent reduction in the central bank's balance sheet would cause future dividend income to fall. In other words, the transfer would not create any extra income for the government; it would simply transfer it from the future to the present, effectively spending money that properly belongs to future generations.

The problem with this argument is that it only looks at one side of the ledger, the fall in RBI dividends, without looking at the other side, namely the returns from deploying the capital elsewhere. But this is precisely the government's role, to assess the nation's priorities, and place its excess capital where the risk-adjusted social returns are the highest. And this is unlikely to be in the central bank, which invests only in low-yielding assets like US treasury bonds. (Precisely for this reason, countries like China and South Korea have taken some of their foreign exchange assets out of the central bank and placed them in sovereign wealth funds, where they would be deployed in higher-yielding assets.)

Put another way, maintaining excess capital in the central bank can create an opportunity cost for society. This cost can be measured as the difference between the average return on the central bank's assets and the social return from deploying that capital elsewhere. A very conservative proxy for this social return is the average debt servicing cost for the general government.[15]

Figure 5 compares the two returns, showing that over the past two decades rates on government bonds have been consistently higher than the RBI's return on assets, by a wide

Figure 5: Return on Assets for the RBI vs Debt Servicing Costs for General Government



margin. An illustrative calculation suggests that using excess capital to retire debt could save the government ₹33,000 crore to ₹45,000 crore per year, based on the current returns, g-sec rates, and estimates of excess capital.

The argument for transferring capital from the RBI to the public sector banks is even stronger. Put simply, it makes little financial sense to deploy excess capital in the RBI, where returns are minimal, when the need of the hour—from an economic, social, and even financial perspective—is to redeploy it into the financial sector (conditional, of course, on it being reformed along the lines elaborated in Subramanian (2018) so that banks can start making loans again.

Conclusions

The RBI has an unusually high level of capital. If the choices made by other central banks are used as a benchmark, the RBI appears to have a minimum of ₹5 lakh crore in excess capital. An alternative cross-country econometric analysis suggests that the excess capital is even greater, between ₹5.7 lakh crore and ₹7.9 lakh crore.

These numbers are based on analysis of market risk. In addition, the RBI maintains a buffer for contingency risks. At this stage, it is difficult to assess whether this target is appropriate, but the contingency amounts are small and would not change the main conclusion.

The fact of excess capital, of course, does not imply that this amount is simply available for the government to use as it likes. For a start, it is important to emphasise that the above analysis holds only for financial, "below the line" operations. If the special dividend is instead used to finance budgetary spending, this would inflate the money supply, since the cash would be injected into the economy, rather than returned to the central bank. This would create inflationary pressures and difficulties for the RBI. So, to be clear, transfers from the valuation reserves should only be used for operations like recapitalising PSU banks and retiring debt.

Moroever, any such transfers should address the valid concerns on risks to the RBI's balance sheet. A clear rule, enshrined in law and agreed between the central bank and government, could stipulate that the government will never allow central bank capital to fall below a jointly agreed threshold. That way, the benefits of excess capital can be reaped without compromising the integrity of the central bank's balance sheet and without undermining its policy effectiveness.

Most importantly, it must be emphasised that any decision to use excess reserves must be taken cooperatively, not adversarially, to avoid any sense of the government raiding the RBI. A final point is worth emphasising. Especially in India, any suggestion of using the RBI's balance sheet encounters resistance because it smacks of financial engineering (which is bad enough) and that too involving a highly respected institution. It also goes against some innate sense of financial conservatism. But, during and after the Global Financial Crisis, major central banks (including the Fed and the European Central Bank) across the world have lent the heft of their balance sheets to pull economies out of dire economic circumstances, even when this required pushing the frontiers of central banking. Indeed, more recently, there have been proposals to use central bank capital as "helicopter money" (Hampl and Havranek 2018). Against this evolving view of central banking, the suggestion that the RBI's excess capital should be deployed elsewhere—to rehabilitate the banking system conditional on reforms being implemented—is actually tame and perhaps even conservative.

NOTES

1 Throughout this note, the term "capital" will comprise shareholder equity plus retained earning plus valuation buffers.

2 See *Economist* (2015): https://www.economist.com/news/finance-and-economics/21640363-ecb-and-swiss-national-bank-should-be-much-more-relaxed-about-losing.

3 Revaluation gains occur, for example, when the exchange rate depreciates, increasing the local currency value of the foreign exchange reserves.

4 The sample of countries is detailed in Appendix 1.

5 This is the language of the Act: "47. Allocation of surplus profits.

After making provision for bad and doubtful debts, depreciation in assets, contributions to staff and superannuation funds and for all other matters for which provision is to be made by or under this Act or which are usually provided for by bankers, the balance of the profits shall be paid to the Central Government."

6 However, the Malegam Committee (2013) had pointed out that the CGRA has a small component of realised gains as well.

7 Other risks—credit risk, operational risk and contingency risk are given in Appendix 3.

8 The Subrahmanyam Committee and Malegam Committee recommendations were based on scenario analysis whereas the Thorat Committee used a combination of scenario analysis and Value-at-Risk (VaR) estimates with a 99% confidence interval to arrive at provisions for various kinds of risks. The Thorat Committee recommendations, however, were not accepted by the RBI. The methodologies adopted by these past committees have been criticised on various grounds. The Malegam Committee, for example, had apparently not fully incorporated interest rate risk for a few securities.

9 It can be shown mathematically that as we select a higher confidence interval (keeping time period constant) then the VaR value will also increase and a central bank will have to provide for higher equity capital. $VaR_{95} < VaR_{99} < VaR_{99.9} < VaR_{99.99}$

S-VaR is calculated for the maximum stress period. Therefore, for a given confidence interval and time period usually: S – VaR $\geq$ VaR.

Expected shortfall analysis calculates the weighted average of all the shocks to the left of the confidence interval which has been chosen. ES $\geq$ VaR.

10 Other central banks not shown in the table use some kind of scenario analysis rather than a formal VaR model and tend to use confidence levels of 95% or 99%.

11 And that prescription is not even for central banks but for commercial banks for which norms clearly need to be tighter.

12 The second problem with annualisation is subtler. In this annualisation, underlying returns are magnified by a factor of 5. What this means is that since an S-VaR model by definition chooses a sample of high risk, the magnification will be greater under an S-VaR than a VaR model. This creates an extra bias towards risk aversion.

13 Expectedly, oil exporters such as Russia, Norway and Nigeria also tend to have higher capital than warranted. The results are robust to dropping Japan which has an unusually high level of government debt. We also run a series of regressions like in Table 6 with core capital rather than total capital as the dependent variable. The results are reported in Appendix 3. The results are very similar: India is a consistent positive outlier. The average of the regression coefficients suggest that the RBI has excess core capital of 7.9%, which accounts for almost all of the current magnitude.

14 In India, the situation is a bit more complicated because banks can designate some of their securities as "hold to maturity," in which case their prices remain at book value, even when market prices change. Even so, most securities are still marked to market.

15 One counter to this argument is that from a consolidated balance sheet perspective, any excess capital in the central bank will already be reflected as lower net government debt, which should benefit the government via lower borrowing costs. But in practice this never happens. Even rating agencies do not include the central banks' capital in assessing the government's fiscal position. So, deploying excess capital outside the central bank's balance sheet might create clear additional benefits.

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Appendix 1: Sample of Countries

	Economic Development and Inflation Targeting Classification	
	Advanced	Developing
Inflation targeting	Australia	Armenia
	Canada	Brazil
	Iceland	Chile
	Israel	Colombia
	Japan	Czech Republic
	Norway	Ghana
	Sweden	Hungary
	Switzerland	India
	Turkey	Indonesia
	United Kingdom	Mexico
	United States	Peru
		Philippines
		Poland
		Romania
		South Africa
		Thailand
		Turkey
Non-inflation targeting	Austria	Argentina
	Belgium	Bangladesh
	Denmark	China
	Finland	Croatia
	France	Ghana
	Germany	Kenya
	Hong Kong	Malaysia
	Italy	Nigeria
	Netherlands	Pakistan
	Singapore	Russia
	Spain	Sri Lanka
	Taiwan	Tunisia

Appendix 2: Details of Buffers

Contingency fund (CF): CF represents the amount set aside on a year-to-year basis for meeting unexpected and unforeseen contingencies, including depreciation in the value of securities, risks arising out of monetary/exchange rate policy operations, systemic risks and any risk arising on account of the special responsibilities enjoined upon the bank.

Asset development fund (ADF): The ADF created in 1997–98, represents the amounts set aside each year to meet internal capital expenditure and make investments in subsidiaries and associated institutions.

Currency and gold revaluation account (CGRA): Unrealised gains/losses on valuation of foreign currency assets (FCA) and Gold are not taken to the Income Account, instead recorded in the CGRA. CGRA represents accumulated net balance of unrealised gains arising out of valuation of FCA and gold and, therefore, its balance varies with the size of the asset base, movement in the exchange rate and price of gold.

Investment revaluation account–foreign securities (IRA–FS): The foreign dated securities are marked to market on the last business day of each month and the unrealised gains/losses arising there from are transferred to the IRA–FS.

Investment revaluation account–rupee securities (IRA–RS): The rupee securities held as assets of Banking Department are marked to market on the last business day of the month and the unrealised gains/losses arising there from are booked in IRA–RS.

Foreign exchange forward contracts valuation account (FCVA) and provision for forward contracts valuation account (PFCVA): Forward contracts entered into by the Reserve Bank of India as part of its intervention operations are revalued on a yearly basis on 30 June. While the marked to market gain is credited to the FCVA with contra debit to Revaluation of Forward Contracts Account (RFCA), marked to market loss is debited to the FCVA with contra credit to the PFCVA.

Appendix 3: Credit Risk, Operational Risk and Contingency Risk

Credit risk: RBI has also calculated credit risk for its asset portfolio using the Basel-II standardised approach. For credit risk calculations, risk weights, probability of default, and loss given default have been assigned values as per the Basel II norms and the composition of the RBI asset portfolio. This approach leads to credit risk capital allocation of 0.4% of the total assets for 2017.

Operational risk*:* Operational risk has been calculated using the Basic Indicator Approach (BIA) as specified in the Basel II norms. The capital charge for operational risk equals 15% of the average of the previous three years of positive profits. This approach leads to an operational risk capital allocation of 0.4% of the total assets.

Contingency risk*:* RBI has considered the following scenarios:
(i) Risks arising from Emergency Liquidity Assistance (ELA) operations due to the RBI's lender of last resort (LOLR) role and its impact on balance sheet; (ii) Risks arising from sterilisation/exchange rate operations and their impact on the balance sheet; and (iii) Risks arising from the monetary policy mandate for managing high inflation risks.

It has also assumed that the risk capital calculated for ELA and managing inflation risks has zero correlation with market risks, whereas sterilisation risk has a correlation of 1 with market risk. Also, it has taken high inflation risk capital requirement as zero. Hence, it only includes capital required for ELA, which has been estimated at around 6.5% of total assets. However, it recommends a medium-term target of 4% of total assets to be achieved in the next five years.

Since, only ELA has been considered in the contingent risk calculation, we only discuss the relevant methodology. The peak liquidity stress tests assume that in case of a severe systemic crisis, this stress may continue for several days. The total peak liquidity has been distributed to banks in proportion to their liquidity requirements to arrive at liquidity provided for each bank. In case of a severe (systemic) and prolonged crisis, the banks are assumed to need to dip into their available SLR securities. In this methodology, it is assumed that the Reserve Bank of India first provides collateralised funding as per requirements and as the crises deepen/escalate, ELA with relaxed collateral norms (lower credit quality) is resorted to. This gives rise to credit risk for the bank.

Maximum net daily liquidity injection (outstanding) by the RBI was ₹2.1 trillion (16 July 2013). Since in severe crisis periods, the peak liquidity requirement may continue for several days, a period of 10 days has been taken in this exercise. SLR is assumed to be at 10% over and above liquidity coverage ratio (LCR). This is based on a medium-term assumption that with the introduction of the LCR, the SLR requirements will be brought down to international levels.

A 10% haircut/margin has been assumed on the eligible collateral of commercial banks. It has been assumed that the banks would be required to meet the funding needs using their stock of liquid assets only and there will be no external/market borrowing/funding. ELA losses incurred by the RBI are assessed by assuming a recovery rate of 80% on the liquidity support on the poor-quality collateral. There is little experience of bank bankruptcies in India, but statistics from the US show that recovery from bank bankruptcies is often high.[1]

The capital charge will be converted into a metric of percentage of the combined banking sector balance sheet and going forward, this metric will be used for determining capital charge for determining ELA risk.

ELA operations could be expected to have an expansionary impact on the balance sheet to the extent of liquidity provided under the ELA operations. Further, during a period of financial stress, a 15% rupee depreciation is assumed (due to likely capital outflows), as well as concomitant $75 billion reduction in forex reserves on account of likely market interventions to reduce exchange rate volatility (which would lead to a contraction in balance sheet size). The underlying presumption is that in the face of a financial stability crisis, reducing exchange rate volatility through use of forex reserves would be a policy objective. Reckoning all these complex interlinkages (including depreciation of the rupee also having an expansionary impact, movement of collateral into balance sheet in case of default, etc) between the expansionary and contractionary impacts of ELA operations, a net 25% increase in balance sheet size is assumed for enhanced market risk.

1 A study of over 1,500 bank bankruptcies in the US between 1984 and 2002 showed that the average degree of recovery was 79% (McDill 2004). However, these are recovery rates for Scheduled Commercial Banks and not the Federal Reserve which actually made a profit on its emergency liquidity operations under TARP.

Appendix 4: Market Risk Estimations

Market risk for RBI has been calculated based on three different methodologies—VaR, S-VaR and ES/VaR. The purpose is to study, based on historical data, possible losses the RBI balance sheet may suffer and make provisions accordingly. The RBI balance sheet consists of FCA, gold and domestic securities. FCA consists of foreign currencies as well as foreign securities. While the share of FCA, gold and domestic securities is available, the share of various assets within FCA and domestic securities is not available. The following assumptions have been made:
(i) 30% of the FCA is assumed to be in currencies. Of the foreign currencies, 70% is assumed to be dollar, 20% euro, and 10% pound.
(ii) 70% of the FCA is assumed to be securities. Of these securities, 70% is assumed to be US 10-year government securities (g-sec); 20% German 10-year g-sec; and 10% UK 10-year g-sec.

(iii) 100% of the domestic securities are assumed to be 10-year g-sec.
The variables used for scenario analysis are the following:
(a) INR–USD exchange rate,
(b) INR–GBP exchange rate,
(c) INR–EUR exchange rate,
(d) US 10-year government securities yield,
(e) UK 10-year government securities yield,
(f) Germany 10-year government securities yield,
(g) Price of gold,
(h) Indian 10-year government securities yield.
VaR, S-VaR and ES/VaR have been calculated for the following scenarios –
(i) annualising 10 days portfolio return under 97.55, 99% and 99.99% confidence intervals;
(ii) annualising 1-month portfolio return under 97.55, 99% and 99.99% CIs;
(iii) annualising 3-month portfolio return under 97.55, 99% and 99.99%; and
(iv) annualising 3-month portfolio return under 97.55, 99% and 99.99% CIs.
For S-VaR, August 2013 has been taken as the reference period to make our results comparable to RBI results. RBI has identified August 2013 as the relevant maximum stress period T.

Appendix 5: Econometric Analysis

We run a simple cross-country econometric model relating capital to underlying features of an economy that might be relevant in assessing optimal capital.

Formally, the regression run is:

$$E_i = \beta_0 + \beta_1 N_i + \beta_2 KO_i + \beta_3 D_i + \beta_4 C_i + \beta_5 IT_i + \beta_6 NPA_i + \beta_7 OD_i + \beta_8 ID_i + \varepsilon_i$$

where
E = Equity to total assets ratio
N= Net foreign assets to total assets ratio
KO = Chinn–Ito capital openness index
D = General government debt to GDP ratio
C = Sovereign credit Rating dummy (1 if investment grade otherwise 0)
IT = Inflation targeting dummy (1 if country follows inflation targeting)
NPA = Non-performing assets to gross loans ratio
ID = India dummy
OD = Oil exporting countries dummy
i = Index for 51 countries in the sample
ε = Error term
Data on equity to total assets and net foreign assets to total assets have been compiled from annual reports of concerned central banks. Capital Openness is as measured by the Chinn–Ito Index.

General Government to Debt GDP has been taken from the *World Economic Outlook* database of the IMF. NPA to gross loan ratio has been taken from *WDI* database of World Bank. Standard and Poor's rating has been used to create sovereign credit rating dummy. It is taken as 1 if sovereign rating is investment grade or above; and 0 otherwise. Inflation targeting is a dummy variable and is assigned a value of 1 if the central banks follow inflation targeting frameworks. Oil exporters dummy is assigned a value of 1 for Norway, Russia and Nigeria and 0 for other countries.

The results of the regression are reported below for core capital.

Appendix Table 6: Estimates for an India Dummy in Central Bank Core Capital Regressions

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Non-performing assets	0.167 (0.228)						0.039 (0.193)	0.061 (0.197)
Net foreign assets		-0.038 (0.035)					-0.022 (0.04)	-0.019 (0.039)
Capital openness			0.556 (0.782)				0.787 (1.347)	1.105 (1.441)
Debt to GDP				0.008 (0.024)			-0.024 (0.029)	-0.033 (0.029)
Inflation targeting regime					-4.443** (2.032)		-3.809 (2.254)	-4.294* (2.254)
Credit rating						-1.780 (2.056)	-2.226 (4.326)	-3.749 (4.629)
India dummy	5.20*** (1.303)	6.70*** (1.554)	7.43*** (2.398)	6.00*** (1.045)	8.04*** (1.661)	6.43*** (1.349)	10.50** (4.792)	11.50** (5.196)
Oil exporter dummy								-8.612** (4.147)
Observations	39	39	39	39	39	39	39	39
R-squared	0.031	0.071	0.035	0.024	0.129	0.033	0.172	0.204

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1